Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Alabama

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

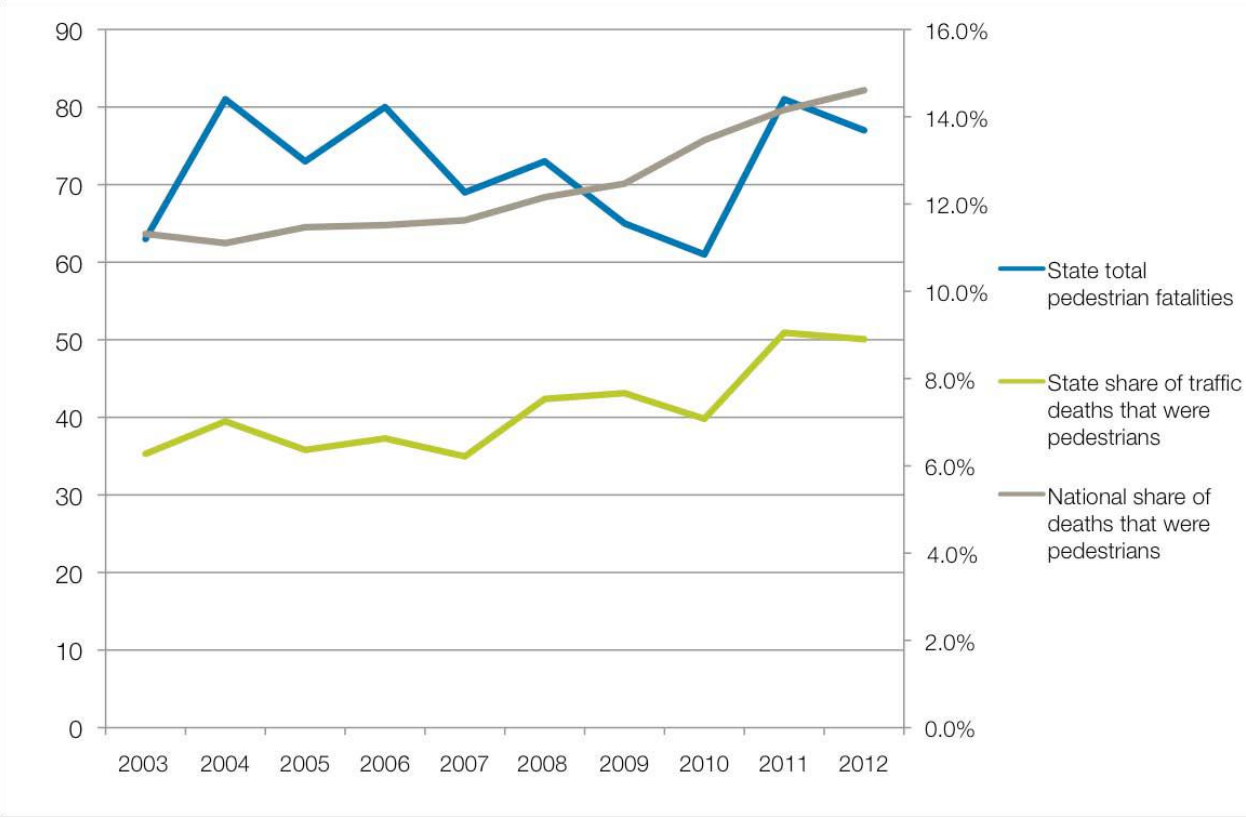
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **723 people died while walking in Alabama**.

FIGURE 1

Pedestrian fatalities in Alabama, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Alabama

In Alabama from 2003–2012, 723 people were killed while walking, resulting in a fatality rate of 1.55 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.2 percent in Alabama.

Within Alabama, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Alabama was 125.19, compared to the national PDI of 52.2 and ranked 2nd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Alabama, ranked by PDI

National Rank	Metropolitan area	Total pedestrian deaths (2003–2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index
6	Birmingham-Hoover, AL*	148	1.33	1.1%	125.60

Metros marked with an asterisk have a margin of error of over 10 percent for the Journey-To-Work data.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Alabama, 33.1 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **72.9 percent of pedestrian fatalities in Alabama were on roads with a speed limit of 40 mph or higher**, compared to 5.7 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 49 children in Alabama.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.4 percent of Alabama's population, adults aged 65 and older account for 12.7 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Alabama is 1.87 per 100,000 people (nationally, 3.19), compared to a rate of 1.98 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Alabama suffer at a rate of 2.47 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.0 percent of Alabama's population, and 7.5 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Alabama from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.54. The rate for Hispanic people of any race was 2.85; and for black people and African Americans, 3.03.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

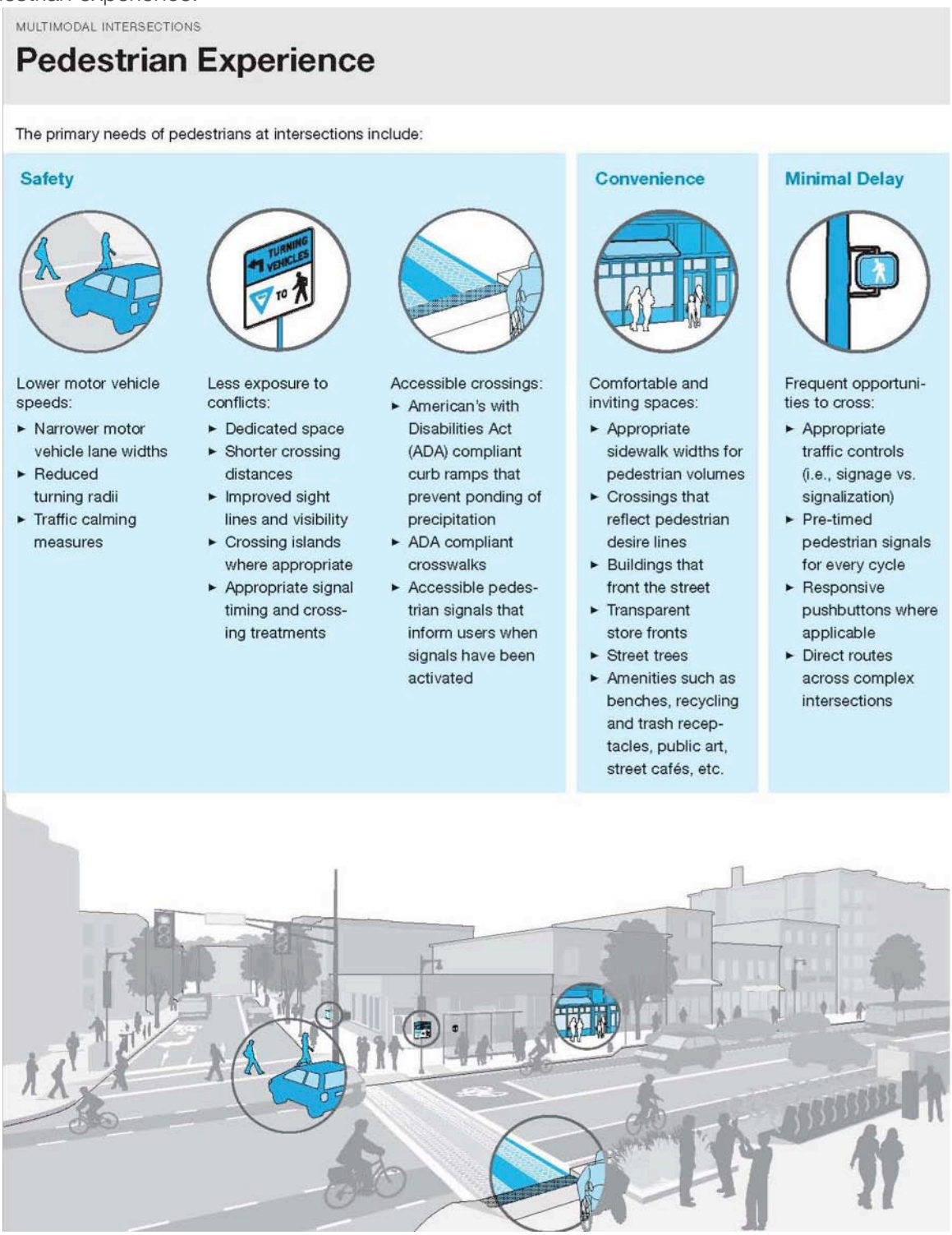
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Anniston-Oxford, AL	200	12	6.0%	1.19	0.0%	0.0%	91.7%	50.0%
Auburn-Opelika, AL	221	14	6.3%	1.42	0.0%	0.0%	100.0%	50.0%
Birmingham-Hoover, AL	1,950	148	7.6%	1.33	0.7%	6.8%	62.2%	30.8%
Columbus, GA-AL	473	67	14.2%	2.02	0.0%	0.0%	64.2%	60.9%
Decatur, AL	314	14	4.5%	0.78	0.0%	7.1%	85.7%	35.7%
Dothan, AL	261	12	4.6%	1.10	0.0%	8.3%	83.3%	50.0%
Florence-Muscle Shoals, AL	273	21	7.7%	1.91	0.0%	0.0%	95.0%	23.8%
Gadsden, AL	193	5	2.6%	0.38	0.0%	20.0%	40.0%	20.0%
Huntsville, AL	702	68	9.7%	1.77	0.0%	9.1%	75.8%	26.5%
Mobile, AL	796	144	18.1%	3.06	2.1%	5.0%	63.1%	25.5%
Montgomery, AL	737	68	9.2%	1.76	0.0%	8.8%	79.4%	23.9%
Tuscaloosa, AL	514	34	6.6%	1.28	0.0%	5.9%	70.6%	44.1%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Autauga County	122	6	4.9%	1.15	0.0%	0.0%	83.3%	33.3%
Baldwin County	336	22	6.5%	1.27	0.0%	0.0%	77.3%	40.9%
Barbour County	65	4	6.2%	1.44	0.0%	25.0%	75.0%	50.0%
Bibb County	62	0	0.0%	0.00	N/A	N/A	N/A	N/A
Blount County	134	8	6.0%	1.43	0.0%	0.0%	100.0%	42.9%
Bullock County	50	1	2.0%	0.92	0.0%	0.0%	0.0%	0.0%
Butler County	91	2	2.2%	0.96	0.0%	50.0%	0.0%	0.0%
Calhoun County	200	12	6.0%	1.03	0.0%	0.0%	91.7%	50.0%
Chambers County	98	1	1.0%	0.29	0.0%	0.0%	100.0%	0.0%
Cherokee County	81	3	3.7%	1.18	0.0%	33.3%	66.7%	66.7%
Chilton County	162	1	0.6%	0.23	0.0%	0.0%	100.0%	0.0%
Choctaw County	59	3	5.1%	2.11	0.0%	0.0%	100.0%	66.7%
Clarke County	84	7	8.3%	2.66	0.0%	14.3%	71.4%	57.1%
Clay County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cleburne County	80	3	3.8%	2.04	0.0%	0.0%	66.7%	100.0%
Coffee County	95	7	7.4%	1.46	0.0%	0.0%	100.0%	71.4%
Colbert County	125	12	9.6%	2.21	0.0%	0.0%	100.0%	16.7%
Conecuh County	77	0	0.0%	0.00	N/A	N/A	N/A	N/A
Coosa County	47	1	2.1%	0.88	0.0%	0.0%	100.0%	100.0%
Covington County	107	5	4.7%	1.33	0.0%	20.0%	80.0%	80.0%
Crenshaw County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cullman County	251	8	3.2%	1.01	0.0%	0.0%	62.5%	0.0%
Dale County	103	5	4.9%	1.01	0.0%	20.0%	80.0%	40.0%
Dallas County	110	7	6.4%	1.59	0.0%	0.0%	100.0%	57.1%
DeKalb County	159	7	4.4%	1.01	0.0%	0.0%	71.4%	33.3%
Elmore County	178	11	6.2%	1.44	0.0%	0.0%	90.9%	45.5%
Escambia County	141	2	1.4%	0.53	0.0%	0.0%	100.0%	50.0%
Etowah County	193	5	2.6%	0.48	0.0%	20.0%	40.0%	20.0%
Fayette County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	73	3	4.1%	0.96	0.0%	0.0%	66.7%	0.0%
Geneva County	64	4	6.3%	1.52	0.0%	25.0%	75.0%	50.0%
Greene County	70	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hale County	68	2	2.9%	1.23	0.0%	0.0%	100.0%	50.0%
Henry County	41	1	2.4%	0.59	0.0%	0.0%	100.0%	0.0%
Houston County	156	7	4.5%	0.72	0.0%	0.0%	85.7%	57.1%
Jackson County	168	6	3.6%	1.12	0.0%	0.0%	83.3%	33.3%
Jefferson County	925	114	12.3%	1.73	0.9%	7.9%	58.8%	27.4%
Lamar County	32	1	3.1%	0.68	0.0%	0.0%	100.0%	0.0%
Lauderdale County	148	9	6.1%	0.99	0.0%	0.0%	88.9%	33.3%
Lawrence County	121	6	5.0%	1.75	0.0%	0.0%	83.3%	33.3%
Lee County	221	14	6.3%	1.05	0.0%	0.0%	100.0%	50.0%
Limestone County	233	8	3.4%	1.03	0.0%	0.0%	75.0%	25.0%
Lowndes County	89	3	3.4%	2.53	0.0%	0.0%	100.0%	33.3%
Macon County	100	7	7.0%	3.20	0.0%	0.0%	85.7%	71.4%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Madison County	469	60	12.8%	1.88	0.0%	10.3%	75.9%	26.7%
Marengo County	66	5	7.6%	2.35	0.0%	0.0%	100.0%	60.0%
Marion County	84	2	2.4%	0.65	0.0%	0.0%	100.0%	50.0%
Marshall County	186	13	7.0%	1.45	0.0%	7.7%	84.6%	46.2%
Mobile County	796	144	18.1%	3.54	2.1%	5.0%	63.1%	25.5%
Monroe County	72	2	2.8%	0.86	0.0%	0.0%	100.0%	0.0%
Montgomery County	348	48	13.8%	2.11	0.0%	12.5%	75.0%	17.0%
Morgan County	193	8	4.1%	0.68	0.0%	12.5%	87.5%	37.5%
Perry County	49	2	4.1%	1.86	0.0%	0.0%	100.0%	0.0%
Pickens County	43	1	2.3%	0.50	0.0%	0.0%	0.0%	0.0%
Pike County	98	5	5.1%	1.57	0.0%	20.0%	80.0%	40.0%
Randolph County	55	0	0.0%	0.00	N/A	N/A	N/A	N/A
Russell County	163	18	11.0%	3.46	0.0%	0.0%	94.4%	50.0%
Shelby County	229	8	3.5%	0.44	0.0%	0.0%	50.0%	25.0%
St. Clair County	193	7	3.6%	0.89	0.0%	0.0%	71.4%	42.9%
Sumter County	59	3	5.1%	2.16	0.0%	0.0%	100.0%	33.3%
Talladega County	220	13	5.9%	1.59	8.3%	33.3%	50.0%	7.7%
Tallapoosa County	85	5	5.9%	1.21	0.0%	0.0%	100.0%	40.0%
Tuscaloosa County	376	32	8.5%	1.73	0.0%	6.3%	68.8%	43.8%
Walker County	245	10	4.1%	1.48	0.0%	10.0%	70.0%	60.0%
Washington County	51	2	3.9%	1.14	0.0%	0.0%	50.0%	50.0%
Wilcox County	72	5	6.9%	4.15	0.0%	0.0%	100.0%	40.0%
Winston County	76	2	2.6%	0.81	0.0%	0.0%	0.0%	0.0%
State total	**10,061**	**723**	**7.2%**	**1.55**	**0.7%**	**5.7%**	**72.9%**	**33.1%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Alaska

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **87 people died while walking in Alaska**.

FIGURE 1

Pedestrian fatalities in Alaska, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Alaska

In Alaska from 2003–2012, 87 people were killed while walking, resulting in a fatality rate of 1.26 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 12.0 percent in Alaska.

Within Alaska, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Alaska was 13.89, compared to the national PDI of 52.2 and ranked 50th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Alaska, 37.0 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **67.5 percent of pedestrian fatalities in Alaska were on roads with a speed limit of 40 mph or higher**, compared to 21.7 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 13 children in Alaska.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 7.0 percent of Alaska's population, adults aged 65 and older account for 12.8 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Alaska is 3.18 per 100,000 people (nationally, 3.19), compared to a rate of 1.62 for people under 65 years old (nationally, 1.75).[8]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Alaska from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 0.92. The rate for American Indians and Alaska Natives was 5.72. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[9] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[10]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

9 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

10 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

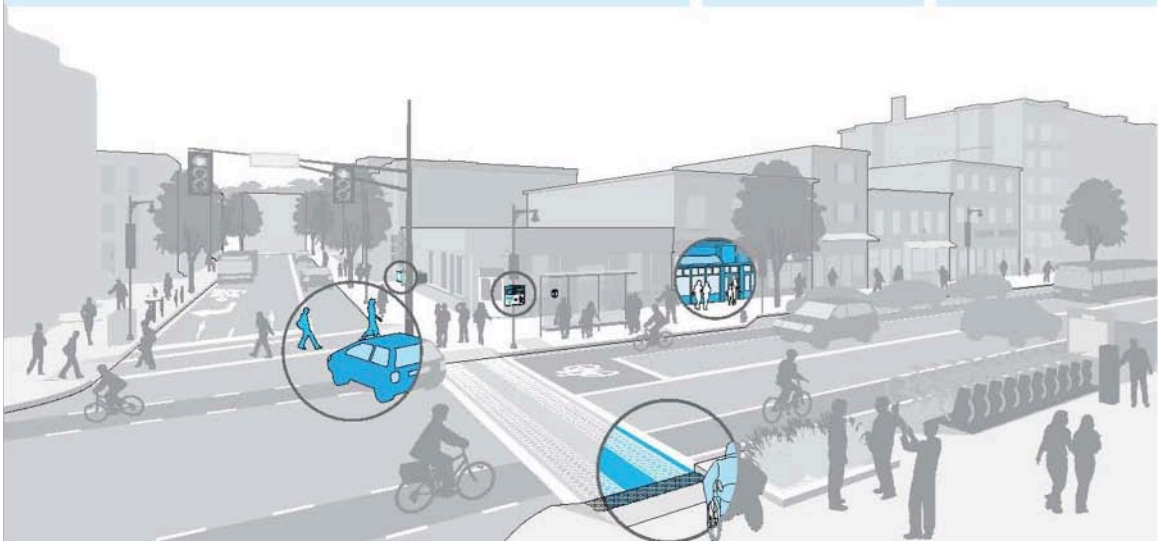
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Anchorage, AK	355	53	14.9%	1.21	0.0%	6.1%	75.5%	40.4%
Fairbanks, AK	98	8	8.2%	0.82	12.5%	25.0%	37.5%	12.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Aleutians East Borough	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Aleutians West Census Area	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Anchorage Municipality	204	48	23.5%	1.69	0.0%	6.7%	73.3%	40.4%
Bethel Census Area	2	1	50.0%	0.59	100.0%	100.0%	0.0%	N/A
Bristol Bay Borough	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Denali Borough	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dillingham Census Area	7	1	14.3%	2.06	0.0%	0.0%	100.0%	0.0%
Fairbanks North Star Borough	98	8	8.2%	0.85	12.5%	25.0%	37.5%	12.5%
Haines Borough	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hoonah-Angoon Census Area	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Juneau City & Borough	16	2	12.5%	0.64	0.0%	0.0%	50.0%	50.0%
Kenai Peninsula Borough	127	4	3.1%	0.75	0.0%	0.0%	100.0%	25.0%
Ketchikan Gateway Borough	8	1	12.5%	0.74	N/A	N/A	N/A	0.0%
Kodiak Island Borough	6	3	50.0%	2.23	0.0%	0.0%	0.0%	33.3%
Lake and Peninsula Borough	4	2	50.0%	12.25	N/A	N/A	N/A	0.0%
Matanuska-Susitna Borough	151	5	3.3%	0.61	0.0%	0.0%	100.0%	40.0%
Nome Census Area	11	5	45.5%	5.30	0.0%	66.7%	0.0%	0.0%
North Slope Borough	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Northwest Arctic Borough	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Petersburg Census	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Prince of Wales-Hyder Census Area	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Sitka City and Borough	4	1	25.0%	1.12	100.0%	100.0%	0.0%	0.0%
Skagway Municipality	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Southeast Fairbanks Census Area	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Valdez-Cordova Census Area	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wade Hampton Census Area	5	1	20.0%	1.35	100.0%	100.0%	0.0%	0.0%
Wrangell City and Borough	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Yakutat City and Borough	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Yukon-Koyukuk Census Area	17	5	29.4%	8.60	0.0%	0.0%	66.7%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
State total	725	87	12.0%	1.26	4.8%	21.7%	67.5%	37.0%
US Total	383,489	47,025	12.3%	1.56	1.0%	9.8%	61.3%	52.3%

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Arizona

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

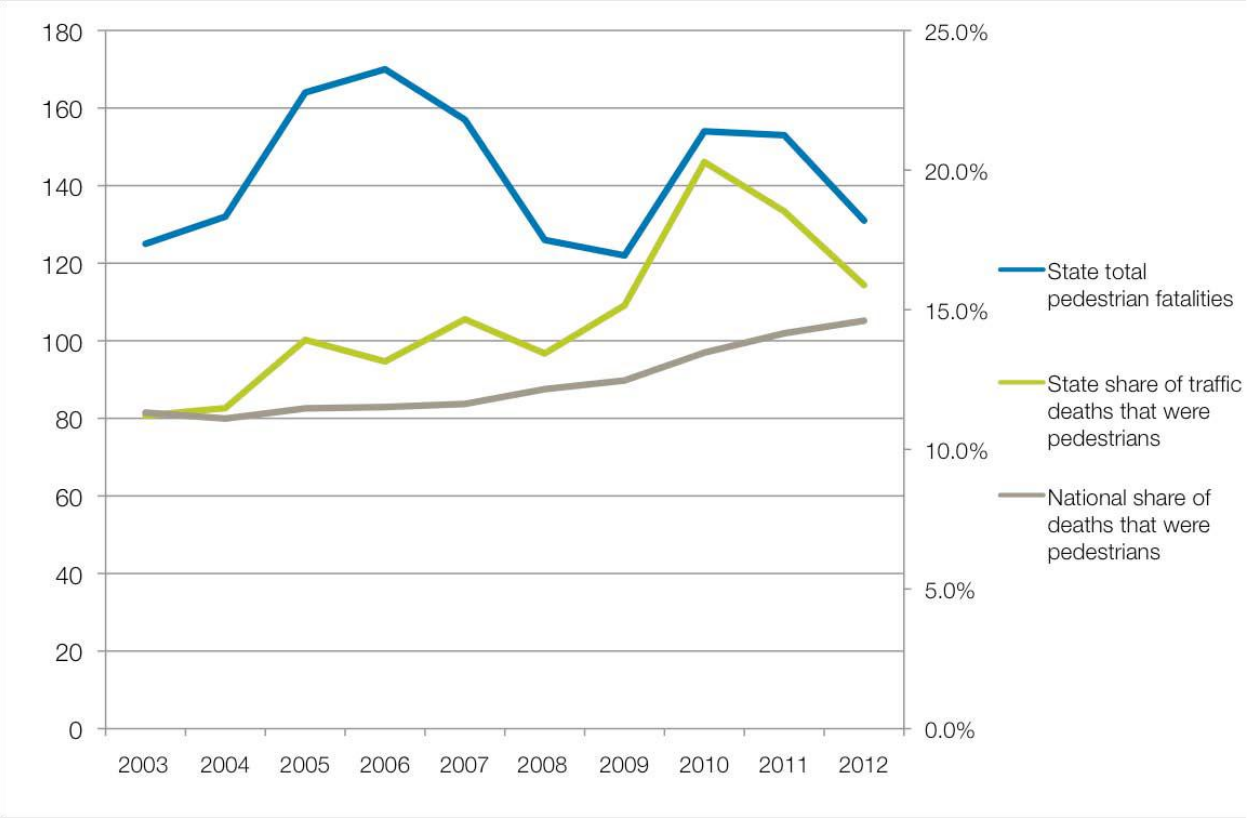
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,434 people died while walking in Arizona**.

FIGURE 1

Pedestrian fatalities in Arizona, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Arizona

In Arizona from 2003–2012, 1,434 people were killed while walking, resulting in a fatality rate of 2.34 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 14.4 percent in Arizona.

Within Arizona, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Arizona was 101.16, compared to the national PDI of 52.2 and ranked 8th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Arizona, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
9	Phoenix-Mesa-Scottsdale, AZ	840	1.86	1.6%	118.64

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Arizona, 64.4 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **71.5 percent of pedestrian fatalities in Arizona were on roads with a speed limit of 40 mph or higher**, compared to 7.0 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5]They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 80 children in Arizona.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.2 percent of Arizona's population, adults aged 65 and older account for 14.9 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Arizona is 3.24 per 100,000 people (nationally, 3.19), compared to a rate of 2.79 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Arizona suffer at a rate of 3.46 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.9 percent of Arizona's population, and 7.1 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Arizona from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.96. The rate for Hispanic people of any race was 2.89; for black people and African Americans, 2.43; for Asians and Pacific Islanders, 0.97; and for American Indians and Alaska Natives, 16.62.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

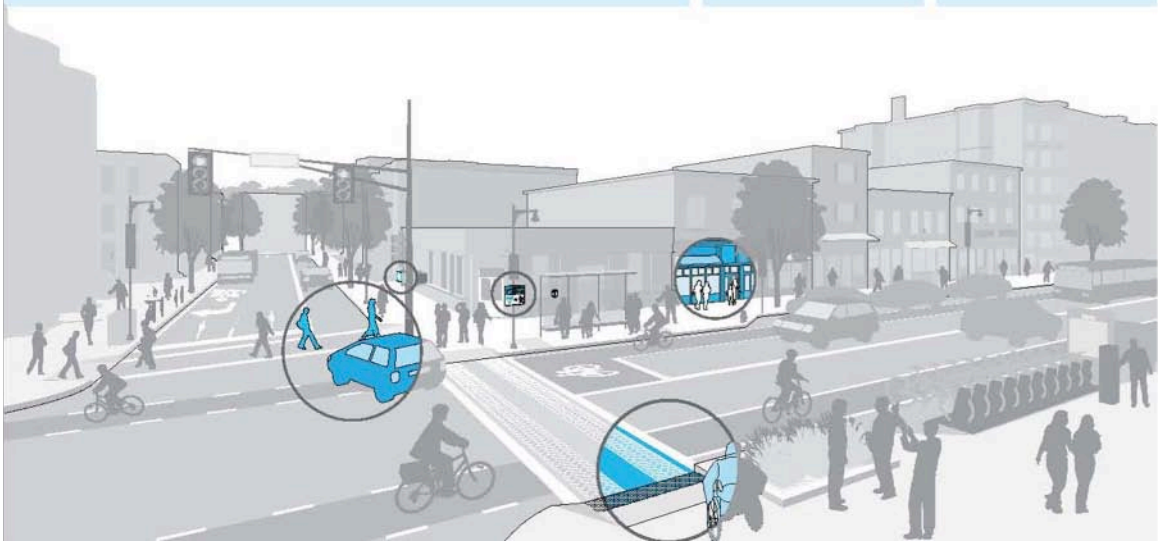
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Flagstaff, AZ	553	71	12.8%	5.67	0.0%	6.0%	82.0%	58.0%
Lake Havasu City-Kingman, AZ	531	52	9.8%	2.39	0.0%	8.0%	72.0%	57.7%
Phoenix-Mesa-Scottsdale, AZ	4,936	840	17.0%	1.86	0.3%	6.9%	72.2%	70.9%
Prescott, AZ	579	37	6.4%	1.51	0.0%	16.1%	71.0%	56.8%
Tucson, AZ	1,230	203	16.5%	2.00	0.5%	8.1%	64.9%	71.3%
Yuma, AZ	268	33	12.3%	2.04	0.0%	15.6%	46.9%	72.7%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Apache County	423	46	10.9%	6.55	0.0%	0.0%	100.0%	21.7%
Cochise County	348	30	8.6%	2.34	0.0%	0.0%	81.5%	70.0%
Coconino County	553	71	12.8%	5.44	0.0%	6.0%	82.0%	58.0%
Gila County	201	16	8.0%	3.03	9.1%	9.1%	63.6%	68.8%
Graham County	84	16	19.0%	4.53	0.0%	0.0%	69.2%	93.8%
Greenlee County	28	1	3.6%	1.22	0.0%	0.0%	100.0%	0.0%
La Paz County	252	12	4.8%	5.89	0.0%	9.1%	72.7%	50.0%
Maricopa County	4,112	764	18.6%	2.07	0.3%	7.1%	72.1%	73.5%
Mohave County	531	52	9.8%	2.67	0.0%	8.0%	72.0%	57.7%
Navajo County	420	65	15.5%	6.14	0.0%	5.4%	75.7%	21.0%
Pima County	1,230	203	16.5%	2.13	0.5%	8.1%	64.9%	71.3%
Pinal County	824	76	9.2%	2.47	0.0%	4.6%	73.8%	44.0%
Santa Cruz County	104	10	9.6%	2.22	10.0%	50.0%	50.0%	30.0%
Yavapai County	579	37	6.4%	1.82	0.0%	16.1%	71.0%	56.8%
Yuma County	268	33	12.3%	1.76	0.0%	15.6%	46.9%	72.7%
State total	**9,960**	**1,434**	**14.4%**	**2.34**	**0.4%**	**7.0%**	**71.5%**	**64.4%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014 Arkansas

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

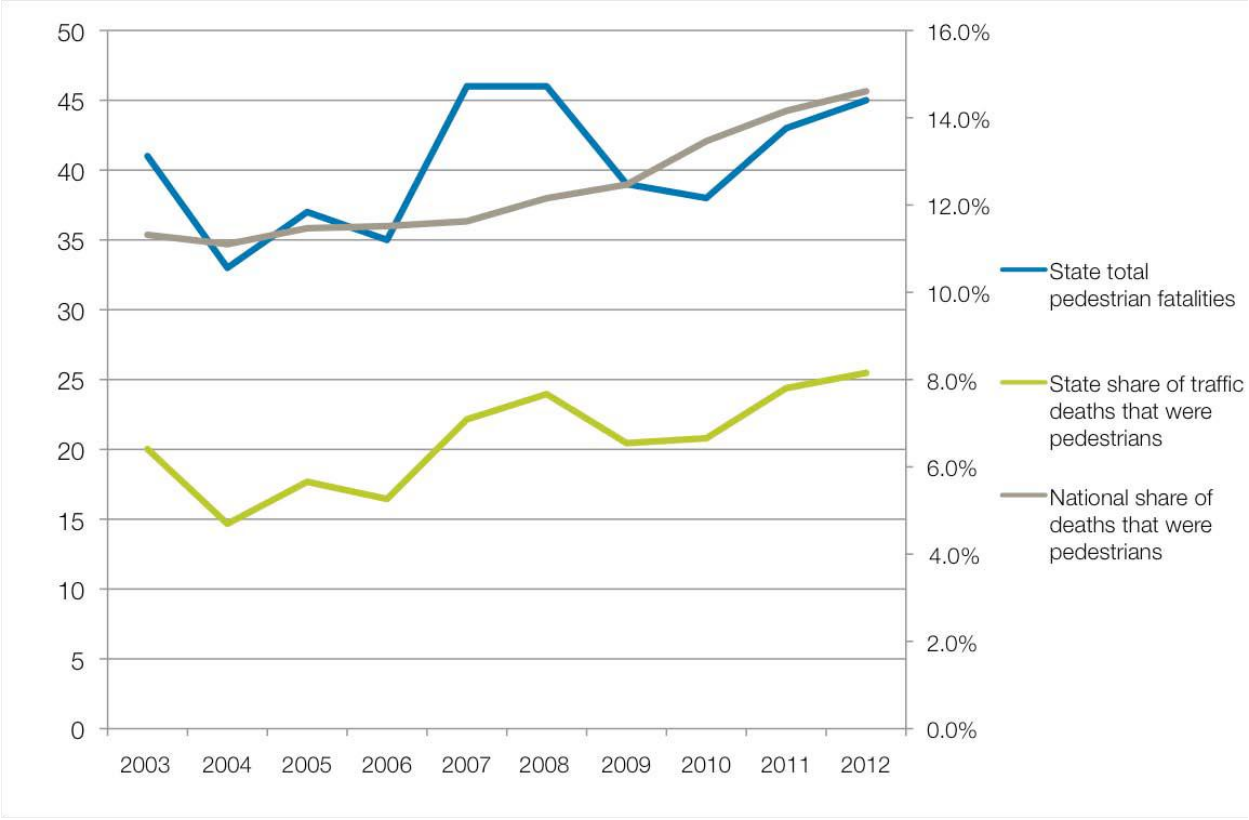
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **403 people died while walking in Arkansas**.

FIGURE 1

Pedestrian fatalities in Arkansas, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Arkansas

In Arkansas from 2003–2012, 403 people were killed while walking, resulting in a fatality rate of 1.41 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 6.5 percent in Arkansas.

Within Arkansas, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Arkansas was 79.98, compared to the national PDI of 52.2 and ranked 14th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Arkansas, 40.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **73.4 percent of pedestrian fatalities in Arkansas were on roads with a speed limit of 40 mph or higher**, compared to 3.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 31 children in Arkansas.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 14.0 percent of Arkansas's population, adults aged 65 and older account for 17.6 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Arkansas is 2.36 per 100,000 people (nationally, 3.19), compared to a rate of 1.81 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Arkansas suffer at a rate of 2.9 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.4 percent of Arkansas's population, and 9.8 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Arkansas from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.69. The rate for Hispanic people of any race was 1.14; and for black people and African Americans, 3.20.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

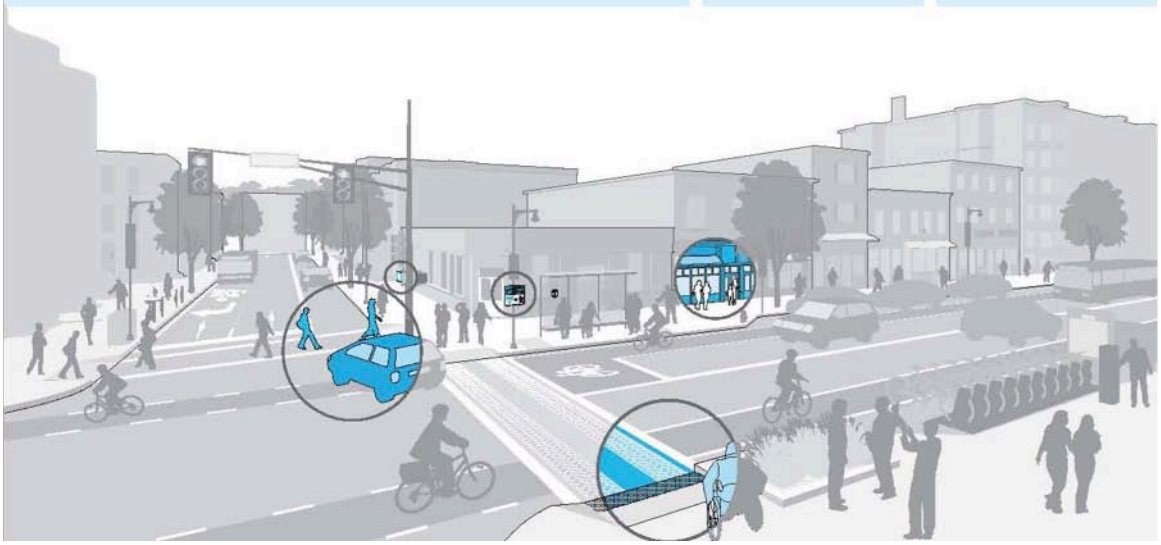
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Fayetteville-Springdale-Rogers, AR-MO	664	41	6.2%	0.90	0.0%	7.1%	66.7%	41.5%
Fort Smith, AR-OK	535	32	6.0%	1.34	3.2%	6.5%	61.3%	37.5%
Hot Springs, AR	194	18	9.3%	2.29	0.0%	5.6%	44.4%	61.1%
Jonesboro, AR	266	18	6.8%	1.48	0.0%	0.0%	83.3%	66.7%
Little Rock-North Little Rock-Conway, AR	1,122	104	9.3%	1.65	3.0%	4.0%	73.3%	26.9%
Memphis, TN-MS-AR	2,007	239	11.9%	1.72	0.9%	1.7%	77.4%	54.8%
Pine Bluff, AR	225	29	12.9%	3.01	0.0%	0.0%	69.0%	41.4%
Texarkana, TX-Texarkana, AR	302	32	10.6%	1.91	0.0%	0.0%	84.4%	43.8%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Arkansas County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ashley County	47	0	0.0%	0.00	N/A	N/A	N/A	N/A
Baxter County	94	2	2.1%	0.49	0.0%	0.0%	50.0%	0.0%
Benton County	268	11	4.1%	0.54	0.0%	0.0%	81.8%	63.6%
Boone County	71	4	5.6%	1.10	0.0%	0.0%	100.0%	25.0%
Bradley County	30	2	6.7%	1.70	0.0%	0.0%	100.0%	50.0%
Calhoun County	26	1	3.8%	1.81	0.0%	0.0%	100.0%	100.0%
Carroll County	91	2	2.2%	0.75	0.0%	0.0%	50.0%	100.0%
Chicot County	42	4	9.5%	3.27	0.0%	0.0%	100.0%	75.0%
Clark County	63	4	6.3%	1.74	0.0%	25.0%	50.0%	50.0%
Clay County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cleburne County	84	2	2.4%	0.78	0.0%	0.0%	50.0%	50.0%
Cleveland County	30	1	3.3%	1.14	0.0%	0.0%	100.0%	0.0%
Columbia County	62	3	4.8%	1.21	0.0%	0.0%	33.3%	66.7%
Conway County	64	6	9.4%	2.87	0.0%	0.0%	83.3%	33.3%
Craighead County	181	12	6.6%	1.30	0.0%	0.0%	91.7%	66.7%
Crawford County	98	6	6.1%	1.00	0.0%	0.0%	83.3%	50.0%
Crittenden County	151	29	19.2%	5.75	0.0%	0.0%	92.9%	10.3%
Cross County	49	1	2.0%	0.55	0.0%	0.0%	100.0%	100.0%
Dallas County	22	2	9.1%	2.39	0.0%	0.0%	100.0%	50.0%
Desha County	43	4	9.3%	2.97	0.0%	0.0%	100.0%	100.0%
Drew County	53	2	3.8%	1.07	0.0%	0.0%	100.0%	50.0%
Faulkner County	158	4	2.5%	0.38	25.0%	25.0%	75.0%	50.0%
Franklin County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fulton County	47	2	4.3%	1.64	0.0%	0.0%	100.0%	50.0%
Garland County	194	18	9.3%	1.91	0.0%	5.6%	44.4%	61.1%
Grant County	57	3	5.3%	1.71	0.0%	0.0%	100.0%	66.7%
Greene County	84	3	3.6%	0.73	0.0%	0.0%	100.0%	100.0%
Hempstead County	75	4	5.3%	1.76	0.0%	0.0%	75.0%	25.0%
Hot Spring County	121	3	2.5%	0.93	0.0%	0.0%	100.0%	33.3%
Howard County	35	1	2.9%	0.72	0.0%	0.0%	100.0%	100.0%
Independence County	107	4	3.7%	1.11	0.0%	25.0%	75.0%	50.0%
Izard County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	62	6	9.7%	3.33	0.0%	0.0%	50.0%	83.3%
Jefferson County	159	27	17.0%	3.43	0.0%	0.0%	66.7%	40.7%
Johnson County	61	2	3.3%	0.80	0.0%	0.0%	0.0%	50.0%
Lafayette County	32	5	15.6%	6.39	0.0%	0.0%	80.0%	80.0%
Lawrence County	66	3	4.5%	1.73	0.0%	0.0%	100.0%	66.7%
Lee County	36	2	5.6%	1.84	0.0%	0.0%	50.0%	50.0%
Lincoln County	36	1	2.8%	0.70	0.0%	0.0%	100.0%	100.0%
Little River County	31	3	9.7%	2.29	0.0%	0.0%	100.0%	66.7%
Logan County	55	2	3.6%	0.89	0.0%	0.0%	100.0%	100.0%
Lonoke County	162	8	4.9%	1.24	0.0%	0.0%	87.5%	12.5%
Madison County	68	1	1.5%	0.66	0.0%	0.0%	100.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Marion County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Miller County	123	10	8.1%	2.34	0.0%	0.0%	80.0%	60.0%
Mississippi County	126	9	7.1%	1.92	0.0%	0.0%	77.8%	0.0%
Monroe County	56	3	5.4%	3.47	0.0%	0.0%	100.0%	33.3%
Montgomery County	27	1	3.7%	1.06	0.0%	0.0%	100.0%	100.0%
Nevada County	50	1	2.0%	1.08	0.0%	0.0%	100.0%	0.0%
Newton County	28	1	3.6%	1.19	0.0%	100.0%	0.0%	100.0%
Ouachita County	62	0	0.0%	0.00	N/A	N/A	N/A	N/A
Perry County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Phillips County	44	4	9.1%	1.76	0.0%	0.0%	50.0%	50.0%
Pike County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Poinsett County	85	6	7.1%	2.42	0.0%	0.0%	66.7%	66.7%
Polk County	60	2	3.3%	0.98	0.0%	0.0%	100.0%	100.0%
Pope County	119	5	4.2%	0.84	0.0%	0.0%	60.0%	80.0%
Prairie County	47	4	8.5%	4.51	0.0%	0.0%	100.0%	0.0%
Pulaski County	558	83	14.9%	2.21	2.5%	3.8%	70.0%	26.5%
Randolph County	44	3	6.8%	1.66	0.0%	0.0%	100.0%	66.7%
Saline County	142	6	4.2%	0.60	0.0%	0.0%	83.3%	16.7%
Scott County	30	1	3.3%	0.90	0.0%	0.0%	100.0%	100.0%
Searcy County	39	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sebastian County	135	11	8.1%	0.90	0.0%	0.0%	36.4%	36.4%
Sevier County	48	2	4.2%	1.21	0.0%	0.0%	100.0%	50.0%
Sharp County	59	1	1.7%	0.58	0.0%	0.0%	100.0%	100.0%
St. Francis County	95	6	6.3%	2.11	0.0%	0.0%	100.0%	16.7%
Stone County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Union County	100	6	6.0%	1.41	0.0%	20.0%	40.0%	33.3%
Van Buren County	73	0	0.0%	0.00	N/A	N/A	N/A	N/A
Washington County	232	27	11.6%	1.39	0.0%	10.7%	60.7%	29.6%
White County	167	10	6.0%	1.35	0.0%	0.0%	60.0%	30.0%
Woodruff County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Yell County	76	1	1.3%	0.46	0.0%	100.0%	0.0%	100.0%
State total	**6,181**	**403**	**6.5%**	**1.41**	**0.8%**	**3.3%**	**73.4%**	**40.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
California

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

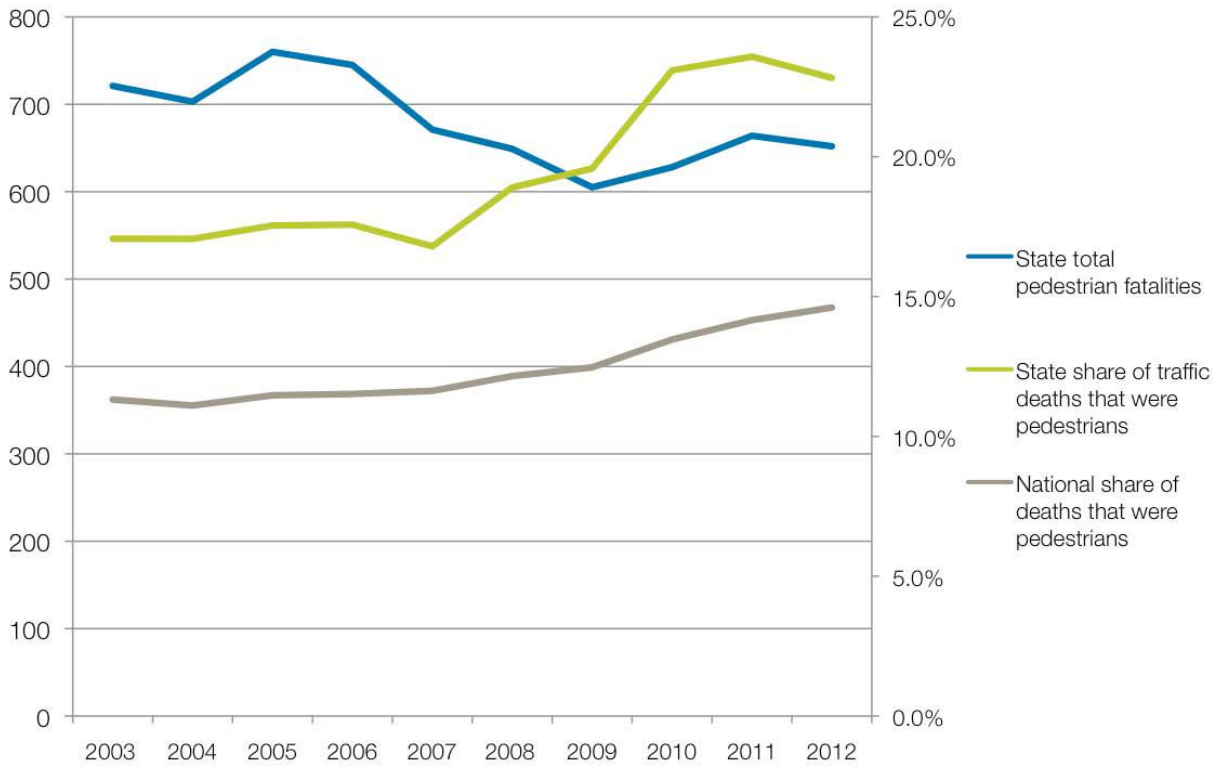
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **6,798 people died while walking in California**.

FIGURE 1

Pedestrian fatalities in California, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in California

In California from 2003–2012, 6,798 people were killed while walking, resulting in a fatality rate of 1.86 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 19.0 percent in California.

Within California, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for California was 62.04, compared to the national PDI of 52.2 and ranked 17th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in California, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
14	Riverside-San Bernardino-Ontario, CA	889	1.81	1.8%	102.17
23	Sacramento--Arden-Arcade--Roseville, CA	390	1.66	2.0%	81.27
27	Los Angeles-Long Beach-Santa Ana, CA	2,435	1.79	2.7%	66.91
29	San Diego-Carlsbad-San Marcos, CA	576	1.79	2.7%	66.02
30	San Jose-Sunnyvale-Santa Clara, CA	260	1.35	2.1%	65.58
47	San Francisco-Oakland-Fremont, CA	633	1.36	4.3%	31.44

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In California, 60.3 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **55.2 percent of pedestrian fatalities in California were on roads with a speed limit of 40 mph or higher**, compared to 13.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 446 children in California.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 10.9 percent of California's population, adults aged 65 and older account for 24.1 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in California is 5.03 per 100,000 people (nationally, 3.19), compared to a rate of 1.94 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in California suffer at a rate of 6.4 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.2 percent of California's population, and 14.7 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In California from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.08. The rate for Hispanic people of any race was 2.48; for black people and African Americans, 3.25; for Asians and Pacific Islanders, 1.80; and for American Indians and Alaska Natives, 3.68.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

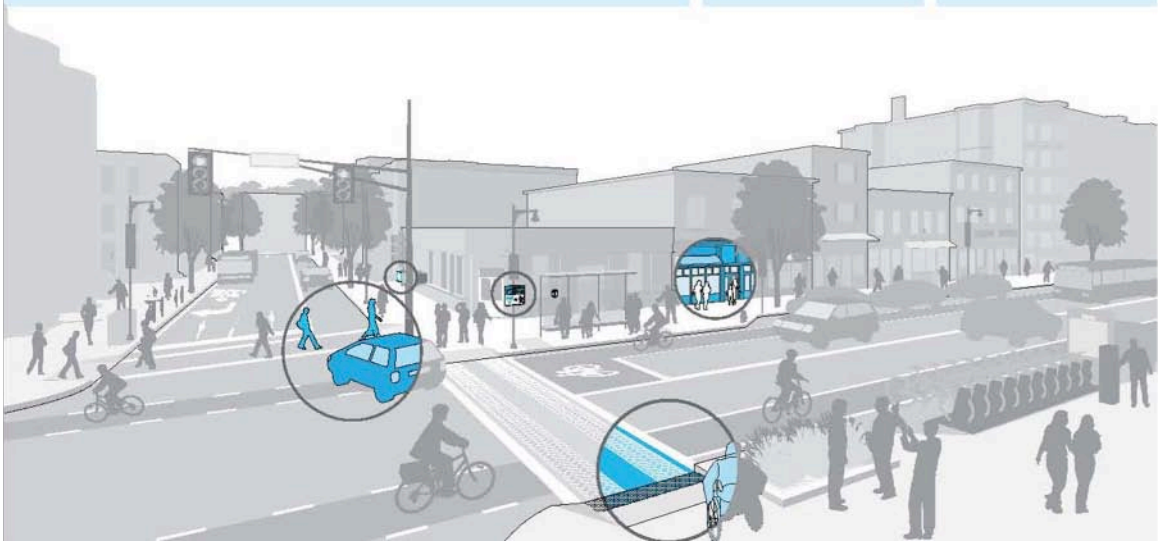
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bakersfield, CA	1,471	206	14.0%	2.50	2.4%	9.8%	80.0%	69.8%
Chico, CA	312	44	14.1%	2.54	0.0%	11.6%	53.5%	63.6%
El Centro, CA	394	37	9.4%	1.96	0.0%	8.1%	78.4%	45.9%
Fresno, CA	1,434	207	14.4%	2.21	0.0%	2.5%	89.6%	59.4%
Hanford-Corcoran, CA	326	19	5.8%	1.45	0.0%	5.6%	61.1%	52.6%
Los Angeles-Long Beach-Santa Ana, CA	8,616	2,435	28.3%	1.79	0.5%	14.0%	42.3%	70.6%
Madera-Chowchilla, CA	366	50	13.7%	2.66	0.0%	14.3%	59.2%	56.0%
Merced, CA	512	67	13.1%	1.95	1.5%	9.1%	69.7%	52.2%
Modesto, CA	697	102	14.6%	1.90	1.0%	16.8%	53.5%	46.1%
Napa, CA	155	12	7.7%	0.88	0.0%	8.3%	58.3%	75.0%
Oxnard-Thousand Oaks-Ventura, CA	676	85	12.6%	1.07	3.6%	14.5%	57.8%	64.3%
Redding, CA	273	41	15.0%	2.81	0.0%	9.8%	58.5%	46.3%
Riverside-San Bernardino-Ontario, CA	5,901	889	15.1%	1.81	0.2%	7.0%	79.8%	54.2%
Sacramento--Arden-Arcade--Roseville, CA	2,051	390	19.0%	1.66	0.0%	9.6%	70.8%	64.5%
Salinas, CA	497	67	13.5%	1.35	1.5%	26.9%	46.3%	52.2%
San Diego-Carlsbad-San Marcos, CA	2,592	576	22.2%	1.79	0.4%	10.2%	63.2%	50.7%
San Francisco-Oakland Fremont, CA	2,360	633	26.8%	1.36	0.6%	37.3%	30.3%	56.3%
San Jose-Sunnyvale-Santa Clara, CA	1,008	260	25.8%	1.35	0.8%	14.3%	49.2%	64.6%
San Luis Obispo-Paso Robles, CA	361	28	7.8%	1.11	0.0%	3.6%	64.3%	67.9%
Santa Barbara-Santa Maria-Goleta, CA	418	76	18.2%	1.75	0.0%	10.7%	50.7%	60.5%
Santa Cruz-Watsonville, CA	199	34	17.1%	0.99	0.0%	44.1%	35.3%	64.7%
Santa Rosa-Petaluma, CA	460	61	13.3%	1.45	0.0%	12.7%	52.4%	59.0%
Stockton, CA	949	145	15.3%	1.89	0.7%	13.1%	61.4%	51.7%
Vallejo-Fairfield, CA	388	54	13.9%	1.26	0.0%	16.4%	49.1%	50.0%
Visalia-Porterville, CA	857	98	11.4%	2.13	1.1%	9.5%	71.6%	56.1%
Yuba City, CA	299	28	9.4%	1.80	0.0%	17.9%	46.4%	60.7%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Alameda County	860	211	24.5%	1.42	1.0%	27.6%	36.2%	55.9%
Alpine County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Amador County	115	4	3.5%	1.06	0.0%	0.0%	50.0%	100.0%
Butte County	312	44	14.1%	2.02	0.0%	11.6%	53.5%	63.6%
Calaveras County	126	4	3.2%	0.88	0.0%	25.0%	75.0%	25.0%
Colusa County	91	5	5.5%	2.39	0.0%	33.3%	66.7%	20.0%
Contra Costa County	659	124	18.8%	1.21	0.8%	18.0%	44.3%	53.3%
Del Norte County	93	14	15.1%	4.95	0.0%	7.1%	92.9%	64.3%
El Dorado County	256	13	5.1%	0.73	0.0%	23.1%	46.2%	69.2%
Fresno County	1,434	207	14.4%	2.30	0.0%	2.5%	89.6%	59.4%
Glenn County	87	3	3.4%	1.08	0.0%	0.0%	33.3%	100.0%
Humboldt County	245	31	12.7%	2.33	0.0%	9.7%	41.9%	80.6%
Imperial County	394	37	9.4%	2.24	0.0%	8.1%	78.4%	45.9%
Inyo County	100	4	4.0%	2.16	0.0%	0.0%	100.0%	75.0%
Kern County	1,471	206	14.0%	2.58	2.4%	9.8%	80.0%	69.8%
Kings County	326	19	5.8%	1.28	0.0%	5.6%	61.1%	52.6%
Lake County	161	13	8.1%	2.03	0.0%	7.7%	46.2%	61.5%
Lassen County	104	2	1.9%	0.58	0.0%	0.0%	100.0%	100.0%
Los Angeles County	6,875	1,998	29.1%	2.04	0.6%	15.0%	34.7%	70.3%
Madera County	366	50	13.7%	3.44	0.0%	14.3%	59.2%	56.0%
Marin County	91	15	16.5%	0.60	0.0%	53.3%	20.0%	33.3%
Mariposa County	59	2	3.4%	1.10	0.0%	0.0%	50.0%	50.0%
Mendocino County	234	25	10.7%	2.85	4.2%	20.8%	66.7%	76.0%
Merced County	512	67	13.1%	2.69	1.5%	9.1%	69.7%	52.2%
Modoc County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Mono County	40	2	5.0%	1.44	0.0%	0.0%	50.0%	100.0%
Monterey County	497	67	13.5%	1.63	1.5%	26.9%	46.3%	52.2%
Napa County	155	12	7.7%	0.90	0.0%	8.3%	58.3%	75.0%
Nevada County	153	9	5.9%	0.92	0.0%	22.2%	55.6%	44.4%
Orange County	1,741	437	25.1%	1.47	0.2%	9.5%	77.1%	72.0%
Placer County	318	43	13.5%	1.30	0.0%	2.3%	81.4%	52.4%
Plumas County	67	1	1.5%	0.49	0.0%	0.0%	100.0%	100.0%
Riverside County	2,720	403	14.8%	1.96	0.3%	8.7%	78.3%	49.3%
Sacramento County	1,246	305	24.5%	2.19	0.0%	9.9%	73.0%	67.5%
San Benito County	75	3	4.0%	0.55	0.0%	66.7%	33.3%	66.7%
San Bernardino County	3,181	486	15.3%	2.45	0.2%	5.6%	81.0%	58.4%
San Diego County	2,592	576	22.2%	1.91	0.4%	10.2%	63.2%	50.7%
San Francisco County	387	192	49.6%	2.44	0.0%	61.9%	12.7%	62.0%
San Joaquin County	949	145	15.3%	2.17	0.7%	13.1%	61.4%	51.7%
San Luis Obispo	361	28	7.8%	1.06	0.0%	3.6%	64.3%	67.9%
San Mateo County	363	91	25.1%	1.29	1.1%	31.9%	36.3%	53.3%
Santa Barbara County	418	76	18.2%	1.83	0.0%	10.7%	50.7%	60.5%
Santa Clara County	933	257	27.5%	1.48	0.8%	13.7%	49.4%	64.6%
Santa Cruz County	199	34	17.1%	1.32	0.0%	44.1%	35.3%	64.7%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Shasta County	273	41	15.0%	2.32	0.0%	9.8%	58.5%	46.3%
Sierra County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Siskiyou County	126	5	4.0%	1.12	0.0%	42.9%	14.3%	20.0%
Solano County	388	54	13.9%	1.31	0.0%	16.4%	49.1%	50.0%
Sonoma County	460	61	13.3%	1.28	0.0%	12.7%	52.4%	59.0%
Stanislaus County	697	102	14.6%	2.01	1.0%	16.8%	53.5%	46.1%
Sutter County	158	10	6.3%	1.09	0.0%	10.0%	60.0%	70.0%
Tehama County	150	17	11.3%	2.75	0.0%	5.9%	82.4%	35.3%
Trinity County	74	0	0.0%	0.00	N/A	N/A	N/A	N/A
Tulare County	857	98	11.4%	2.31	1.1%	9.5%	71.6%	56.1%
Tuolumne County	149	13	8.7%	2.33	0.0%	23.1%	38.5%	46.2%
Ventura County	676	85	12.6%	1.05	3.6%	14.5%	57.8%	64.3%
Yolo County	231	29	12.6%	1.49	0.0%	11.1%	40.7%	48.3%
Yuba County	141	18	12.8%	2.59	0.0%	22.2%	38.9%	55.6%
State total	**35,829**	**6,798**	**19.0%**	**1.86**	**0.5%**	**13.5%**	**55.2%**	**60.3%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Colorado

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

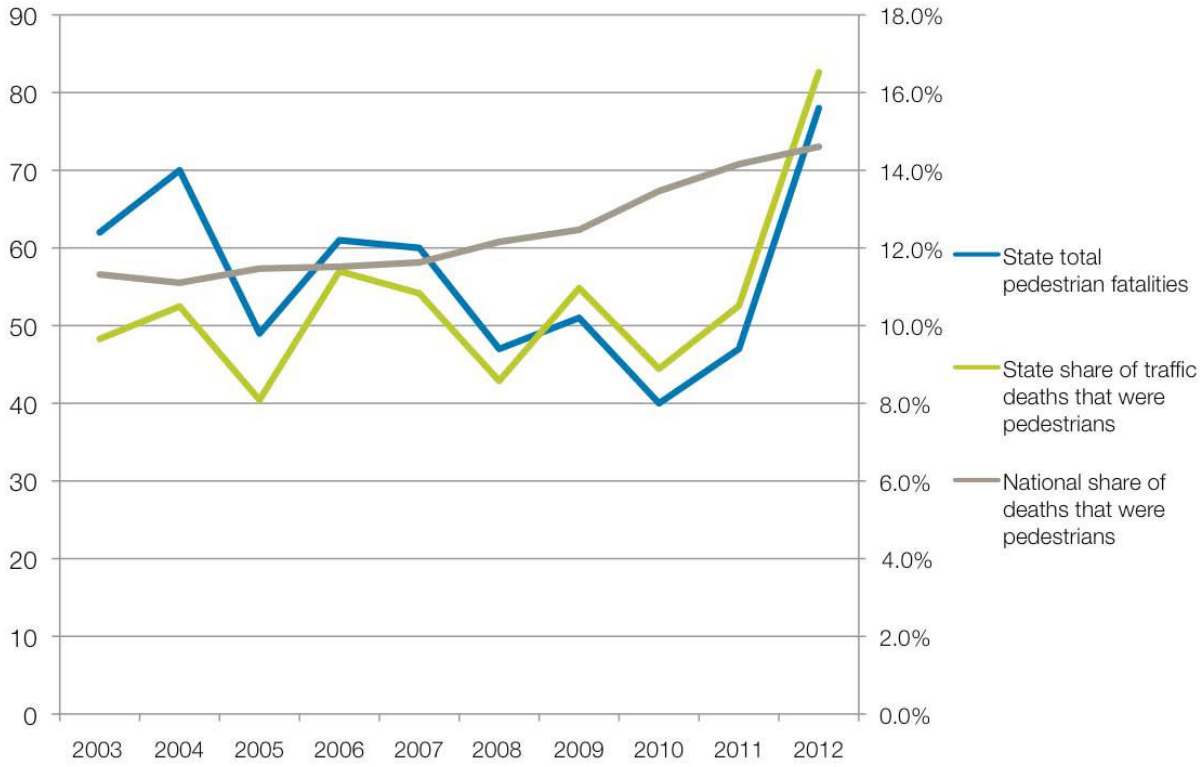
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **565 people died while walking in Colorado**.

FIGURE 1

Pedestrian fatalities in Colorado, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Colorado

In Colorado from 2003–2012, 565 people were killed while walking, resulting in a fatality rate of 1.17 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 10.5 percent in Colorado.

Within Colorado, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Colorado was 34.10, compared to the national PDI of 52.2 and ranked 29th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Colorado, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
31	Denver-Aurora-Broomfield, CO	349	1.24	2.1%	58.13

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Colorado, 68.2 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **47.3 percent of pedestrian fatalities in Colorado were on roads with a speed limit of 40 mph or higher**, compared to 8.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 38 children in Colorado.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 10.3 percent of Colorado's population, adults aged 65 and older account for 21.1 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Colorado is 3.06 per 100,000 people (nationally, 3.19), compared to a rate of 1.31 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Colorado suffer at a rate of 3.37 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 4.7 percent of Colorado's population, and 10.5 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access to destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Colorado from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.26. The rate for Hispanic people of any race was 2.10; for black people and African Americans, 2.39; for Asians and Pacific Islanders, 1.34; and for American Indians and Alaska Natives, 3.43.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

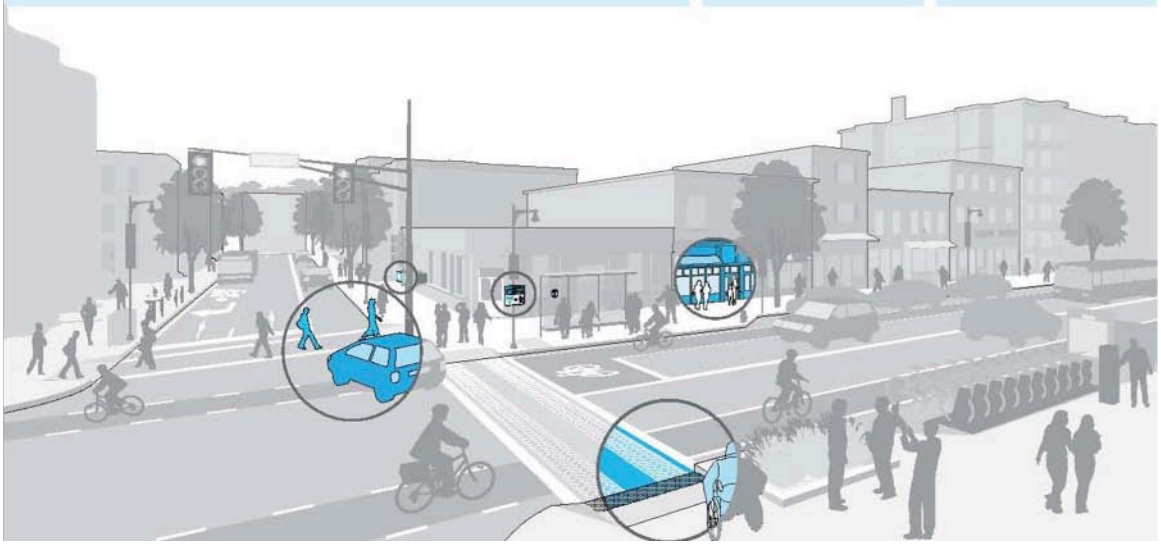
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Boulder, CO	202	29	14.4%	1.01	0.0%	10.3%	37.9%	79.3%
Colorado Springs, CO	476	36	7.6%	0.59	0.0%	13.5%	37.8%	86.1%
Denver-Aurora-Broomfield, CO	1,845	349	18.9%	1.24	0.8%	8.5%	42.8%	69.9%
Fort Collins-Loveland, CO	270	17	6.3%	0.53	0.0%	0.0%	56.3%	70.6%
Grand Junction, CO	177	17	9.6%	1.36	0.0%	18.8%	31.3%	41.2%
Greeley, CO	474	20	4.2%	0.47	0.0%	5.0%	75.0%	45.0%
Pueblo, CO	227	26	11.5%	2.01	3.8%	19.2%	46.2%	61.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	364	61	16.8%	1.45	0.0%	3.2%	61.9%	63.9%
Alamosa County	51	1	2.0%	0.65	0.0%	0.0%	0.0%	100.0%
Arapahoe County	313	69	22.0%	1.25	0.0%	8.7%	58.0%	75.4%
Archuleta County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Baca County	44	1	2.3%	2.57	0.0%	0.0%	100.0%	100.0%
Bent County	14	2	14.3%	3.27	0.0%	0.0%	100.0%	100.0%
Boulder County	202	29	14.4%	1.00	0.0%	10.3%	37.9%	79.3%
Broomfield County	25	5	20.0%	0.97	0.0%	20.0%	40.0%	60.0%
Chaffee County	44	1	2.3%	0.57	0.0%	0.0%	100.0%	100.0%
Cheyenne County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clear Creek County	37	2	5.4%	2.19	0.0%	0.0%	100.0%	50.0%
Conejos County	22	1	4.5%	1.21	0.0%	0.0%	100.0%	100.0%
Costilla County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Crowley County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Custer County	19	2	10.5%	4.89	0.0%	50.0%	50.0%	50.0%
Delta County	74	1	1.4%	0.33	0.0%	100.0%	0.0%	100.0%
Denver County	434	146	33.6%	2.52	1.4%	11.0%	18.5%	72.6%
Dolores County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Douglas County	176	13	7.4%	0.49	0.0%	20.0%	73.3%	30.8%
Eagle County	75	9	12.0%	1.82	0.0%	0.0%	88.9%	11.1%
El Paso County	454	36	7.9%	0.60	0.0%	13.5%	37.8%	86.1%
Elbert County	49	1	2.0%	0.44	0.0%	0.0%	100.0%	0.0%
Fremont County	72	6	8.3%	1.28	0.0%	16.7%	66.7%	66.7%
Garfield County	100	4	4.0%	0.75	0.0%	0.0%	75.0%	75.0%
Gilpin County	6	1	16.7%	1.96	100.0%	100.0%	0.0%	0.0%
Grand County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gunnison County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hinsdale County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Huerfano County	48	3	6.3%	4.31	0.0%	0.0%	100.0%	66.7%
Jackson County	14	1	7.1%	7.06	0.0%	0.0%	100.0%	100.0%
Jefferson County	383	50	13.1%	0.94	0.0%	2.0%	56.0%	76.0%
Kiowa County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kit Carson County	50	2	4.0%	2.46	0.0%	0.0%	50.0%	0.0%
La Plata County	125	6	4.8%	1.21	0.0%	16.7%	83.3%	83.3%
Lake County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Larimer County	270	17	6.3%	0.59	0.0%	0.0%	56.3%	70.6%
Las Animas County	55	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lincoln County	45	2	4.4%	3.60	0.0%	0.0%	100.0%	0.0%
Logan County	45	3	6.7%	1.35	0.0%	0.0%	33.3%	66.7%
Mesa County	177	17	9.6%	1.22	0.0%	18.8%	31.3%	41.2%
Mineral County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Moffat County	33	1	3.0%	0.75	0.0%	0.0%	100.0%	100.0%
Montezuma County	60	6	10.0%	2.40	16.7%	16.7%	66.7%	83.3%
Montrose County	52	2	3.8%	0.51	0.0%	0.0%	50.0%	50.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Morgan County	53	2	3.8%	0.71	0.0%	50.0%	50.0%	50.0%
Otero County	36	2	5.6%	1.05	0.0%	0.0%	50.0%	50.0%
Ouray County	16	1	6.3%	2.35	0.0%	0.0%	100.0%	100.0%
Park County	58	1	1.7%	0.62	0.0%	0.0%	100.0%	100.0%
Phillips County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pitkin County	28	1	3.6%	0.62	0.0%	0.0%	0.0%	100.0%
Prowers County	36	2	5.6%	1.54	0.0%	0.0%	0.0%	50.0%
Pueblo County	227	26	11.5%	1.68	3.8%	19.2%	46.2%	61.5%
Rio Blanco County	38	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rio Grande County	23	1	4.3%	0.83	0.0%	0.0%	0.0%	100.0%
Routt County	42	3	7.1%	1.33	0.0%	0.0%	100.0%	100.0%
Saguache County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
San Juan County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
San Miguel County	19	1	5.3%	1.37	0.0%	0.0%	100.0%	0.0%
Sedgwick County	7	1	14.3%	4.07	0.0%	0.0%	100.0%	0.0%
Summit County	56	2	3.6%	0.75	50.0%	50.0%	50.0%	50.0%
Teller County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Washington County	37	1	2.7%	2.06	0.0%	0.0%	100.0%	0.0%
Weld County	474	20	4.2%	0.84	0.0%	5.0%	75.0%	45.0%
Yuma County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
State total	**5,386**	**565**	**10.5%**	**1.17**	**1.1%**	**8.3%**	**47.3%**	**68.2%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014 Connecticut

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **351 people died while walking in Connecticut**.

FIGURE 1

Pedestrian fatalities in Connecticut, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Connecticut

In Connecticut from 2003–2012, 351 people were killed while walking, resulting in a fatality rate of 0.99 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 12.6 percent in Connecticut.

Within Connecticut, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Connecticut was 35.02, compared to the national PDI of 52.2 and ranked 27th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Connecticut, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
38	Hartford-West Hartford-East Hartford, CT	121	1.11	2.7%	41.58

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Connecticut, 54.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **35.2 percent of pedestrian fatalities in Connecticut were on roads with a speed limit of 40 mph or higher**, compared to 36.6 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 20 children in Connecticut.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.8 percent of Connecticut's population, adults aged 65 and older account for 28.4 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Connecticut is 2.76 per 100,000 people (nationally, 3.19), compared to a rate of 1.11 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Connecticut suffer at a rate of 3.38 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.1 percent of Connecticut's population, and 18.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Connecticut from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.34. The rate for Hispanic people of any race was 1.42; and for black people and African Americans, 1.49.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

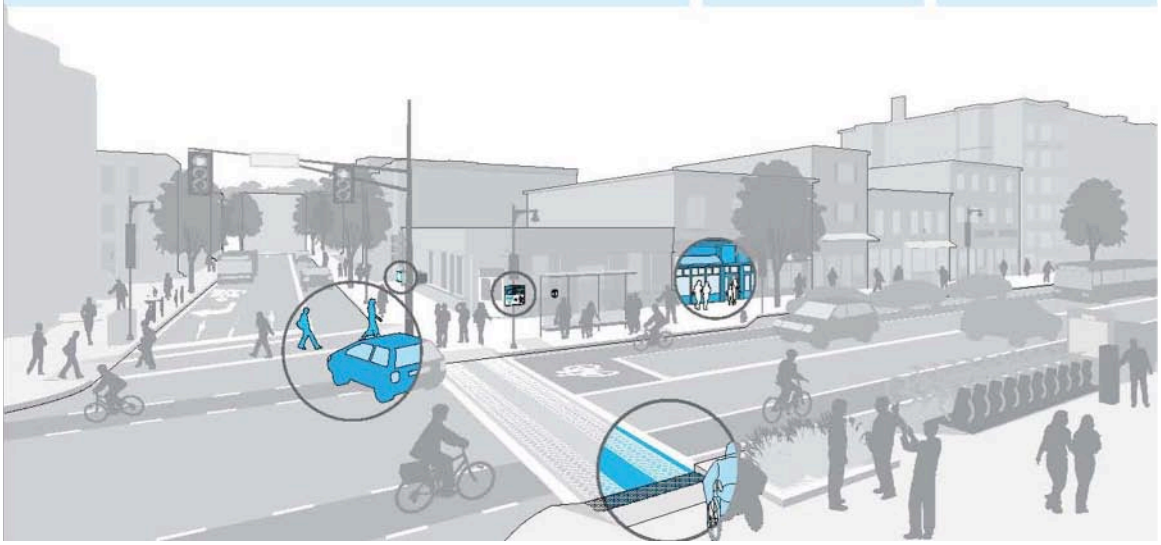
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bridgeport-Stamford-Norwalk, CT	520	75	14.4%	0.76	0.0%	45.9%	25.7%	56.0%
Hartford-West Hartford-East Hartford, CT	940	121	12.9%	1.11	0.9%	31.6%	32.5%	50.0%
New Haven-Milford, CT	660	99	15.0%	1.28	0.0%	49.0%	35.7%	52.5%
Norwich-New London, CT	312	36	11.5%	0.88	0.0%	31.4%	54.3%	50.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Fairfield County	520	75	14.4%	0.83	0.0%	45.9%	25.7%	56.0%
Hartford County	640	94	14.7%	1.06	0.0%	37.8%	25.6%	48.9%
Litchfield County	173	11	6.4%	0.58	0.0%	27.3%	36.4%	72.7%
Middlesex County	152	12	7.9%	0.73	8.3%	8.3%	50.0%	66.7%
New Haven County	660	99	15.0%	1.16	0.0%	49.0%	35.7%	52.5%
New London County	312	36	11.5%	1.33	0.0%	31.4%	54.3%	50.0%
Tolland County	148	15	10.1%	1.00	0.0%	13.3%	60.0%	42.9%
Windham County	175	9	5.1%	0.77	0.0%	33.3%	44.4%	55.6%
State total	**2,780**	**351**	**12.6%**	**0.99**	**0.3%**	**36.6%**	**35.2%**	**54.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Delaware

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **194 people died while walking in Delaware**.

FIGURE 1

Pedestrian fatalities in Delaware, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Delaware

In Delaware from 2003–2012, 194 people were killed while walking, resulting in a fatality rate of 2.22 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 15.9 percent in Delaware.

Within Delaware, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Delaware was 103.55, compared to the national PDI of 52.2 and ranked 6th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Delaware, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
34	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	959	1.64	3.7%	44.27

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Delaware, 72.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **84.0 percent of pedestrian fatalities in Delaware were on roads with a speed limit of 40 mph or higher**, compared to 8.8 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.7 percent of Delaware's population, adults aged 65 and older account for 16.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Delaware is 2.44 per 100,000 people (nationally, 3.19), compared to a rate of 2.00 for people under 65 years old (nationally, 1.75).[8]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Delaware from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.08. The rate for Hispanic people of any race was 2.05; and for black people and African Americans, 1.93.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[9] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[10]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

9 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

10 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

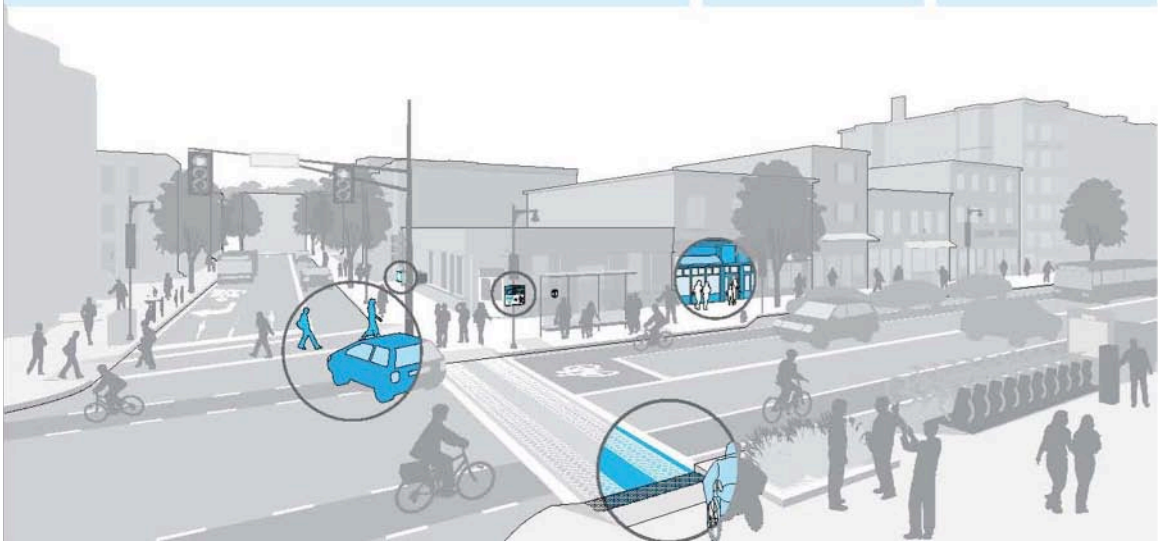
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#

- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)
- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Dover, DE	247	36	14.6%	1.97	2.8%	11.1%	86.1%	75.0%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	4,984	959	19.2%	1.64	0.7%	20.1%	54.9%	66.4%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Kent County	247	36	14.6%	2.34	2.8%	11.1%	86.1%	75.0%
New Castle County	565	120	21.2%	2.26	0.8%	10.2%	80.5%	75.0%
Sussex County	410	38	9.3%	2.03	2.6%	5.3%	92.1%	63.2%
State total	**1,223**	**194**	**15.9%**	**2.22**	**1.5%**	**8.8%**	**84.0%**	**72.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
District of Columbia

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **133 people died while walking in the District of Columbia**.

FIGURE 1

Pedestrian fatalities in the District of Columbia, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in the District of Columbia

In the District of Columbia from 2003–2012, 133 people were killed while walking, resulting in a fatality rate of 2.26 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 36.1 percent in the District of Columbia.

Within the District of Columbia, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for the District of Columbia was 14.47, compared to the national PDI of 52.2 and ranked 49th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

PDI information for the District of Columbia metro area

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
35	Washington-Arlington-Alexandria, DC-VA-MD-WV	843	1.41	3.2%	44.06

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways.

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **9.0 percent of pedestrian fatalities in the District of Columbia were on roads with a speed limit of 40 mph or higher**, compared to 69.2 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 11 children in the District of Columbia.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.6 percent of the District of Columbia's population, adults aged 65 and older account for 17.4 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in the District of Columbia is 4.47 per 100,000 people (nationally, 3.19), compared to a rate of 2.79 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in the District of Columbia suffer at a rate of 4.24 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.6 percent of the District of Columbia's population, and 8.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In the District of Columbia from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.59. The rate for Hispanic people of any race was 3.74; and for black people and African Americans, 3.60.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

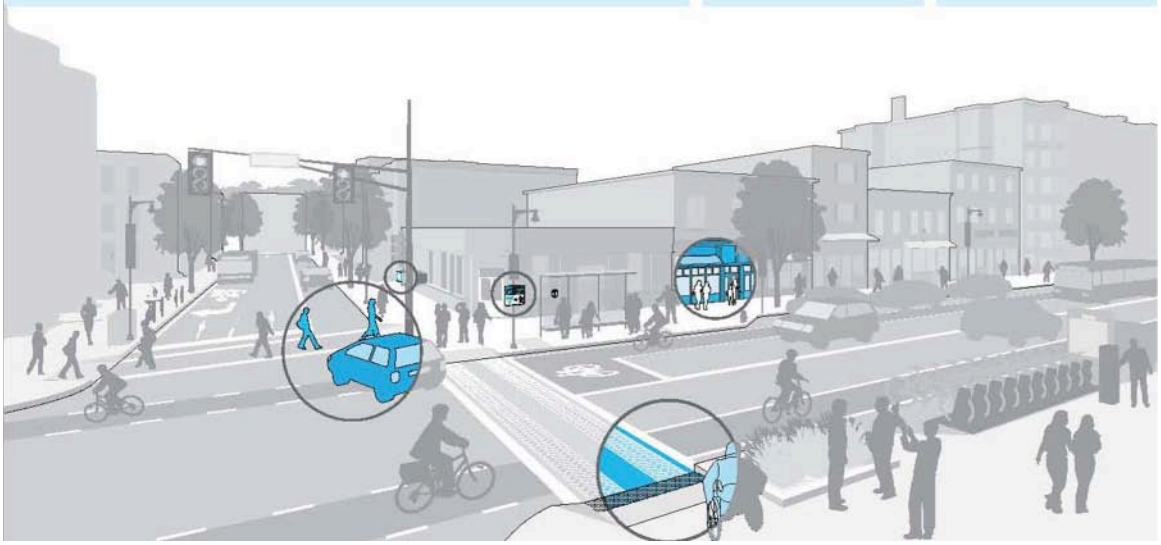
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Washington-Arlington-Alexandria, DC-VA-MD-WV	4,204	843	20.1%	1.41	0.2%	18.8%	51.4%	56.1%

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Florida

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

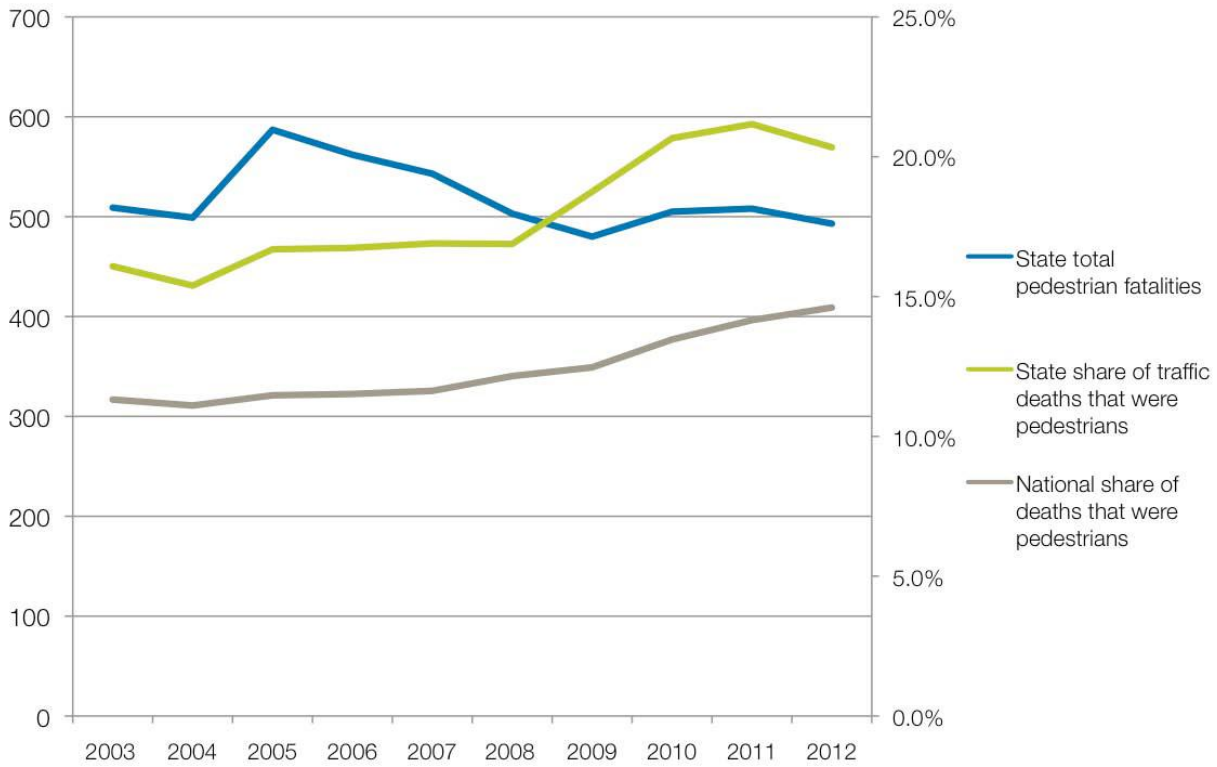
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **5,189 people died while walking in Florida**.

FIGURE 1

Pedestrian fatalities in Florida, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Florida

In Florida from 2003–2012, 5,189 people were killed while walking, resulting in a fatality rate of 2.83 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 17.7 percent in Florida.

Within Florida, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Florida was 168.65, compared to the national PDI of 52.2 and ranked 1st nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Florida, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
1	Orlando-Kissimmee, FL	583	2.75	1.1%	244.28
2	Tampa-St. Petersburg-Clearwater, FL	874	2.97	1.6%	190.13
3	Jacksonville, FL	359	2.48	1.4%	182.71
4	Miami-Fort Lauderdale-Pompano Beach, FL	1,539	2.58	1.8%	145.33

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Florida, 63.3 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **73.3 percent of pedestrian fatalities in Florida were on roads with a speed limit of 40 mph or higher**, compared to 3.7 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 233 children in Florida.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 16.9 percent of Florida's population, adults aged 65 and older account for 21.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Florida is 3.92 per 100,000 people (nationally, 3.19), compared to a rate of 2.9 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Florida suffer at a rate of 4.73 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 8.2 percent of Florida's population, and 12.5 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Florida from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.85. The rate for Hispanic people of any race was 3.43; for black people and African Americans, 3.47; for Asians and Pacific Islanders, 0.98; and for American Indians and Alaska Natives, 4.17.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

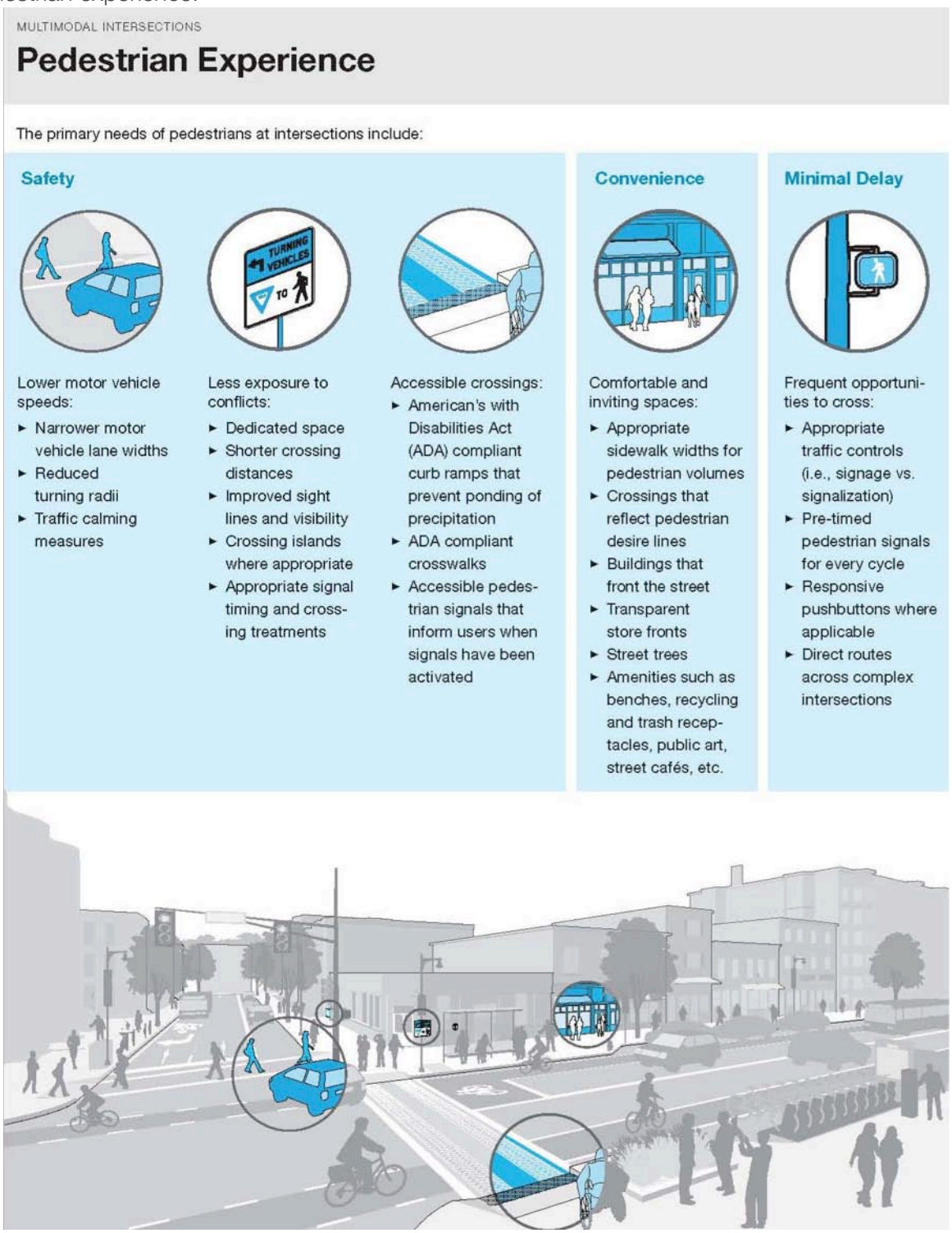
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bradenton-Sarasota-Venice, FL	1,047	172	16.4%	2.44	2.4%	7.6%	78.2%	59.6%
Cape Coral-Fort Myers, FL	964	163	16.9%	1.89	0.6%	1.9%	81.8%	55.8%
Deltona-Daytona Beach-Ormond Beach, FL	1,075	177	16.5%	3.83	1.2%	4.7%	71.9%	65.9%
Fort Walton Beach-Crestview-Destin, FL	238	39	16.4%	2.62	2.6%	13.2%	60.5%	86.8%
Gainesville, FL	431	43	10.0%	1.06	0.0%	0.0%	83.7%	60.5%
Jacksonville, FL	2,060	359	17.4%	2.48	0.8%	2.5%	73.4%	62.6%
Lakeland-Winter Haven, FL	1,152	169	14.7%	2.91	1.2%	4.3%	82.2%	65.1%
Miami-Fort Lauderdale-Pompano Beach, FL	6,690	1,539	23.0%	2.58	1.7%	5.0%	63.8%	57.6%
Naples-Marco Island, FL	487	53	10.9%	1.48	2.0%	10.2%	55.1%	34.0%
Ocala, FL	786	104	13.2%	3.13	1.0%	1.0%	88.2%	54.8%
Orlando-Kissimmee, FL	3,093	583	18.8%	2.75	1.4%	6.9%	83.8%	68.5%
Palm Bay-Melbourne-Titusville, FL	783	136	17.4%	2.28	3.0%	5.2%	77.6%	66.9%
Palm Coast, FL	211	21	10.0%	3.13	5.0%	5.0%	80.0%	52.4%
Panama City-Lynn Haven-Panama City Beach, FL	316	68	21.5%	3.43	1.5%	1.5%	66.2%	79.4%
Pensacola-Ferry Pass-Brent, FL	714	124	17.4%	3.01	0.0%	4.1%	70.2%	65.3%
Port St. Lucie, FL	699	94	13.4%	2.02	2.2%	8.6%	69.9%	63.0%
Punta Gorda, FL	282	38	13.5%	2.00	0.0%	0.0%	73.0%	44.7%
Sebastian-Vero Beach, FL	268	25	9.3%	2.03	0.0%	0.0%	62.5%	40.0%
Tallahassee, FL	628	75	11.9%	2.23	1.4%	2.8%	70.4%	70.7%
Tampa-St. Petersburg-Clearwater, FL	3,998	874	21.9%	2.97	0.9%	3.3%	76.7%	61.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Alachua County	380	40	10.5%	1.66	0.0%	0.0%	85.0%	57.5%
Baker County	110	6	5.5%	2.31	0.0%	0.0%	66.7%	50.0%
Bay County	316	68	21.5%	4.11	1.5%	1.5%	66.2%	79.4%
Bradford County	79	8	10.1%	2.83	0.0%	0.0%	75.0%	75.0%
Brevard County	783	136	17.4%	2.54	3.0%	5.2%	77.6%	66.9%
Broward County	2,095	488	23.3%	2.80	1.7%	6.5%	67.4%	61.9%
Calhoun County	45	4	8.9%	2.82	0.0%	0.0%	100.0%	75.0%
Charlotte County	282	38	13.5%	2.40	0.0%	0.0%	73.0%	44.7%
Citrus County	269	36	13.4%	2.62	0.0%	0.0%	77.1%	66.7%
Clay County	206	28	13.6%	1.55	3.6%	3.6%	89.3%	71.4%
Collier County	487	53	10.9%	1.69	2.0%	10.2%	55.1%	34.0%
Columbia County	275	27	9.8%	4.13	0.0%	0.0%	92.6%	59.3%
DeSoto County	104	11	10.6%	3.21	0.0%	9.1%	72.7%	54.5%
Dixie County	67	8	11.9%	5.06	0.0%	0.0%	87.5%	75.0%
Duval County	1,274	259	20.3%	3.05	0.4%	2.0%	67.7%	60.1%
Escambia County	483	92	19.0%	3.08	0.0%	1.1%	66.3%	64.1%
Flagler County	211	21	10.0%	2.43	5.0%	5.0%	80.0%	52.4%
Franklin County	34	1	2.9%	0.90	0.0%	0.0%	100.0%	100.0%
Gadsden County	179	19	10.6%	4.13	0.0%	0.0%	94.7%	73.7%
Gilchrist County	51	3	5.9%	1.84	0.0%	0.0%	66.7%	100.0%
Glades County	60	2	3.3%	1.60	0.0%	0.0%	100.0%	100.0%
Gulf County	36	1	2.8%	0.64	0.0%	0.0%	100.0%	100.0%
Hamilton County	76	2	2.6%	1.38	0.0%	0.0%	50.0%	50.0%
Hardee County	91	16	17.6%	5.89	0.0%	0.0%	93.8%	93.8%
Hendry County	162	14	8.6%	3.66	0.0%	0.0%	64.3%	71.4%
Hernando County	331	39	11.8%	2.37	0.0%	0.0%	84.6%	51.3%
Highlands County	202	26	12.9%	2.68	8.0%	8.0%	68.0%	56.0%
Hillsborough County	1,766	368	20.8%	3.10	0.8%	4.2%	82.5%	52.9%
Holmes County	51	1	2.0%	0.51	0.0%	0.0%	100.0%	0.0%
Indian River County	268	25	9.3%	1.88	0.0%	0.0%	62.5%	40.0%
Jackson County	180	10	5.6%	2.06	0.0%	0.0%	77.8%	50.0%
Jefferson County	74	7	9.5%	4.88	0.0%	14.3%	85.7%	71.4%
Lafayette County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lake County	552	69	12.5%	2.44	0.0%	10.3%	85.3%	65.2%
Lee County	964	163	16.9%	2.77	0.6%	1.9%	81.8%	55.8%
Leon County	320	47	14.7%	1.76	2.3%	2.3%	56.8%	70.2%
Levy County	146	11	7.5%	2.79	0.0%	0.0%	100.0%	81.8%
Liberty County	27	2	7.4%	2.49	0.0%	0.0%	100.0%	100.0%
Madison County	100	1	1.0%	0.52	0.0%	0.0%	100.0%	100.0%
Manatee County	545	95	17.4%	3.02	3.2%	7.4%	79.8%	57.4%
Marion County	786	104	13.2%	3.27	1.0%	1.0%	88.2%	54.8%
Martin County	314	41	13.1%	2.86	2.5%	5.0%	70.0%	82.5%
Miami-Dade County	2,876	739	25.7%	3.02	1.2%	1.7%	59.3%	54.2%
Monroe County	223	47	21.1%	6.30	4.3%	6.4%	76.6%	95.7%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Nassau County	165	22	13.3%	3.16	0.0%	0.0%	85.7%	54.5%
Okaloosa County	238	39	16.4%	2.13	2.6%	13.2%	60.5%	86.8%
Okeechobee County	136	16	11.8%	4.07	0.0%	12.5%	56.3%	75.0%
Orange County	1,639	372	22.7%	3.38	1.9%	5.5%	83.6%	71.5%
Osceola County	527	65	12.3%	2.59	0.0%	6.2%	83.1%	62.5%
Palm Beach County	1,719	312	18.2%	2.41	2.9%	10.1%	68.4%	59.0%
Pasco County	818	174	21.3%	3.93	1.7%	2.3%	81.6%	73.3%
Pinellas County	1,083	293	27.1%	3.18	0.7%	3.1%	65.3%	65.4%
Polk County	1,152	169	14.7%	2.93	1.2%	4.3%	82.2%	65.1%
Putnam County	217	35	16.1%	4.73	2.9%	8.6%	74.3%	68.6%
Santa Rosa County	231	32	13.9%	2.19	0.0%	12.5%	81.3%	68.8%
Sarasota County	502	77	15.3%	2.07	1.3%	7.9%	76.3%	62.3%
Seminole County	375	77	20.5%	1.86	1.4%	11.6%	84.1%	62.2%
St. Johns County	305	44	14.4%	2.51	2.3%	6.8%	90.9%	77.3%
St. Lucie County	385	53	13.8%	2.04	1.9%	11.3%	69.8%	48.1%
Sumter County	205	13	6.3%	1.58	0.0%	0.0%	92.3%	84.6%
Suwannee County	167	12	7.2%	2.97	0.0%	0.0%	91.7%	25.0%
Taylor County	67	5	7.5%	2.31	0.0%	0.0%	100.0%	100.0%
Union County	46	3	6.5%	1.99	0.0%	0.0%	66.7%	66.7%
Volusia County	1,075	177	16.5%	3.61	1.2%	4.7%	71.9%	65.9%
Wakulla County	55	2	3.6%	0.70	0.0%	0.0%	100.0%	50.0%
Walton County	213	17	8.0%	3.25	5.9%	5.9%	88.2%	82.4%
Washington County	88	4	4.5%	1.70	0.0%	0.0%	50.0%	50.0%
State total	**29,302**	**5,189**	**17.7%**	**2.83**	**1.4%**	**3.7%**	**73.3%**	**63.3%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Georgia

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

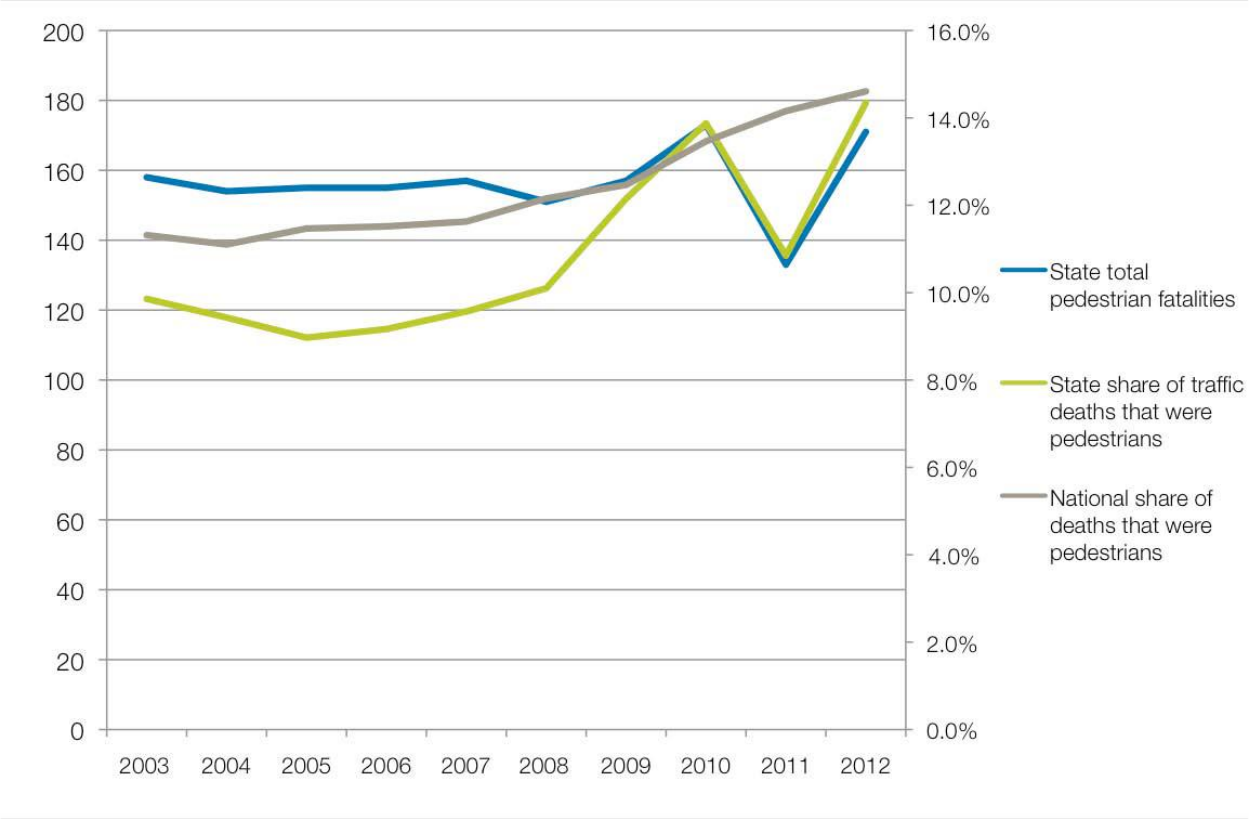
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,564 people died while walking in Georgia**.

FIGURE 1

Pedestrian fatalities in Georgia, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Georgia

In Georgia from 2003–2012, 1,564 people were killed while walking, resulting in a fatality rate of 1.67 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 10.6 percent in Georgia.

Within Georgia, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Georgia was 103.96, compared to the national PDI of 52.2 and ranked 5th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Georgia, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
8	Atlanta-Sandy Springs-Marietta, GA	839	1.59	1.3%	119.35

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Georgia, 56.9 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **74.7 percent of pedestrian fatalities in Georgia were on roads with a speed limit of 40 mph or higher**, compared to 3.8 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 112 children in Georgia.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 10.0 percent of Georgia's population, adults aged 65 and older account for 11.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Georgia is 2.48 per 100,000 people (nationally, 3.19), compared to a rate of 2.12 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Georgia suffer at a rate of 3.12 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 4.3 percent of Georgia's population, and 6.2 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Georgia from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.74. The rate for Hispanic people of any race was 3.19; for black people and African Americans, 2.74; and for Asians and Pacific Islanders, 1.34.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

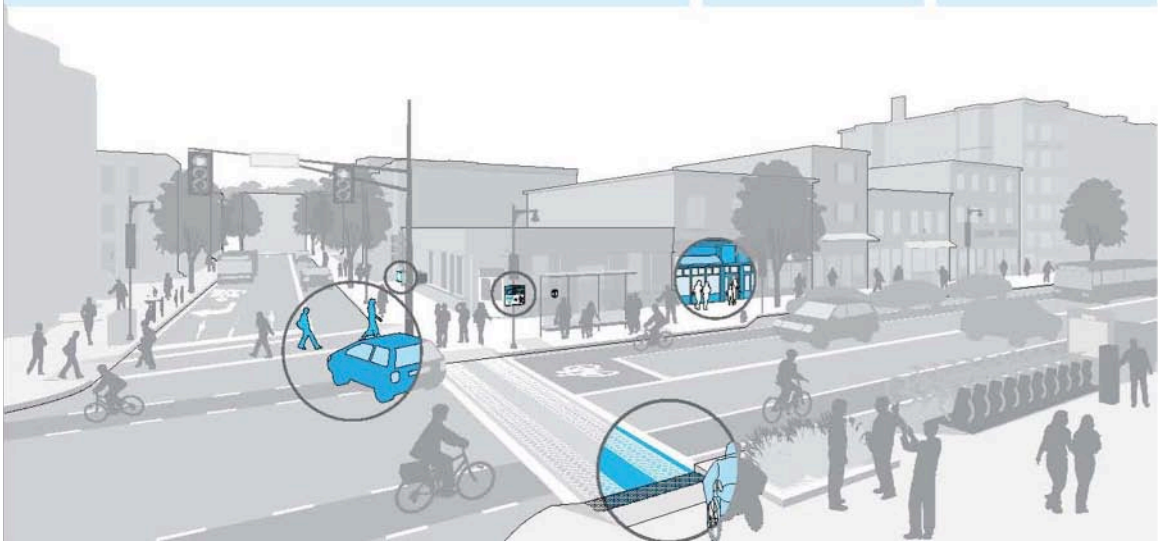
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Albany, GA	256	34	13.3%	1.90	0.0%	0.0%	75.8%	78.1%
Athens-Clarke County, GA	285	31	10.9%	1.86	0.0%	0.0%	83.9%	67.7%
Atlanta-Sandy Springs-Marietta, GA	5,976	839	14.0%	1.59	0.0%	5.1%	74.6%	59.5%
Augusta-Richmond County, GA-SC	962	119	12.4%	2.59	0.0%	0.8%	78.8%	58.8%
Brunswick, GA	275	31	11.3%	3.39	3.1%	3.1%	81.3%	50.0%
Chattanooga, TN-GA	826	58	7.0%	0.95	1.8%	10.7%	66.1%	69.0%
Columbus, GA-AL	473	67	14.2%	2.02	0.0%	0.0%	64.2%	60.9%
Dalton, GA	258	15	5.8%	0.71	6.7%	6.7%	93.3%	73.3%
Gainesville, GA	267	15	5.6%	0.55	0.0%	0.0%	80.0%	46.7%
Hinesville-Fort Stewart, GA	151	6	4.0%	0.51	0.0%	0.0%	66.7%	16.7%
Macon, GA	485	76	15.7%	3.44	0.0%	5.3%	72.4%	63.4%
Rome, GA	164	16	9.8%	1.46	0.0%	6.3%	81.3%	62.5%
Savannah, GA	500	55	11.0%	1.72	0.0%	5.4%	69.6%	71.4%
Valdosta, GA	246	23	9.3%	2.00	0.0%	0.0%	72.0%	50.0%
Warner Robins, GA	170	16	9.4%	1.14	0.0%	6.3%	68.8%	73.3%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Appling County	57	2	3.5%	1.11	0.0%	0.0%	100.0%	50.0%
Atkinson County	28	2	7.1%	2.43	0.0%	0.0%	50.0%	50.0%
Bacon County	30	5	16.7%	4.61	0.0%	0.0%	100.0%	80.0%
Baker County	17	1	5.9%	2.69	0.0%	0.0%	100.0%	0.0%
Baldwin County	79	10	12.7%	2.16	0.0%	10.0%	80.0%	66.7%
Banks County	55	5	9.1%	2.86	0.0%	0.0%	100.0%	40.0%
Barrow County	128	3	2.3%	0.47	0.0%	33.3%	33.3%	66.7%
Bartow County	236	19	8.1%	2.00	0.0%	0.0%	100.0%	42.1%
Ben Hill County	20	2	10.0%	1.14	0.0%	0.0%	100.0%	50.0%
Berrien County	35	2	5.7%	1.09	0.0%	50.0%	0.0%	50.0%
Bibb County	253	59	23.3%	3.81	0.0%	6.8%	64.4%	72.2%
Bleckley County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Brantley County	68	7	10.3%	4.02	0.0%	0.0%	85.7%	20.0%
Brooks County	54	2	3.7%	1.24	0.0%	0.0%	100.0%	100.0%
Bryan County	69	3	4.3%	1.05	0.0%	0.0%	100.0%	66.7%
Bulloch County	139	8	5.8%	1.20	0.0%	0.0%	100.0%	50.0%
Burke County	94	12	12.8%	5.20	0.0%	0.0%	66.7%	33.3%
Butts County	59	3	5.1%	1.31	0.0%	0.0%	66.7%	0.0%
Calhoun County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Camden County	95	9	9.5%	1.85	0.0%	0.0%	100.0%	50.0%
Candler County	49	1	2.0%	0.94	0.0%	0.0%	100.0%	0.0%
Carroll County	240	15	6.3%	1.40	0.0%	13.3%	60.0%	46.7%
Catoosa County	67	1	1.5%	0.16	0.0%	0.0%	100.0%	0.0%
Charlton County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chatham County	356	50	14.0%	1.96	0.0%	5.9%	68.6%	72.7%
Chattahoochee County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chattooga County	54	3	5.6%	1.16	0.0%	33.3%	66.7%	66.7%
Cherokee County	176	13	7.4%	0.65	0.0%	0.0%	91.7%	30.8%
Clarke County	115	24	20.9%	2.10	0.0%	0.0%	83.3%	79.2%
Clay County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clayton County	271	66	24.4%	2.54	0.0%	3.1%	89.2%	84.4%
Clinch County	36	6	16.7%	8.77	16.7%	33.3%	33.3%	0.0%
Cobb County	554	107	19.3%	1.59	0.0%	7.5%	79.4%	61.2%
Coffee County	97	5	5.2%	1.21	0.0%	0.0%	100.0%	40.0%
Colquitt County	112	11	9.8%	2.48	0.0%	0.0%	63.6%	77.8%
Columbia County	111	12	10.8%	1.04	0.0%	0.0%	91.7%	66.7%
Cook County	49	0	0.0%	0.00	N/A	N/A	N/A	N/A
Coweta County	194	13	6.7%	1.10	0.0%	0.0%	100.0%	50.0%
Crawford County	36	1	2.8%	0.78	0.0%	0.0%	100.0%	0.0%
Crisp County	61	7	11.5%	3.04	0.0%	0.0%	42.9%	28.6%
Dade County	45	1	2.2%	0.61	0.0%	0.0%	100.0%	0.0%
Dawson County	59	3	5.1%	1.43	0.0%	0.0%	66.7%	66.7%
Decatur County	78	5	6.4%	1.80	0.0%	0.0%	100.0%	100.0%
DeKalb County	695	181	26.0%	2.65	0.0%	2.2%	81.2%	67.3%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Dodge County	40	1	2.5%	0.47	0.0%	0.0%	0.0%	0.0%
Dooly County	46	2	4.3%	1.44	0.0%	50.0%	50.0%	50.0%
Dougherty County	111	17	15.3%	1.80	0.0%	0.0%	64.7%	70.6%
Douglas County	178	12	6.7%	0.98	0.0%	7.7%	69.2%	41.7%
Early County	40	2	5.0%	1.77	0.0%	0.0%	100.0%	50.0%
Echols County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Effingham County	75	2	2.7%	0.41	0.0%	0.0%	50.0%	50.0%
Elbert County	56	1	1.8%	0.49	0.0%	0.0%	100.0%	0.0%
Emanuel County	57	0	0.0%	0.00	N/A	N/A	N/A	N/A
Evans County	33	1	3.0%	0.92	0.0%	0.0%	100.0%	100.0%
Fannin County	63	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fayette County	70	2	2.9%	0.19	0.0%	50.0%	50.0%	50.0%
Floyd County	164	16	9.8%	1.68	0.0%	6.3%	81.3%	62.5%
Forsyth County	170	10	5.9%	0.63	0.0%	11.1%	88.9%	87.5%
Franklin County	73	4	5.5%	1.83	0.0%	0.0%	75.0%	100.0%
Fulton County	995	198	19.9%	2.25	0.0%	6.5%	51.8%	53.9%
Gilmer County	79	2	2.5%	0.73	0.0%	0.0%	0.0%	50.0%
Glascock County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Glynn County	152	20	13.2%	2.62	5.0%	5.0%	80.0%	63.2%
Gordon County	109	9	8.3%	1.70	0.0%	0.0%	100.0%	50.0%
Grady County	52	6	11.5%	2.44	0.0%	0.0%	50.0%	66.7%
Greene County	67	5	7.5%	3.18	0.0%	0.0%	80.0%	50.0%
Gwinnett County	663	102	15.4%	1.34	0.0%	5.9%	83.3%	55.6%
Habersham County	103	3	2.9%	0.73	0.0%	0.0%	66.7%	0.0%
Hall County	267	15	5.6%	0.88	0.0%	0.0%	80.0%	46.7%
Hancock County	29	1	3.4%	1.04	0.0%	0.0%	100.0%	100.0%
Haralson County	77	3	3.9%	1.06	0.0%	0.0%	100.0%	66.7%
Harris County	75	8	10.7%	2.66	0.0%	0.0%	87.5%	14.3%
Hart County	56	2	3.6%	0.81	0.0%	0.0%	100.0%	100.0%
Heard County	37	2	5.4%	1.73	0.0%	0.0%	100.0%	50.0%
Henry County	268	26	9.7%	1.39	0.0%	7.7%	88.5%	40.0%
Houston County	170	16	9.4%	1.20	0.0%	6.3%	68.8%	73.3%
Irwin County	36	4	11.1%	4.14	0.0%	0.0%	100.0%	50.0%
Jackson County	175	6	3.4%	1.08	0.0%	0.0%	100.0%	33.3%
Jasper County	30	1	3.3%	0.75	0.0%	0.0%	100.0%	100.0%
Jeff Davis County	43	1	2.3%	0.70	0.0%	0.0%	0.0%	100.0%
Jefferson County	49	5	10.2%	2.96	0.0%	0.0%	80.0%	100.0%
Jenkins County	29	2	6.9%	2.36	0.0%	0.0%	100.0%	50.0%
Johnson County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jones County	63	5	7.9%	1.80	0.0%	0.0%	100.0%	80.0%
Lamar County	42	2	4.8%	1.14	0.0%	0.0%	100.0%	100.0%
Lanier County	21	2	9.5%	2.19	0.0%	0.0%	50.0%	0.0%
Laurens County	140	8	5.7%	1.68	0.0%	0.0%	62.5%	42.9%
Lee County	55	6	10.9%	2.18	0.0%	0.0%	100.0%	83.3%
Liberty County	109	5	4.6%	0.78	0.0%	0.0%	80.0%	20.0%
Lincoln County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Long County	42	1	2.4%	0.76	0.0%	0.0%	0.0%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Lowndes County	161	19	11.8%	1.83	0.0%	0.0%	71.4%	50.0%
Lumpkin County	91	2	2.2%	0.71	0.0%	0.0%	100.0%	50.0%
Macon County	41	4	9.8%	2.77	0.0%	0.0%	100.0%	75.0%
Madison County	69	3	4.3%	1.09	0.0%	0.0%	66.7%	66.7%
Marion County	26	3	11.5%	3.64	0.0%	0.0%	100.0%	66.7%
McDuffie County	72	7	9.7%	3.24	0.0%	0.0%	85.7%	42.9%
McIntosh County	55	4	7.3%	2.99	0.0%	0.0%	80.0%	25.0%
Meriwether County	61	2	3.3%	0.90	0.0%	0.0%	100.0%	50.0%
Miller County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Mitchell County	62	1	1.6%	0.42	0.0%	0.0%	100.0%	100.0%
Monroe County	86	8	9.3%	3.15	0.0%	0.0%	100.0%	0.0%
Montgomery County	25	1	4.0%	1.11	0.0%	0.0%	0.0%	0.0%
Morgan County	78	4	5.1%	2.29	0.0%	25.0%	75.0%	75.0%
Murray County	84	3	3.6%	0.76	0.0%	0.0%	100.0%	100.0%
Muscogee County	200	38	19.0%	2.02	0.0%	0.0%	42.1%	75.0%
Newton County	150	14	9.3%	1.51	0.0%	7.1%	78.6%	50.0%
Oconee County	61	4	6.6%	1.30	0.0%	0.0%	100.0%	0.0%
Oglethorpe County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Paulding County	147	8	5.4%	0.62	0.0%	12.5%	87.5%	75.0%
Peach County	61	8	13.1%	3.03	0.0%	0.0%	87.5%	57.1%
Pickens County	84	1	1.2%	0.35	0.0%	0.0%	100.0%	100.0%
Pierce County	58	3	5.2%	1.68	0.0%	0.0%	100.0%	66.7%
Pike County	37	2	5.4%	1.18	0.0%	0.0%	100.0%	50.0%
Polk County	90	7	7.8%	1.72	0.0%	0.0%	66.7%	57.1%
Pulaski County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Putnam County	52	3	5.8%	1.45	0.0%	33.3%	0.0%	0.0%
Quitman County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rabun County	39	4	10.3%	2.48	0.0%	0.0%	75.0%	75.0%
Randolph County	12	2	16.7%	2.61	0.0%	0.0%	100.0%	100.0%
Richmond County	314	54	17.2%	2.72	0.0%	1.9%	77.8%	64.7%
Rockdale County	88	15	17.0%	1.84	0.0%	0.0%	86.7%	76.9%
Schley County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Screven County	36	2	5.6%	1.35	0.0%	0.0%	100.0%	100.0%
Seminole County	25	1	4.0%	1.13	0.0%	0.0%	0.0%	0.0%
Spalding County	119	10	8.4%	1.60	0.0%	0.0%	30.0%	22.2%
Stephens County	50	1	2.0%	0.39	0.0%	0.0%	100.0%	100.0%
Stewart County	26	4	15.4%	6.91	0.0%	0.0%	100.0%	100.0%
Sumter County	60	7	11.7%	2.14	0.0%	0.0%	50.0%	42.9%
Talbot County	35	4	11.4%	5.86	0.0%	0.0%	100.0%	75.0%
Taliaferro County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Tattnall County	45	3	6.7%	1.25	0.0%	0.0%	100.0%	66.7%
Taylor County	29	2	6.9%	2.28	0.0%	0.0%	100.0%	100.0%
Telfair County	22	1	4.5%	0.64	0.0%	0.0%	0.0%	0.0%
Terrell County	21	4	19.0%	4.09	0.0%	0.0%	75.0%	100.0%
Thomas County	82	4	4.9%	0.91	0.0%	0.0%	75.0%	50.0%
Tift County	96	9	9.4%	2.27	0.0%	0.0%	77.8%	25.0%
Toombs County	61	3	4.9%	1.11	0.0%	0.0%	33.3%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Towns County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Treutlen County	32	1	3.1%	1.46	0.0%	0.0%	100.0%	0.0%
Troup County	143	7	4.9%	1.08	0.0%	0.0%	85.7%	33.3%
Turner County	50	4	8.0%	4.43	0.0%	0.0%	100.0%	25.0%
Twiggs County	47	3	6.4%	3.16	0.0%	0.0%	100.0%	66.7%
Union County	37	1	2.7%	0.48	0.0%	100.0%	0.0%	N/A
Upson County	48	7	14.6%	2.57	0.0%	28.6%	71.4%	57.1%
Walker County	107	6	5.6%	0.90	0.0%	16.7%	66.7%	66.7%
Walton County	148	6	4.1%	0.76	0.0%	0.0%	33.3%	50.0%
Ware County	90	3	3.3%	0.84	0.0%	0.0%	33.3%	33.3%
Warren County	40	1	2.5%	1.68	0.0%	0.0%	100.0%	0.0%
Washington County	50	4	8.0%	1.91	0.0%	0.0%	100.0%	100.0%
Wayne County	71	5	7.0%	1.70	0.0%	0.0%	60.0%	80.0%
Webster County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wheeler County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
White County	59	0	0.0%	0.00	N/A	N/A	N/A	N/A
Whitfield County	174	12	6.9%	1.22	8.3%	8.3%	91.7%	66.7%
Wilcox County	27	3	11.1%	3.33	0.0%	0.0%	33.3%	66.7%
Wilkes County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wilkinson County	32	1	3.1%	1.03	0.0%	0.0%	100.0%	100.0%
Worth County	52	6	11.5%	2.76	0.0%	0.0%	80.0%	100.0%
State total	**14,748**	**1,564**	**10.6%**	**1.67**	**0.2%**	**3.8%**	**74.7%**	**56.9%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Hawaii

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

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This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

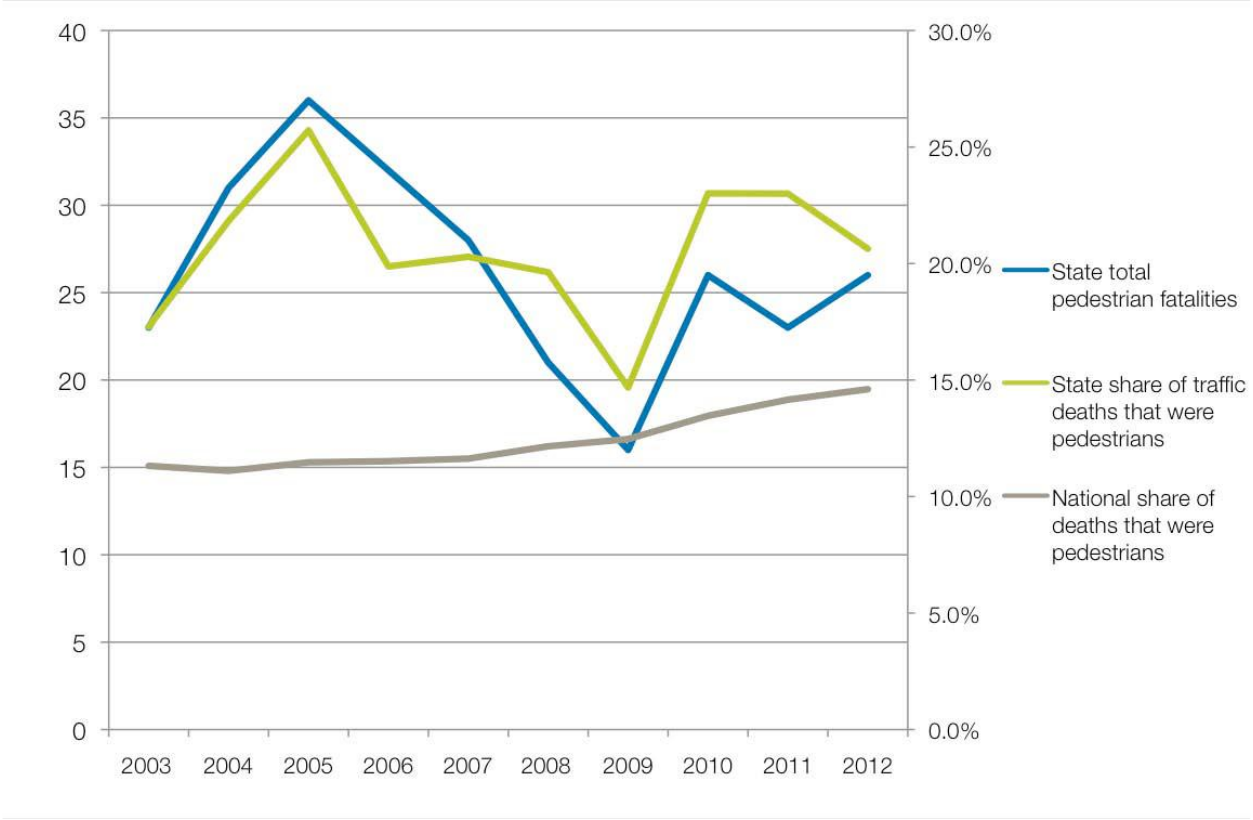
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **262 people died while walking in Hawaii**.

FIGURE 1

Pedestrian fatalities in Hawaii, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Hawaii

In Hawaii from 2003–2012, 262 people were killed while walking, resulting in a fatality rate of 1.98 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 20.6 percent in Hawaii.

Within Hawaii, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Hawaii was 34.97, compared to the national PDI of 52.2 and ranked 28th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Hawaii, 63.0 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **19.8 percent of pedestrian fatalities in Hawaii were on roads with a speed limit of 40 mph or higher**, compared to 37.0 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 11 children in Hawaii.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.7 percent of Hawaii's population, adults aged 65 and older account for 41.9 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Hawaii is 6.81 per 100,000 people (nationally, 3.19), compared to a rate of 1.5 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Hawaii suffer at a rate of 9.75 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.8 percent of Hawaii's population, and 29.9 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Hawaii from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.97. The rate for Hispanic people of any race was 1.82; and for Asians and Pacific Islanders, 2.44. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

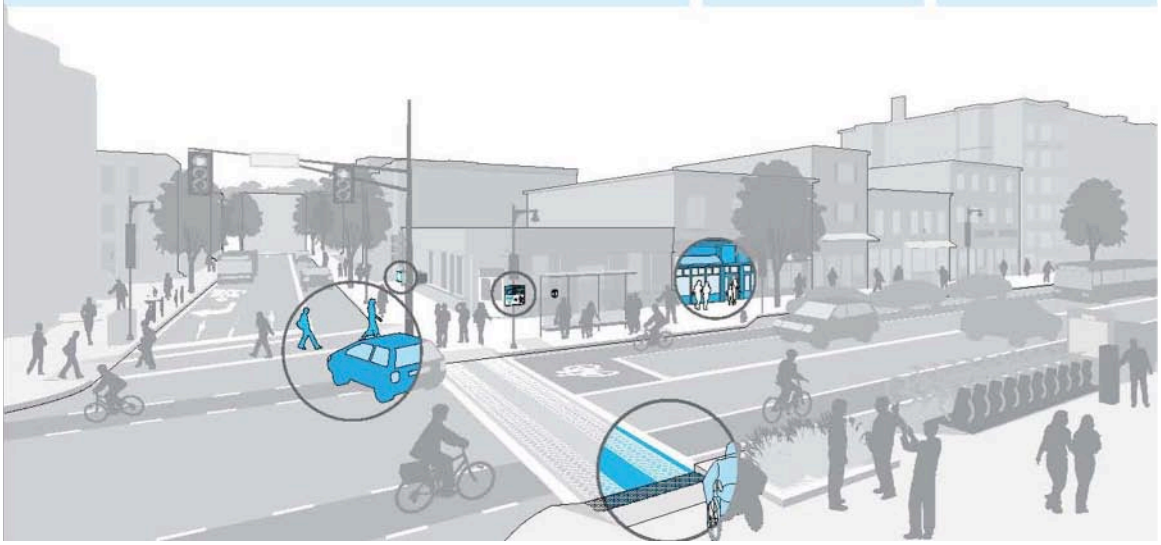
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Honolulu, HI	642	180	28.0%	1.57	0.6%	48.9%	11.7%	66.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Hawaii County	340	42	12.4%	2.38	2.4%	14.6%	43.9%	58.5%
Honolulu County	642	180	28.0%	1.93	0.6%	48.9%	11.7%	66.5%
Kalawao County	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Kauai County	91	9	9.9%	1.39	0.0%	77.8%	11.1%	55.6%
Maui County	196	31	15.8%	2.08	22.6%	22.6%	48.4%	67.7%
State total	**1,269**	**262**	**20.6%**	**1.98**	**3.5%**	**37.0%**	**19.8%**	**63.0%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Idaho

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

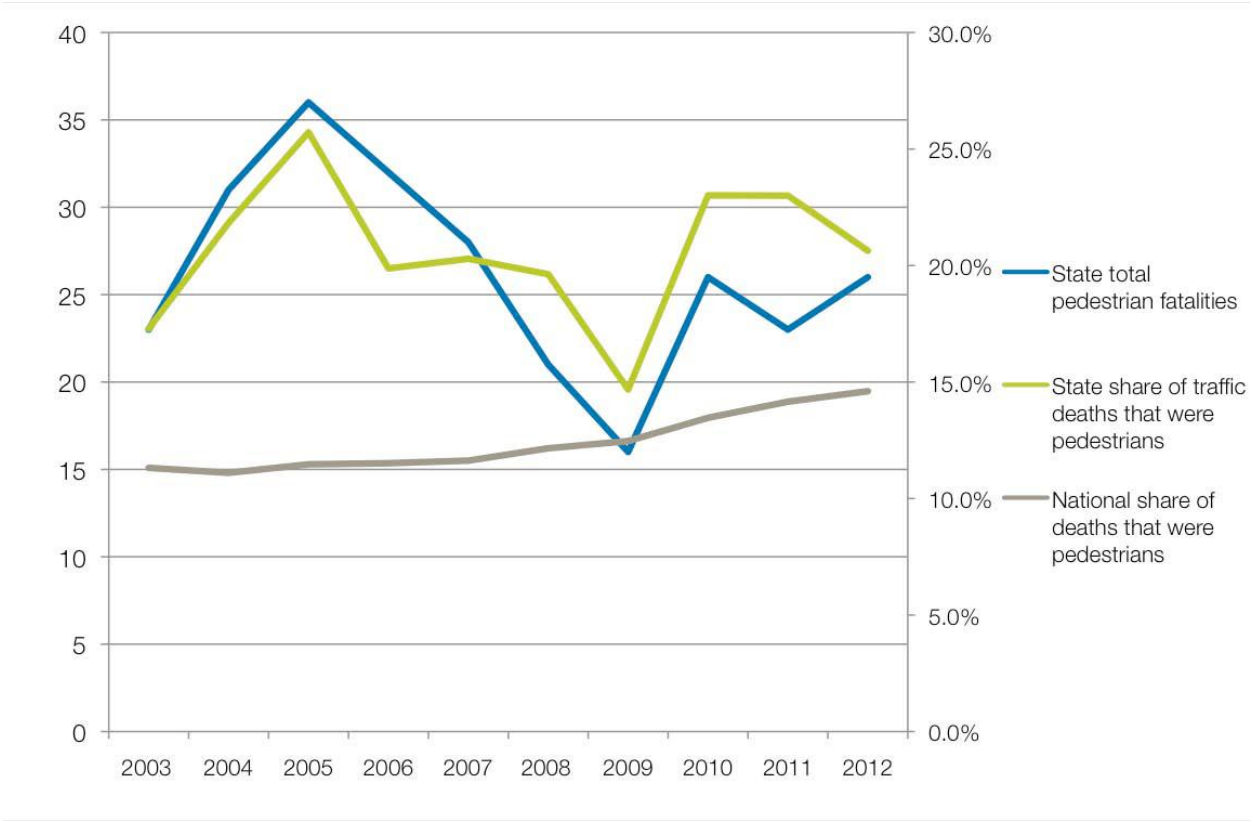
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **119 people died while walking in Idaho**.

FIGURE 1

Pedestrian fatalities in Idaho, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Idaho

In Idaho from 2003–2012, 119 people were killed while walking, resulting in a fatality rate of 0.79 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.0 percent in Idaho.

Within Idaho, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Idaho was 22.25, compared to the national PDI of 52.2 and ranked 42nd nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Idaho, 53.8 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **48.7 percent of pedestrian fatalities in Idaho were on roads with a speed limit of 40 mph or higher**, compared to 12.8 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 12 children in Idaho.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.8 percent of Idaho's population, adults aged 65 and older account for 28.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Idaho is 3.37 per 100,000 people (nationally, 3.19), compared to a rate of 1.13 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Idaho suffer at a rate of 3.76 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.4 percent of Idaho's population, and 14.5 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Idaho from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.36. The rate for Hispanic people of any race was 1.51. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

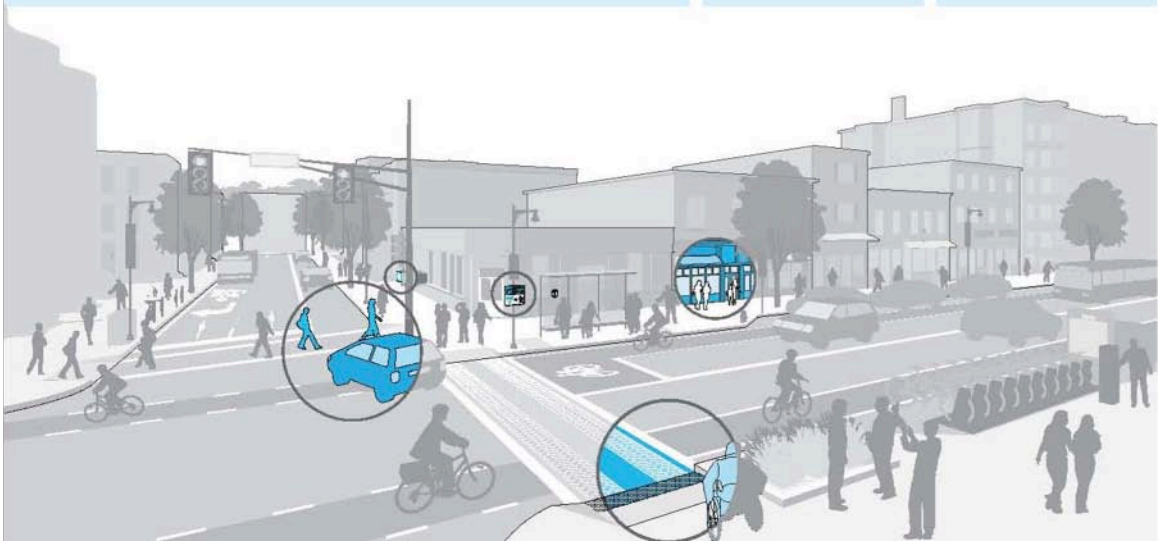
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Boise City-Nampa, ID	515	39	7.6%	0.45	7.7%	12.8%	35.9%	61.5%
Coeur d'Alene, ID	136	3	2.2%	0.14	0.0%	0.0%	66.7%	100.0%
Idaho Falls, ID	137	6	4.4%	0.46	0.0%	0.0%	40.0%	50.0%
Lewiston, ID-WA	91	6	6.6%	1.31	0.0%	50.0%	33.3%	66.7%
Logan, UT-ID	96	7	7.3%	0.48	0.0%	16.7%	66.7%	57.1%
Pocatello, ID	136	8	5.9%	0.66	0.0%	0.0%	62.5%	62.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Ada County	203	22	10.8%	0.59	4.5%	9.1%	27.3%	63.6%
Adams County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bannock County	82	6	7.3%	0.75	0.0%	0.0%	50.0%	83.3%
Bear Lake County	24	1	4.2%	1.65	0.0%	0.0%	100.0%	100.0%
Benewah County	22	1	4.5%	1.09	0.0%	0.0%	0.0%	0.0%
Bingham County	91	5	5.5%	1.13	0.0%	0.0%	100.0%	0.0%
Blaine County	54	1	1.9%	0.47	0.0%	100.0%	0.0%	100.0%
Boise County	64	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bonner County	81	4	4.9%	1.00	0.0%	50.0%	25.0%	75.0%
Bonneville County	106	5	4.7%	0.51	0.0%	0.0%	50.0%	60.0%
Boundary County	30	1	3.3%	0.94	0.0%	0.0%	0.0%	N/A
Butte County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Camas County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Canyon County	186	17	9.1%	0.96	11.8%	17.6%	47.1%	58.8%
Caribou County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cassia County	76	7	9.2%	3.17	0.0%	0.0%	71.4%	42.9%
Clark County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clearwater County	16	1	6.3%	1.15	100.0%	100.0%	0.0%	0.0%
Custer County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Elmore County	120	2	1.7%	0.76	0.0%	0.0%	50.0%	0.0%
Franklin County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fremont County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gem County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gooding County	51	1	2.0%	0.67	0.0%	100.0%	0.0%	100.0%
Idaho County	78	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jefferson County	31	1	3.2%	0.42	0.0%	0.0%	0.0%	0.0%
Jerome County	88	4	4.5%	1.91	0.0%	0.0%	75.0%	50.0%
Kootenai County	136	3	2.2%	0.23	0.0%	0.0%	66.7%	100.0%
Latah County	43	5	11.6%	1.36	0.0%	20.0%	60.0%	50.0%
Lemhi County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lewis County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lincoln County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Madison County	40	9	22.5%	2.55	11.1%	22.2%	55.6%	66.7%
Minidoka County	57	2	3.5%	1.02	0.0%	0.0%	100.0%	50.0%
Nez Perce County	81	6	7.4%	1.55	0.0%	50.0%	33.3%	66.7%
Oneida County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Owyhee County	42	0	0.0%	0.00	N/A	N/A	N/A	N/A
Payette County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Power County	54	2	3.7%	2.64	0.0%	0.0%	100.0%	0.0%
Shoshone County	24	1	4.2%	0.78	0.0%	0.0%	100.0%	0.0%
Teton County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Twin Falls County	118	10	8.5%	1.36	0.0%	20.0%	50.0%	60.0%
Valley County	21	1	4.8%	1.07	100.0%	100.0%	0.0%	0.0%
Washington County	16	1	6.3%	0.99	0.0%	0.0%	100.0%	100.0%

State total	**2,365**	**119**	**5.0%**	**0.79**	**5.1%**	**12.8%**	**48.7%**	**53.8%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Illinois

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

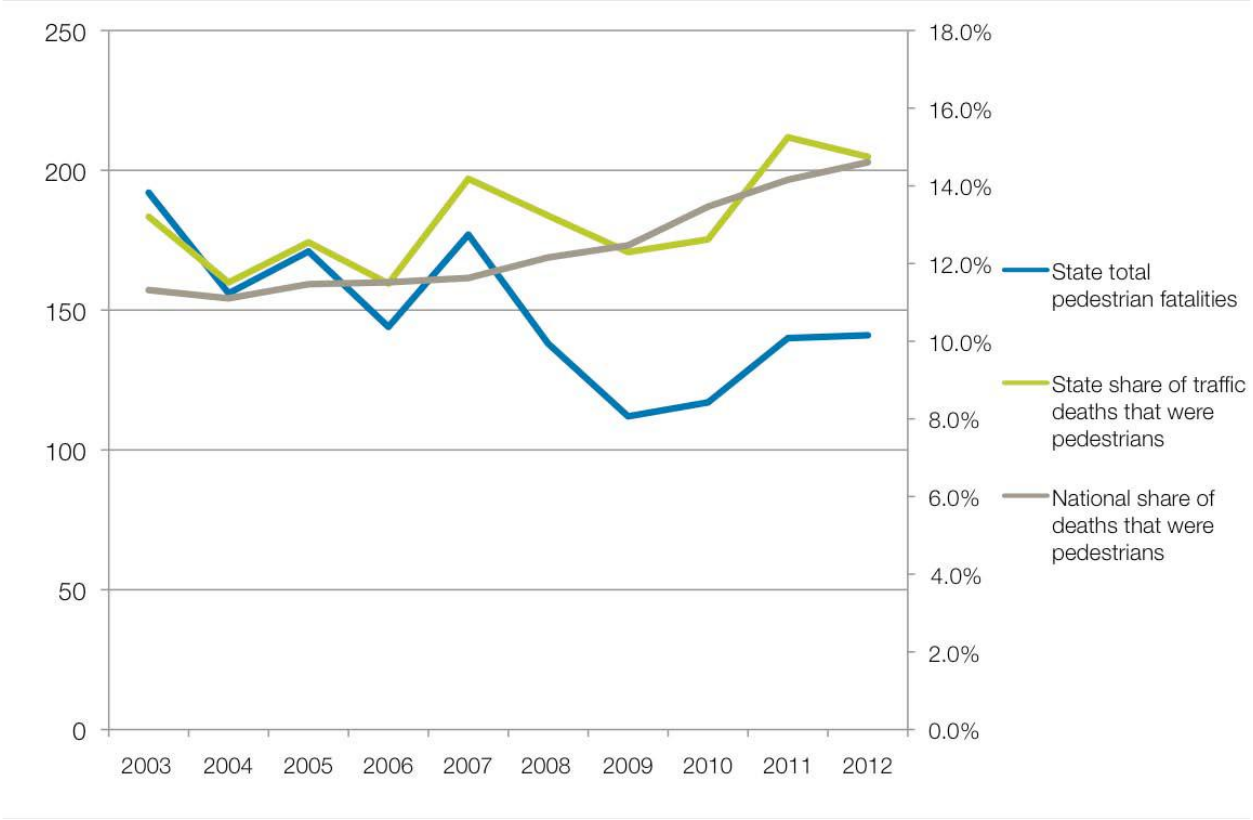
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,488 people died while walking in Illinois**.

FIGURE 1

Pedestrian fatalities in Illinois, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Illinois

In Illinois from 2003–2012, 1,488 people were killed while walking, resulting in a fatality rate of 1.17 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 13.0 percent in Illinois.

Within Illinois, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Illinois was 32.29, compared to the national PDI of 52.2 and ranked 31st nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Illinois, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
44	Chicago-Naperville-Joliet, IL-IN-WI	1,165	1.03	3.1%	32.94

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Illinois, 56.3 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **42.7 percent of pedestrian fatalities in Illinois were on roads with a speed limit of 40 mph or higher**, compared to 3.9 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 119 children in Illinois.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.2 percent of Illinois's population, adults aged 65 and older account for 20.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Illinois is 2.8 per 100,000 people (nationally, 3.19), compared to a rate of 1.51 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Illinois suffer at a rate of 3.41 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.0 percent of Illinois's population, and 12.2 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Illinois from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.43. The rate for Hispanic people of any race was 1.71; for black people and African Americans, 2.68; and for Asians and Pacific Islanders, 0.97.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

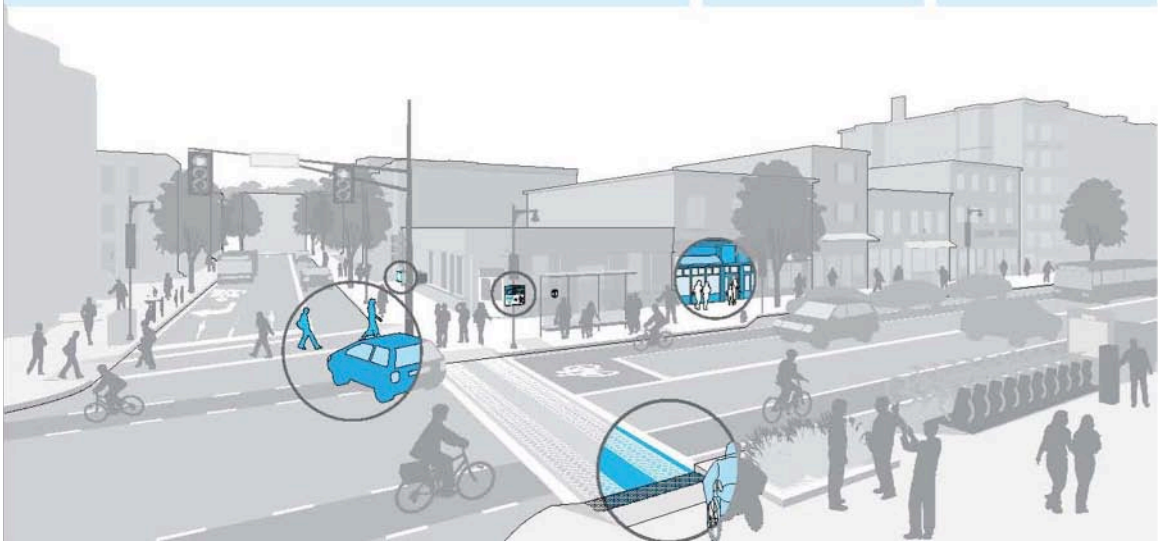
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bloomington-Normal, IL	150	13	8.7%	0.47	0.0%	0.0%	76.9%	53.8%
Cape Girardeau-Jackson, MO-IL	137	12	8.8%	1.45	0.0%	0.0%	91.7%	33.3%
Champaign-Urbana, IL	221	26	11.8%	0.95	4.2%	8.3%	37.5%	53.8%
Chicago-Naperville-Joliet, IL-IN-WI	6,370	1,165	18.3%	1.03	1.9%	6.3%	35.0%	54.1%
Danville, IL	119	13	10.9%	1.96	0.0%	0.0%	42.9%	84.6%
Davenport-Moline-Rock Island, IA-IL	320	24	7.5%	0.58	0.0%	8.3%	50.0%	54.2%
Decatur, IL	106	11	10.4%	1.27	0.0%	0.0%	33.3%	72.7%
Kankakee-Bradley, IL	156	13	8.3%	1.06	0.0%	0.0%	61.5%	38.5%
Peoria, IL	394	36	9.1%	0.63	0.0%	0.0%	65.7%	63.9%
Rockford, IL	367	28	7.6%	0.75	3.6%	7.1%	60.7%	50.0%
Springfield, IL	225	26	11.6%	1.33	3.8%	3.8%	61.5%	65.4%
St. Louis, MO-IL	3,299	364	11.0%	1.22	2.5%	9.6%	51.5%	43.6%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	44	4	9.1%	0.60	0.0%	0.0%	50.0%	75.0%
Alexander County	28	4	14.3%	4.69	0.0%	0.0%	75.0%	50.0%
Bond County	42	3	7.1%	1.68	0.0%	0.0%	100.0%	33.3%
Boone County	84	5	6.0%	0.96	0.0%	20.0%	60.0%	40.0%
Brown County	11	1	9.1%	1.45	0.0%	0.0%	0.0%	100.0%
Bureau County	58	2	3.4%	0.57	0.0%	0.0%	50.0%	50.0%
Calhoun County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Carroll County	34	2	5.9%	1.28	0.0%	0.0%	0.0%	100.0%
Cass County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Champaign County	180	25	13.9%	1.27	4.3%	8.7%	34.8%	52.0%
Christian County	74	4	5.4%	1.14	0.0%	0.0%	75.0%	100.0%
Clark County	48	1	2.1%	0.60	0.0%	0.0%	0.0%	100.0%
Clay County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clinton County	87	3	3.4%	0.81	0.0%	0.0%	100.0%	66.7%
Coles County	88	8	9.1%	1.50	12.5%	12.5%	62.5%	50.0%
Cook County	3,122	803	25.7%	1.54	1.8%	5.5%	28.4%	55.4%
Crawford County	36	3	8.3%	1.51	0.0%	0.0%	100.0%	33.3%
Cumberland County	48	1	2.1%	0.90	0.0%	0.0%	100.0%	0.0%
De Witt County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
DeKalb County	116	6	5.2%	0.59	0.0%	0.0%	83.3%	66.7%
Douglas County	51	3	5.9%	1.50	0.0%	0.0%	100.0%	100.0%
DuPage County	367	59	16.1%	0.64	1.8%	1.8%	63.2%	70.2%
Edgar County	32	2	6.3%	1.07	0.0%	0.0%	100.0%	50.0%
Edwards County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Effingham County	96	10	10.4%	2.92	0.0%	0.0%	90.0%	20.0%
Fayette County	63	3	4.8%	1.37	0.0%	0.0%	100.0%	33.3%
Ford County	29	1	3.4%	0.71	0.0%	0.0%	100.0%	100.0%
Franklin County	92	9	9.8%	2.28	0.0%	0.0%	55.6%	33.3%
Fulton County	58	1	1.7%	0.27	0.0%	0.0%	100.0%	100.0%
Gallatin County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Greene County	22	1	4.5%	0.71	0.0%	0.0%	100.0%	100.0%
Grundy County	98	8	8.2%	1.70	0.0%	0.0%	75.0%	25.0%
Hamilton County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hancock County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hardin County	19	1	5.3%	2.24	0.0%	0.0%	100.0%	100.0%
Henderson County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Henry County	69	2	2.9%	0.40	0.0%	0.0%	0.0%	50.0%
Iroquois County	109	4	3.7%	1.33	0.0%	0.0%	100.0%	0.0%
Jackson County	94	11	11.7%	1.84	0.0%	0.0%	45.5%	63.6%
Jasper County	22	1	4.5%	1.02	0.0%	0.0%	0.0%	100.0%
Jefferson County	80	3	3.8%	0.76	0.0%	0.0%	66.7%	33.3%
Jersey County	54	2	3.7%	0.88	0.0%	0.0%	100.0%	50.0%
Jo Daviess County	44	4	9.1%	1.76	0.0%	25.0%	75.0%	100.0%
Johnson County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Kane County	347	37	10.7%	0.75	0.0%	8.3%	36.1%	63.9%
Kankakee County	156	13	8.3%	1.17	0.0%	0.0%	61.5%	38.5%
Kendall County	121	1	0.8%	0.10	0.0%	0.0%	100.0%	100.0%
Knox County	54	3	5.6%	0.56	0.0%	0.0%	66.7%	66.7%
Lake County	350	47	13.4%	0.68	0.0%	4.3%	52.2%	80.9%
LaSalle County	220	12	5.5%	1.06	20.0%	20.0%	60.0%	50.0%
Lawrence County	32	1	3.1%	0.60	0.0%	0.0%	100.0%	0.0%
Lee County	73	4	5.5%	1.12	0.0%	0.0%	100.0%	0.0%
Livingston County	110	2	1.8%	0.51	0.0%	50.0%	50.0%	0.0%
Logan County	55	4	7.3%	1.31	0.0%	0.0%	75.0%	0.0%
Macon County	106	11	10.4%	0.99	0.0%	0.0%	33.3%	72.7%
Macoupin County	63	0	0.0%	0.00	N/A	N/A	N/A	N/A
Madison County	346	29	8.4%	1.09	0.0%	3.4%	69.0%	75.9%
Marion County	71	3	4.2%	0.76	0.0%	0.0%	100.0%	0.0%
Marshall County	36	1	2.8%	0.78	0.0%	0.0%	100.0%	0.0%
Mason County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Massac County	52	1	1.9%	0.65	0.0%	0.0%	0.0%	100.0%
McDonough County	36	2	5.6%	0.61	0.0%	0.0%	100.0%	0.0%
McHenry County	246	18	7.3%	0.60	0.0%	5.9%	35.3%	50.0%
McLean County	150	13	8.7%	0.79	0.0%	0.0%	76.9%	53.8%
Menard County	17	1	5.9%	0.79	0.0%	0.0%	100.0%	100.0%
Mercer County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Monroe County	68	1	1.5%	0.31	0.0%	0.0%	100.0%	100.0%
Montgomery County	63	7	11.1%	2.32	0.0%	0.0%	100.0%	14.3%
Morgan County	43	1	2.3%	0.28	0.0%	0.0%	100.0%	0.0%
Moultrie County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ogle County	132	5	3.8%	0.94	0.0%	0.0%	60.0%	40.0%
Peoria County	177	22	12.4%	1.19	0.0%	0.0%	52.4%	68.2%
Perry County	32	1	3.1%	0.45	0.0%	0.0%	0.0%	100.0%
Piatt County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pike County	35	2	5.7%	1.20	0.0%	0.0%	0.0%	50.0%
Pope County	17	1	5.9%	2.27	0.0%	0.0%	100.0%	0.0%
Pulaski County	17	2	11.8%	3.15	0.0%	0.0%	100.0%	50.0%
Putnam County	11	1	9.1%	1.67	0.0%	0.0%	100.0%	100.0%
Randolph County	62	0	0.0%	0.00	N/A	N/A	N/A	N/A
Richland County	22	1	4.5%	0.62	0.0%	0.0%	100.0%	0.0%
Rock Island County	90	8	8.9%	0.54	0.0%	0.0%	62.5%	62.5%
Saline County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sangamon County	208	25	12.0%	1.28	4.0%	4.0%	60.0%	64.0%
Schuyler County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Scott County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Shelby County	38	4	10.5%	1.79	0.0%	0.0%	50.0%	25.0%
St. Clair County	371	55	14.8%	2.07	1.9%	9.4%	62.3%	60.0%
Stark County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stephenson County	63	9	14.3%	1.88	0.0%	0.0%	55.6%	55.6%
Tazewell County	120	11	9.2%	0.83	0.0%	0.0%	90.9%	54.5%
Union County	39	3	7.7%	1.67	0.0%	0.0%	66.7%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Vermilion County	119	13	10.9%	1.58	0.0%	0.0%	42.9%	84.6%
Wabash County	11	2	18.2%	1.64	0.0%	0.0%	100.0%	0.0%
Warren County	31	3	9.7%	1.68	0.0%	0.0%	66.7%	100.0%
Washington County	49	1	2.0%	0.67	0.0%	0.0%	100.0%	0.0%
Wayne County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
White County	23	4	17.4%	2.70	0.0%	25.0%	25.0%	100.0%
Whiteside County	71	7	9.9%	1.19	0.0%	0.0%	50.0%	71.4%
Will County	510	59	11.6%	0.91	1.7%	8.3%	53.3%	57.6%
Williamson County	132	12	9.1%	1.84	0.0%	8.3%	25.0%	66.7%
Winnebago County	283	23	8.1%	0.79	4.3%	4.3%	60.9%	52.2%
Woodford County	50	2	4.0%	0.53	0.0%	0.0%	50.0%	100.0%
State total	**11,429**	**1,488**	**13.0%**	**1.17**	**1.7%**	**3.9%**	**42.7%**	**56.3%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Indiana

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

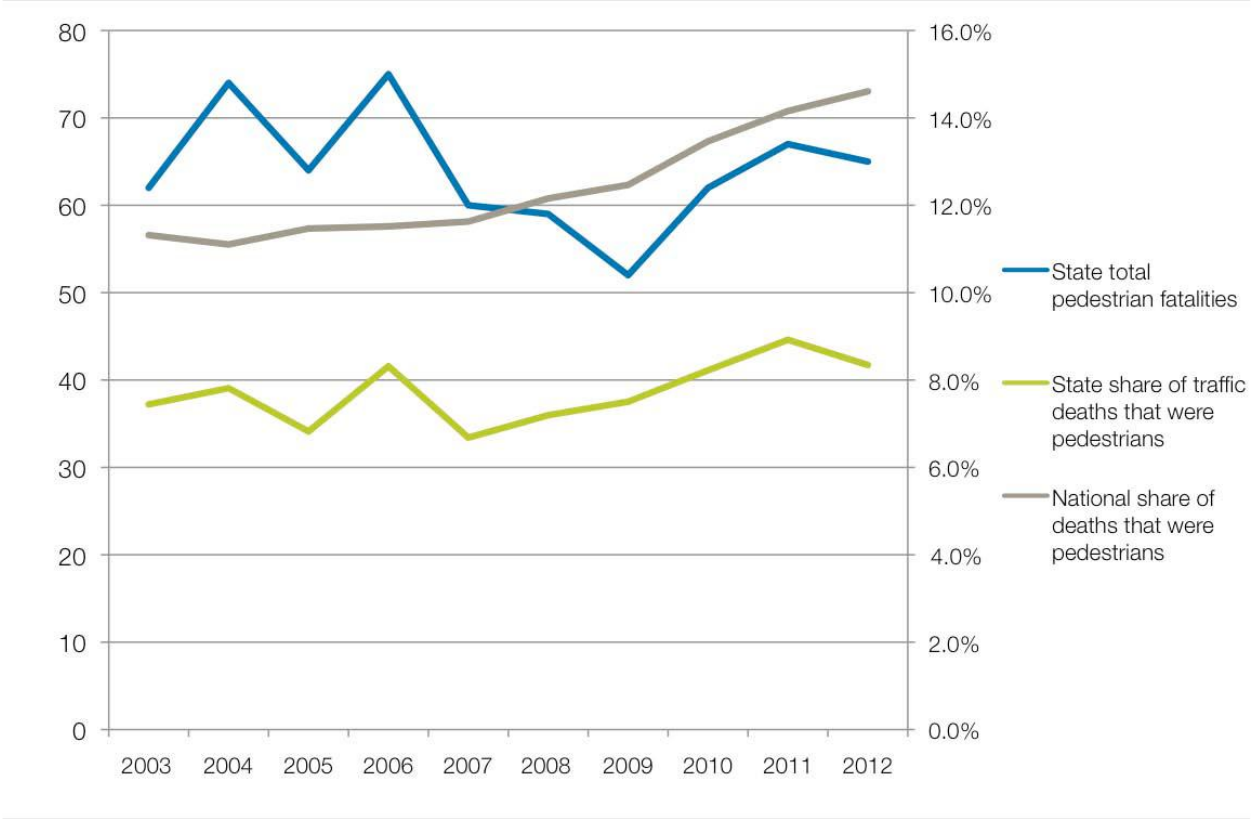
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **640 people died while walking in Indiana**.

FIGURE 1

Pedestrian fatalities in Indiana, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Indiana

In Indiana from 2003–2012, 640 people were killed while walking, resulting in a fatality rate of 1.00 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.7 percent in Indiana.

Within Indiana, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Indiana was 43.07, compared to the national PDI of 52.2 and ranked 23rd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Indiana, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
25	Indianapolis-Carmel, IN	199	1.16	1.6%	72.98

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Indiana, 15.4 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **56.4 percent of pedestrian fatalities in Indiana were on roads with a speed limit of 40 mph or higher**, compared to 7.2 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 81 children in Indiana.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.6 percent of Indiana's population, adults aged 65 and older account for 20.1 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Indiana is 2.19 per 100,000 people (nationally, 3.19), compared to a rate of 1.25 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Indiana suffer at a rate of 2.88 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.0 percent of Indiana's population, and 12.6 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Indiana from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.3. The rate for Hispanic people of any race was 1.36; and for black people and African Americans, 2.02.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

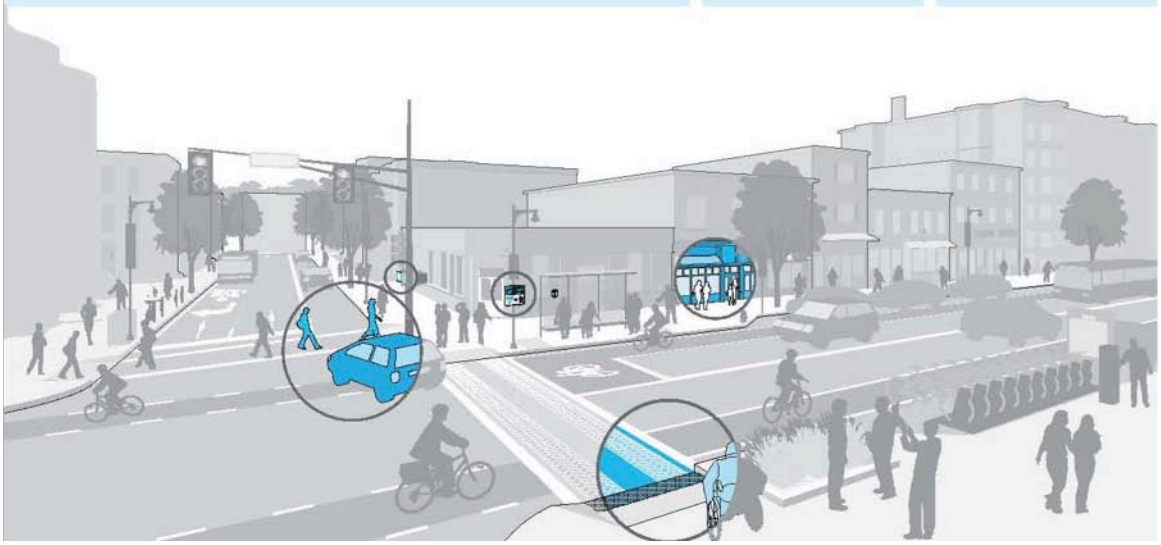
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Anderson, IN	154	12	7.8%	0.91	8.3%	8.3%	58.3%	0.0%
Bloomington, IN	227	14	6.2%	0.93	0.0%	14.3%	42.9%	14.3%
Chicago-Naperville-Joliet, IL-IN-WI	6,370	1,165	18.3%	1.03	1.9%	6.3%	35.0%	54.1%
Cincinnati-Middletown, OH-KY-IN	1,962	187	9.5%	0.84	0.5%	20.3%	47.3%	36.4%
Columbus, IN	116	7	6.0%	0.78	0.0%	0.0%	71.4%	57.1%
Elkhart-Goshen, IN	308	21	6.8%	0.91	0.0%	5.0%	60.0%	0.0%
Evansville, IN-KY	453	35	7.7%	1.17	0.0%	2.9%	42.9%	22.9%
Fort Wayne, IN	354	26	7.3%	0.62	0.0%	0.0%	73.9%	3.8%
Indianapolis-Carmel, IN	1,684	199	11.8%	1.16	3.4%	5.6%	61.5%	8.0%
Kokomo, IN	126	9	7.1%	1.01	0.0%	0.0%	75.0%	33.3%
Lafayette, IN	231	18	7.8%	0.69	0.0%	5.9%	70.6%	33.3%
Louisville/Jefferson County, KY-IN	1,606	200	12.5%	1.60	1.5%	9.5%	49.5%	51.0%
Michigan City-La Porte, IN	239	16	6.7%	1.08	0.0%	0.0%	86.7%	56.3%
Muncie, IN	132	7	5.3%	0.34	0.0%	0.0%	80.0%	0.0%
South Bend-Mishawaka, IN-MI	313	35	11.2%	1.00	3.1%	9.4%	43.8%	28.6%
Terre Haute, IN	279	18	6.5%	1.16	0.0%	0.0%	47.1%	22.2%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	47	4	8.5%	1.17	0.0%	0.0%	50.0%	25.0%
Allen County	256	24	9.4%	0.69	0.0%	0.0%	71.4%	0.0%
Bartholomew County	116	7	6.0%	0.93	0.0%	0.0%	71.4%	57.1%
Benton County	27	1	3.7%	1.13	0.0%	0.0%	100.0%	100.0%
Blackford County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Boone County	96	2	2.1%	0.37	0.0%	0.0%	33.3%	0.0%
Brown County	38	2	5.3%	1.31	0.0%	0.0%	100.0%	0.0%
Carroll County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cass County	67	5	7.5%	1.27	20.0%	40.0%	20.0%	0.0%
Clark County	115	10	8.7%	0.94	10.0%	10.0%	50.0%	20.0%
Clay County	52	3	5.8%	1.11	0.0%	0.0%	66.7%	33.3%
Clinton County	84	6	7.1%	1.81	0.0%	0.0%	66.7%	16.7%
Crawford County	34	1	2.9%	0.92	0.0%	0.0%	100.0%	0.0%
Daviess County	63	2	3.2%	0.65	0.0%	0.0%	50.0%	0.0%
Dearborn County	83	2	2.4%	0.41	0.0%	0.0%	100.0%	50.0%
Decatur County	56	4	7.1%	1.57	0.0%	0.0%	100.0%	25.0%
DeKalb County	67	3	4.5%	0.72	0.0%	0.0%	66.7%	33.3%
Delaware County	132	7	5.3%	0.59	0.0%	0.0%	80.0%	0.0%
Dubois County	55	1	1.8%	0.24	0.0%	0.0%	0.0%	0.0%
Elkhart County	308	21	6.8%	1.08	0.0%	5.0%	60.0%	0.0%
Fayette County	26	1	3.8%	0.41	0.0%	0.0%	0.0%	0.0%
Floyd County	82	8	9.8%	1.09	0.0%	0.0%	14.3%	0.0%
Fountain County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	52	1	1.9%	0.43	0.0%	0.0%	0.0%	100.0%
Fulton County	39	1	2.6%	0.48	0.0%	100.0%	0.0%	0.0%
Gibson County	75	4	5.3%	1.20	0.0%	25.0%	50.0%	25.0%
Grant County	84	6	7.1%	0.85	0.0%	0.0%	50.0%	0.0%
Greene County	64	2	3.1%	0.60	0.0%	50.0%	0.0%	50.0%
Hamilton County	170	14	8.2%	0.55	7.1%	21.4%	71.4%	21.4%
Hancock County	86	4	4.7%	0.60	25.0%	25.0%	75.0%	25.0%
Harrison County	85	3	3.5%	0.79	0.0%	0.0%	100.0%	0.0%
Hendricks County	129	9	7.0%	0.66	0.0%	0.0%	77.8%	33.3%
Henry County	93	5	5.4%	1.03	0.0%	0.0%	66.7%	0.0%
Howard County	92	9	9.8%	1.08	0.0%	0.0%	75.0%	33.3%
Huntington County	57	1	1.8%	0.27	0.0%	0.0%	0.0%	0.0%
Jackson County	93	3	3.2%	0.71	0.0%	0.0%	66.7%	33.3%
Jasper County	98	5	5.1%	1.53	0.0%	0.0%	100.0%	20.0%
Jay County	36	1	2.8%	0.47	0.0%	0.0%	100.0%	0.0%
Jefferson County	47	3	6.4%	0.93	33.3%	33.3%	66.7%	0.0%
Jennings County	66	1	1.5%	0.35	0.0%	0.0%	100.0%	0.0%
Johnson County	117	10	8.5%	0.75	0.0%	0.0%	80.0%	20.0%
Knox County	66	1	1.5%	0.26	0.0%	0.0%	100.0%	100.0%
Kosciusko County	117	1	0.9%	0.13	0.0%	0.0%	100.0%	100.0%
LaGrange County	74	3	4.1%	0.82	0.0%	0.0%	33.3%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Lake County	506	70	13.8%	1.42	2.9%	13.0%	42.0%	25.7%
LaPorte County	239	16	6.7%	1.45	0.0%	0.0%	86.7%	56.3%
Lawrence County	84	1	1.2%	0.22	0.0%	0.0%	100.0%	0.0%
Madison County	154	12	7.8%	0.91	8.3%	8.3%	58.3%	0.0%
Marion County	814	146	17.9%	1.64	2.4%	4.0%	54.4%	4.1%
Marshall County	86	6	7.0%	1.28	0.0%	0.0%	100.0%	33.3%
Martin County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Miami County	64	4	6.3%	1.08	0.0%	33.3%	33.3%	0.0%
Monroe County	102	10	9.8%	0.75	0.0%	10.0%	40.0%	10.0%
Montgomery County	81	3	3.7%	0.79	0.0%	0.0%	0.0%	0.0%
Morgan County	94	3	3.2%	0.44	0.0%	0.0%	100.0%	0.0%
Newton County	55	4	7.3%	2.80	0.0%	0.0%	25.0%	0.0%
Noble County	73	5	6.8%	1.06	0.0%	20.0%	60.0%	40.0%
Ohio County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Orange County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Owen County	61	2	3.3%	0.92	0.0%	0.0%	100.0%	0.0%
Parke County	37	3	8.1%	1.73	0.0%	0.0%	50.0%	66.7%
Perry County	38	3	7.9%	1.55	0.0%	0.0%	100.0%	0.0%
Pike County	27	2	7.4%	1.55	0.0%	50.0%	0.0%	0.0%
Porter County	220	29	13.2%	1.81	10.7%	14.3%	39.3%	6.9%
Posey County	36	2	5.6%	0.76	0.0%	0.0%	100.0%	0.0%
Pulaski County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Putnam County	53	2	3.8%	0.53	0.0%	0.0%	100.0%	50.0%
Randolph County	39	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ripley County	45	2	4.4%	0.70	0.0%	0.0%	50.0%	0.0%
Rush County	36	1	2.8%	0.57	N/A	N/A	N/A	0.0%
Scott County	48	1	2.1%	0.42	0.0%	0.0%	100.0%	100.0%
Shelby County	87	7	8.0%	1.59	14.3%	14.3%	85.7%	0.0%
Spencer County	53	3	5.7%	1.44	0.0%	0.0%	66.7%	0.0%
St. Joseph County	209	26	12.4%	0.98	4.3%	8.7%	34.8%	23.1%
Starke County	73	3	4.1%	1.29	0.0%	0.0%	66.7%	66.7%
Steuben County	73	5	6.8%	1.47	0.0%	0.0%	80.0%	0.0%
Sullivan County	40	1	2.5%	0.46	0.0%	0.0%	0.0%	0.0%
Switzerland County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Tippecanoe County	167	17	10.2%	1.02	0.0%	6.3%	68.8%	29.4%
Tipton County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Union County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Vanderburgh County	161	19	11.8%	1.07	0.0%	0.0%	26.3%	10.5%
Vermillion County	44	1	2.3%	0.61	0.0%	0.0%	100.0%	0.0%
Vigo County	143	13	9.1%	1.22	0.0%	0.0%	41.7%	23.1%
Wabash County	66	4	6.1%	1.20	0.0%	0.0%	25.0%	0.0%
Warren County	33	1	3.0%	1.17	0.0%	0.0%	100.0%	0.0%
Warrick County	64	5	7.8%	0.86	0.0%	0.0%	60.0%	0.0%
Washington County	53	2	3.8%	0.71	50.0%	50.0%	50.0%	0.0%
Wayne County	89	2	2.2%	0.29	0.0%	0.0%	50.0%	0.0%
Wells County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
White County	59	1	1.7%	0.40	0.0%	0.0%	0.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Whitley County	65	2	3.1%	0.61	0.0%	0.0%	100.0%	50.0%
State total	**8,315**	**640**	**7.7%**	**1.00**	**2.8%**	**7.2%**	**56.4%**	**15.4%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Iowa

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

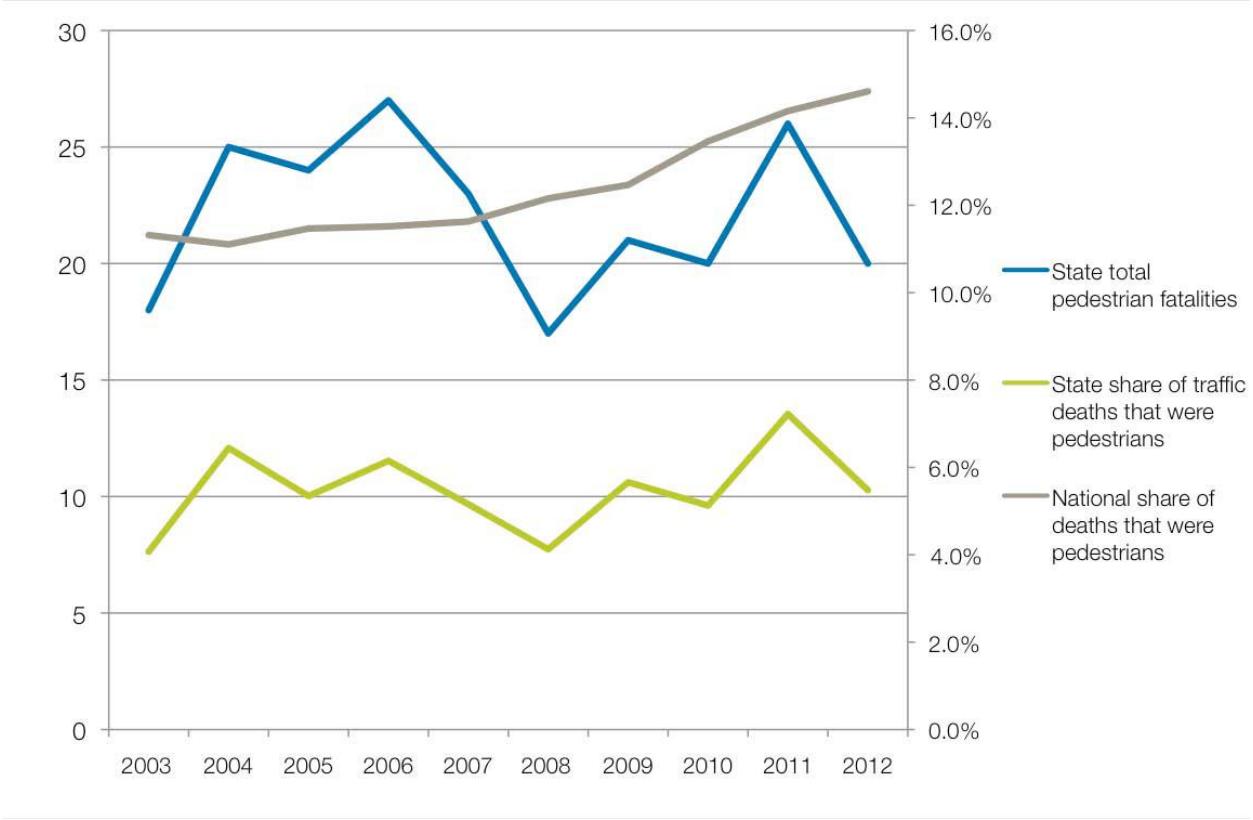
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **221 people died while walking in Iowa**.

FIGURE 1

Pedestrian fatalities in Iowa, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Iowa

In Iowa from 2003–2012, 221 people were killed while walking, resulting in a fatality rate of 0.73 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.4 percent in Iowa.

Within Iowa, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Iowa was 18.53, compared to the national PDI of 52.2 and ranked 46th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Iowa, 31.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **52.8 percent of pedestrian fatalities in Iowa were on roads with a speed limit of 40 mph or higher**, compared to 21.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 24 children in Iowa.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 14.8 percent of Iowa's population, adults aged 65 and older account for 22.6 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Iowa is 1.64 per 100,000 people (nationally, 3.19), compared to a rate of 0.98 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Iowa suffer at a rate of 2.07 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.7 percent of Iowa's population, and 14.8 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Iowa from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.04. The rate for Hispanic people of any race was 1.47; and for black people and African Americans, 1.69.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

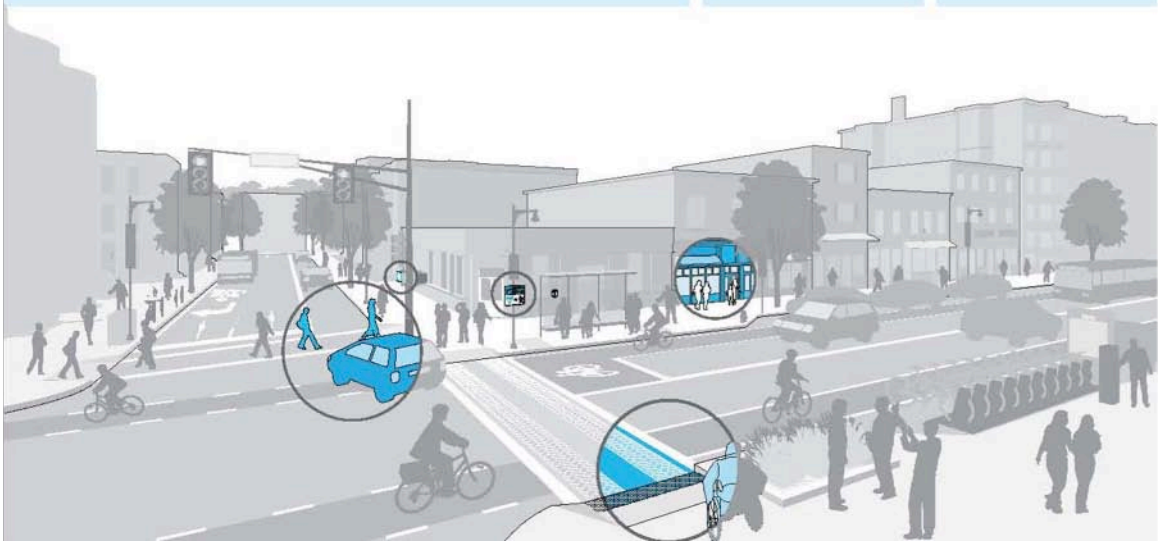
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Ames, IA	56	6	10.7%	0.67	0.0%	33.3%	16.7%	16.7%
Cedar Rapids, IA	223	10	4.5%	0.31	0.0%	33.3%	66.7%	20.0%
Davenport-Moline-Rock Island, IA-IL	320	24	7.5%	0.58	0.0%	8.3%	50.0%	54.2%
Des Moines-West Des Moines, IA	483	43	8.9%	0.80	0.0%	25.6%	39.5%	23.3%
Dubuque, IA	78	6	7.7%	0.64	0.0%	16.7%	16.7%	16.7%
Iowa City, IA	142	6	4.2%	0.39	0.0%	50.0%	50.0%	16.7%
Omaha-Council Bluffs, NE-IA	761	55	7.2%	0.53	1.9%	9.3%	53.7%	41.8%
Sioux City, IA-NE-SD	156	13	8.3%	0.98	0.0%	33.3%	33.3%	7.7%
Waterloo-Cedar Falls, IA	167	13	7.8%	0.72	0.0%	33.3%	50.0%	38.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adair County	47	3	6.4%	3.85	0.0%	0.0%	66.7%	0.0%
Adams County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Allamakee County	36	2	5.6%	1.40	50.0%	50.0%	50.0%	0.0%
Appanoose County	38	2	5.3%	1.52	0.0%	0.0%	100.0%	100.0%
Audubon County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Benton County	51	1	2.0%	0.38	0.0%	0.0%	100.0%	0.0%
Black Hawk County	119	9	7.6%	0.70	0.0%	50.0%	37.5%	33.3%
Boone County	58	2	3.4%	0.76	0.0%	50.0%	50.0%	0.0%
Bremer County	19	1	5.3%	0.42	0.0%	0.0%	100.0%	0.0%
Buchanan County	34	3	8.8%	1.43	0.0%	0.0%	100.0%	0.0%
Buena Vista County	33	1	3.0%	0.50	0.0%	0.0%	100.0%	0.0%
Butler County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Calhoun County	18	2	11.1%	1.98	50.0%	50.0%	50.0%	0.0%
Carroll County	33	1	3.0%	0.48	0.0%	0.0%	100.0%	0.0%
Cass County	26	1	3.8%	0.72	0.0%	0.0%	100.0%	0.0%
Cedar County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cerro Gordo County	58	4	6.9%	0.90	0.0%	50.0%	0.0%	25.0%
Cherokee County	32	1	3.1%	0.82	0.0%	0.0%	0.0%	0.0%
Chickasaw County	21	2	9.5%	1.60	0.0%	0.0%	50.0%	0.0%
Clarke County	21	2	9.5%	2.16	0.0%	0.0%	100.0%	100.0%
Clay County	32	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clayton County	54	2	3.7%	1.10	0.0%	0.0%	100.0%	50.0%
Clinton County	68	3	4.4%	0.61	33.3%	66.7%	0.0%	66.7%
Crawford County	36	2	5.6%	1.18	0.0%	0.0%	100.0%	100.0%
Dallas County	57	4	7.0%	0.67	0.0%	75.0%	25.0%	0.0%
Davis County	19	1	5.3%	1.15	0.0%	0.0%	100.0%	100.0%
Decatur County	24	2	8.3%	2.36	0.0%	0.0%	100.0%	50.0%
Delaware County	28	3	10.7%	1.68	0.0%	33.3%	66.7%	0.0%
Des Moines County	50	4	8.0%	0.99	0.0%	0.0%	50.0%	25.0%
Dickinson County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dubuque County	78	6	7.7%	0.65	0.0%	16.7%	16.7%	16.7%
Emmet County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fayette County	29	1	3.4%	0.47	0.0%	0.0%	100.0%	100.0%
Floyd County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	25	2	8.0%	1.87	0.0%	0.0%	100.0%	0.0%
Fremont County	35	3	8.6%	3.99	0.0%	0.0%	100.0%	0.0%
Greene County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grundy County	29	3	10.3%	2.42	0.0%	0.0%	66.7%	66.7%
Guthrie County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hamilton County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hancock County	19	1	5.3%	0.87	0.0%	0.0%	100.0%	0.0%
Hardin County	36	1	2.8%	0.56	0.0%	100.0%	0.0%	0.0%
Harrison County	53	1	1.9%	0.66	0.0%	100.0%	0.0%	0.0%
Henry County	38	1	2.6%	0.49	N/A	N/A	N/A	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Howard County	17	1	5.9%	1.04	0.0%	100.0%	0.0%	0.0%
Humboldt County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ida County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Iowa County	38	1	2.6%	0.61	0.0%	0.0%	100.0%	0.0%
Jackson County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jasper County	91	5	5.5%	1.35	0.0%	0.0%	60.0%	40.0%
Jefferson County	30	2	6.7%	1.21	0.0%	0.0%	100.0%	100.0%
Johnson County	112	5	4.5%	0.40	0.0%	40.0%	60.0%	20.0%
Jones County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Keokuk County	28	1	3.6%	0.94	0.0%	100.0%	0.0%	0.0%
Kossuth County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lee County	65	2	3.1%	0.55	0.0%	0.0%	100.0%	100.0%
Linn County	146	9	6.2%	0.44	0.0%	37.5%	62.5%	22.2%
Louisa County	30	1	3.3%	0.85	100.0%	100.0%	0.0%	0.0%
Lucas County	24	1	4.2%	1.09	0.0%	0.0%	100.0%	100.0%
Lyon County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Madison County	13	1	7.7%	0.65	0.0%	0.0%	100.0%	100.0%
Mahaska County	38	2	5.3%	0.89	0.0%	50.0%	0.0%	50.0%
Marion County	42	2	4.8%	0.60	0.0%	50.0%	50.0%	50.0%
Marshall County	67	1	1.5%	0.25	0.0%	0.0%	0.0%	100.0%
Mills County	42	4	9.5%	2.67	0.0%	0.0%	75.0%	0.0%
Mitchell County	17	1	5.9%	0.93	0.0%	100.0%	0.0%	0.0%
Monona County	30	1	3.3%	1.06	0.0%	0.0%	100.0%	0.0%
Monroe County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Montgomery County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Muscatine County	49	1	2.0%	0.24	0.0%	0.0%	100.0%	100.0%
O'Brien County	17	1	5.9%	0.69	0.0%	0.0%	100.0%	0.0%
Osceola County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Page County	13	1	7.7%	0.62	0.0%	0.0%	100.0%	100.0%
Palo Alto County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Plymouth County	44	3	6.8%	1.20	0.0%	0.0%	66.7%	33.3%
Pocahontas County	14	1	7.1%	1.32	0.0%	0.0%	100.0%	0.0%
Polk County	320	37	11.6%	0.89	0.0%	18.9%	40.5%	24.3%
Pottawattamie County	147	8	5.4%	0.87	0.0%	0.0%	85.7%	25.0%
Poweshiek County	47	3	6.4%	1.58	0.0%	0.0%	100.0%	0.0%
Ringgold County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sac County	26	1	3.8%	0.95	N/A	N/A	N/A	0.0%
Scott County	139	14	10.1%	0.86	0.0%	14.3%	50.0%	50.0%
Shelby County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sioux County	58	1	1.7%	0.30	0.0%	100.0%	0.0%	0.0%
Story County	56	6	10.7%	0.69	0.0%	33.3%	16.7%	16.7%
Tama County	37	2	5.4%	1.12	0.0%	50.0%	50.0%	50.0%
Taylor County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Union County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Van Buren County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wapello County	45	2	4.4%	0.56	0.0%	0.0%	100.0%	100.0%
Warren County	72	1	1.4%	0.22	0.0%	100.0%	0.0%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Washington County	30	1	3.3%	0.46	0.0%	100.0%	0.0%	0.0%
Wayne County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Webster County	65	3	4.6%	0.78	0.0%	100.0%	0.0%	33.3%
Winnebago County	13	3	23.1%	2.72	0.0%	33.3%	33.3%	33.3%
Winneshiek County	37	1	2.7%	0.48	0.0%	0.0%	100.0%	100.0%
Woodbury County	91	10	11.0%	0.98	0.0%	44.4%	11.1%	10.0%
Worth County	23	1	4.3%	1.31	0.0%	0.0%	100.0%	0.0%
Wright County	19	3	15.8%	2.23	33.3%	33.3%	66.7%	0.0%
State total	**4,062**	**221**	**5.4%**	**0.73**	**2.3%**	**21.3%**	**52.8%**	**31.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Kansas

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

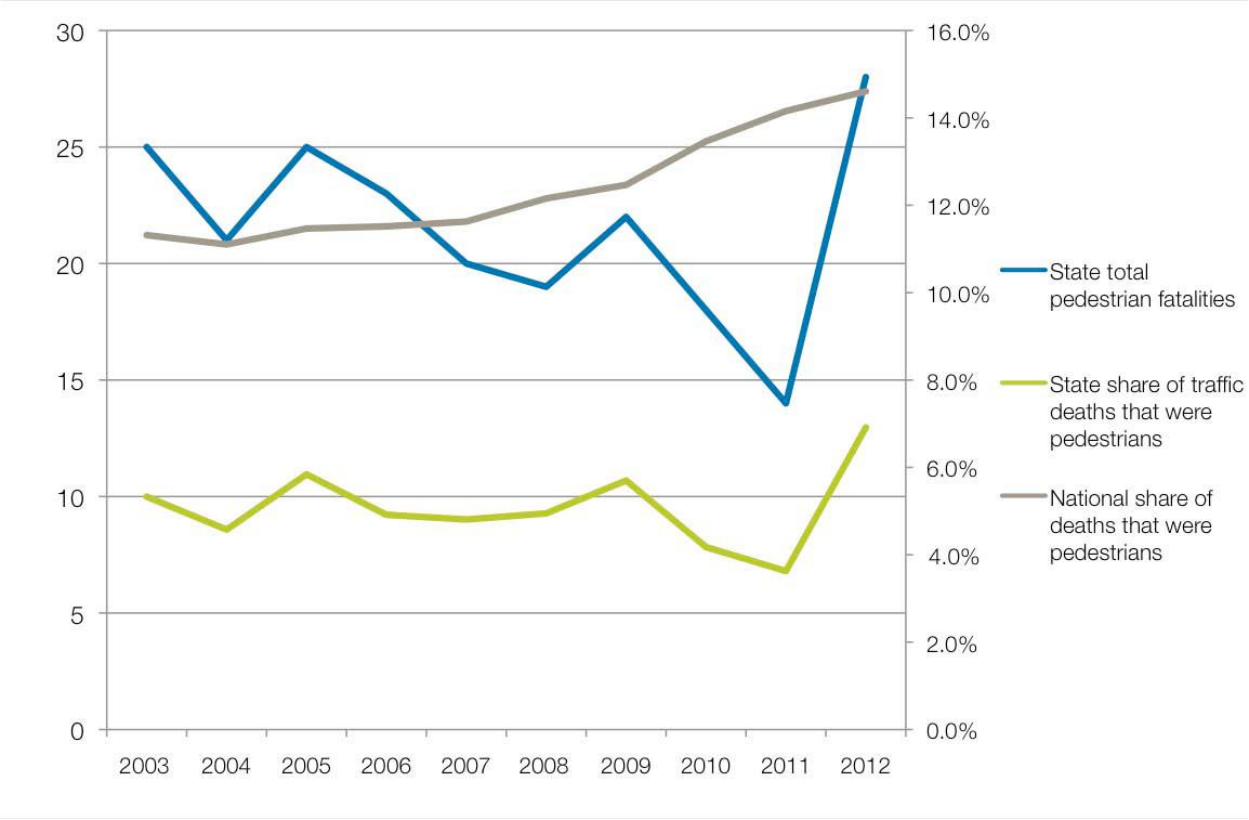
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **215 people died while walking in Kansas**.

FIGURE 1

Pedestrian fatalities in Kansas, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Kansas

In Kansas from 2003–2012, 215 people were killed while walking, resulting in a fatality rate of 0.77 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.1 percent in Kansas.

Within Kansas, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Kansas was 28.74, compared to the national PDI of 52.2 and ranked 35th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Kansas, 48.8 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **56.5 percent of pedestrian fatalities in Kansas were on roads with a speed limit of 40 mph or higher**, compared to 5.1 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 23 children in Kansas.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.1 percent of Kansas's population, adults aged 65 and older account for 21.8 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Kansas is 2 per 100,000 people (nationally, 3.19), compared to a rate of 1.08 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Kansas suffer at a rate of 2.36 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.7 percent of Kansas's population, and 13.2 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Kansas from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.10. The rate for Hispanic people of any race was 1.45; and for black people and African Americans, 1.58.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

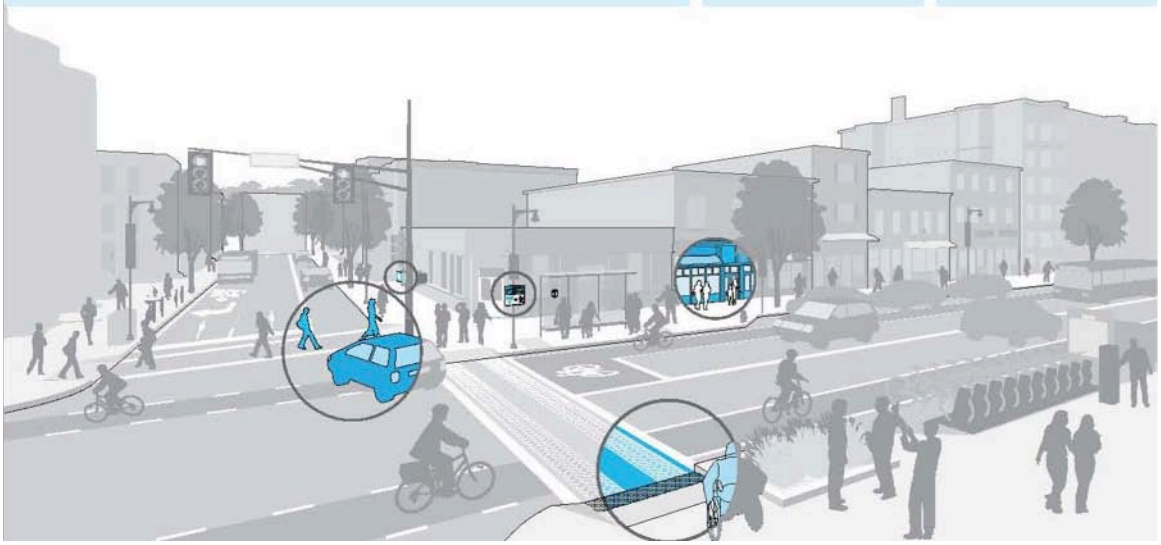
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Kansas City, MO-KS	2,185	228	10.4%	1.13	1.8%	9.3%	58.2%	27.3%
Lawrence, KS	94	6	6.4%	0.36	0.0%	0.0%	33.3%	50.0%
Manhattan, KS	126	5	4.0%	0.47	0.0%	0.0%	80.0%	60.0%
St. Joseph, MO-KS	216	15	6.9%	0.94	0.0%	14.3%	50.0%	13.3%
Topeka, KS	335	16	4.8%	0.26	0.0%	0.0%	62.5%	56.3%
Wichita, KS	713	58	8.1%	1.00	1.7%	1.7%	51.7%	55.2%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Allen County	47	0	0.0%	0.00	N/A	N/A	N/A	N/A
Anderson County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Atchison County	30	1	3.3%	0.59	0.0%	0.0%	0.0%	0.0%
Barber County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Barton County	40	4	10.0%	1.45	0.0%	0.0%	100.0%	100.0%
Bourbon County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Brown County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Butler County	116	3	2.6%	0.47	0.0%	0.0%	66.7%	66.7%
Chase County	25	1	4.0%	3.49	0.0%	0.0%	0.0%	0.0%
Chautauqua County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cherokee County	54	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cheyenne County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clark County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clay County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cloud County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Coffey County	24	1	4.2%	1.16	0.0%	0.0%	100.0%	0.0%
Comanche County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cowley County	62	2	3.2%	0.55	0.0%	0.0%	50.0%	50.0%
Crawford County	56	1	1.8%	0.26	0.0%	0.0%	100.0%	0.0%
Decatur County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dickinson County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Doniphan County	29	1	3.4%	1.26	0.0%	0.0%	100.0%	100.0%
Douglas County	94	6	6.4%	0.55	0.0%	0.0%	33.3%	50.0%
Edwards County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Elk County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ellis County	51	4	7.8%	1.43	25.0%	25.0%	75.0%	25.0%
Ellsworth County	24	1	4.2%	1.55	100.0%	100.0%	0.0%	100.0%
Finney County	76	4	5.3%	1.09	0.0%	0.0%	50.0%	50.0%
Ford County	82	6	7.3%	1.82	0.0%	0.0%	83.3%	83.3%
Franklin County	40	3	7.5%	1.17	33.3%	33.3%	66.7%	33.3%
Geary County	50	2	4.0%	0.65	0.0%	0.0%	50.0%	50.0%
Gove County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Graham County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gray County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Greeley County	3	2	66.7%	15.56	0.0%	0.0%	100.0%	50.0%
Greenwood County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hamilton County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harper County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harvey County	67	6	9.0%	1.76	16.7%	16.7%	50.0%	50.0%
Haskell County	30	2	6.7%	4.74	0.0%	0.0%	100.0%	50.0%
Hodgeman County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jefferson County	53	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Jewell County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Johnson County	230	19	8.3%	0.36	0.0%	10.5%	63.2%	26.3%
Kearny County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kingman County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kiowa County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Labette County	48	1	2.1%	0.46	0.0%	0.0%	0.0%	100.0%
Lane County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Leavenworth County	101	7	6.9%	0.94	0.0%	0.0%	28.6%	28.6%
Lincoln County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Linn County	23	2	8.7%	2.05	0.0%	0.0%	50.0%	50.0%
Logan County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lyon County	57	2	3.5%	0.57	0.0%	0.0%	50.0%	50.0%
Marion County	48	1	2.1%	0.78	0.0%	0.0%	100.0%	0.0%
Marshall County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
McPherson County	59	2	3.4%	0.68	0.0%	0.0%	100.0%	50.0%
Meade County	17	2	11.8%	4.42	0.0%	0.0%	50.0%	50.0%
Miami County	80	1	1.3%	0.32	0.0%	0.0%	100.0%	100.0%
Mitchell County	15	1	6.7%	1.56	100.0%	100.0%	0.0%	0.0%
Montgomery County	87	4	4.6%	1.14	0.0%	0.0%	50.0%	75.0%
Morris County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Morton County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nemaha County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Neosho County	35	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ness County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Norton County	11	1	9.1%	1.75	0.0%	0.0%	0.0%	100.0%
Osage County	66	3	4.5%	1.82	0.0%	0.0%	66.7%	66.7%
Osborne County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ottawa County	17	2	11.8%	3.28	50.0%	50.0%	50.0%	50.0%
Pawnee County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Phillips County	13	2	15.4%	3.56	0.0%	0.0%	100.0%	50.0%
Pottawatomie County	31	3	9.7%	1.46	0.0%	0.0%	100.0%	66.7%
Pratt County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rawlins County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Reno County	130	6	4.6%	0.94	0.0%	16.7%	50.0%	33.3%
Republic County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rice County	19	1	5.3%	0.98	0.0%	0.0%	0.0%	0.0%
Riley County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rooks County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rush County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Russell County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Saline County	63	3	4.8%	0.55	0.0%	0.0%	66.7%	66.7%
Scott County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sedgwick County	453	48	10.6%	0.99	0.0%	0.0%	50.0%	56.3%
Seward County	49	4	8.2%	1.76	0.0%	0.0%	75.0%	75.0%
Shawnee County	146	11	7.5%	0.63	0.0%	0.0%	54.5%	63.6%
Sheridan County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sherman County	28	2	7.1%	3.29	0.0%	0.0%	0.0%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Smith County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stafford County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stanton County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stevens County	23	1	4.3%	1.79	0.0%	0.0%	100.0%	100.0%
Sumner County	77	1	1.3%	0.41	0.0%	0.0%	100.0%	0.0%
Thomas County	32	1	3.1%	1.28	0.0%	0.0%	100.0%	0.0%
Trego County	12	1	8.3%	3.32	0.0%	0.0%	0.0%	0.0%
Wabaunsee County	30	2	6.7%	2.87	0.0%	0.0%	100.0%	0.0%
Wallace County	8	1	12.5%	6.60	100.0%	100.0%	0.0%	100.0%
Washington County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wichita County	3	1	33.3%	4.37	0.0%	0.0%	100.0%	0.0%
Wilson County	37	2	5.4%	2.08	0.0%	0.0%	100.0%	100.0%
Woodson County	25	1	4.0%	2.95	0.0%	0.0%	100.0%	100.0%
Wyandotte County	219	26	11.9%	1.67	8.0%	12.0%	44.0%	36.0%
State total	**4,232**	**215**	**5.1%**	**0.77**	**4.2%**	**5.1%**	**56.5%**	**48.8%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Kentucky

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

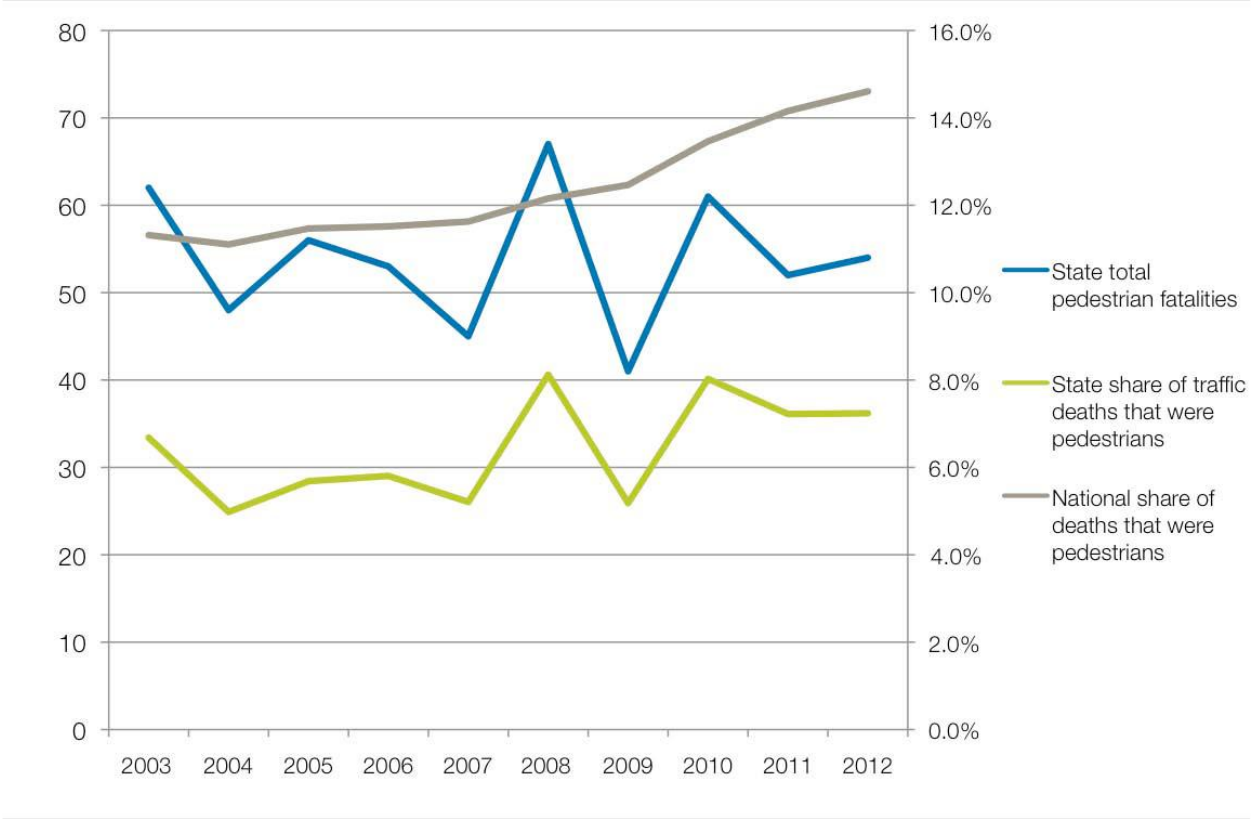
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **539 people died while walking in Kentucky**.

FIGURE 1

Pedestrian fatalities in Kentucky, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Kentucky

In Kentucky from 2003–2012, 539 people were killed while walking, resulting in a fatality rate of 1.26 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 6.3 percent in Kentucky.

Within Kentucky, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Kentucky was 58.34, compared to the national PDI of 52.2 and ranked 20th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Kentucky, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
17	Louisville/Jefferson County, KY-IN	200	1.60	1.6%	98.48

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Kentucky, 50.3 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **66.4 percent of pedestrian fatalities in Kentucky were on roads with a speed limit of 40 mph or higher**, compared to 7.6 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 61 children in Kentucky.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.9 percent of Kentucky's population, adults aged 65 and older account for 21.1 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Kentucky is 2.66 per 100,000 people (nationally, 3.19), compared to a rate of 1.47 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Kentucky suffer at a rate of 3.41 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.8 percent of Kentucky's population, and 12.2 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Kentucky from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.54. The rate for Hispanic people of any race was 3.28; and for black people and African Americans, 2.12.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

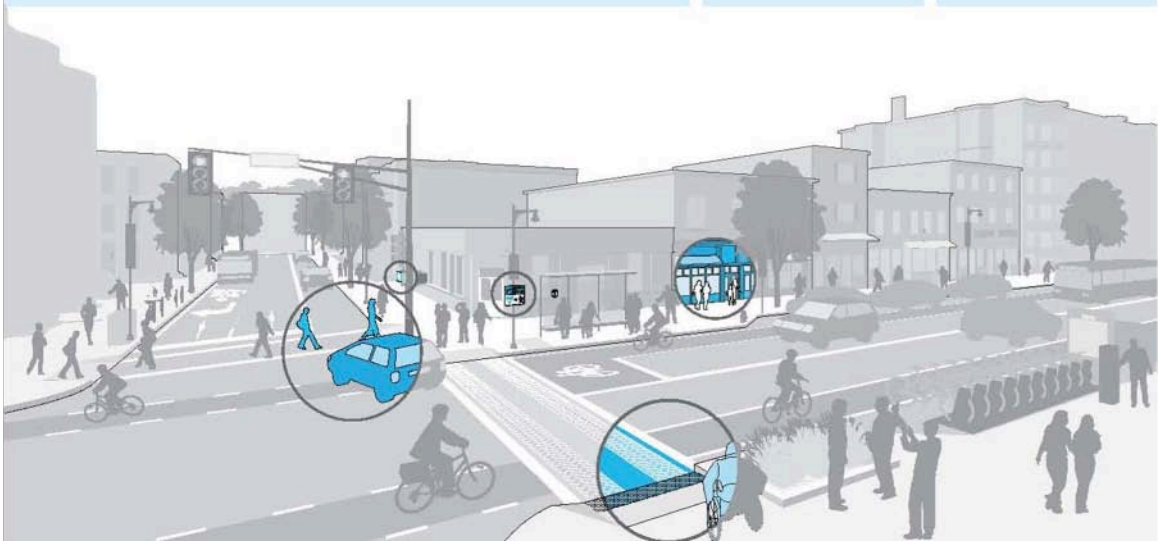
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the of safety their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bowling Green, KY	227	14	6.2%	0.95	0.0%	14.3%	78.6%	64.3%
Cincinnati-Middletown, OH-KY-IN	1,962	187	9.5%	0.84	0.5%	20.3%	47.3%	36.4%
Clarksville, TN-KY	464	37	8.0%	1.53	2.7%	5.4%	86.5%	78.4%
Elizabethtown, KY	230	9	3.9%	0.84	0.0%	0.0%	88.9%	66.7%
Evansville, IN-KY	453	35	7.7%	1.17	0.0%	2.9%	42.9%	22.9%
Huntington-Ashland, WV-KY-OH	468	32	6.8%	1.11	0.0%	15.6%	59.4%	53.1%
Lexington-Fayette, KY	609	58	9.5%	1.44	0.0%	10.3%	56.9%	56.9%
Louisville/Jefferson County, KY-IN	1,606	200	12.5%	1.60	1.5%	9.5%	49.5%	51.0%
Owensboro, KY	142	7	4.9%	0.87	0.0%	0.0%	85.7%	57.1%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adair County	43	5	11.6%	2.72	0.0%	20.0%	60.0%	40.0%
Allen County	50	0	0.0%	0.00	N/A	N/A	N/A	N/A
Anderson County	24	2	8.3%	0.96	0.0%	0.0%	100.0%	50.0%
Ballard County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Barren County	118	2	1.7%	0.48	0.0%	0.0%	100.0%	0.0%
Bath County	44	2	4.5%	1.73	0.0%	0.0%	100.0%	0.0%
Bell County	76	3	3.9%	1.04	0.0%	0.0%	100.0%	100.0%
Boone County	142	15	10.6%	1.34	0.0%	0.0%	80.0%	33.3%
Bourbon County	40	2	5.0%	1.01	0.0%	0.0%	100.0%	50.0%
Boyd County	67	6	9.0%	1.21	0.0%	33.3%	33.3%	16.7%
Boyle County	58	1	1.7%	0.36	0.0%	100.0%	0.0%	100.0%
Bracken County	29	1	3.4%	1.18	0.0%	0.0%	0.0%	0.0%
Breathitt County	68	3	4.4%	2.09	0.0%	0.0%	100.0%	33.3%
Breckinridge County	52	4	7.7%	2.02	0.0%	0.0%	100.0%	25.0%
Bullitt County	102	4	3.9%	0.56	0.0%	0.0%	100.0%	25.0%
Butler County	49	1	2.0%	0.78	0.0%	0.0%	100.0%	0.0%
Caldwell County	24	1	4.2%	0.78	0.0%	0.0%	100.0%	0.0%
Calloway County	88	2	2.3%	0.55	50.0%	50.0%	50.0%	0.0%
Campbell County	85	10	11.8%	1.12	0.0%	30.0%	40.0%	60.0%
Carlisle County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Carroll County	46	1	2.2%	0.94	0.0%	0.0%	100.0%	0.0%
Carter County	99	4	4.0%	1.45	0.0%	0.0%	100.0%	0.0%
Casey County	43	2	4.7%	1.26	0.0%	0.0%	100.0%	50.0%
Christian County	121	7	5.8%	0.96	0.0%	14.3%	85.7%	57.1%
Clark County	64	5	7.8%	1.43	0.0%	0.0%	80.0%	20.0%
Clay County	104	7	6.7%	3.12	14.3%	14.3%	85.7%	28.6%
Clinton County	46	2	4.3%	1.98	0.0%	0.0%	100.0%	50.0%
Crittenden County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cumberland County	23	1	4.3%	1.43	0.0%	0.0%	100.0%	0.0%
Daviess County	97	5	5.2%	0.53	0.0%	0.0%	80.0%	60.0%
Edmonson County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Elliott County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Estill County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fayette County	276	43	15.6%	1.50	0.0%	7.0%	55.8%	58.1%
Fleming County	29	1	3.4%	0.70	0.0%	0.0%	0.0%	0.0%
Floyd County	140	6	4.3%	1.50	16.7%	16.7%	83.3%	50.0%
Franklin County	65	5	7.7%	1.02	0.0%	0.0%	100.0%	60.0%
Fulton County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gallatin County	44	2	4.5%	2.39	0.0%	0.0%	100.0%	0.0%
Garrard County	32	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	66	2	3.0%	0.82	0.0%	0.0%	50.0%	0.0%
Graves County	86	3	3.5%	0.81	0.0%	0.0%	66.7%	0.0%
Grayson County	71	6	8.5%	2.36	0.0%	0.0%	100.0%	50.0%
Green County	16	2	12.5%	1.76	0.0%	0.0%	50.0%	50.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Greenup County	68	6	8.8%	1.63	0.0%	0.0%	83.3%	66.7%
Hancock County	23	2	8.7%	2.34	0.0%	0.0%	100.0%	50.0%
Hardin County	185	8	4.3%	0.80	0.0%	0.0%	87.5%	75.0%
Harlan County	91	4	4.4%	1.34	0.0%	0.0%	100.0%	50.0%
Harrison County	43	1	2.3%	0.54	100.0%	100.0%	0.0%	100.0%
Hart County	88	3	3.4%	1.65	0.0%	0.0%	100.0%	0.0%
Henderson County	89	4	4.5%	0.87	0.0%	0.0%	50.0%	100.0%
Henry County	33	1	3.0%	0.65	0.0%	0.0%	100.0%	0.0%
Hickman County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hopkins County	87	6	6.9%	1.28	0.0%	16.7%	50.0%	33.3%
Jackson County	41	1	2.4%	0.74	0.0%	0.0%	100.0%	0.0%
Jefferson County	758	149	19.7%	2.05	0.7%	10.0%	44.0%	56.4%
Jessamine County	73	4	5.5%	0.87	0.0%	50.0%	25.0%	50.0%
Johnson County	53	8	15.1%	3.43	0.0%	0.0%	87.5%	37.5%
Kenton County	113	16	14.2%	1.02	0.0%	18.8%	37.5%	31.3%
Knott County	67	1	1.5%	0.60	0.0%	0.0%	100.0%	0.0%
Knox County	101	7	6.9%	2.21	0.0%	0.0%	85.7%	71.4%
Larue County	45	1	2.2%	0.72	0.0%	0.0%	100.0%	0.0%
Laurel County	179	4	2.2%	0.69	0.0%	0.0%	100.0%	50.0%
Lawrence County	42	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lee County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Leslie County	45	2	4.4%	1.73	0.0%	0.0%	100.0%	50.0%
Letcher County	80	2	2.5%	0.82	50.0%	50.0%	0.0%	0.0%
Lewis County	42	2	4.8%	1.44	50.0%	50.0%	50.0%	0.0%
Lincoln County	84	4	4.8%	1.62	0.0%	0.0%	75.0%	25.0%
Livingston County	35	2	5.7%	2.10	0.0%	0.0%	100.0%	50.0%
Logan County	68	1	1.5%	0.37	0.0%	0.0%	100.0%	100.0%
Lyon County	23	1	4.3%	1.20	0.0%	0.0%	100.0%	0.0%
Madison County	163	5	3.1%	0.62	0.0%	0.0%	100.0%	60.0%
Magoffin County	31	1	3.2%	0.75	0.0%	0.0%	100.0%	0.0%
Marion County	62	2	3.2%	1.02	0.0%	50.0%	50.0%	100.0%
Marshall County	88	2	2.3%	0.64	0.0%	0.0%	100.0%	0.0%
Martin County	33	1	3.0%	0.76	0.0%	0.0%	100.0%	0.0%
Mason County	45	1	2.2%	0.58	0.0%	0.0%	100.0%	0.0%
McCracken County	138	10	7.2%	1.54	0.0%	0.0%	40.0%	60.0%
McCreary County	44	1	2.3%	0.56	0.0%	0.0%	100.0%	100.0%
McLean County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Meade County	77	6	7.8%	2.06	0.0%	0.0%	100.0%	66.7%
Menifee County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Mercer County	39	1	2.6%	0.47	0.0%	0.0%	100.0%	100.0%
Metcalfe County	32	1	3.1%	0.99	0.0%	0.0%	100.0%	100.0%
Monroe County	36	1	2.8%	0.90	0.0%	0.0%	0.0%	0.0%
Montgomery County	78	4	5.1%	1.57	0.0%	0.0%	75.0%	25.0%
Morgan County	33	3	9.1%	2.13	0.0%	0.0%	100.0%	66.7%
Muhlenberg County	88	3	3.4%	0.95	0.0%	0.0%	100.0%	66.7%
Nelson County	93	6	6.5%	1.43	0.0%	0.0%	83.3%	83.3%
Nicholas County	17	1	5.9%	1.41	0.0%	0.0%	100.0%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Ohio County	64	2	3.1%	0.84	0.0%	0.0%	100.0%	0.0%
Oldham County	53	3	5.7%	0.52	0.0%	0.0%	66.7%	66.7%
Owen County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Owsley County	17	1	5.9%	2.10	0.0%	0.0%	100.0%	100.0%
Pendleton County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Perry County	100	5	5.0%	1.74	0.0%	0.0%	60.0%	40.0%
Pike County	249	10	4.0%	1.53	0.0%	0.0%	100.0%	80.0%
Powell County	44	1	2.3%	0.78	0.0%	0.0%	100.0%	100.0%
Pulaski County	148	7	4.7%	1.14	0.0%	0.0%	85.7%	85.7%
Robertson County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rockcastle County	60	4	6.7%	2.35	0.0%	0.0%	75.0%	25.0%
Rowan County	73	2	2.7%	0.87	0.0%	0.0%	100.0%	0.0%
Russell County	44	1	2.3%	0.58	0.0%	0.0%	100.0%	0.0%
Scott County	75	4	5.3%	0.92	0.0%	25.0%	50.0%	100.0%
Shelby County	92	1	1.1%	0.25	0.0%	0.0%	100.0%	100.0%
Simpson County	50	0	0.0%	0.00	N/A	N/A	N/A	N/A
Spencer County	33	2	6.1%	1.24	0.0%	50.0%	50.0%	50.0%
Taylor County	61	2	3.3%	0.83	0.0%	0.0%	100.0%	100.0%
Todd County	45	1	2.2%	0.82	0.0%	0.0%	100.0%	100.0%
Trigg County	51	1	2.0%	0.72	0.0%	0.0%	100.0%	0.0%
Trimble County	30	5	16.7%	5.67	0.0%	20.0%	60.0%	40.0%
Union County	39	4	10.3%	2.64	0.0%	0.0%	100.0%	25.0%
Warren County	203	14	6.9%	1.30	0.0%	14.3%	78.6%	64.3%
Washington County	47	1	2.1%	0.87	0.0%	0.0%	100.0%	100.0%
Wayne County	52	2	3.8%	0.97	0.0%	50.0%	50.0%	100.0%
Webster County	28	1	3.6%	0.73	0.0%	0.0%	100.0%	100.0%
Whitley County	114	5	4.4%	1.39	0.0%	0.0%	100.0%	20.0%
Wolfe County	40	3	7.5%	4.14	0.0%	0.0%	100.0%	33.3%
Woodford County	81	0	0.0%	0.00	N/A	N/A	N/A	N/A
State total	**8,496**	**539**	**6.3%**	**1.26**	**1.3%**	**7.6%**	**66.4%**	**50.3%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Louisiana

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,030 people died while walking in Louisiana**.

FIGURE 1

Pedestrian fatalities in Louisiana, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Louisiana

In Louisiana from 2003–2012, 1,030 people were killed while walking, resulting in a fatality rate of 2.29 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 11.9 percent in Louisiana.

Within Louisiana, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Louisiana was 116.63, compared to the national PDI of 52.2 and ranked 3rd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Louisiana, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
22	New Orleans-Metairie-Kenner, LA	272	2.09	2.5%	84.90

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Louisiana, 50.3 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **70.8 percent of pedestrian fatalities in Louisiana were on roads with a speed limit of 40 mph or higher**, compared to 9.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 81 children in Louisiana.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.9 percent of Louisiana's population, adults aged 65 and older account for 9.8 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Louisiana is 2.15 per 100,000 people (nationally, 3.19), compared to a rate of 2.7 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Louisiana suffer at a rate of 2.47 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.4 percent of Louisiana's population, and 5.1 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Louisiana from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.17. The rate for Hispanic people of any race was 2.52; for black people and African Americans, 3.47; and for Asians and Pacific Islanders, 2.15.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

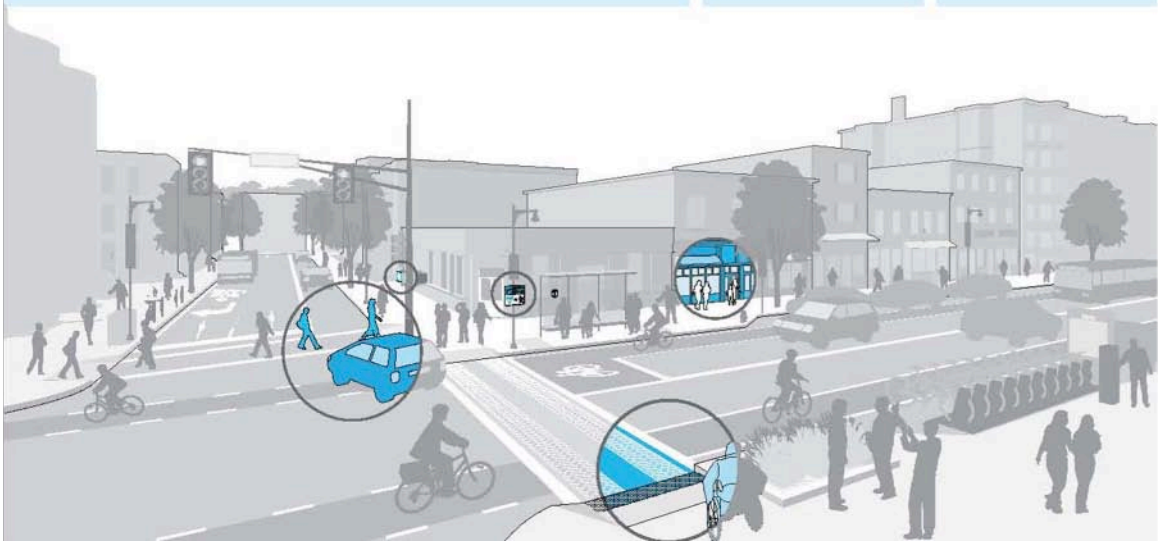
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Alexandria, LA	281	30	10.7%	2.99	0.0%	7.4%	74.1%	56.7%
Baton Rouge, LA	1,502	163	10.9%	2.24	0.6%	3.8%	83.1%	65.2%
Houma-Bayou Cane-Thibodaux, LA	489	48	9.8%	2.21	4.3%	8.5%	76.6%	62.5%
Lafayette, LA	508	74	14.6%	2.63	0.0%	7.0%	85.9%	49.3%
Lake Charles, LA	431	64	14.8%	2.91	0.0%	4.8%	81.0%	43.8%
Monroe, LA	278	31	11.2%	1.93	0.0%	16.7%	56.7%	64.5%
New Orleans-Metairie-Kenner, LA	1,480	272	18.4%	2.09	5.8%	13.5%	53.8%	55.9%
Shreveport-Bossier City, LA	649	71	10.9%	1.45	0.0%	9.0%	76.1%	50.7%

Appendix C: County-level data

Parish	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Acadia Parish	155	14	9.0%	2.31	0.0%	14.3%	71.4%	28.6%
Allen Parish	65	4	6.2%	1.56	0.0%	0.0%	100.0%	50.0%
Ascension Parish	227	26	11.5%	2.61	0.0%	7.7%	84.6%	53.8%
Assumption Parish	80	7	8.8%	3.00	28.6%	28.6%	57.1%	57.1%
Avoyelles Parish	92	16	17.4%	3.83	0.0%	12.5%	68.8%	56.3%
Beauregard Parish	91	7	7.7%	2.01	0.0%	0.0%	71.4%	28.6%
Bienville Parish	56	3	5.4%	2.06	0.0%	0.0%	100.0%	0.0%
Bossier Parish	152	21	13.8%	1.86	0.0%	10.5%	68.4%	52.4%
Caddo Parish	397	47	11.8%	1.86	0.0%	8.9%	77.8%	53.2%
Calcasieu Parish	401	62	15.5%	3.28	0.0%	4.8%	80.6%	45.2%
Caldwell Parish	36	2	5.6%	1.96	0.0%	0.0%	100.0%	0.0%
Cameron Parish	30	2	6.7%	2.52	0.0%	0.0%	100.0%	0.0%
Catahoula Parish	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Claiborne Parish	38	0	0.0%	0.00	N/A	N/A	N/A	N/A
Concordia Parish	53	5	9.4%	2.46	0.0%	0.0%	60.0%	100.0%
De Soto Parish	100	3	3.0%	1.14	0.0%	0.0%	100.0%	0.0%
East Baton Rouge Parish	541	86	15.9%	2.00	0.0%	2.4%	75.9%	69.5%
East Carroll Parish	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
East Feliciana Parish	60	3	5.0%	1.48	0.0%	0.0%	100.0%	66.7%
Evangeline Parish	84	12	14.3%	3.50	0.0%	9.1%	72.7%	41.7%
Franklin Parish	44	1	2.3%	0.48	0.0%	0.0%	100.0%	0.0%
Grant Parish	50	3	6.0%	1.41	0.0%	0.0%	100.0%	66.7%
Iberia Parish	165	22	13.3%	3.00	0.0%	14.3%	85.7%	40.9%
Iberville Parish	128	6	4.7%	1.80	16.7%	16.7%	66.7%	50.0%
Jackson Parish	40	1	2.5%	0.63	N/A	N/A	N/A	0.0%
Jefferson Davis Parish	115	11	9.6%	3.50	0.0%	0.0%	72.7%	18.2%
Jefferson Parish	331	90	27.2%	2.05	13.6%	14.8%	53.4%	58.9%
Lafayette Parish	355	57	16.1%	2.68	0.0%	5.5%	85.5%	55.4%
Lafourche Parish	250	24	9.6%	2.53	4.2%	8.3%	79.2%	58.3%
LaSalle Parish	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lincoln Parish	106	7	6.6%	1.54	0.0%	28.6%	57.1%	14.3%
Livingston Parish	263	16	6.1%	1.34	0.0%	0.0%	100.0%	37.5%
Madison Parish	60	3	5.0%	2.42	0.0%	50.0%	50.0%	33.3%
Morehouse Parish	73	11	15.1%	3.84	0.0%	18.2%	45.5%	81.8%
Natchitoches Parish	114	10	8.8%	2.55	0.0%	10.0%	70.0%	40.0%
Orleans Parish	383	89	23.2%	2.41	1.2%	19.3%	19.3%	50.0%
Ouachita Parish	205	29	14.1%	1.91	0.0%	14.3%	57.1%	69.0%
Plaquemines Parish	50	6	12.0%	2.42	0.0%	0.0%	83.3%	66.7%
Pointe Coupee Parish	88	4	4.5%	1.77	0.0%	0.0%	100.0%	100.0%
Rapides Parish	231	27	11.7%	2.08	0.0%	8.3%	70.8%	55.6%
Red River Parish	37	1	2.7%	1.09	0.0%	0.0%	100.0%	100.0%
Richland Parish	54	4	7.4%	1.93	0.0%	66.7%	33.3%	0.0%
Sabine Parish	71	4	5.6%	1.67	33.3%	33.3%	66.7%	0.0%

Parish	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
St. Bernard Parish	58	12	20.7%	2.78	9.1%	9.1%	81.8%	100.0%
St. Charles Parish	115	13	11.3%	2.51	0.0%	7.7%	76.9%	53.8%
St. Helena Parish	57	3	5.3%	2.74	0.0%	0.0%	100.0%	100.0%
St. James Parish	81	4	4.9%	1.84	0.0%	0.0%	100.0%	0.0%
St. John the Baptist Parish	125	20	16.0%	4.37	5.0%	5.0%	90.0%	80.0%
St. Landry Parish	236	28	11.9%	3.32	3.6%	14.3%	82.1%	35.7%
St. Martin Parish	153	17	11.1%	3.31	0.0%	12.5%	87.5%	29.4%
St. Mary Parish	120	22	18.3%	4.08	0.0%	9.5%	85.7%	54.5%
St. Tammany Parish	418	42	10.0%	1.86	0.0%	7.7%	89.7%	36.6%
Tangipahoa Parish	372	39	10.5%	3.38	0.0%	13.2%	76.3%	25.6%
Tensas Parish	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Terrebonne Parish	239	24	10.0%	2.18	4.3%	8.7%	73.9%	66.7%
Union Parish	73	2	2.7%	0.88	0.0%	50.0%	50.0%	0.0%
Vermilion Parish	113	12	10.6%	2.11	0.0%	8.3%	66.7%	66.7%
Vernon Parish	124	12	9.7%	2.34	0.0%	0.0%	90.9%	75.0%
Washington Parish	124	8	6.5%	1.74	0.0%	25.0%	12.5%	50.0%
Webster Parish	77	7	9.1%	1.70	0.0%	14.3%	57.1%	42.9%
West Baton Rouge Parish	111	18	16.2%	7.81	0.0%	5.6%	94.4%	76.5%
West Carroll Parish	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
West Feliciana Parish	27	1	3.7%	0.64	0.0%	0.0%	100.0%	100.0%
Winn Parish	46	0	0.0%	0.00	N/A	N/A	N/A	N/A
State total	**8,673**	**1,030**	**11.9%**	**2.29**	**2.2%**	**9.3%**	**70.8%**	**50.3%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Maine

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

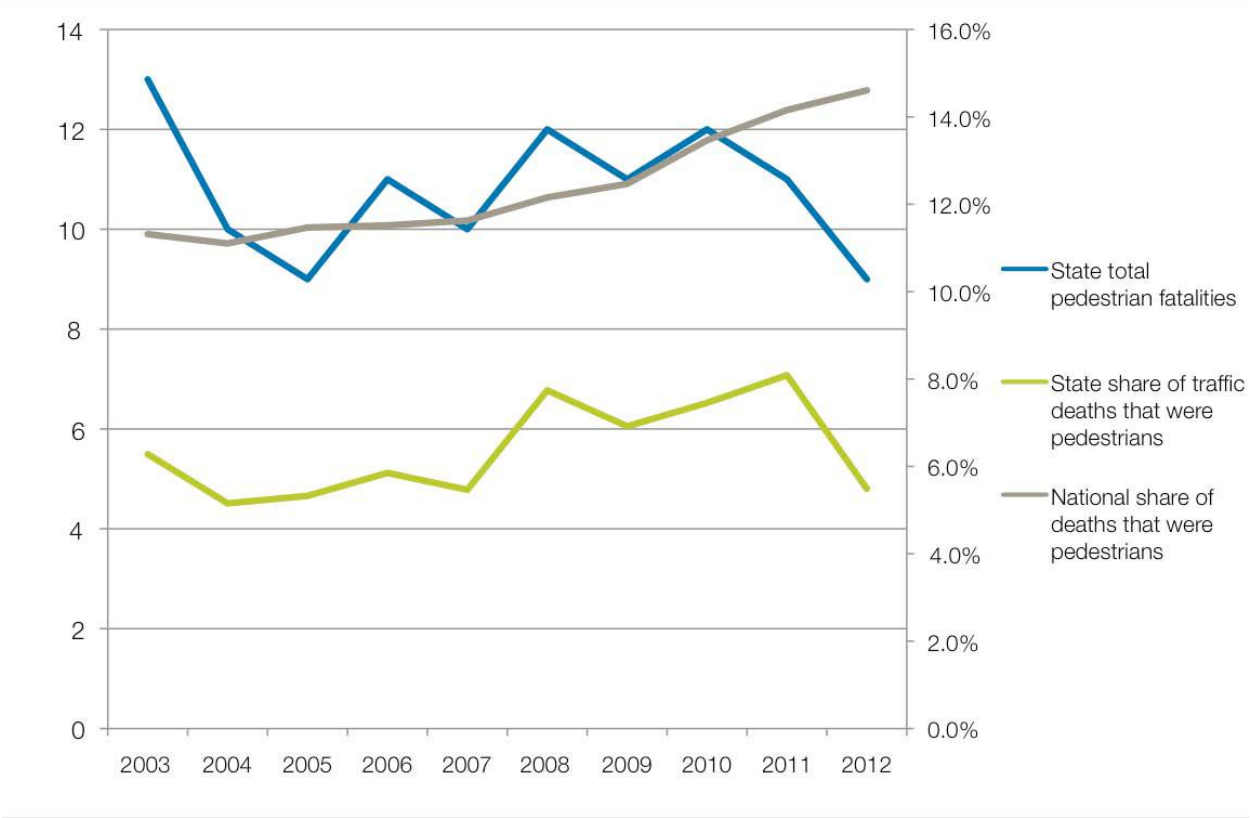
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **108 people died while walking in Maine**.

FIGURE 1

Pedestrian fatalities in Maine, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Maine

In Maine from 2003–2012, 108 people were killed while walking, resulting in a fatality rate of 0.82 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 6.3 percent in Maine.

Within Maine, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Maine was 20.42, compared to the national PDI of 52.2 and ranked 44th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Maine, 44.9 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **48.1 percent of pedestrian fatalities in Maine were on roads with a speed limit of 40 mph or higher**, compared to 19.8 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 15.0 percent of Maine's population, adults aged 65 and older account for 35.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Maine is 2.97 per 100,000 people (nationally, 3.19), compared to a rate of 0.96 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Maine suffer at a rate of 3.8 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.2 percent of Maine's population, and 21.8 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Maine from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.26. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

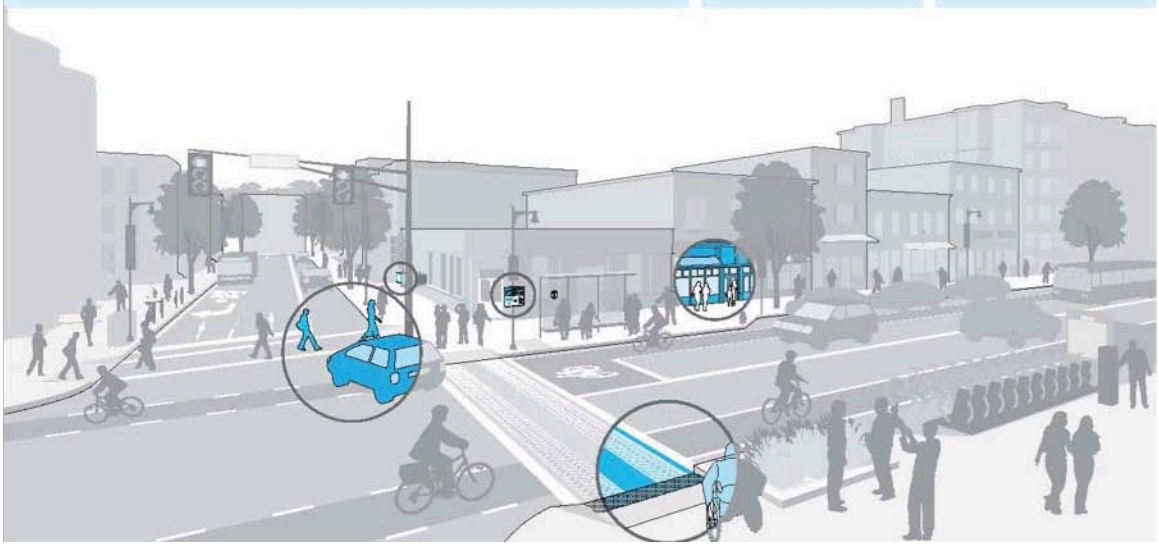
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bangor, ME	176	20	11.4%	1.17	0.0%	45.0%	40.0%	50.0%
Lewiston-Auburn, ME	114	8	7.0%	0.56	0.0%	0.0%	40.0%	42.9%
Portland-South Portland-Biddeford, ME	506	35	6.9%	0.70	0.0%	22.9%	31.4%	34.3%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Androscoggin County	114	8	7.0%	0.74	0.0%	0.0%	40.0%	42.9%
Aroostook County	122	7	5.7%	0.97	0.0%	0.0%	85.7%	42.9%
Cumberland County	225	20	8.9%	0.72	0.0%	10.0%	25.0%	45.0%
Franklin County	58	3	5.2%	0.98	0.0%	0.0%	66.7%	66.7%
Hancock County	114	7	6.1%	1.29	0.0%	42.9%	57.1%	57.1%
Kennebec County	149	9	6.0%	0.74	0.0%	33.3%	44.4%	33.3%
Knox County	47	2	4.3%	0.50	0.0%	50.0%	50.0%	50.0%
Lincoln County	69	2	2.9%	0.58	0.0%	0.0%	50.0%	50.0%
Oxford County	92	4	4.3%	0.70	0.0%	25.0%	75.0%	25.0%
Penobscot County	176	20	11.4%	1.32	0.0%	45.0%	40.0%	50.0%
Piscataquis County	32	2	6.3%	1.14	0.0%	50.0%	50.0%	50.0%
Sagadahoc County	51	3	5.9%	0.84	0.0%	0.0%	33.3%	0.0%
Somerset County	106	6	5.7%	1.16	0.0%	0.0%	66.7%	16.7%
Waldo County	67	3	4.5%	0.78	0.0%	0.0%	100.0%	66.7%
Washington County	64	0	0.0%	0.00	N/A	N/A	N/A	N/A
York County	230	12	5.2%	0.61	0.0%	50.0%	41.7%	25.0%
State total	**1,716**	**108**	**6.3%**	**0.82**	**0.0%**	**19.8%**	**48.1%**	**44.9%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Maryland

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

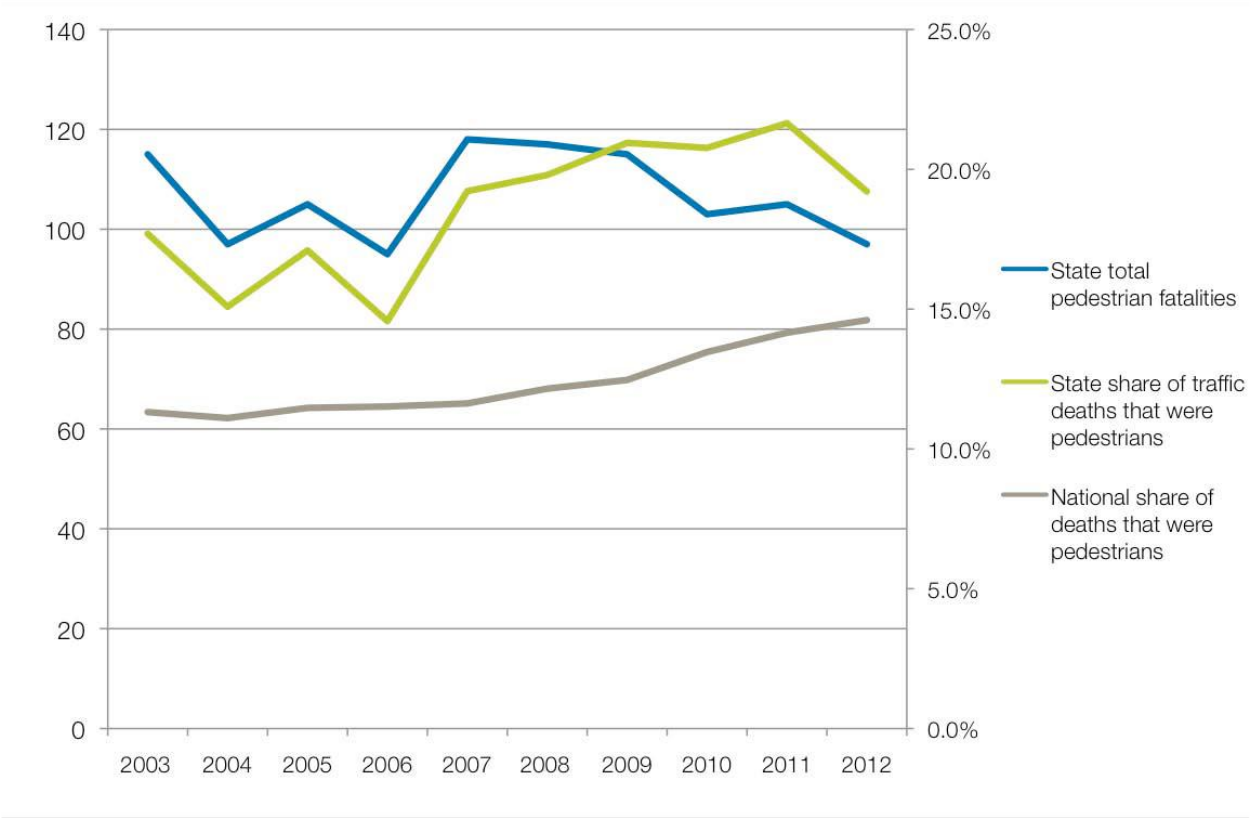
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,067 people died while walking in Maryland**.

FIGURE 1

Pedestrian fatalities in Maryland, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Maryland

In Maryland from 2003–2012, 1,067 people were killed while walking, resulting in a fatality rate of 1.88 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 18.4 percent in Maryland.

Within Maryland, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Maryland was 78.64, compared to the national PDI of 52.2 and ranked 15th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Maryland, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
28	Baltimore-Towson, MD	482	1.78	2.7%	66.42

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Maryland, 64.0 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **55.2 percent of pedestrian fatalities in Maryland were on roads with a speed limit of 40 mph or higher**, compared to 8.2 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 71 children in Maryland.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.7 percent of Maryland's population, adults aged 65 and older account for 15.6 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Maryland is 3.11 per 100,000 people (nationally, 3.19), compared to a rate of 2.23 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Maryland suffer at a rate of 3.15 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.5 percent of Maryland's population, and 7.4 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Maryland from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.93. The rate for Hispanic people of any race was 3.60; for black people and African Americans, 2.93; and for Asians and Pacific Islanders, 1.68.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

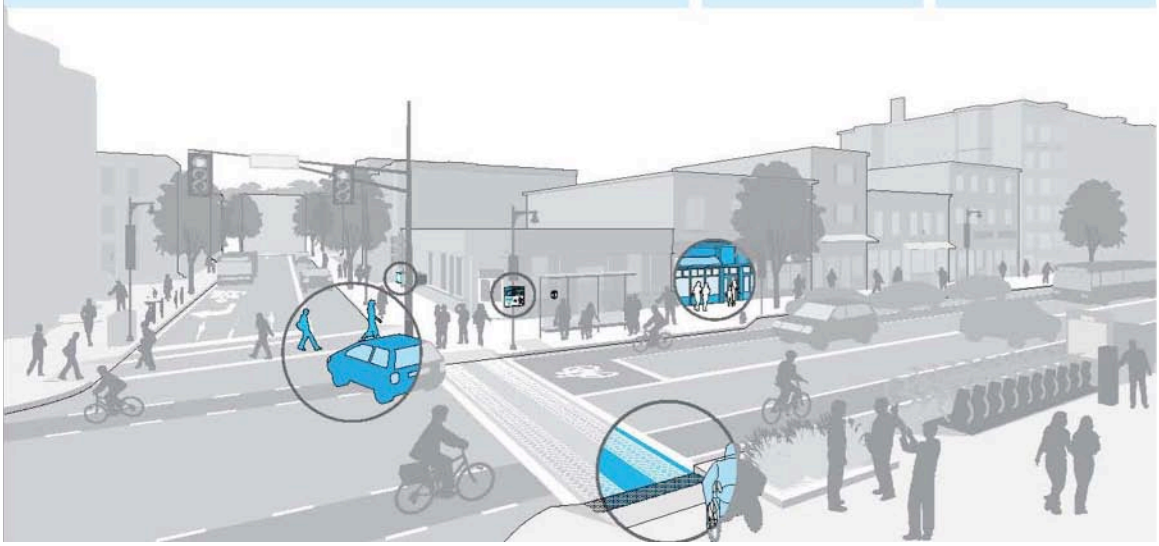
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Baltimore-Towson, MD	2,394	482	20.1%	1.78	0.4%	12.4%	47.7%	64.6%
Cumberland, MD-WV	152	7	4.6%	0.58	0.0%	14.3%	71.4%	42.9%
Hagerstown-Martinsburg, MD-WV	414	35	8.5%	0.82	0.0%	11.8%	73.5%	62.9%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	4,984	959	19.2%	1.64	0.7%	20.1%	54.9%	66.4%
Salisbury, MD	159	20	12.6%	1.60	0.0%	0.0%	70.0%	75.0%
Washington-Arlington-Alexandria, DC-VA-MD-WV	4,204	843	20.1%	1.41	0.2%	18.8%	51.4%	56.1%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Allegany County	98	5	5.1%	0.67	0.0%	0.0%	80.0%	60.0%
Anne Arundel County	513	94	18.3%	1.78	0.0%	9.6%	71.3%	51.6%
Baltimore city	386	129	33.4%	2.07	0.0%	26.6%	12.5%	78.1%
Baltimore County	731	175	23.9%	2.19	1.2%	7.6%	44.8%	65.1%
Calvert County	125	9	7.2%	1.03	0.0%	0.0%	100.0%	77.8%
Caroline County	82	10	12.2%	3.10	0.0%	0.0%	66.7%	50.0%
Carroll County	199	17	8.5%	1.02	0.0%	0.0%	76.5%	68.8%
Cecil County	200	19	9.5%	1.92	0.0%	11.1%	55.6%	52.6%
Charles County	211	35	16.6%	2.46	0.0%	5.7%	88.6%	73.5%
Dorchester County	54	5	9.3%	1.56	0.0%	20.0%	60.0%	60.0%
Frederick County	236	22	9.3%	0.97	0.0%	22.7%	63.6%	40.9%
Garrett County	87	7	8.0%	2.32	0.0%	16.7%	50.0%	28.6%
Harford County	256	34	13.3%	1.41	0.0%	5.9%	82.4%	61.8%
Howard County	213	22	10.3%	0.79	0.0%	5.3%	78.9%	38.1%
Kent County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Montgomery County	493	123	24.9%	1.30	0.0%	5.7%	59.0%	75.2%
Prince George's County	1,120	269	24.0%	3.14	0.8%	4.2%	50.8%	59.0%
Queen Anne's County	96	11	11.5%	2.37	0.0%	0.0%	100.0%	63.6%
Somerset County	29	3	10.3%	1.15	0.0%	0.0%	100.0%	100.0%
St. Mary's County	132	19	14.4%	1.88	0.0%	10.5%	84.2%	73.7%
Talbot County	62	3	4.8%	0.81	0.0%	0.0%	100.0%	100.0%
Washington County	201	16	8.0%	1.10	0.0%	6.7%	80.0%	43.8%
Wicomico County	130	17	13.1%	1.78	0.0%	0.0%	64.7%	70.6%
Worcester County	114	23	20.2%	4.52	0.0%	0.0%	80.0%	91.3%
State total	**5,799**	**1,067**	**18.4%**	**1.88**	**0.4%**	**8.2%**	**55.2%**	**64.0%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014 Massachusetts

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **716 people died while walking in Massachusetts**.

FIGURE 1

Pedestrian fatalities in Massachusetts, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Massachusetts

In Massachusetts from 2003–2012, 716 people were killed while walking, resulting in a fatality rate of 1.10 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 17.8 percent in Massachusetts.

Within Massachusetts, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Massachusetts was 21.87, compared to the national PDI of 52.2 and ranked 43rd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Massachusetts, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
39	Providence-New Bedford-Fall River, RI-MA	198	1.26	3.2%	39.94
51	Boston-Cambridge-Quincy, MA-NH	476	0.99	5.3%	18.65

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Massachusetts, 33.1 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **30.3 percent of pedestrian fatalities in Massachusetts were on roads with a speed limit of 40 mph or higher**, compared to 4.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 34 children in Massachusetts.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.4 percent of Massachusetts's population, adults aged 65 and older account for 33.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Massachusetts is 3.2 per 100,000 people (nationally, 3.19), compared to a rate of 0.99 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Massachusetts suffer at a rate of 4.04 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.9 percent of Massachusetts's population, and 21.6 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Massachusetts from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.31. The rate for Hispanic people of any race was 1.17; for black people and African Americans, 1.35; and for Asians and Pacific Islanders, 1.17.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

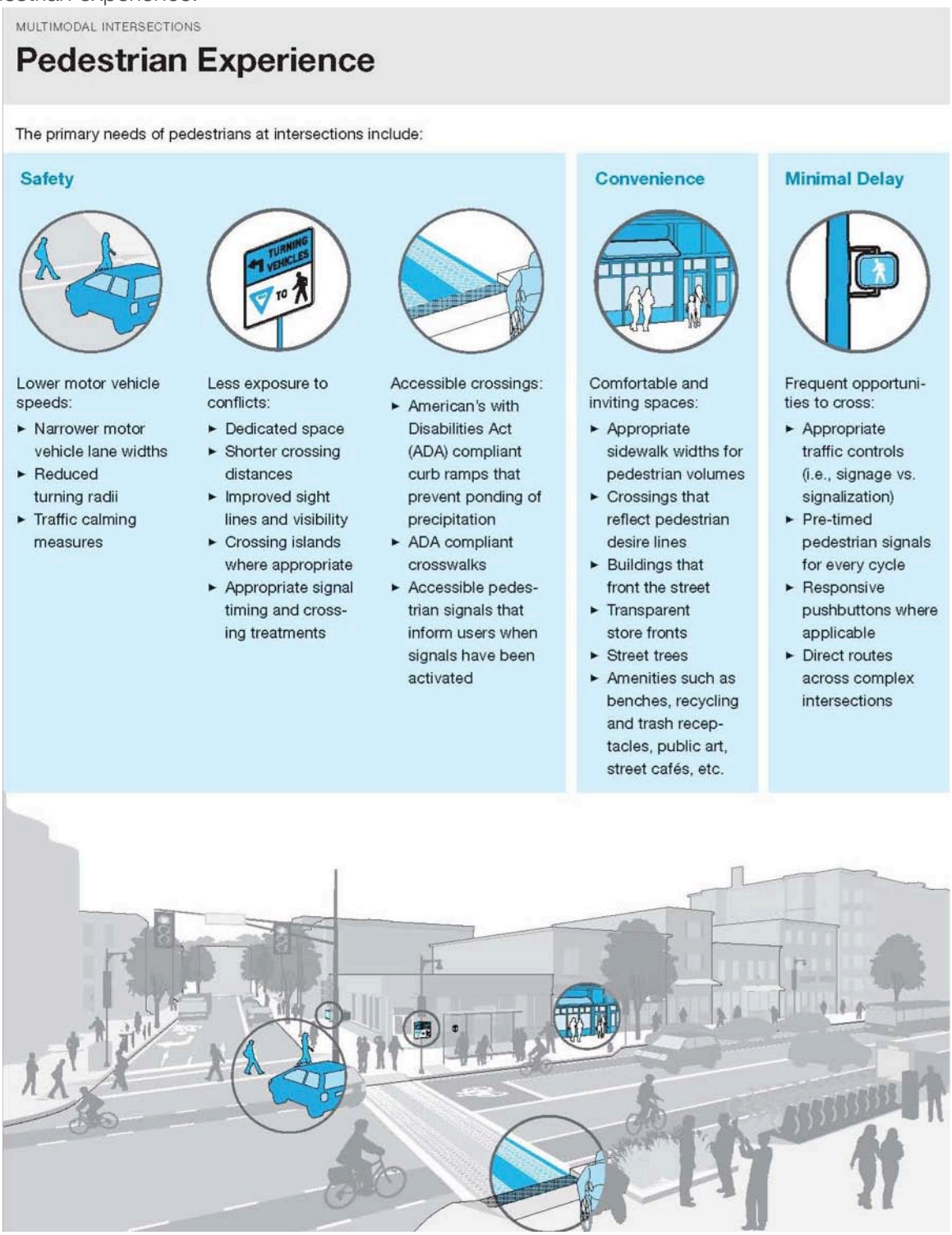
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Barnstable Town, MA	217	24	11.1%	1.39	0.0%	4.2%	33.3%	34.8%
Boston-Cambridge-Quincy, MA-NH	2,399	476	19.8%	0.99	2.2%	6.9%	29.0%	29.1%
Pittsfield, MA	152	20	13.2%	1.22	5.6%	11.1%	44.4%	30.0%
Providence-New Bedford-Fall River, RI-MA	1,273	198	15.6%	1.26	0.5%	28.5%	32.6%	49.7%
Springfield, MA	504	79	15.7%	0.92	1.3%	3.9%	28.6%	27.3%
Worcester, MA	585	72	12.3%	0.83	4.2%	7.0%	35.2%	34.7%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Barnstable County	217	24	11.1%	1.10	0.0%	4.2%	33.3%	34.8%
Berkshire County	152	20	13.2%	1.52	5.6%	11.1%	44.4%	30.0%
Bristol County	504	77	15.3%	1.41	1.3%	4.0%	40.0%	39.0%
Dukes County	13	1	7.7%	0.62	0.0%	0.0%	0.0%	100.0%
Essex County	397	81	20.4%	1.10	5.3%	9.3%	33.3%	30.0%
Franklin County	67	6	9.0%	0.84	0.0%	16.7%	66.7%	33.3%
Hampden County	348	62	17.8%	1.34	1.7%	0.0%	20.0%	26.7%
Hampshire County	89	11	12.4%	0.70	0.0%	18.2%	54.5%	27.3%
Middlesex County	587	142	24.2%	0.96	2.2%	7.3%	30.7%	25.7%
Nantucket County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Norfolk County	366	75	20.5%	1.13	1.4%	5.5%	28.8%	36.0%
Plymouth County	406	47	11.6%	0.96	0.0%	6.5%	30.4%	32.6%
Suffolk County	282	98	34.8%	1.38	1.1%	4.4%	16.7%	25.5%
Worcester County	585	72	12.3%	0.91	4.2%	7.0%	35.2%	34.7%
State total	**4,015**	**716**	**17.8%**	**1.10**	**2.5%**	**4.3%**	**30.3%**	**33.1%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Michigan

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

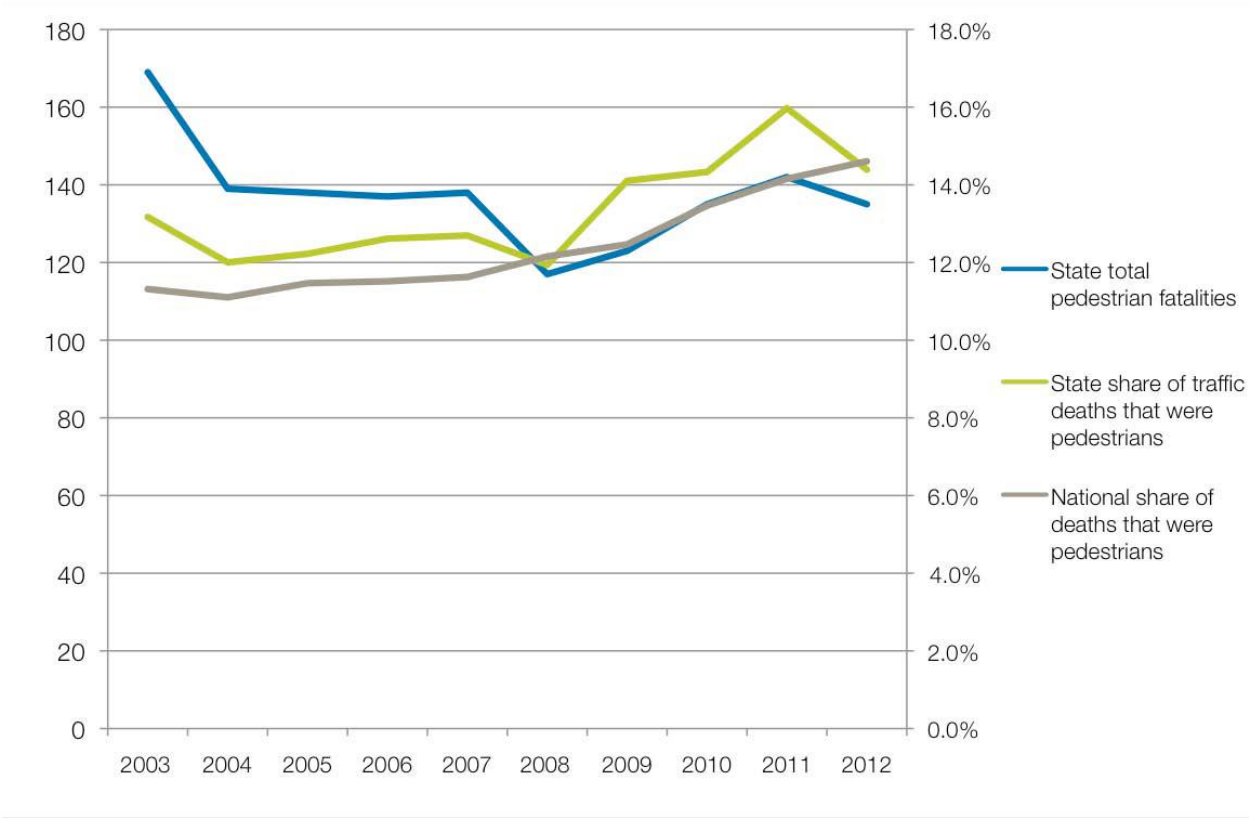
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,373 people died while walking in Michigan**.

FIGURE 1

Pedestrian fatalities in Michigan, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Michigan

In Michigan from 2003–2012, 1,373 people were killed while walking, resulting in a fatality rate of 1.38 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 13.2 percent in Michigan.

Within Michigan, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Michigan was 59.39, compared to the national PDI of 52.2 and ranked 19th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Michigan, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
11	Detroit-Warren-Livonia, MI	713	1.55	1.4%	111.63

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Michigan, 62.0 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **62.4 percent of pedestrian fatalities in Michigan were on roads with a speed limit of 40 mph or higher**, compared to 9.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 95 children in Michigan.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.9 percent of Michigan's population, adults aged 65 and older account for 20.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Michigan is 2.56 per 100,000 people (nationally, 3.19), compared to a rate of 1.5 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Michigan suffer at a rate of 3.1 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.3 percent of Michigan's population, and 11.8 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Michigan from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.39. The rate for Hispanic people of any race was 1.69; for black people and African Americans, 3.00; for Asians and Pacific Islanders, 1.02; and for American Indians and Alaska Natives, 2.03.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

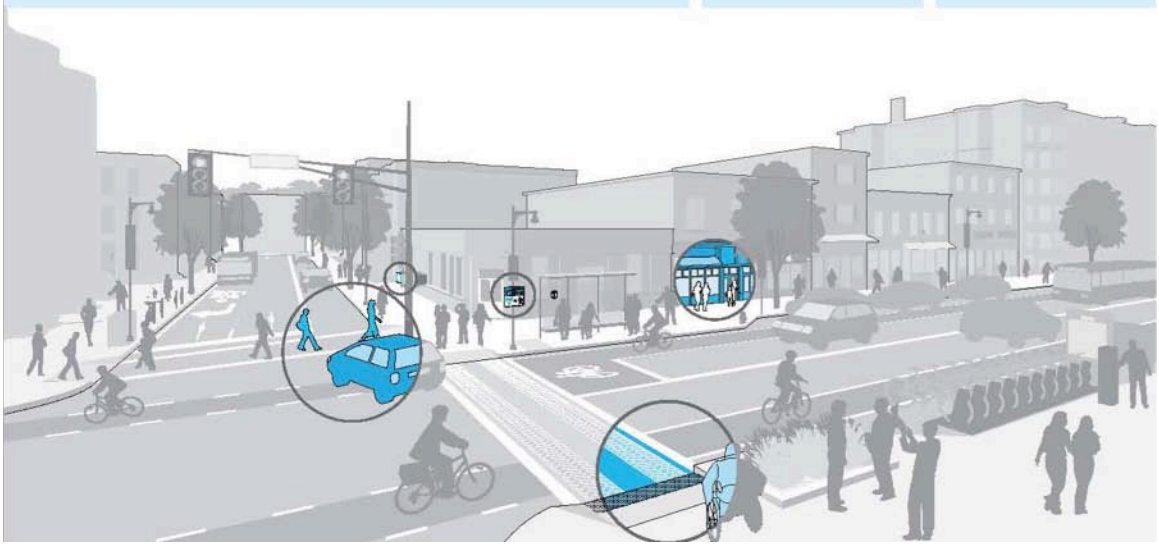
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
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Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Ann Arbor, MI	299	38	12.7%	0.92	0.0%	10.5%	78.9%	55.3%
Battle Creek, MI	173	12	6.9%	0.73	0.0%	18.2%	54.5%	50.0%
Bay City, MI	133	17	12.8%	1.30	0.0%	17.6%	76.5%	47.1%
Detroit-Warren-Livonia, MI	3,387	713	21.1%	1.55	1.0%	12.0%	50.6%	70.1%
Flint, MI	460	86	18.7%	2.07	0.0%	3.5%	70.6%	70.9%
Grand Rapids-Wyoming, MI	857	93	10.9%	1.06	1.1%	15.2%	63.0%	56.0%
Holland-Grand Haven, MI	221	19	8.6%	0.45	0.0%	5.3%	94.7%	52.6%
Jackson, MI	183	15	8.2%	0.75	0.0%	20.0%	53.3%	60.0%
Kalamazoo-Portage, MI	400	36	9.0%	0.86	0.0%	5.6%	72.2%	54.3%
Lansing-East Lansing, MI	400	51	12.8%	0.82	0.0%	11.8%	66.7%	51.0%
Monroe, MI	235	30	12.8%	2.50	0.0%	6.7%	90.0%	56.7%
Muskegon-Norton Shores, MI	189	22	11.6%	1.63	0.0%	13.6%	68.2%	59.1%
Niles-Benton Harbor, MI	222	23	10.4%	1.66	4.3%	8.7%	78.3%	45.5%
Saginaw-Saginaw Township North, MI	248	33	13.3%	1.20	0.0%	6.5%	87.1%	57.6%
South Bend-Mishawaka, IN-MI	313	35	11.2%	1.00	3.1%	9.4%	43.8%	28.6%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Alcona County	29	2	6.9%	1.78	0.0%	0.0%	100.0%	50.0%
Alger County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Allegan County	166	3	1.8%	0.27	0.0%	33.3%	66.7%	33.3%
Alpena County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Antrim County	46	0	0.0%	0.00	N/A	N/A	N/A	N/A
Arenac County	43	1	2.3%	0.61	0.0%	0.0%	100.0%	100.0%
Baraga County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Barry County	97	2	2.1%	0.34	0.0%	50.0%	50.0%	100.0%
Bay County	133	17	12.8%	1.57	0.0%	17.6%	76.5%	47.1%
Benzie County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Berrien County	222	23	10.4%	1.46	4.3%	8.7%	78.3%	45.5%
Branch County	75	3	4.0%	0.65	0.0%	0.0%	50.0%	33.3%
Calhoun County	173	12	6.9%	0.87	0.0%	18.2%	54.5%	50.0%
Cass County	104	9	8.7%	1.72	0.0%	11.1%	66.7%	44.4%
Charlevoix County	25	2	8.0%	0.76	0.0%	0.0%	50.0%	100.0%
Cheboygan County	43	2	4.7%	0.75	0.0%	0.0%	100.0%	0.0%
Chippewa County	49	5	10.2%	1.28	0.0%	0.0%	100.0%	40.0%
Clare County	66	3	4.5%	0.96	0.0%	0.0%	100.0%	66.7%
Clinton County	84	3	3.6%	0.41	0.0%	0.0%	100.0%	0.0%
Crawford County	35	2	5.7%	1.39	0.0%	0.0%	50.0%	50.0%
Delta County	37	4	10.8%	1.07	0.0%	25.0%	75.0%	75.0%
Dickinson County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Eaton County	126	15	11.9%	1.39	0.0%	0.0%	86.7%	80.0%
Emmet County	43	2	4.7%	0.61	0.0%	0.0%	100.0%	0.0%
Genesee County	460	86	18.7%	1.98	0.0%	3.5%	70.6%	70.9%
Gladwin County	29	1	3.4%	0.38	0.0%	0.0%	100.0%	100.0%
Gogebic County	17	1	5.9%	0.60	0.0%	100.0%	0.0%	0.0%
Grand Traverse County	110	12	10.9%	1.40	0.0%	0.0%	91.7%	91.7%
Gratiot County	71	2	2.8%	0.47	0.0%	0.0%	50.0%	50.0%
Hillsdale County	85	8	9.4%	1.70	0.0%	0.0%	72.7%	25.0%
Houghton County	47	8	17.0%	2.21	0.0%	12.5%	50.0%	87.5%
Huron County	39	4	10.3%	1.18	0.0%	50.0%	50.0%	50.0%
Ingham County	190	33	17.4%	1.17	0.0%	18.2%	54.5%	42.4%
Ionia County	92	10	10.9%	1.55	0.0%	10.0%	90.0%	40.0%
Iosco County	39	2	5.1%	0.76	0.0%	0.0%	100.0%	50.0%
Iron County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Isabella County	83	5	6.0%	0.73	0.0%	0.0%	100.0%	100.0%
Jackson County	183	15	8.2%	0.93	0.0%	20.0%	53.3%	60.0%
Kalamazoo County	255	25	9.8%	1.01	0.0%	8.0%	64.0%	62.5%
Kalkaska County	49	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kent County	577	75	13.0%	1.25	0.0%	14.9%	60.8%	57.3%
Keweenaw County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lake County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lapeer County	133	5	3.8%	0.56	0.0%	0.0%	100.0%	40.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Leelanau County	28	2	7.1%	0.92	0.0%	0.0%	100.0%	50.0%
Lenawee County	137	8	5.8%	0.80	0.0%	12.5%	87.5%	37.5%
Livingston County	199	14	7.0%	0.78	7.1%	14.3%	85.7%	53.8%
Luce County	17	2	11.8%	2.98	0.0%	0.0%	100.0%	0.0%
Mackinac County	32	4	12.5%	3.52	0.0%	0.0%	100.0%	0.0%
Macomb County	500	108	21.6%	1.29	1.9%	5.6%	78.7%	81.3%
Manistee County	34	2	5.9%	0.80	0.0%	0.0%	50.0%	50.0%
Marquette County	68	7	10.3%	1.05	0.0%	14.3%	57.1%	100.0%
Mason County	41	3	7.3%	1.04	0.0%	0.0%	100.0%	33.3%
Mecosta County	63	4	6.3%	0.94	0.0%	25.0%	50.0%	25.0%
Menominee County	32	2	6.3%	0.82	0.0%	0.0%	100.0%	0.0%
Midland County	93	7	7.5%	0.84	0.0%	0.0%	71.4%	100.0%
Missaukee County	33	1	3.0%	0.67	0.0%	0.0%	100.0%	100.0%
Monroe County	235	30	12.8%	1.97	0.0%	6.7%	90.0%	56.7%
Montcalm County	112	12	10.7%	1.89	0.0%	8.3%	91.7%	41.7%
Montmorency County	18	1	5.6%	1.00	0.0%	0.0%	100.0%	0.0%
Muskegon County	189	22	11.6%	1.28	0.0%	13.6%	68.2%	59.1%
Newaygo County	91	6	6.6%	1.23	16.7%	16.7%	50.0%	60.0%
Oakland County	648	121	18.7%	1.00	0.0%	10.0%	70.0%	70.2%
Oceana County	42	2	4.8%	0.74	0.0%	0.0%	100.0%	0.0%
Ogemaw County	39	2	5.1%	0.92	0.0%	50.0%	50.0%	50.0%
Ontonagon County	21	1	4.8%	1.42	0.0%	0.0%	100.0%	100.0%
Osceola County	33	2	6.1%	0.84	0.0%	0.0%	100.0%	50.0%
Oscoda County	25	2	8.0%	2.23	0.0%	0.0%	0.0%	100.0%
Otsego County	51	5	9.8%	2.05	0.0%	0.0%	100.0%	60.0%
Ottawa County	221	19	8.6%	0.73	0.0%	5.3%	94.7%	52.6%
Presque Isle County	13	1	7.7%	0.73	0.0%	0.0%	100.0%	100.0%
Roscommon County	34	2	5.9%	0.80	0.0%	0.0%	100.0%	50.0%
Saginaw County	248	33	13.3%	1.62	0.0%	6.5%	87.1%	57.6%
Sanilac County	66	3	4.5%	0.68	0.0%	0.0%	100.0%	66.7%
Schoolcraft County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Shiawassee County	101	5	5.0%	0.70	0.0%	0.0%	80.0%	40.0%
St. Clair County	195	21	10.8%	1.27	0.0%	10.0%	70.0%	42.9%
St. Joseph County	118	12	10.2%	1.94	0.0%	0.0%	81.8%	50.0%
Tuscola County	105	10	9.5%	1.76	0.0%	10.0%	70.0%	70.0%
Van Buren County	145	11	7.6%	1.44	0.0%	0.0%	90.9%	36.4%
Washtenaw County	299	38	12.7%	1.11	0.0%	10.5%	78.9%	55.3%
Wayne County	1,712	444	25.9%	2.35	0.9%	14.4%	35.6%	69.5%
Wexford County	79	1	1.3%	0.31	0.0%	0.0%	50.0%	0.0%
State total	**10,364**	**1,373**	**13.2%**	**1.38**	**0.7%**	**9.5%**	**62.4%**	**62.0%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Minnesota

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **395 people died while walking in Minnesota**.

FIGURE 1

Pedestrian fatalities in Minnesota, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Minnesota

In Minnesota from 2003–2012, 395 people were killed while walking, resulting in a fatality rate of 0.76 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 8.2 percent in Minnesota.

Within Minnesota, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Minnesota was 24.81, compared to the national PDI of 52.2 and ranked 38th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Minnesota, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
46	Minneapolis-St. Paul-Bloomington, MN-WI	249	0.72	2.2%	32.15

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Minnesota, 52.8 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **57.0 percent of pedestrian fatalities in Minnesota were on roads with a speed limit of 40 mph or higher**, compared to 2.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 33 children in Minnesota.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.4 percent of Minnesota's population, adults aged 65 and older account for 25.7 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Minnesota is 2.26 per 100,000 people (nationally, 3.19), compared to a rate of 0.92 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Minnesota suffer at a rate of 3.08 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.2 percent of Minnesota's population, and 17.5 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Minnesota from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.00. The rate for Hispanic people of any race was 0.81; for black people and African Americans, 1.38; for Asians and Pacific Islanders, 1.17; and for American Indians and Alaska Natives, 6.07.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

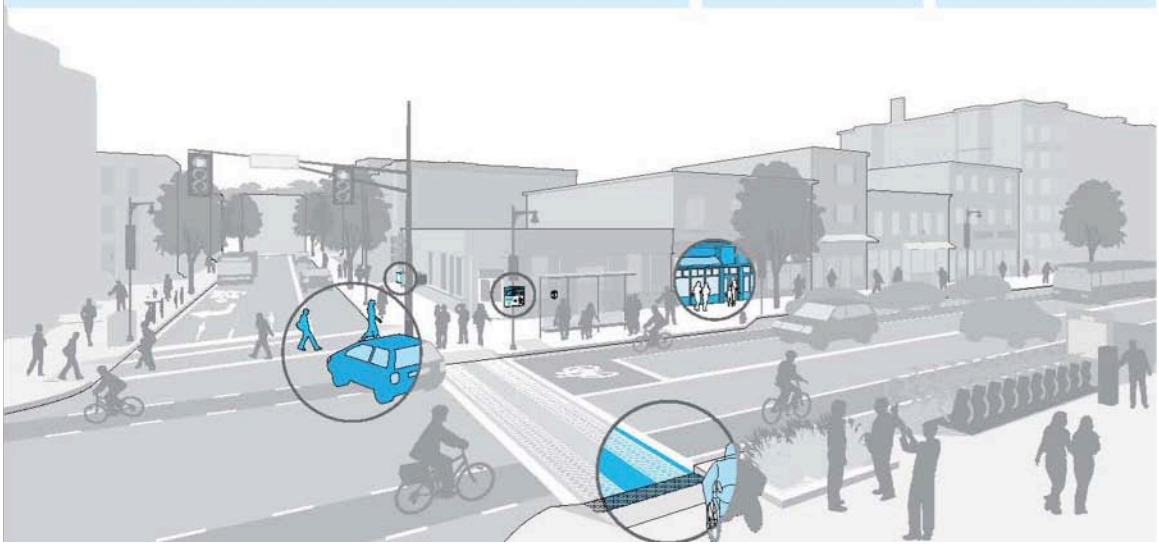
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Duluth, MN-WI	299	20	6.7%	0.64	0.0%	10.0%	50.0%	60.0%
Fargo, ND-MN	133	17	12.8%	1.05	6.3%	12.5%	50.0%	47.1%
Grand Forks, ND-MN	119	1	0.8%	0.20	0.0%	0.0%	0.0%	100.0%
La Crosse, WI-MN	95	11	11.6%	1.20	0.0%	27.3%	36.4%	72.7%
Mankato-North Mankato, MN	114	8	7.0%	0.83	12.5%	12.5%	37.5%	37.5%
Minneapolis-St. Paul-Bloomington, MN-WI	2,016	249	12.4%	0.72	2.0%	3.7%	53.3%	59.0%
Rochester, MN	182	9	4.9%	0.43	0.0%	0.0%	36.4%	44.4%
St. Cloud, MN	192	12	6.3%	0.64	8.3%	8.3%	33.3%	33.3%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Aitkin County	40	1	2.5%	0.62	0.0%	0.0%	100.0%	100.0%
Anoka County	213	37	17.4%	1.14	0.0%	0.0%	83.8%	67.6%
Becker County	53	5	9.4%	1.55	0.0%	0.0%	60.0%	40.0%
Beltrami County	52	5	9.6%	1.15	0.0%	0.0%	80.0%	20.0%
Benton County	49	3	6.1%	0.79	0.0%	0.0%	33.3%	33.3%
Big Stone County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Blue Earth County	73	8	11.0%	1.29	12.5%	12.5%	37.5%	37.5%
Brown County	27	2	7.4%	0.77	0.0%	0.0%	100.0%	100.0%
Carlton County	47	2	4.3%	0.58	0.0%	0.0%	100.0%	50.0%
Carver County	79	3	3.8%	0.34	0.0%	0.0%	33.3%	100.0%
Cass County	64	9	14.1%	3.16	0.0%	0.0%	100.0%	44.4%
Chippewa County	28	1	3.6%	0.80	0.0%	0.0%	100.0%	100.0%
Chisago County	70	4	5.7%	0.77	0.0%	0.0%	100.0%	50.0%
Clay County	56	3	5.4%	0.53	0.0%	0.0%	66.7%	33.3%
Clearwater County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cook County	9	3	33.3%	5.77	0.0%	0.0%	100.0%	66.7%
Cottonwood County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Crow Wing County	88	7	8.0%	1.15	0.0%	0.0%	71.4%	57.1%
Dakota County	212	17	8.0%	0.44	0.0%	0.0%	100.0%	64.7%
Dodge County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Douglas County	65	4	6.2%	1.12	0.0%	0.0%	50.0%	25.0%
Faribault County	27	1	3.7%	0.67	0.0%	0.0%	100.0%	100.0%
Fillmore County	35	1	2.9%	0.48	0.0%	0.0%	100.0%	0.0%
Freeborn County	59	4	6.8%	1.27	0.0%	0.0%	50.0%	25.0%
Goodhue County	70	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hennepin County	463	85	18.4%	0.75	3.6%	4.8%	34.5%	54.1%
Houston County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hubbard County	42	3	7.1%	1.50	0.0%	0.0%	100.0%	100.0%
Isanti County	63	3	4.8%	0.81	0.0%	0.0%	100.0%	33.3%
Itasca County	73	7	9.6%	1.57	16.7%	16.7%	33.3%	57.1%
Jackson County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kanabec County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kandiyohi County	69	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kittson County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Koochiching County	15	1	6.7%	0.74	0.0%	0.0%	100.0%	100.0%
Lac qui Parle County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lake County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lake of the Woods County	8	1	12.5%	2.39	0.0%	0.0%	100.0%	0.0%
Le Sueur County	31	2	6.5%	0.73	0.0%	0.0%	100.0%	50.0%
Lincoln County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lyon County	33	1	3.0%	0.39	0.0%	0.0%	100.0%	100.0%
Mahnomen County	20	1	5.0%	1.87	0.0%	0.0%	100.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Marshall County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Martin County	30	3	10.0%	1.44	0.0%	0.0%	33.3%	100.0%
McLeod County	39	3	7.7%	0.82	0.0%	0.0%	66.7%	33.3%
Meeker County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Mille Lacs County	58	4	6.9%	1.56	0.0%	0.0%	100.0%	50.0%
Morrison County	69	3	4.3%	0.91	0.0%	0.0%	66.7%	33.3%
Mower County	30	3	10.0%	0.77	33.3%	33.3%	33.3%	66.7%
Murray County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nicollet County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nobles County	38	0	0.0%	0.00	N/A	N/A	N/A	N/A
Norman County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Olmsted County	107	7	6.5%	0.50	0.0%	0.0%	33.3%	57.1%
Otter Tail County	93	4	4.3%	0.70	0.0%	0.0%	50.0%	25.0%
Pennington County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pine County	80	5	6.3%	1.72	0.0%	0.0%	100.0%	60.0%
Pipestone County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Polk County	60	1	1.7%	0.32	0.0%	0.0%	0.0%	100.0%
Pope County	22	3	13.6%	2.71	0.0%	0.0%	66.7%	33.3%
Ramsey County	201	54	26.9%	1.07	3.8%	3.8%	22.6%	64.8%
Red Lake County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Redwood County	29	2	6.9%	1.24	0.0%	0.0%	50.0%	0.0%
Renville County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rice County	78	3	3.8%	0.48	0.0%	0.0%	33.3%	33.3%
Rock County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Roseau County	20	1	5.0%	0.63	0.0%	0.0%	100.0%	0.0%
Scott County	111	10	9.0%	0.81	0.0%	0.0%	60.0%	70.0%
Sherburne County	110	8	7.3%	0.94	0.0%	0.0%	100.0%	50.0%
Sibley County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
St. Louis County	193	16	8.3%	0.80	0.0%	0.0%	50.0%	62.5%
Stearns County	143	9	6.3%	0.62	11.1%	11.1%	33.3%	33.3%
Steele County	52	2	3.8%	0.56	0.0%	0.0%	100.0%	50.0%
Stevens County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Swift County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Todd County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Traverse County	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wabasha County	44	2	4.5%	0.92	0.0%	0.0%	50.0%	0.0%
Wadena County	16	1	6.3%	0.73	0.0%	0.0%	100.0%	0.0%
Waseca County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Washington County	142	12	8.5%	0.52	0.0%	0.0%	90.9%	33.3%
Watonwan County	20	1	5.0%	0.89	0.0%	0.0%	0.0%	0.0%
Wilkin County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Winona County	68	3	4.4%	0.59	0.0%	0.0%	0.0%	66.7%
Wright County	137	10	7.3%	0.85	0.0%	0.0%	70.0%	60.0%
Yellow Medicine County	21	1	4.8%	0.95	0.0%	0.0%	0.0%	0.0%
State total	**4,835**	**395**	**8.2%**	**0.76**	**2.3%**	**2.5%**	**57.0%**	**52.8%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Mississippi

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

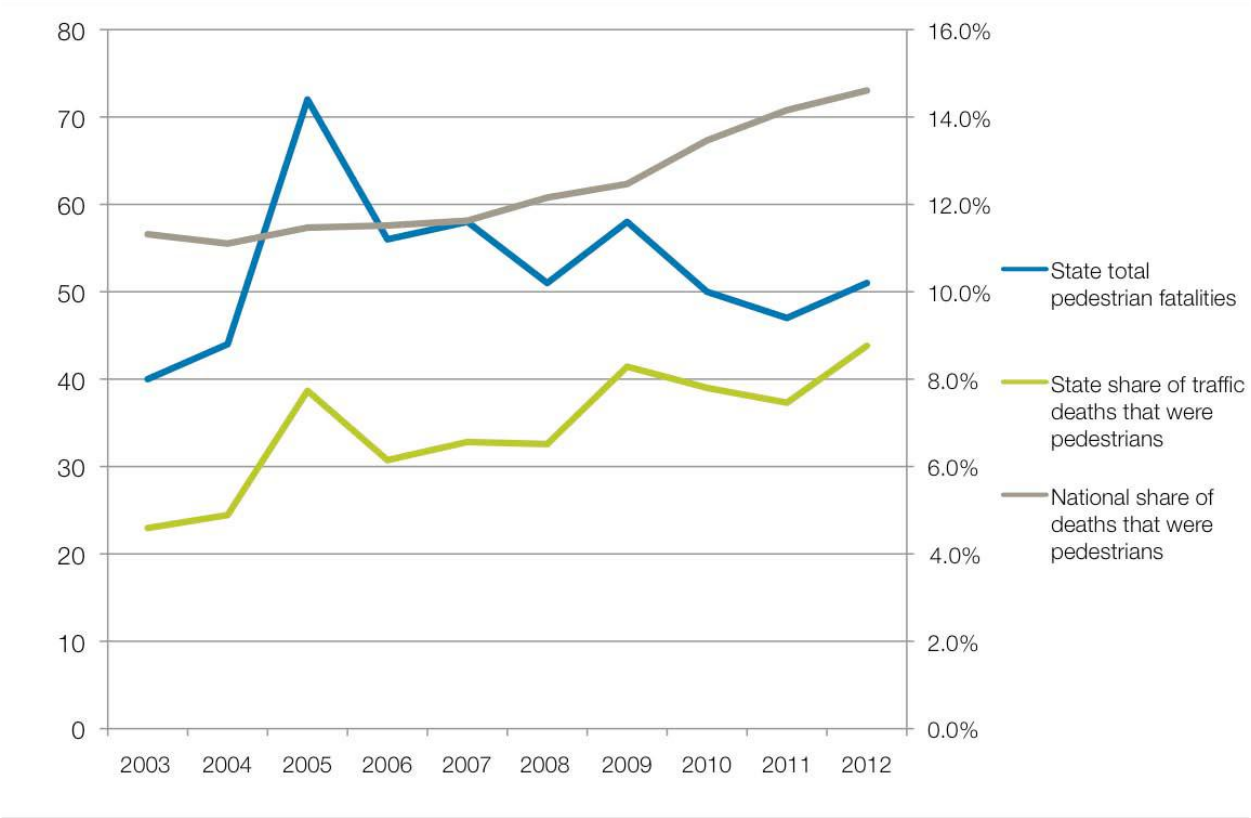
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **527 people died while walking in Mississippi**.

FIGURE 1

Pedestrian fatalities in Mississippi, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Mississippi

In Mississippi from 2003–2012, 527 people were killed while walking, resulting in a fatality rate of 1.80 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 6.7 percent in Mississippi.

Within Mississippi, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Mississippi was 102.56, compared to the national PDI of 52.2 and ranked 7th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Mississippi, 18.1 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **77.6 percent of pedestrian fatalities in Mississippi were on roads with a speed limit of 40 mph or higher**, compared to 7.6 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 29 children in Mississippi.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.4 percent of Mississippi's population, adults aged 65 and older account for 15.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Mississippi is 3.1 per 100,000 people (nationally, 3.19), compared to a rate of 2.42 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Mississippi suffer at a rate of 4.07 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.6 percent of Mississippi's population, and 9.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Mississippi from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.14. The rate for Hispanic people of any race was 3.16; and for black people and African Americans, 2.95.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

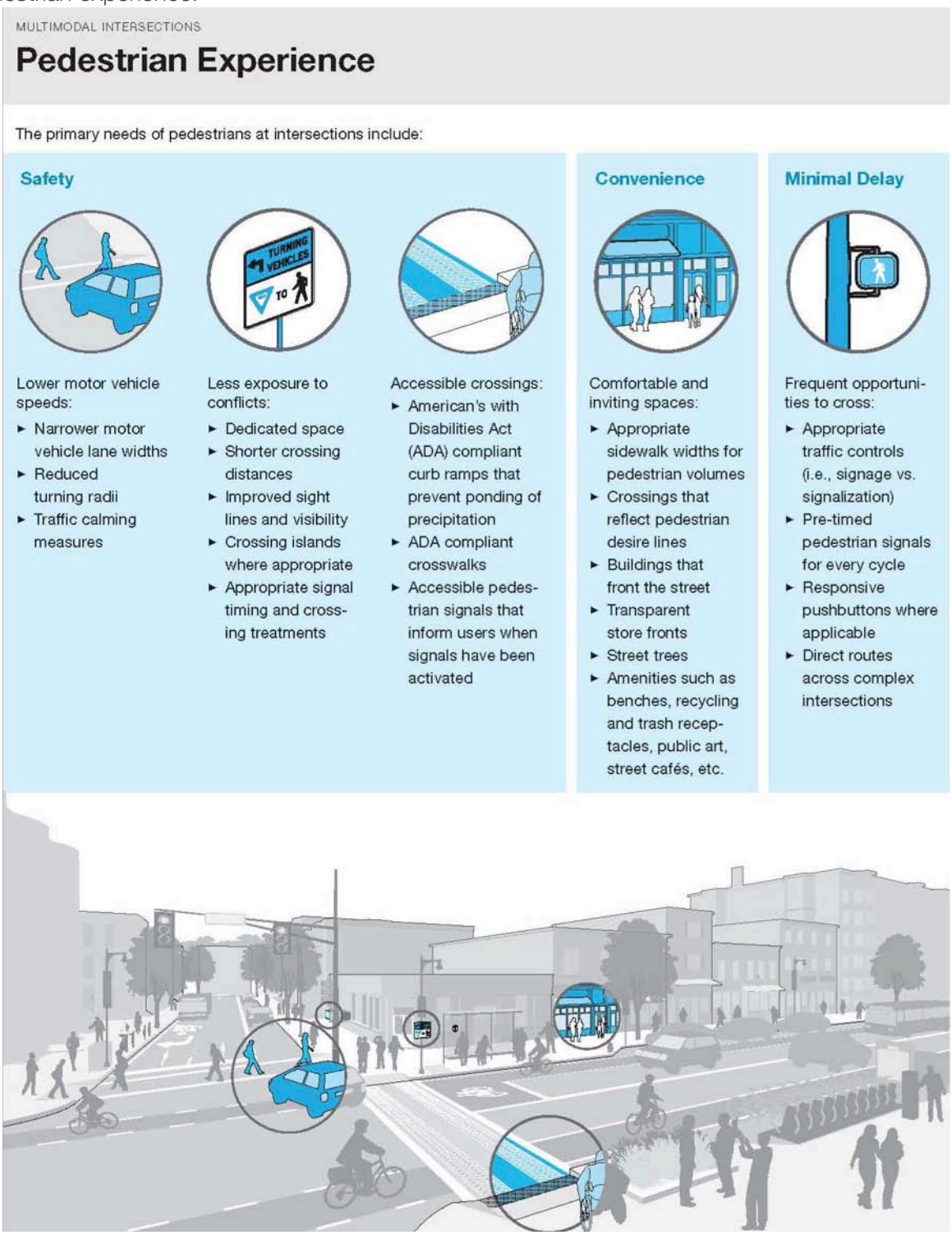
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Gulfport-Biloxi, MS	533	56	10.5%	2.40	3.7%	11.1%	59.3%	21.4%
Hattiesburg, MS	411	32	7.8%	1.54	0.0%	0.0%	71.0%	12.5%
Jackson, MS	1,098	96	8.7%	1.52	2.1%	9.4%	68.8%	12.5%
Memphis, TN-MS-AR	2,007	239	11.9%	1.72	0.9%	1.7%	77.4%	54.8%
Pascagoula, MS	372	37	9.9%	1.73	0.0%	2.7%	86.5%	10.8%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	58	6	10.3%	1.83	0.0%	0.0%	80.0%	16.7%
Alcorn County	89	3	3.4%	0.82	0.0%	0.0%	100.0%	0.0%
Amite County	46	2	4.3%	1.51	0.0%	0.0%	100.0%	0.0%
Attala County	56	3	5.4%	1.54	0.0%	0.0%	66.7%	0.0%
Benton County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bolivar County	81	10	12.3%	2.82	0.0%	10.0%	70.0%	50.0%
Calhoun County	50	3	6.0%	2.01	0.0%	0.0%	100.0%	0.0%
Carroll County	48	1	2.1%	0.95	0.0%	0.0%	100.0%	0.0%
Chickasaw County	51	0	0.0%	0.00	N/A	N/A	N/A	N/A
Choctaw County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Claiborne County	37	5	13.5%	4.95	0.0%	0.0%	100.0%	0.0%
Clarke County	74	4	5.4%	2.37	0.0%	0.0%	100.0%	0.0%
Clay County	46	4	8.7%	1.91	0.0%	0.0%	75.0%	0.0%
Coahoma County	88	12	13.6%	4.44	0.0%	0.0%	66.7%	25.0%
Copiah County	128	4	3.1%	1.36	0.0%	0.0%	100.0%	25.0%
Covington County	117	4	3.4%	2.04	0.0%	0.0%	100.0%	25.0%
DeSoto County	253	18	7.1%	1.20	5.6%	11.1%	83.3%	16.7%
Forrest County	246	27	11.0%	3.65	0.0%	0.0%	65.4%	14.8%
Franklin County	26	3	11.5%	3.70	0.0%	0.0%	100.0%	33.3%
George County	93	4	4.3%	1.84	0.0%	0.0%	100.0%	25.0%
Greene County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grenada County	71	3	4.2%	1.36	33.3%	33.3%	33.3%	0.0%
Hancock County	135	10	7.4%	2.26	0.0%	10.0%	70.0%	40.0%
Harrison County	342	43	12.6%	2.29	4.9%	12.2%	58.5%	18.6%
Hinds County	493	68	13.8%	2.75	1.5%	11.8%	61.8%	7.4%
Holmes County	96	7	7.3%	3.56	0.0%	0.0%	85.7%	28.6%
Humphreys County	34	5	14.7%	5.15	0.0%	0.0%	100.0%	80.0%
Issaquena County	18	1	5.6%	6.32	0.0%	0.0%	100.0%	0.0%
Itawamba County	95	5	5.3%	2.15	0.0%	0.0%	100.0%	60.0%
Jackson County	279	33	11.8%	2.40	0.0%	3.0%	84.8%	9.1%
Jasper County	61	1	1.6%	0.58	0.0%	0.0%	0.0%	0.0%
Jefferson County	34	2	5.9%	2.46	0.0%	0.0%	100.0%	0.0%
Jefferson Davis County	54	2	3.7%	1.58	0.0%	0.0%	100.0%	0.0%
Jones County	220	12	5.5%	1.80	0.0%	8.3%	83.3%	16.7%
Kemper County	31	1	3.2%	0.95	0.0%	0.0%	100.0%	100.0%
Lafayette County	82	3	3.7%	0.66	0.0%	0.0%	100.0%	33.3%
Lamar County	100	5	5.0%	0.98	0.0%	0.0%	100.0%	0.0%
Lauderdale County	182	8	4.4%	1.01	0.0%	0.0%	85.7%	25.0%
Lawrence County	49	0	0.0%	0.00	N/A	N/A	N/A	N/A
Leake County	95	4	4.2%	1.72	0.0%	0.0%	100.0%	25.0%
Lee County	177	12	6.8%	1.48	0.0%	0.0%	91.7%	0.0%
Leflore County	74	3	4.1%	0.90	0.0%	33.3%	66.7%	33.3%
Lincoln County	115	8	7.0%	2.33	0.0%	0.0%	87.5%	0.0%
Lowndes County	85	6	7.1%	1.01	0.0%	0.0%	83.3%	16.7%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Madison County	121	3	2.5%	0.33	0.0%	0.0%	100.0%	0.0%
Marion County	102	7	6.9%	2.65	0.0%	0.0%	100.0%	71.4%
Marshall County	167	7	4.2%	1.91	0.0%	0.0%	71.4%	14.3%
Monroe County	96	7	7.3%	1.88	0.0%	0.0%	71.4%	14.3%
Montgomery County	43	2	4.7%	1.79	0.0%	0.0%	100.0%	50.0%
Neshoba County	123	8	6.5%	2.72	0.0%	0.0%	100.0%	12.5%
Newton County	85	1	1.2%	0.46	0.0%	0.0%	100.0%	0.0%
Noxubee County	33	3	9.1%	2.55	0.0%	0.0%	100.0%	66.7%
Oktibbeha County	59	3	5.1%	0.65	33.3%	33.3%	0.0%	0.0%
Panola County	167	8	4.8%	2.31	0.0%	0.0%	100.0%	0.0%
Pearl River County	167	8	4.8%	1.48	0.0%	0.0%	87.5%	37.5%
Perry County	65	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pike County	103	6	5.8%	1.51	0.0%	0.0%	83.3%	0.0%
Pontotoc County	84	4	4.8%	1.37	0.0%	0.0%	75.0%	25.0%
Prentiss County	76	3	3.9%	1.18	0.0%	0.0%	100.0%	0.0%
Quitman County	24	2	8.3%	2.30	0.0%	0.0%	100.0%	0.0%
Rankin County	254	11	4.3%	0.81	9.1%	9.1%	81.8%	27.3%
Scott County	123	5	4.1%	1.77	0.0%	0.0%	80.0%	20.0%
Sharkey County	19	1	5.3%	1.88	0.0%	0.0%	100.0%	0.0%
Simpson County	102	10	9.8%	3.64	0.0%	0.0%	80.0%	30.0%
Smith County	42	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stone County	56	3	5.4%	1.82	0.0%	0.0%	33.3%	0.0%
Sunflower County	62	3	4.8%	0.98	0.0%	0.0%	50.0%	33.3%
Tallahatchie County	49	1	2.0%	0.66	0.0%	0.0%	100.0%	0.0%
Tate County	103	6	5.8%	2.16	16.7%	33.3%	50.0%	0.0%
Tippah County	67	4	6.0%	1.83	0.0%	0.0%	100.0%	50.0%
Tishomingo County	68	3	4.4%	1.54	0.0%	0.0%	100.0%	33.3%
Tunica County	70	2	2.9%	1.89	0.0%	0.0%	50.0%	0.0%
Union County	75	7	9.3%	2.61	0.0%	0.0%	85.7%	0.0%
Walthall County	49	2	4.1%	1.30	0.0%	0.0%	100.0%	0.0%
Warren County	128	9	7.0%	1.85	11.1%	11.1%	77.8%	33.3%
Washington County	140	17	12.1%	3.19	0.0%	0.0%	56.3%	17.6%
Wayne County	53	3	5.7%	1.43	0.0%	0.0%	100.0%	33.3%
Webster County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wilkinson County	31	2	6.5%	2.00	0.0%	0.0%	100.0%	0.0%
Winston County	66	4	6.1%	2.06	0.0%	0.0%	75.0%	0.0%
Yalobusha County	57	3	5.3%	2.34	0.0%	0.0%	100.0%	0.0%
Yazoo County	76	4	5.3%	1.42	0.0%	0.0%	75.0%	25.0%
State total	**7,833**	**527**	**6.7%**	**1.80**	**1.7%**	**7.6%**	**77.6%**	**18.1%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Missouri

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

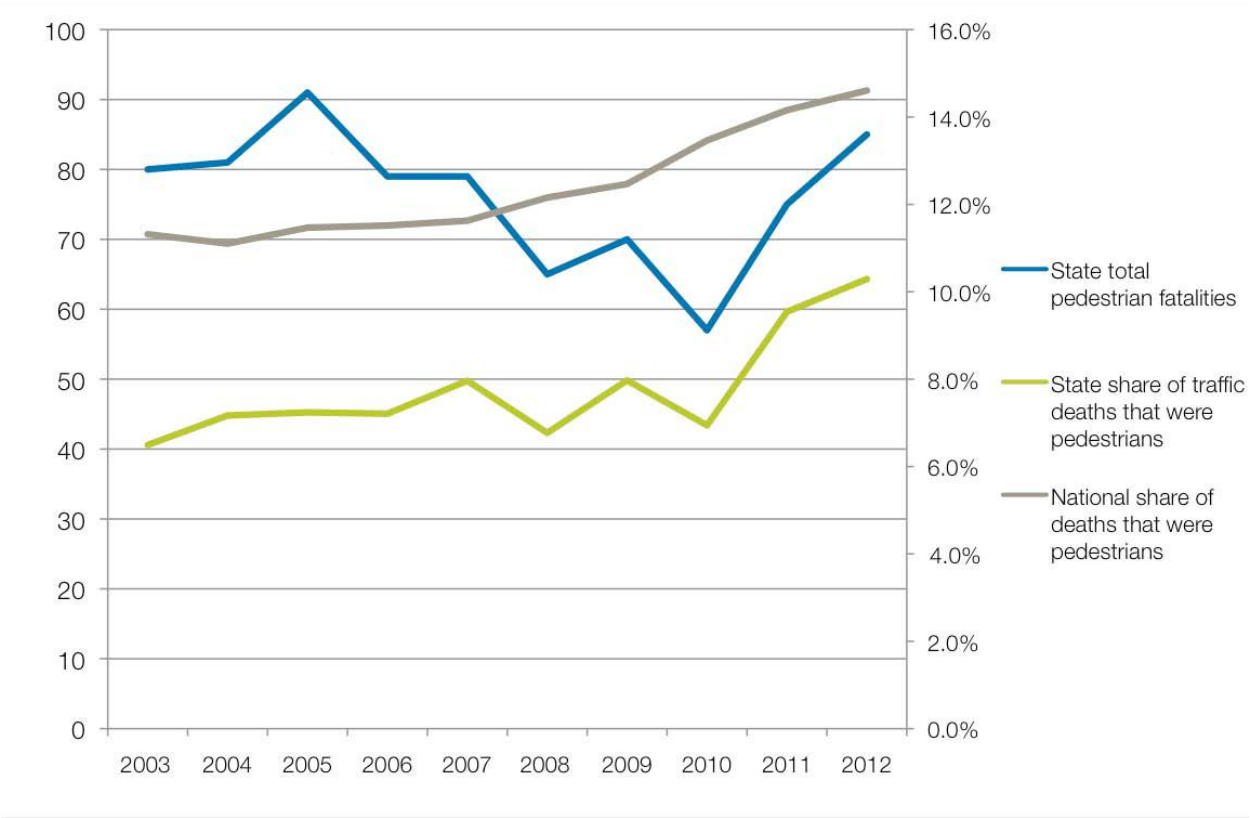
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **762 people died while walking in Missouri**.

FIGURE 1

Pedestrian fatalities in Missouri, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Missouri

In Missouri from 2003–2012, 762 people were killed while walking, resulting in a fatality rate of 1.29 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.6 percent in Missouri.

Within Missouri, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Missouri was 59.55, compared to the national PDI of 52.2 and ranked 18th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Missouri, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
21	Kansas City, MO-KS	228	1.13	1.3%	85.74
26	St. Louis, MO-IL	364	1.22	1.7%	69.69

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Missouri, 34.1 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **62.6 percent of pedestrian fatalities in Missouri were on roads with a speed limit of 40 mph or higher**, compared to 8.7 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 60 children in Missouri.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.6 percent of Missouri's population, adults aged 65 and older account for 16.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Missouri is 2 per 100,000 people (nationally, 3.19), compared to a rate of 1.61 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Missouri suffer at a rate of 2.4 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.5 percent of Missouri's population, and 9.4 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Missouri from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.53. The rate for Hispanic people of any race was 1.59; for black people and African Americans, 2.58; and for Asians and Pacific Islanders, 1.51.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

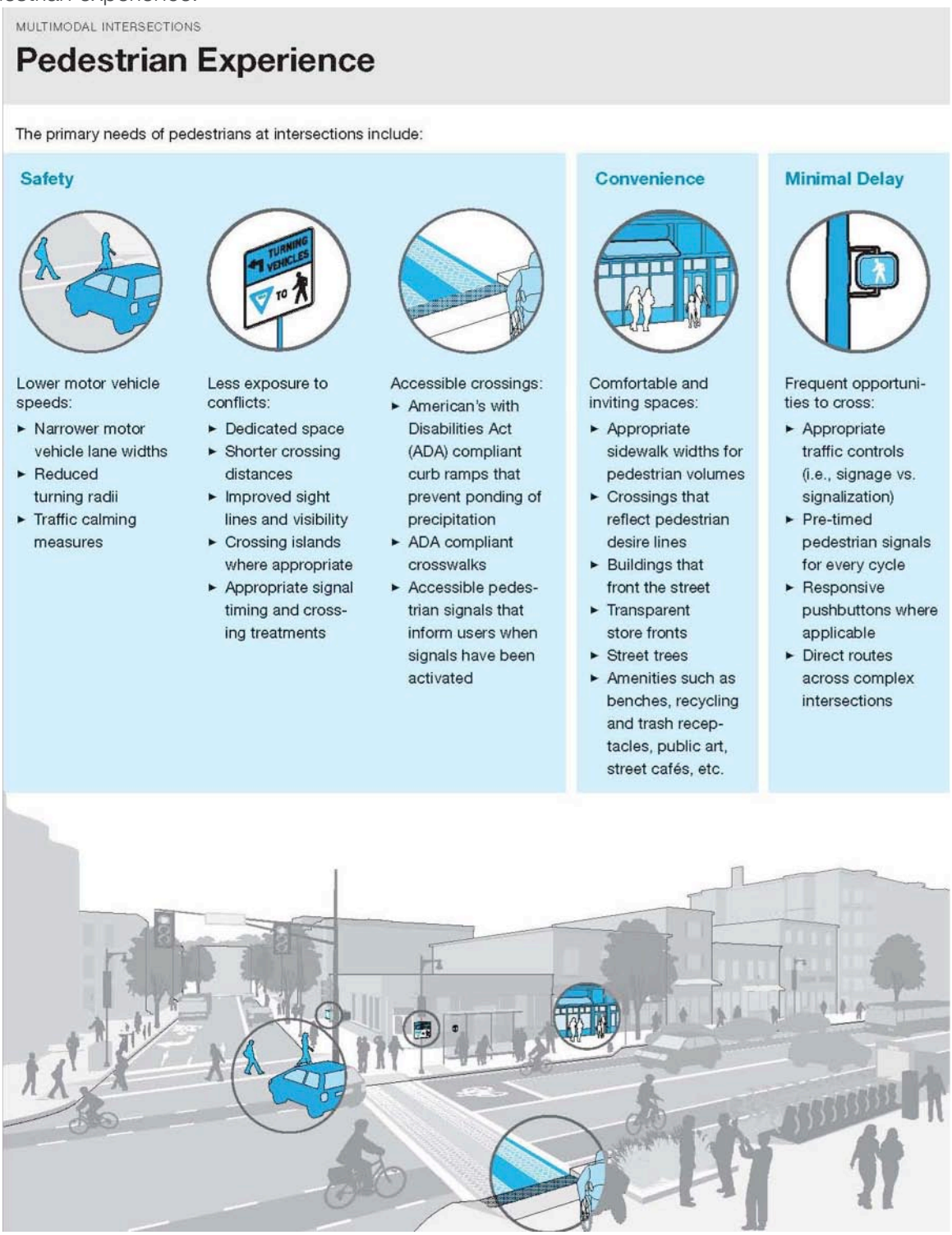
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Cape Girardeau-Jackson, MO-IL	137	12	8.8%	1.45	0.0%	0.0%	91.7%	33.3%
Columbia, MO	241	18	7.5%	0.81	0.0%	0.0%	83.3%	50.0%
Fayetteville-Springdale-Rogers, AR-MO	664	41	6.2%	0.90	0.0%	7.1%	66.7%	41.5%
Jefferson City, MO	297	13	4.4%	0.80	0.0%	0.0%	92.3%	46.2%
Joplin, MO	363	25	6.9%	1.14	0.0%	4.0%	80.0%	32.0%
Kansas City, MO-KS	2,185	228	10.4%	1.13	1.8%	9.3%	58.2%	27.3%
Springfield, MO	663	53	8.0%	1.05	3.8%	7.7%	80.8%	32.1%
St. Joseph, MO-KS	216	15	6.9%	0.94	0.0%	14.3%	50.0%	13.3%
St. Louis, MO-IL	3,299	364	11.0%	1.22	2.5%	9.6%	51.5%	43.6%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adair County	26	1	3.8%	0.40	100.0%	100.0%	0.0%	0.0%
Andrew County	45	3	6.7%	1.77	0.0%	0.0%	100.0%	0.0%
Atchison County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Audrain County	53	2	3.8%	0.78	0.0%	0.0%	0.0%	50.0%
Barry County	138	6	4.3%	1.69	0.0%	0.0%	66.7%	50.0%
Barton County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bates County	38	1	2.6%	0.59	0.0%	0.0%	100.0%	100.0%
Benton County	63	2	3.2%	1.06	0.0%	0.0%	50.0%	0.0%
Bollinger County	27	1	3.7%	0.80	0.0%	0.0%	100.0%	0.0%
Boone County	215	18	8.4%	1.15	0.0%	0.0%	83.3%	50.0%
Buchanan County	113	10	8.8%	1.14	0.0%	20.0%	30.0%	10.0%
Butler County	135	14	10.4%	3.31	0.0%	21.4%	57.1%	28.6%
Caldwell County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Callaway County	121	7	5.8%	1.61	0.0%	0.0%	85.7%	28.6%
Camden County	128	8	6.3%	1.89	0.0%	0.0%	75.0%	50.0%
Cape Girardeau County	82	7	8.5%	0.95	0.0%	0.0%	100.0%	28.6%
Carroll County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Carter County	36	1	2.8%	1.63	0.0%	0.0%	100.0%	0.0%
Cass County	108	3	2.8%	0.31	0.0%	0.0%	66.7%	33.3%
Cedar County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chariton County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Christian County	100	4	4.0%	0.56	0.0%	0.0%	66.7%	0.0%
Clark County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clay County	244	21	8.6%	0.99	0.0%	0.0%	95.2%	14.3%
Clinton County	37	2	5.4%	0.97	0.0%	0.0%	100.0%	0.0%
Cole County	105	3	2.9%	0.40	0.0%	0.0%	100.0%	66.7%
Cooper County	51	3	5.9%	1.72	0.0%	0.0%	100.0%	33.3%
Crawford County	81	5	6.2%	2.04	0.0%	0.0%	100.0%	0.0%
Dade County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dallas County	48	3	6.3%	1.80	0.0%	33.3%	33.3%	66.7%
Daviess County	29	1	3.4%	1.21	0.0%	0.0%	100.0%	0.0%
DeKalb County	29	1	3.4%	0.78	N/A	N/A	N/A	0.0%
Dent County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Douglas County	42	2	4.8%	1.47	0.0%	0.0%	100.0%	50.0%
Dunklin County	100	4	4.0%	1.24	0.0%	25.0%	75.0%	25.0%
Franklin County	260	15	5.8%	1.50	6.7%	6.7%	53.3%	33.3%
Gasconade County	41	1	2.4%	0.65	0.0%	0.0%	100.0%	100.0%
Gentry County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Greene County	359	37	10.3%	1.39	5.4%	8.1%	83.8%	29.7%
Grundy County	21	1	4.8%	0.98	0.0%	0.0%	100.0%	0.0%
Harrison County	39	1	2.6%	1.13	0.0%	0.0%	100.0%	0.0%
Henry County	64	2	3.1%	0.90	0.0%	0.0%	100.0%	50.0%
Hickory County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Holt County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Howard County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Howell County	117	7	6.0%	1.77	0.0%	14.3%	85.7%	57.1%
Iron County	47	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	778	122	15.7%	1.83	0.0%	9.9%	50.4%	28.7%
Jasper County	184	11	6.0%	0.97	0.0%	0.0%	72.7%	27.3%
Jefferson County	368	19	5.2%	0.89	5.6%	11.1%	83.3%	31.6%
Johnson County	101	8	7.9%	1.54	0.0%	14.3%	71.4%	62.5%
Knox County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Laclede County	101	5	5.0%	1.43	0.0%	20.0%	60.0%	80.0%
Lafayette County	83	4	4.8%	1.20	0.0%	0.0%	100.0%	0.0%
Lawrence County	118	5	4.2%	1.32	0.0%	0.0%	100.0%	20.0%
Lewis County	26	1	3.8%	0.98	0.0%	0.0%	100.0%	100.0%
Lincoln County	104	4	3.8%	0.80	0.0%	0.0%	25.0%	50.0%
Linn County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Livingston County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Macon County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Madison County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Maries County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Marion County	58	7	12.1%	2.45	0.0%	0.0%	71.4%	85.7%
McDonald County	96	2	2.1%	0.88	0.0%	0.0%	50.0%	50.0%
Mercer County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Miller County	113	3	2.7%	1.22	0.0%	0.0%	33.3%	66.7%
Mississippi County	37	4	10.8%	2.85	0.0%	25.0%	25.0%	50.0%
Moniteau County	31	1	3.2%	0.65	0.0%	0.0%	100.0%	100.0%
Monroe County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Montgomery County	56	4	7.1%	3.28	0.0%	0.0%	100.0%	25.0%
Morgan County	62	2	3.2%	0.98	0.0%	0.0%	100.0%	50.0%
New Madrid County	89	9	10.1%	4.76	0.0%	0.0%	87.5%	11.1%
Newton County	179	14	7.8%	2.45	0.0%	7.1%	85.7%	35.7%
Nodaway County	50	0	0.0%	0.00	N/A	N/A	N/A	N/A
Oregon County	46	3	6.5%	2.80	0.0%	0.0%	66.7%	33.3%
Osage County	40	2	5.0%	1.46	0.0%	0.0%	100.0%	50.0%
Ozark County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pemiscot County	72	6	8.3%	3.20	0.0%	0.0%	60.0%	0.0%
Perry County	43	1	2.3%	0.53	N/A	N/A	N/A	0.0%
Pettis County	97	4	4.1%	0.97	0.0%	0.0%	66.7%	50.0%
Phelps County	133	8	6.0%	1.82	0.0%	0.0%	87.5%	12.5%
Pike County	63	6	9.5%	3.23	0.0%	0.0%	100.0%	50.0%
Platte County	128	15	11.7%	1.74	7.1%	21.4%	71.4%	13.3%
Polk County	74	4	5.4%	1.32	0.0%	0.0%	100.0%	50.0%
Pulaski County	101	7	6.9%	1.44	0.0%	28.6%	57.1%	42.9%
Putnam County	12	1	8.3%	1.98	0.0%	0.0%	0.0%	100.0%
Ralls County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Randolph County	44	1	2.3%	0.39	N/A	N/A	N/A	0.0%
Ray County	46	2	4.3%	0.85	0.0%	0.0%	100.0%	50.0%
Reynolds County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ripley County	51	1	2.0%	0.71	0.0%	0.0%	100.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Saline County	53	1	1.9%	0.43	0.0%	0.0%	100.0%	0.0%
Schuyler County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Scotland County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Scott County	79	7	8.9%	1.77	0.0%	0.0%	85.7%	14.3%
Shannon County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Shelby County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
St. Charles County	260	22	8.5%	0.64	0.0%	4.5%	81.8%	9.1%
St. Clair County	56	3	5.4%	3.09	0.0%	0.0%	100.0%	100.0%
St. Francois County	136	8	5.9%	1.26	0.0%	12.5%	75.0%	50.0%
St. Louis city, Missouri	469	120	25.6%	3.72	0.0%	14.7%	23.3%	43.3%
St. Louis County	614	87	14.2%	0.87	7.1%	8.2%	57.6%	34.1%
Ste. Genevieve County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stoddard County	80	2	2.5%	0.67	0.0%	0.0%	100.0%	50.0%
Stone County	91	3	3.3%	0.95	0.0%	0.0%	66.7%	0.0%
Sullivan County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Taney County	104	5	4.8%	1.04	0.0%	20.0%	60.0%	20.0%
Texas County	87	5	5.7%	1.97	0.0%	0.0%	100.0%	80.0%
Vernon County	59	4	6.8%	1.92	0.0%	0.0%	50.0%	50.0%
Warren County	70	2	2.9%	0.65	0.0%	0.0%	50.0%	50.0%
Washington County	111	2	1.8%	0.81	0.0%	0.0%	100.0%	50.0%
Wayne County	69	2	2.9%	1.49	0.0%	0.0%	100.0%	0.0%
Webster County	82	5	6.1%	1.42	0.0%	0.0%	80.0%	40.0%
Worth County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wright County	42	1	2.4%	0.54	0.0%	0.0%	100.0%	0.0%
State total	**9,978**	**762**	**7.6%**	**1.29**	**1.6%**	**8.7%**	**62.6%**	**34.1%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Montana

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

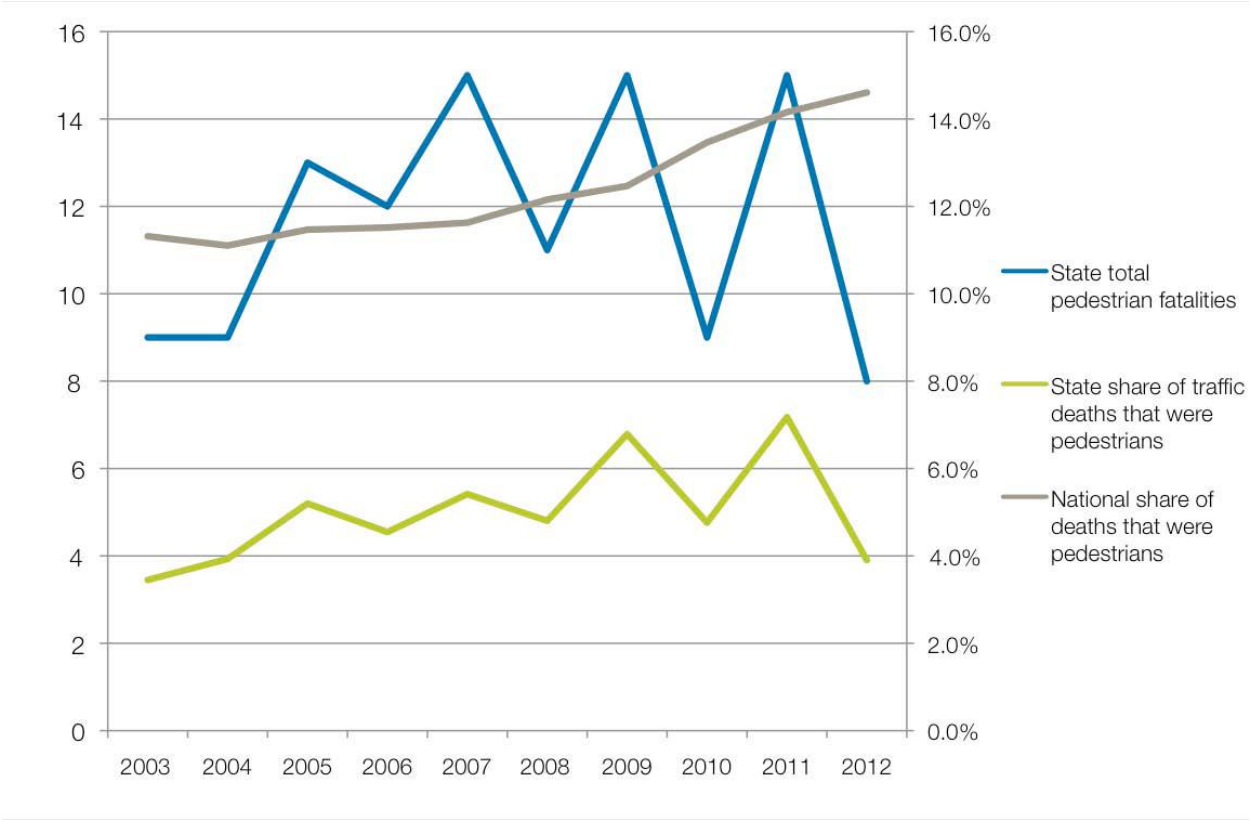
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **116 people died while walking in Montana**.

FIGURE 1

Pedestrian fatalities in Montana, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Montana

In Montana from 2003–2012, 116 people were killed while walking, resulting in a fatality rate of 1.20 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.0 percent in Montana.

Within Montana, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Montana was 24.16, compared to the national PDI of 52.2 and ranked 40th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Montana, 61.7 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **57.8 percent of pedestrian fatalities in Montana were on roads with a speed limit of 40 mph or higher**, compared to 18.1 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 14.1 percent of Montana's population, adults aged 65 and older account for 23.7 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Montana is 3.33 per 100,000 people (nationally, 3.19), compared to a rate of 1.76 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Montana suffer at a rate of 4.12 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.7 percent of Montana's population, and 13.8 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Montana from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.6. The rate for American Indians and Alaska Natives was 6.83. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

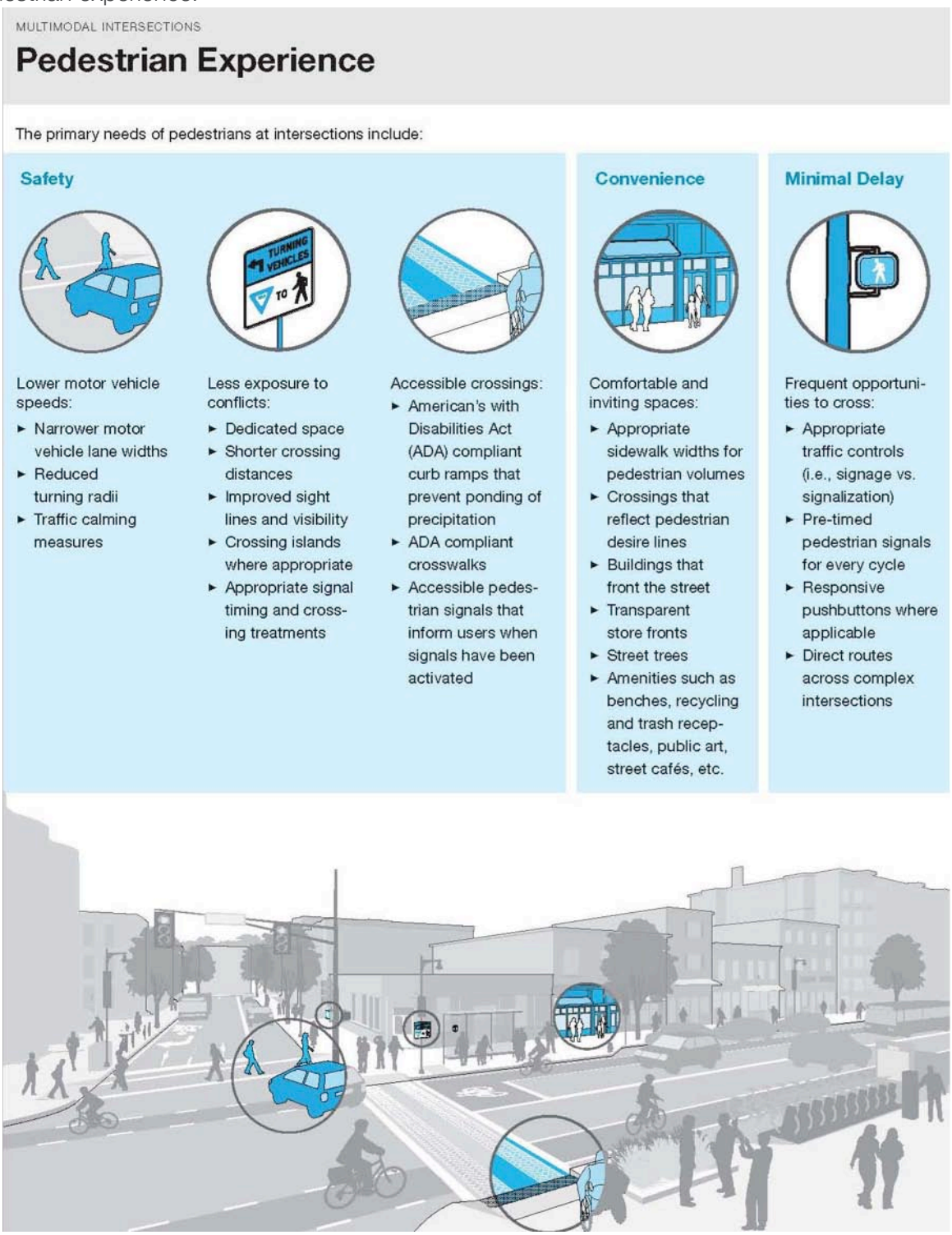
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Billings, MT	247	17	6.9%	0.63	5.9%	11.8%	23.5%	35.3%
Great Falls, MT	91	6	6.6%	1.23	0.0%	33.3%	16.7%	83.3%
Missoula, MT	161	17	10.6%	1.65	0.0%	18.8%	37.5%	56.3%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Beaverhead County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Big Horn County	103	6	5.8%	4.71	0.0%	0.0%	100.0%	33.3%
Blaine County	33	2	6.1%	3.06	0.0%	0.0%	100.0%	100.0%
Broadwater County	28	1	3.6%	1.92	0.0%	0.0%	100.0%	100.0%
Carbon County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Carter County	8	1	12.5%	8.26	0.0%	100.0%	0.0%	100.0%
Cascade County	91	6	6.6%	0.74	0.0%	33.3%	16.7%	83.3%
Chouteau County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Custer County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Daniels County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dawson County	18	1	5.6%	1.12	0.0%	0.0%	100.0%	100.0%
Deer Lodge County	17	1	5.9%	1.08	0.0%	100.0%	0.0%	100.0%
Fallon County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fergus County	34	1	2.9%	0.87	0.0%	100.0%	0.0%	100.0%
Flathead County	189	10	5.3%	1.15	0.0%	20.0%	60.0%	80.0%
Gallatin County	137	9	6.6%	1.05	0.0%	22.2%	77.8%	66.7%
Garfield County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Glacier County	72	3	4.2%	2.25	0.0%	0.0%	66.7%	66.7%
Golden Valley County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Granite County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hill County	30	3	10.0%	1.87	0.0%	33.3%	66.7%	100.0%
Jefferson County	60	3	5.0%	2.72	0.0%	0.0%	100.0%	0.0%
Judith Basin County	15	1	6.7%	4.75	0.0%	0.0%	100.0%	100.0%
Lake County	110	6	5.5%	2.12	0.0%	0.0%	83.3%	83.3%
Lewis and Clark County	89	11	12.4%	1.80	9.1%	9.1%	63.6%	72.7%
Liberty County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lincoln County	58	2	3.4%	1.03	0.0%	50.0%	50.0%	100.0%
Madison County	46	0	0.0%	0.00	N/A	N/A	N/A	N/A
McCone County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Meagher County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Mineral County	46	0	0.0%	0.00	N/A	N/A	N/A	N/A
Missoula County	161	17	10.6%	1.60	0.0%	18.8%	37.5%	56.3%
Musselshell County	14	1	7.1%	2.24	0.0%	0.0%	100.0%	N/A
Park County	45	0	0.0%	0.00	N/A	N/A	N/A	N/A
Petroleum County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Phillips County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pondera County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Powder River County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Powell County	35	0	0.0%	0.00	N/A	N/A	N/A	N/A
Prairie County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ravalli County	59	2	3.4%	0.50	0.0%	50.0%	50.0%	50.0%
Richland County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Roosevelt County	32	1	3.1%	0.96	0.0%	0.0%	100.0%	100.0%
Rosebud County	51	1	2.0%	1.09	0.0%	0.0%	100.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Sanders County	68	2	2.9%	1.78	0.0%	0.0%	100.0%	100.0%
Sheridan County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Silver Bow County	50	5	10.0%	1.48	0.0%	40.0%	60.0%	20.0%
Stillwater County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sweet Grass County	14	1	7.1%	2.72	0.0%	0.0%	100.0%	0.0%
Teton County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Toole County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Treasure County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Valley County	30	1	3.3%	1.35	0.0%	0.0%	100.0%	100.0%
Wheatland County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wibaux County	9	1	11.1%	9.90	0.0%	100.0%	0.0%	0.0%
Yellowstone County	203	17	8.4%	1.19	5.9%	11.8%	23.5%	35.3%
State total	**2,334**	**116**	**5.0%**	**1.20**	**1.7%**	**18.1%**	**57.8%**	**61.7%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Nebraska

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **91 people died while walking in Nebraska**.

FIGURE 1

Pedestrian fatalities in Nebraska, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Nebraska

In Nebraska from 2003–2012, 91 people were killed while walking, resulting in a fatality rate of 0.51 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 3.9 percent in Nebraska.

Within Nebraska, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Nebraska was 16.19, compared to the national PDI of 52.2 and ranked 48th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Nebraska, 43.0 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **51.7 percent of pedestrian fatalities in Nebraska were on roads with a speed limit of 40 mph or higher**, compared to 14.6 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 11 children in Nebraska.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.4 percent of Nebraska's population, adults aged 65 and older account for 19.0 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Nebraska is 1.26 per 100,000 people (nationally, 3.19), compared to a rate of 0.83 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Nebraska suffer at a rate of 1.64 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.8 percent of Nebraska's population, and 12.7 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Nebraska from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 0.84. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

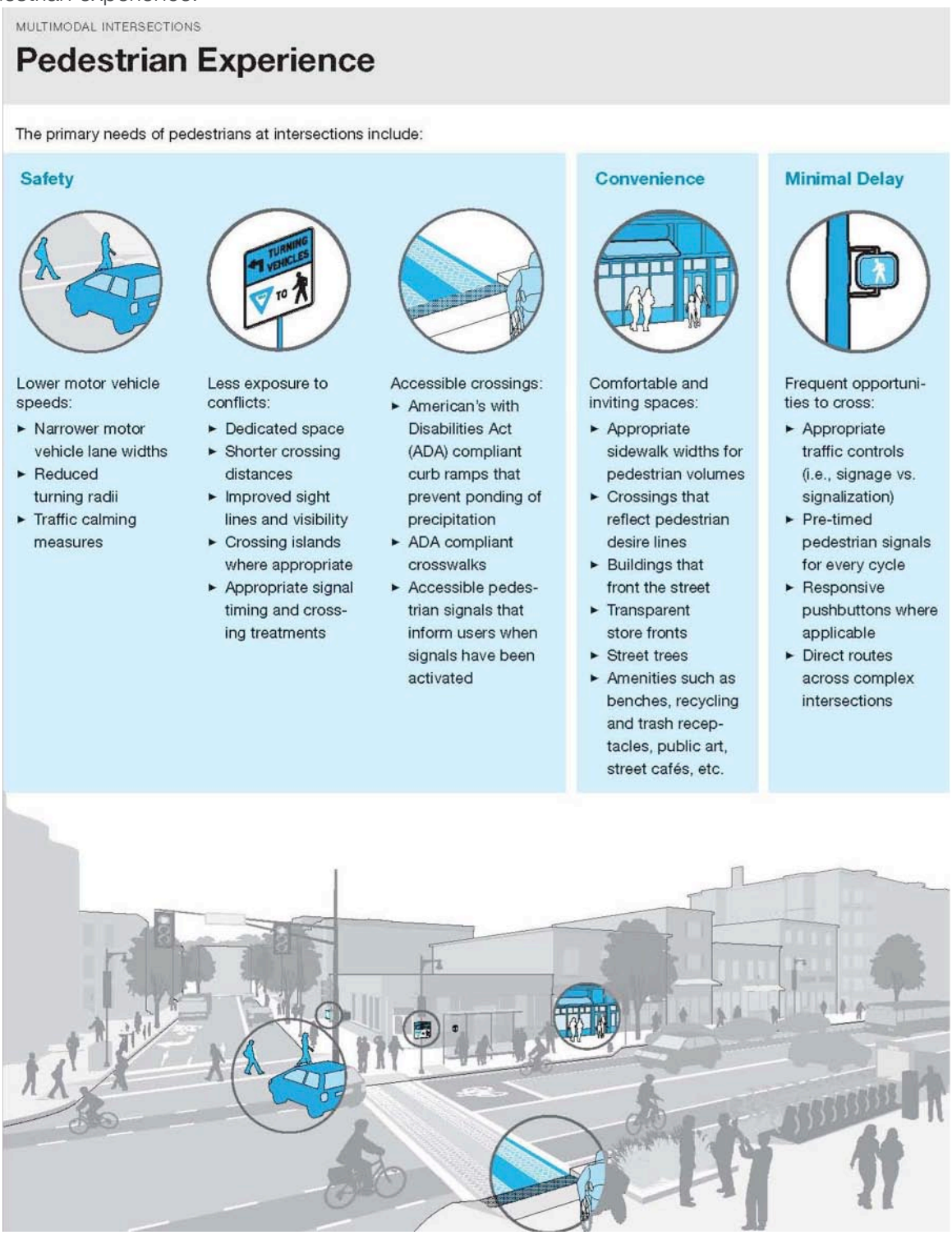
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Lincoln, NE	216	10	4.6%	0.40	10.0%	40.0%	20.0%	70.0%
Omaha-Council Bluffs, NE-IA	761	55	7.2%	0.53	1.9%	9.3%	53.7%	41.8%
Sioux City, IA-NE-SD	156	13	8.3%	0.98	0.0%	33.3%	33.3%	7.7%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	45	2	4.4%	0.64	0.0%	100.0%	0.0%	100.0%
Antelope County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Arthur County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Banner County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Blaine County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Boone County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Box Butte County	20	1	5.0%	0.88	0.0%	100.0%	0.0%	0.0%
Boyd County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Brown County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Buffalo County	89	2	2.2%	0.44	0.0%	0.0%	50.0%	50.0%
Burt County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Butler County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cass County	54	1	1.9%	0.40	0.0%	0.0%	100.0%	0.0%
Cedar County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chase County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cherry County	22	1	4.5%	1.71	0.0%	0.0%	100.0%	100.0%
Cheyenne County	33	1	3.0%	1.00	0.0%	0.0%	100.0%	100.0%
Clay County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Colfax County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cuming County	24	1	4.2%	1.07	0.0%	0.0%	100.0%	0.0%
Custer County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dakota County	20	1	5.0%	0.48	0.0%	0.0%	100.0%	0.0%
Dawes County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dawson County	63	2	3.2%	0.83	0.0%	0.0%	100.0%	0.0%
Deuel County	28	1	3.6%	5.05	0.0%	0.0%	100.0%	0.0%
Dixon County	18	1	5.6%	1.67	0.0%	0.0%	100.0%	0.0%
Dodge County	45	1	2.2%	0.27	0.0%	100.0%	0.0%	0.0%
Douglas County	313	41	13.1%	0.81	2.4%	9.8%	46.3%	51.2%
Dundy County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fillmore County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Frontier County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Furnas County	20	1	5.0%	2.00	0.0%	0.0%	100.0%	0.0%
Gage County	56	0	0.0%	0.00	N/A	N/A	N/A	N/A
Garden County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Garfield County	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gosper County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Greeley County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hall County	71	3	4.2%	0.53	0.0%	0.0%	33.3%	0.0%
Hamilton County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harlan County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hayes County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hitchcock County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Holt County	19	1	5.3%	0.94	0.0%	0.0%	0.0%	100.0%
Hooker County	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Howard County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jefferson County	11	1	9.1%	1.28	0.0%	0.0%	100.0%	0.0%
Johnson County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kearney County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Keith County	34	1	2.9%	1.20	0.0%	0.0%	100.0%	100.0%
Keya Paha County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kimball County	13	1	7.7%	2.60	0.0%	0.0%	0.0%	100.0%
Knox County	26	1	3.8%	1.14	0.0%	100.0%	0.0%	0.0%
Lancaster County	181	10	5.5%	0.36	10.0%	40.0%	20.0%	70.0%
Lincoln County	67	3	4.5%	0.84	0.0%	0.0%	100.0%	33.3%
Logan County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Loup County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Madison County	33	3	9.1%	0.86	0.0%	33.3%	33.3%	33.3%
McPherson County	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Merrick County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Morrill County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nance County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nemaha County	8	1	12.5%	1.38	0.0%	100.0%	0.0%	0.0%
Nuckolls County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Otoe County	42	2	4.8%	1.28	0.0%	0.0%	100.0%	50.0%
Pawnee County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Perkins County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Phelps County	15	1	6.7%	1.07	0.0%	0.0%	100.0%	100.0%
Pierce County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Platte County	58	0	0.0%	0.00	N/A	N/A	N/A	N/A
Polk County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Red Willow County	21	2	9.5%	1.80	0.0%	0.0%	100.0%	50.0%
Richardson County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rock County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Saline County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sarpy County	86	0	0.0%	0.00	N/A	N/A	N/A	N/A
Saunders County	40	0	0.0%	0.00	N/A	N/A	N/A	N/A
Scotts Bluff County	53	1	1.9%	0.27	0.0%	0.0%	100.0%	100.0%
Seward County	35	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sheridan County	19	1	5.3%	1.79	N/A	N/A	N/A	100.0%
Sherman County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sioux County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stanton County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Thayer County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Thomas County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Thurston County	19	2	10.5%	2.88	0.0%	0.0%	100.0%	100.0%
Valley County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Washington County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wayne County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Webster County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Wheeler County	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
York County	47	0	0.0%	0.00	N/A	N/A	N/A	N/A
State total	**2,362**	**91**	**3.9%**	**0.51**	**2.2%**	**14.6%**	**51.7%**	**43.0%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Nevada

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

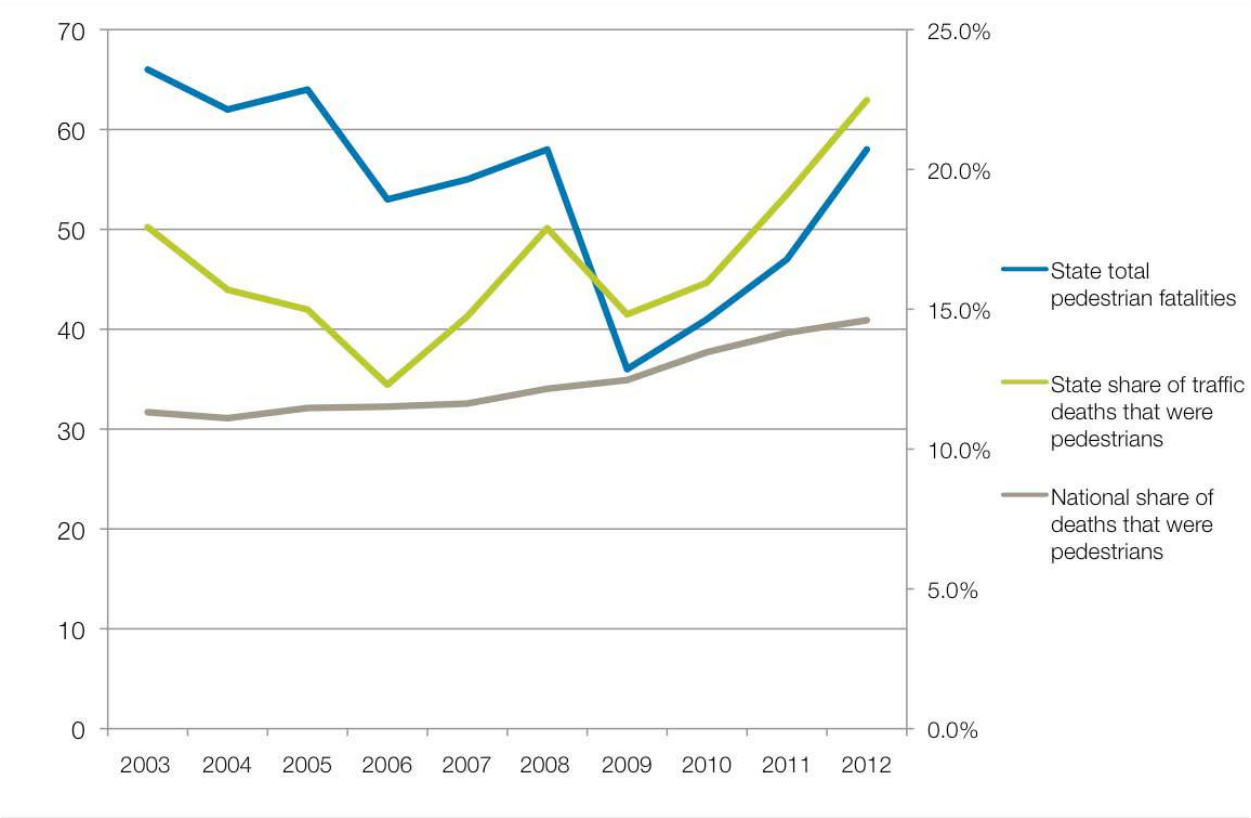
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **540 people died while walking in Nevada**.

FIGURE 1

Pedestrian fatalities in Nevada, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Nevada

In Nevada from 2003–2012, 540 people were killed while walking, resulting in a fatality rate of 2.10 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 16.3 percent in Nevada.

Within Nevada, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Nevada was 85.28, compared to the national PDI of 52.2 and ranked 13th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Nevada, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
13	Las Vegas-Paradise, NV	413	1.85	1.8%	102.67

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Nevada, 65.3 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **58.9 percent of pedestrian fatalities in Nevada were on roads with a speed limit of 40 mph or higher**, compared to 5.8 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 37 children in Nevada.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.4 percent of Nevada's population, adults aged 65 and older account for 17.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Nevada is 3.74 per 100,000 people (nationally, 3.19), compared to a rate of 2.31 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Nevada suffer at a rate of 4.76 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 4.6 percent of Nevada's population, and 8.8 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Nevada from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.65. The rate for Hispanic people of any race was 2.07; for black people and African Americans, 2.45; for Asians and Pacific Islanders, 1.46; and for American Indians and Alaska Natives, 5.58.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

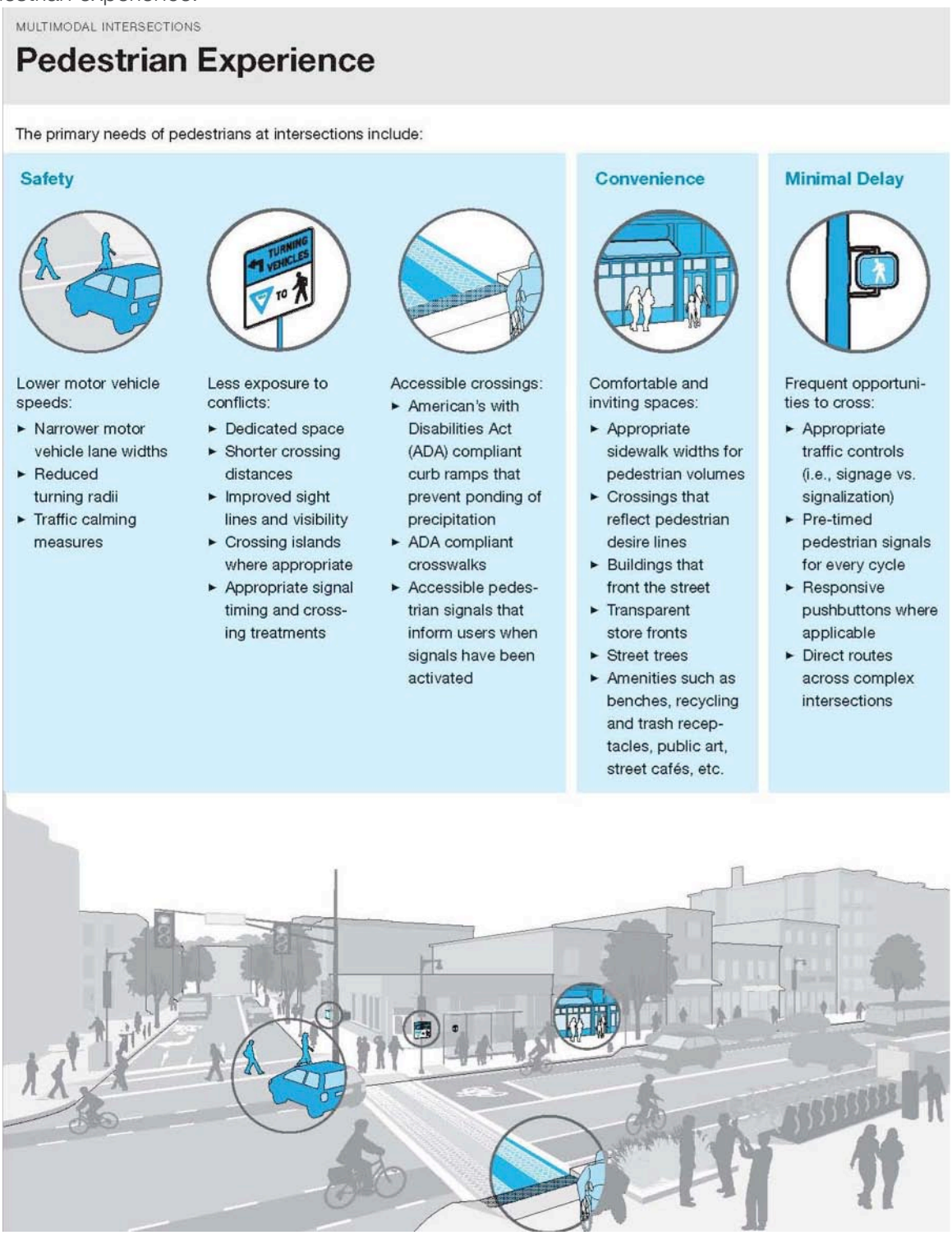
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Carson City, NV	34	7	20.6%	0.72	0.0%	28.6%	42.9%	85.7%
Las Vegas-Paradise, NV	2,045	413	20.2%	1.85	0.2%	6.2%	59.7%	67.3%
Reno-Sparks, NV	367	85	23.2%	1.78	1.2%	15.3%	48.2%	59.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Carson City, Nevada	34	7	20.6%	1.26	0.0%	28.6%	42.9%	85.7%
Churchill County	70	1	1.4%	0.41	0.0%	0.0%	0.0%	100.0%
Clark County	2,045	413	20.2%	2.24	0.2%	6.2%	59.7%	67.3%
Douglas County	78	3	3.8%	0.64	0.0%	33.3%	66.7%	100.0%
Elko County	166	5	3.0%	1.06	0.0%	0.0%	100.0%	50.0%
Esmeralda County	31	1	3.2%	12.05	0.0%	0.0%	100.0%	100.0%
Eureka County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Humboldt County	61	2	3.3%	1.26	0.0%	0.0%	100.0%	50.0%
Lander County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lincoln County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lyon County	97	5	5.2%	1.02	0.0%	0.0%	40.0%	100.0%
Mineral County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nye County	174	12	6.9%	2.87	0.0%	9.1%	72.7%	33.3%
Pershing County	31	3	9.7%	4.51	0.0%	0.0%	100.0%	0.0%
Storey County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Washoe County	358	85	23.7%	2.09	1.2%	15.3%	48.2%	59.5%
White Pine County	44	3	6.8%	3.14	33.3%	33.3%	0.0%	100.0%
State total	**3,322**	**540**	**16.3%**	**2.10**	**0.6%**	**5.8%**	**58.9%**	**65.3%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
New Hampshire

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **100 people died while walking in New Hampshire**.

FIGURE 1

Pedestrian fatalities in New Hampshire, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in New Hampshire

In New Hampshire from 2003–2012, 100 people were killed while walking, resulting in a fatality rate of 0.76 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.7 percent in New Hampshire.

Within New Hampshire, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for New Hampshire was 19.75, compared to the national PDI of 52.2 and ranked 45th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In New Hampshire, 34.1 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **33.3 percent of pedestrian fatalities in New Hampshire were on roads with a speed limit of 40 mph or higher**, compared to 12.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 10 children in New Hampshire.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.6 percent of New Hampshire's population, adults aged 65 and older account for 35.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in New Hampshire is 2.81 per 100,000 people (nationally, 3.19), compared to a rate of 0.75 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in New Hampshire suffer at a rate of 2.87 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.0 percent of New Hampshire's population, and 17.1 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In New Hampshire from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 0.98. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

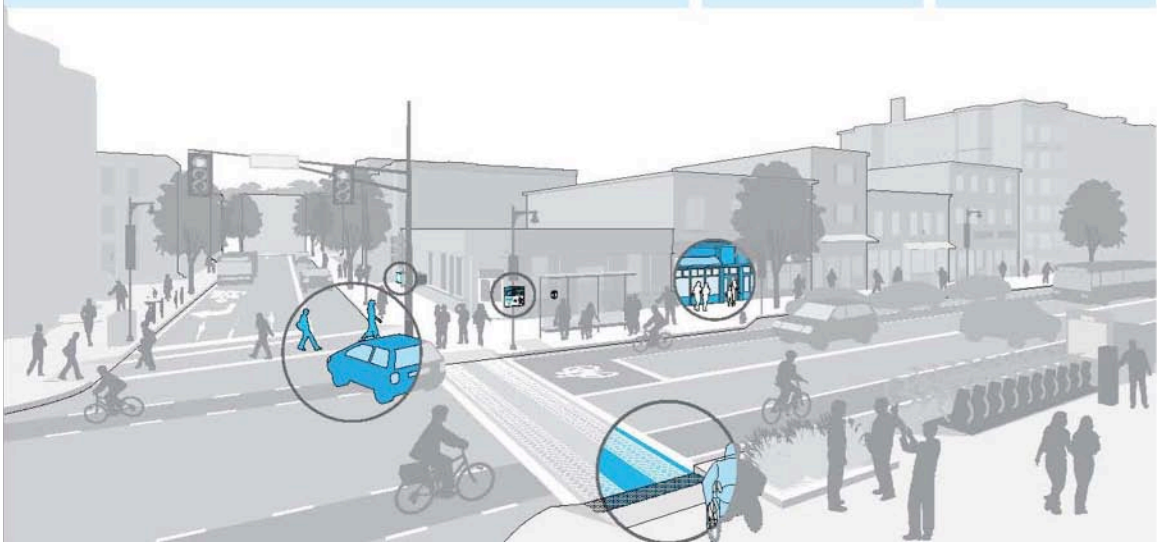
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Boston-Cambridge-Quincy, MA-NH	2,399	476	19.8%	0.99	2.2%	6.9%	29.0%	29.1%
Manchester-Nashua, NH	271	30	11.1%	0.55	0.0%	7.1%	10.7%	43.3%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Belknap County	82	7	8.5%	1.16	0.0%	0.0%	57.1%	28.6%
Carroll County	94	5	5.3%	1.06	0.0%	40.0%	20.0%	40.0%
Cheshire County	90	3	3.3%	0.39	0.0%	0.0%	66.7%	66.7%
Coos County	49	6	12.2%	1.80	0.0%	66.7%	16.7%	33.3%
Grafton County	109	7	6.4%	0.80	0.0%	0.0%	33.3%	0.0%
Hillsborough County	271	30	11.1%	0.75	0.0%	7.1%	10.7%	43.3%
Merrimack County	179	7	3.9%	0.48	0.0%	0.0%	28.6%	28.6%
Rockingham County	254	18	7.1%	0.61	0.0%	0.0%	50.0%	29.4%
Strafford County	107	15	14.0%	1.24	6.7%	20.0%	40.0%	33.3%
Sullivan County	59	2	3.4%	0.46	0.0%	0.0%	100.0%	0.0%
State total	**1,294**	**100**	**7.7%**	**0.76**	**1.0%**	**12.5%**	**33.3%**	**34.1%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
New Jersey

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

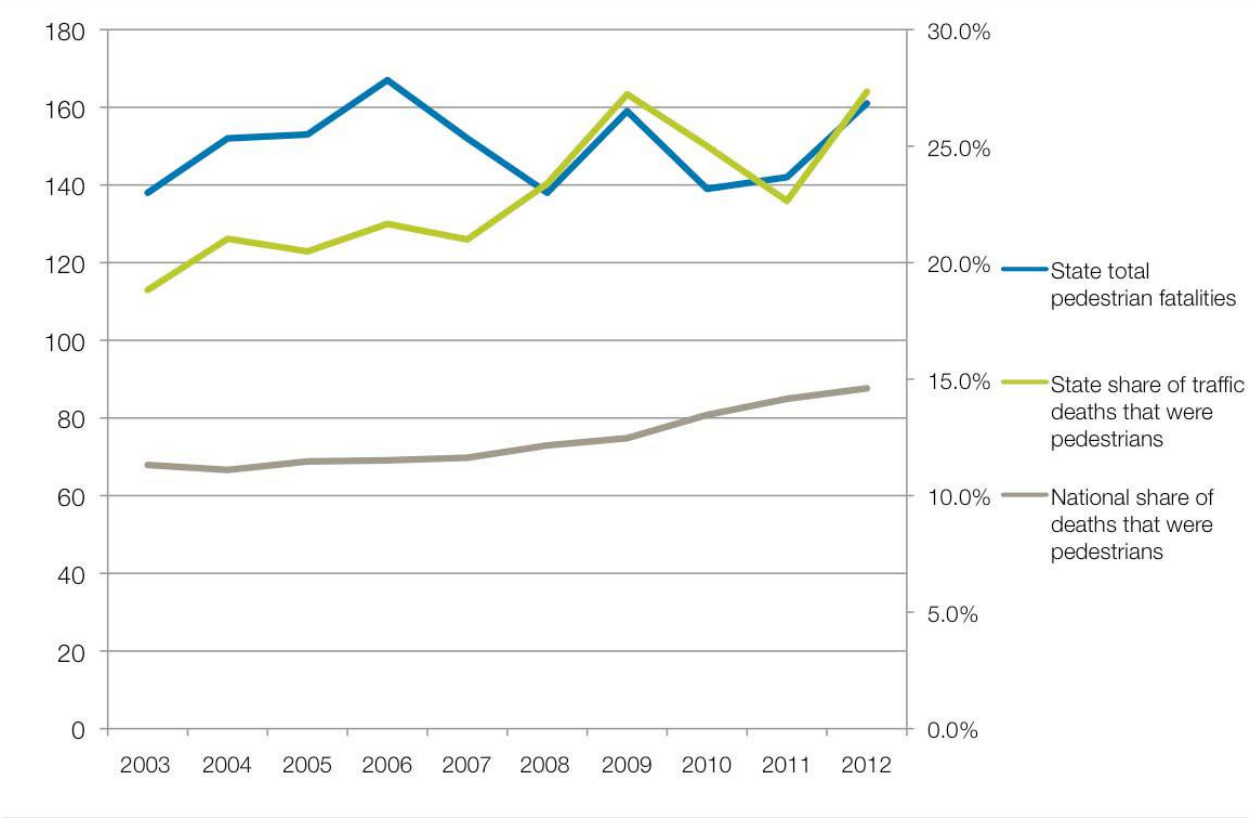
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,501 people died while walking in New Jersey**.

FIGURE 1

Pedestrian fatalities in New Jersey, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in New Jersey

In New Jersey from 2003–2012, 1,501 people were killed while walking, resulting in a fatality rate of 1.72 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 22.6 percent in New Jersey.

Within New Jersey, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for New Jersey was 53.03, compared to the national PDI of 52.2 and ranked 21st nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in New Jersey, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
34	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	959	1.64	3.7%	44.27
48	New York-Northern New Jersey-Long Island, NY-NJ-PA	3,384	1.76	6.2%	28.43

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In New Jersey, 64.9 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **54.7 percent of pedestrian fatalities in New Jersey were on roads with a speed limit of 40 mph or higher**, compared to 27.0 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 74 children in New Jersey.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.1 percent of New Jersey's population, adults aged 65 and older account for 24.9 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in New Jersey is 3.74 per 100,000 people (nationally, 3.19), compared to a rate of 1.7 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in New Jersey suffer at a rate of 4.42 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.5 percent of New Jersey's population, and 14.7 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In New Jersey from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.89. The rate for Hispanic people of any race was 2.22; for black people and African Americans, 2.47; and for Asians and Pacific Islanders, 1.23.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

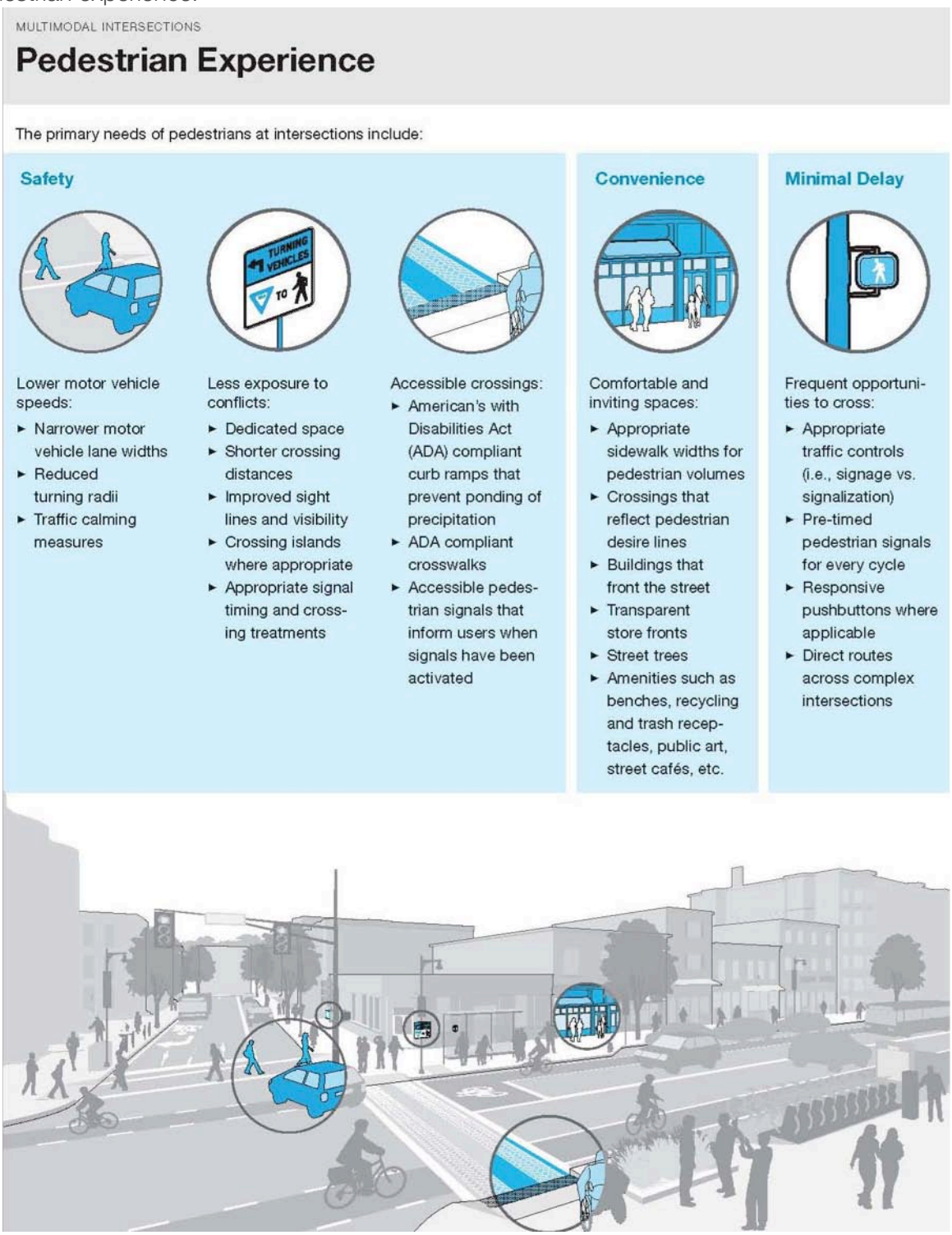
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Allentown-Bethlehem-Easton, PA-NJ	887	97	10.9%	1.14	1.1%	12.8%	45.7%	51.5%
Atlantic City-Hammonton, NJ	428	97	22.7%	2.92	0.0%	17.5%	74.2%	69.1%
New York-Northern New Jersey-Long Island, NY-NJ-PA	10,414	3,384	32.5%	1.76	0.7%	17.1%	37.7%	61.1%
Ocean City, NJ	133	18	13.5%	1.24	0.0%	35.3%	47.1%	66.7%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	4,984	959	19.2%	1.64	0.7%	20.1%	54.9%	66.4%
Trenton-Ewing, NJ	269	64	23.8%	1.86	0.0%	28.6%	58.7%	77.8%
Vineland-Millville-Bridgeton, NJ	255	29	11.4%	1.91	0.0%	20.7%	58.6%	57.1%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Atlantic County	428	97	22.7%	3.57	0.0%	17.5%	74.2%	69.1%
Bergen County	371	131	35.3%	1.46	0.8%	36.4%	37.2%	57.3%
Burlington County	484	75	15.5%	1.67	0.0%	8.0%	85.3%	72.0%
Camden County	399	96	24.1%	1.87	0.0%	22.1%	71.6%	74.0%
Cape May County	133	18	13.5%	1.83	0.0%	35.3%	47.1%	66.7%
Cumberland County	255	29	11.4%	1.88	0.0%	20.7%	58.6%	57.1%
Essex County	515	181	35.1%	2.31	0.6%	56.1%	22.6%	53.3%
Gloucester County	302	38	12.6%	1.35	0.0%	2.6%	86.8%	68.4%
Hudson County	258	98	38.0%	1.57	0.0%	75.0%	19.8%	56.1%
Hunterdon County	100	14	14.0%	1.09	0.0%	0.0%	85.7%	64.3%
Mercer County	269	64	23.8%	1.76	0.0%	28.6%	58.7%	77.8%
Middlesex County	536	145	27.1%	1.82	2.1%	18.8%	67.4%	66.2%
Monmouth County	481	93	19.3%	1.48	0.0%	5.4%	72.0%	73.1%
Morris County	285	51	17.9%	1.04	0.0%	7.8%	70.6%	76.5%
Ocean County	550	102	18.5%	1.80	0.0%	7.9%	72.3%	76.2%
Passaic County	285	92	32.3%	1.85	1.1%	51.1%	30.0%	60.9%
Salem County	162	11	6.8%	1.68	0.0%	18.2%	63.6%	60.0%
Somerset County	191	32	16.8%	1.01	0.0%	15.6%	65.6%	75.0%
Sussex County	147	5	3.4%	0.33	0.0%	0.0%	80.0%	100.0%
Union County	361	119	33.0%	2.24	0.0%	36.4%	33.9%	72.9%
Warren County	132	10	7.6%	0.92	0.0%	0.0%	100.0%	60.0%
State total	**6,644**	**1,501**	**22.6%**	**1.72**	**0.4%**	**27.0%**	**54.7%**	**64.9%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014 New Mexico

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **504 people died while walking in New Mexico**.

FIGURE 1

Pedestrian fatalities in New Mexico, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in New Mexico

In New Mexico from 2003–2012, 504 people were killed while walking, resulting in a fatality rate of 2.53 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 12.2 percent in New Mexico.

Within New Mexico, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for New Mexico was 88.48, compared to the national PDI of 52.2 and ranked 12th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In New Mexico, 58.8 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **72.1 percent of pedestrian fatalities in New Mexico were on roads with a speed limit of 40 mph or higher**, compared to 5.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 30 children in New Mexico.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.6 percent of New Mexico's population, adults aged 65 and older account for 13.1 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in New Mexico is 3.32 per 100,000 people (nationally, 3.19), compared to a rate of 3.16 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in New Mexico suffer at a rate of 4.3 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.6 percent of New Mexico's population, and 7.6 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In New Mexico from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.8. The rate for Hispanic people of any race was 2.63; and for American Indians and Alaska Natives, 12.79. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

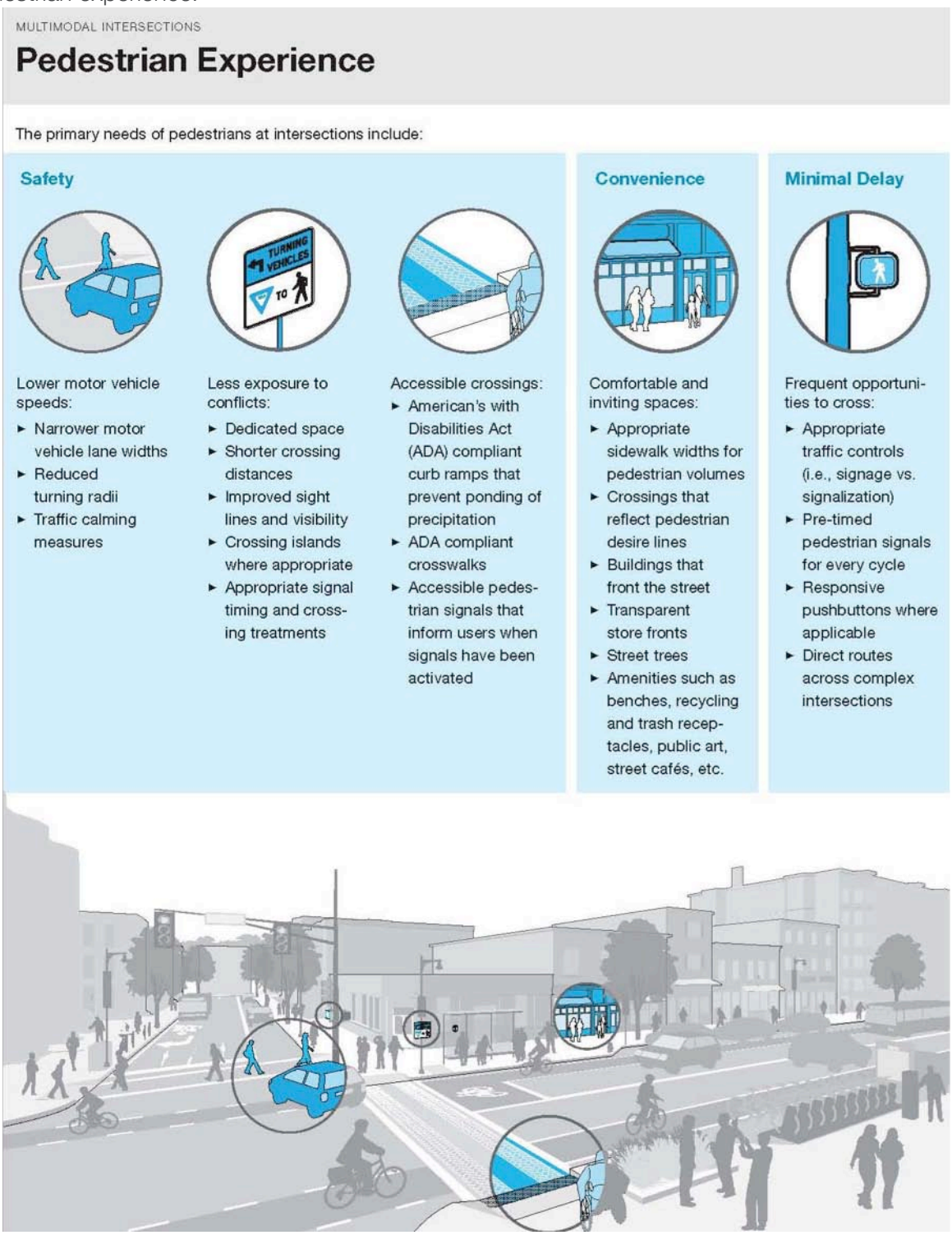
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Albuquerque, NM	1,041	188	18.1%	1.69	0.0%	5.6%	64.8%	55.6%
Farmington, NM	333	64	19.2%	4.20	0.0%	6.6%	83.6%	69.0%
Las Cruces, NM	265	26	9.8%	1.05	0.0%	8.0%	72.0%	46.2%
Santa Fe, NM	224	31	13.8%	2.50	6.5%	12.9%	67.7%	65.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bernalillo County	637	151	23.7%	2.37	0.0%	4.5%	60.6%	59.7%
Catron County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chaves County	119	11	9.2%	1.72	0.0%	0.0%	50.0%	36.4%
Cibola County	116	9	7.8%	3.31	0.0%	12.5%	87.5%	14.3%
Colfax County	65	3	4.6%	2.17	0.0%	0.0%	0.0%	33.3%
Curry County	77	7	9.1%	1.48	0.0%	0.0%	14.3%	28.6%
De Baca County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Doña Ana County	265	26	9.8%	1.31	0.0%	8.0%	72.0%	46.2%
Eddy County	128	7	5.5%	1.33	0.0%	0.0%	50.0%	80.0%
Grant County	63	1	1.6%	0.34	0.0%	0.0%	100.0%	100.0%
Guadalupe County	91	3	3.3%	6.38	0.0%	0.0%	100.0%	33.3%
Harding County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hidalgo County	51	5	9.8%	10.09	20.0%	20.0%	80.0%	0.0%
Lea County	162	10	6.2%	1.62	0.0%	20.0%	40.0%	60.0%
Lincoln County	51	3	5.9%	1.47	0.0%	0.0%	100.0%	66.7%
Los Alamos County	7	1	14.3%	0.55	0.0%	0.0%	0.0%	100.0%
Luna County	107	7	6.5%	2.79	0.0%	0.0%	100.0%	0.0%
McKinley County	384	70	18.2%	9.81	0.0%	3.3%	91.8%	51.5%
Mora County	36	1	2.8%	2.03	0.0%	0.0%	100.0%	0.0%
Otero County	117	16	13.7%	2.53	0.0%	0.0%	78.6%	80.0%
Quay County	83	1	1.2%	1.10	0.0%	0.0%	100.0%	0.0%
Rio Arriba County	160	12	7.5%	2.98	0.0%	0.0%	90.9%	91.7%
Roosevelt County	40	2	5.0%	1.03	0.0%	50.0%	50.0%	50.0%
San Juan County	333	64	19.2%	5.06	0.0%	6.6%	83.6%	69.0%
San Miguel County	93	6	6.5%	2.04	0.0%	0.0%	50.0%	50.0%
Sandoval County	185	21	11.4%	1.75	0.0%	5.9%	88.2%	35.0%
Santa Fe County	224	31	13.8%	2.20	6.5%	12.9%	67.7%	65.5%
Sierra County	43	4	9.3%	3.31	0.0%	0.0%	100.0%	25.0%
Socorro County	107	7	6.5%	3.90	0.0%	0.0%	42.9%	42.9%
Taos County	99	8	8.1%	2.47	16.7%	16.7%	50.0%	85.7%
Torrance County	99	6	6.1%	3.63	0.0%	25.0%	75.0%	20.0%
Union County	34	1	2.9%	2.32	0.0%	0.0%	100.0%	100.0%
Valencia County	120	10	8.3%	1.36	0.0%	11.1%	77.8%	50.0%
State total	**4,131**	**504**	**12.2%**	**2.53**	**0.9%**	**5.3%**	**72.1%**	**58.8%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
New York

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

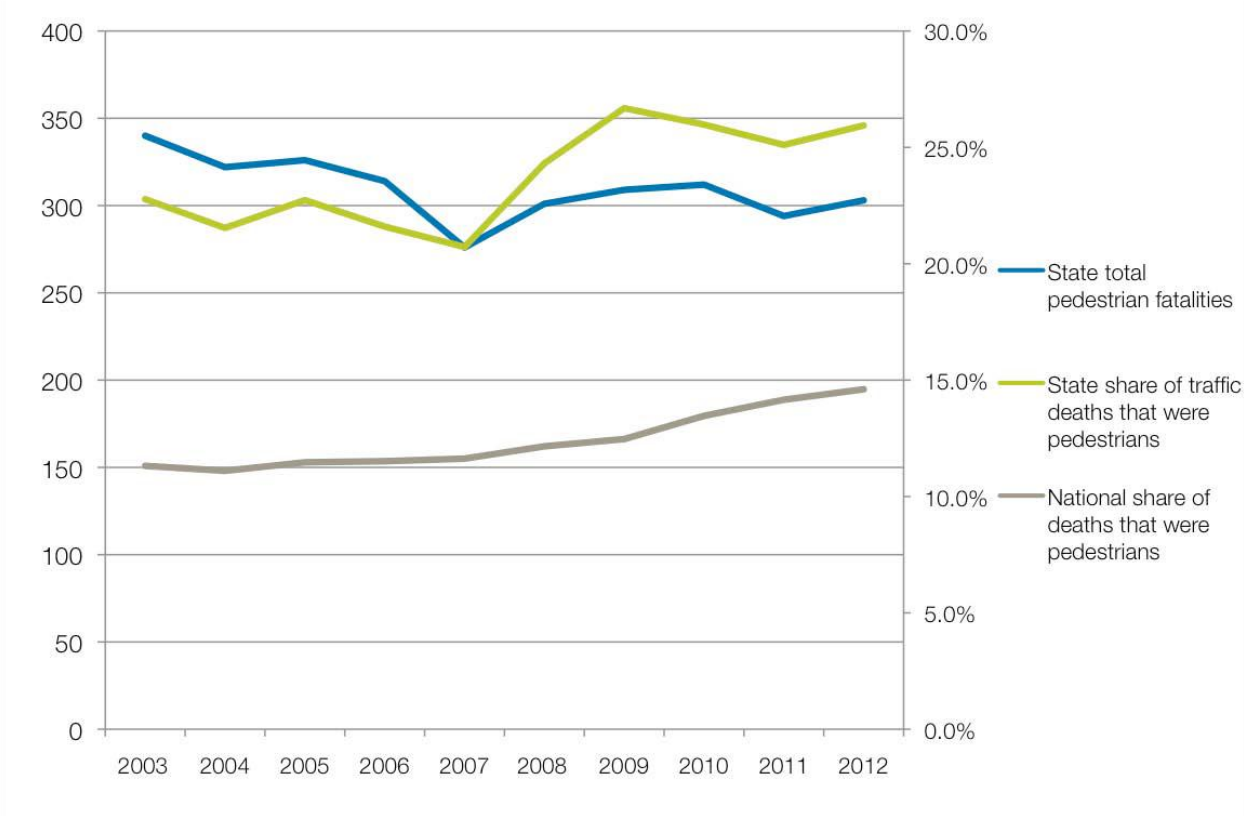
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **3,097 people died while walking in New York**.

FIGURE 1

Pedestrian fatalities in New York, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in New York

In New York from 2003–2012, 3,097 people were killed while walking, resulting in a fatality rate of 1.61 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 23.6 percent in New York.

Within New York, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for New York was 24.48, compared to the national PDI of 52.2 and ranked 39th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in New York, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
37	Buffalo-Niagara Falls, NY	147	1.29	3.0%	43.06
43	Rochester, NY	121	1.20	3.5%	33.97
48	New York-Northern New Jersey-Long Island, NY-NJ-PA	3,384	1.76	6.2%	28.43

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In New York, 56.4 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **41.1 percent of pedestrian fatalities in New York were on roads with a speed limit of 40 mph or higher**, compared to 0.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 149 children in New York.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.2 percent of New York's population, adults aged 65 and older account for 33.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in New York is 4.94 per 100,000 people (nationally, 3.19), compared to a rate of 1.5 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in New York suffer at a rate of 6.02 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.5 percent of New York's population, and 20.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In New York from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.86. The rate for Hispanic people of any race was 2.31; for black people and African Americans, 1.84; for Asians and Pacific Islanders, 1.91; and for American Indians and Alaska Natives, 3.06.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

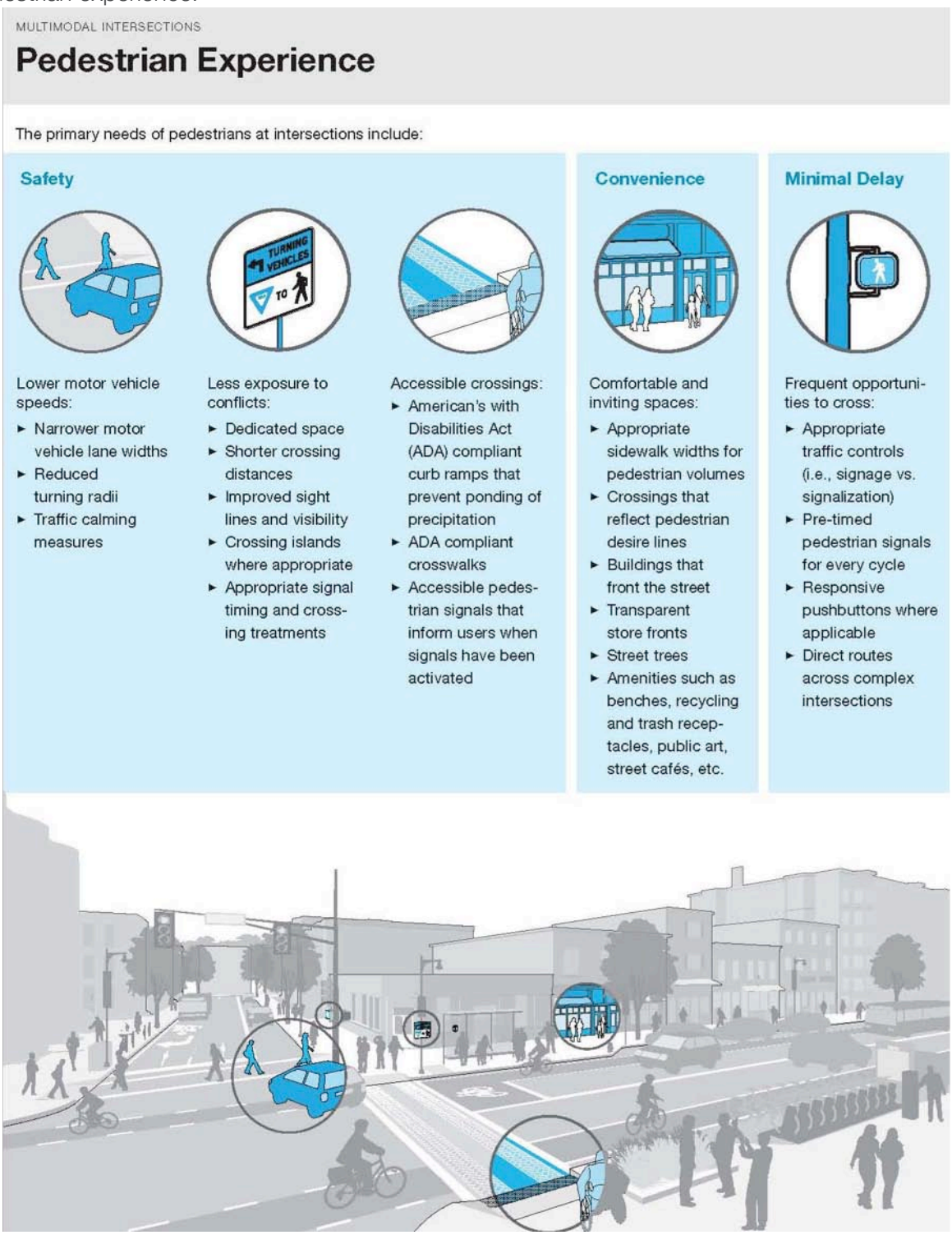
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Albany-Schenectady-Troy, NY	621	88	14.2%	1.06	0.0%	0.0%	56.5%	50.0%
Binghamton, NY	216	31	14.4%	0.80	0.0%	0.0%	66.7%	29.0%
Buffalo-Niagara Falls, NY	774	147	19.0%	1.29	0.0%	0.0%	46.9%	40.8%
Elmira, NY	88	8	9.1%	1.35	0.0%	0.0%	50.0%	37.5%
Glens Falls, NY	180	14	7.8%	1.40	0.0%	0.0%	76.9%	50.0%
Ithaca, NY	95	7	7.4%	0.79	0.0%	0.0%	66.7%	57.1%
Kingston, NY	234	17	7.3%	0.66	0.0%	0.0%	64.7%	47.1%
New York-Northern New Jersey-Long Island, NY-NJ-PA	10,414	3,384	32.5%	1.76	0.7%	17.1%	37.7%	61.1%
Poughkeepsie-Newburgh-Middletown, NY	704	69	9.8%	0.98	6.5%	6.5%	53.2%	41.2%
Rochester, NY	874	121	13.8%	1.20	0.0%	1.0%	50.5%	41.3%
Syracuse, NY	607	82	13.5%	1.12	1.3%	1.3%	62.0%	31.7%
Utica-Rome, NY	279	37	13.3%	1.41	0.0%	0.0%	61.1%	59.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Albany County	190	40	21.1%	1.32	0.0%	0.0%	55.3%	45.0%
Allegany County	74	4	5.4%	0.81	0.0%	0.0%	75.0%	50.0%
Bronx County	478	225	47.1%	1.64	0.0%	1.0%	12.4%	52.7%
Broome County	147	28	19.0%	1.40	0.0%	0.0%	66.7%	28.6%
Cattaraugus County	113	10	8.8%	1.23	0.0%	0.0%	80.0%	50.0%
Cayuga County	103	5	4.9%	0.62	0.0%	0.0%	20.0%	20.0%
Chautauqua County	165	15	9.1%	1.11	0.0%	0.0%	46.7%	33.3%
Chemung County	88	8	9.1%	0.90	0.0%	0.0%	50.0%	37.5%
Chenango County	78	5	6.4%	0.98	0.0%	0.0%	80.0%	20.0%
Clinton County	97	3	3.1%	0.37	0.0%	0.0%	66.7%	33.3%
Columbia County	89	2	2.2%	0.32	0.0%	0.0%	100.0%	50.0%
Cortland County	46	7	15.2%	1.41	0.0%	0.0%	85.7%	71.4%
Delaware County	104	10	9.6%	2.08	0.0%	0.0%	80.0%	30.0%
Dutchess County	262	22	8.4%	0.74	9.5%	9.5%	52.4%	50.0%
Erie County	590	120	20.3%	1.30	0.0%	0.0%	43.7%	38.3%
Essex County	85	10	11.8%	2.54	0.0%	0.0%	70.0%	40.0%
Franklin County	74	12	16.2%	2.33	0.0%	0.0%	80.0%	41.7%
Fulton County	81	8	9.9%	1.45	0.0%	0.0%	75.0%	50.0%
Genesee County	111	3	2.7%	0.50	0.0%	0.0%	66.7%	33.3%
Greene County	85	3	3.5%	0.61	0.0%	0.0%	100.0%	66.7%
Hamilton County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Herkimer County	80	7	8.8%	1.09	0.0%	0.0%	85.7%	57.1%
Jefferson County	133	15	11.3%	1.31	0.0%	0.0%	80.0%	40.0%
Kings County	860	472	54.9%	1.90	0.0%	0.0%	4.5%	63.2%
Lewis County	58	3	5.2%	1.11	0.0%	0.0%	33.3%	0.0%
Livingston County	97	14	14.4%	2.14	0.0%	0.0%	84.6%	21.4%
Madison County	94	9	9.6%	1.24	0.0%	0.0%	88.9%	33.3%
Monroe County	451	71	15.7%	0.96	0.0%	2.0%	35.3%	45.1%
Montgomery County	67	5	7.5%	1.00	0.0%	0.0%	60.0%	20.0%
Nassau County	1,000	308	30.8%	2.31	0.5%	0.5%	39.4%	60.8%
New York County	549	366	66.7%	2.31	0.0%	0.0%	9.2%	73.8%
Niagara County	184	27	14.7%	1.25	0.0%	0.0%	59.3%	51.9%
Oneida County	199	30	15.1%	1.28	0.0%	0.0%	55.2%	60.0%
Onondaga County	342	57	16.7%	1.23	1.9%	1.9%	59.3%	33.3%
Ontario County	151	20	13.2%	1.89	0.0%	0.0%	55.6%	40.0%
Orange County	442	47	10.6%	1.27	4.9%	4.9%	53.7%	37.0%
Orleans County	64	3	4.7%	0.69	0.0%	0.0%	66.7%	100.0%
Oswego County	171	16	9.4%	1.31	0.0%	0.0%	56.3%	25.0%
Otsego County	68	3	4.4%	0.48	0.0%	0.0%	50.0%	66.7%
Putnam County	109	17	15.6%	1.71	0.0%	0.0%	84.6%	47.1%
Queens County	849	363	42.8%	1.64	0.0%	0.0%	14.7%	52.3%
Rensselaer County	133	12	9.0%	0.76	0.0%	0.0%	41.7%	50.0%
Richmond County	205	76	37.1%	1.64	0.0%	0.0%	15.8%	67.1%
Rockland County	197	41	20.8%	1.34	10.5%	13.2%	36.8%	61.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Saratoga County	190	24	12.6%	1.11	0.0%	0.0%	87.0%	62.5%
Schenectady County	76	12	15.8%	0.79	0.0%	0.0%	16.7%	41.7%
Schoharie County	32	0	0.0%	0.00	N/A	N/A	N/A	N/A
Schuyler County	17	1	5.9%	0.54	0.0%	0.0%	0.0%	0.0%
Seneca County	57	3	5.3%	0.85	0.0%	0.0%	66.7%	100.0%
St. Lawrence County	126	7	5.6%	0.63	0.0%	0.0%	57.1%	28.6%
Steuben County	125	8	6.4%	0.81	0.0%	0.0%	85.7%	0.0%
Suffolk County	1,550	360	23.2%	2.43	1.3%	2.6%	61.6%	53.9%
Sullivan County	157	15	9.6%	1.95	6.7%	6.7%	80.0%	46.7%
Tioga County	69	3	4.3%	0.58	0.0%	0.0%	66.7%	33.3%
Tompkins County	95	7	7.4%	0.70	0.0%	0.0%	66.7%	57.1%
Ulster County	234	17	7.3%	0.93	0.0%	0.0%	64.7%	47.1%
Warren County	86	9	10.5%	1.38	0.0%	0.0%	77.8%	44.4%
Washington County	94	5	5.3%	0.80	0.0%	0.0%	75.0%	60.0%
Wayne County	111	13	11.7%	1.39	0.0%	0.0%	66.7%	30.8%
Westchester County	450	89	19.8%	0.94	1.7%	3.4%	37.9%	42.7%
Wyoming County	65	1	1.5%	0.24	0.0%	0.0%	0.0%	0.0%
Yates County	39	1	2.6%	0.40	0.0%	0.0%	0.0%	0.0%
State total	**13,144**	**3,097**	**23.6%**	**1.61**	**0.8%**	**0.3%**	**41.1%**	**56.4%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
North Carolina

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

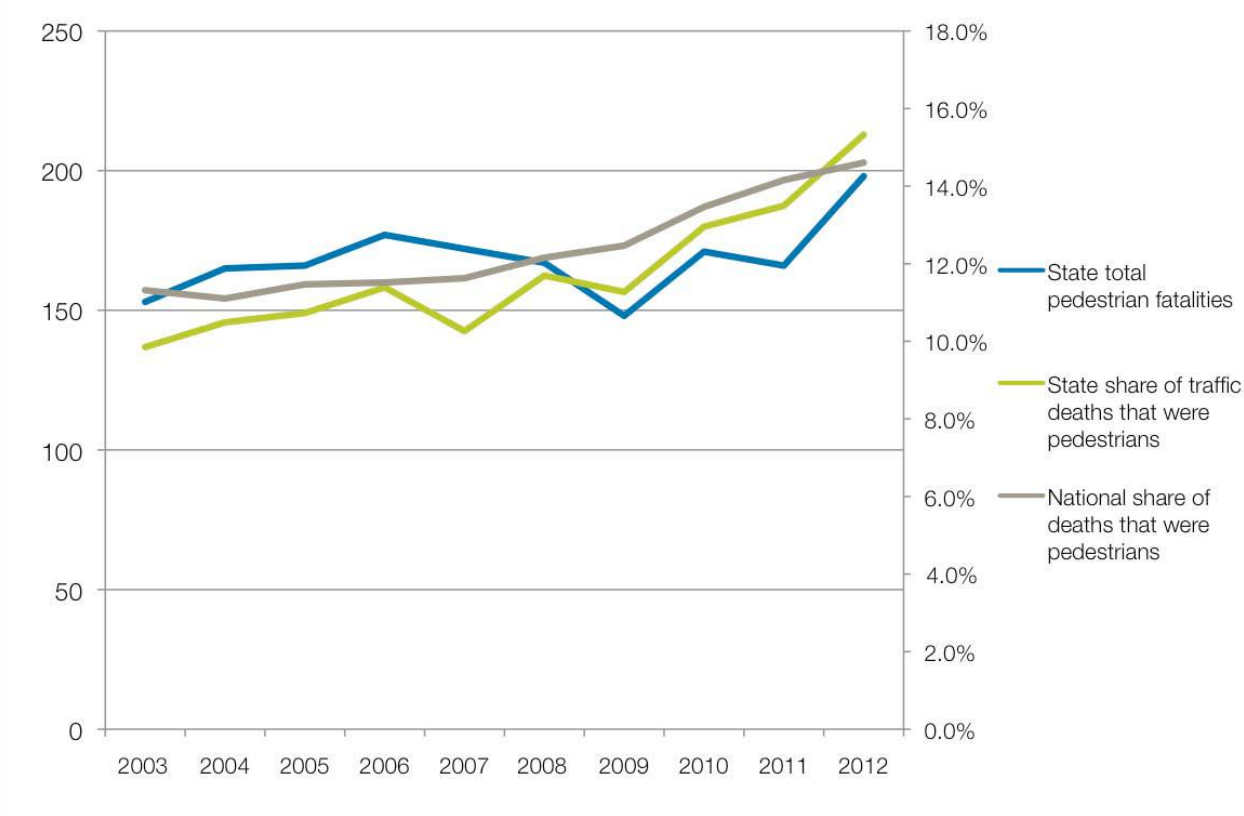
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,683 people died while walking in North Carolina**.

FIGURE 1

Pedestrian fatalities in North Carolina, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in North Carolina

In North Carolina from 2003–2012, 1,683 people were killed while walking, resulting in a fatality rate of 1.84 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 11.6 percent in North Carolina.

Within North Carolina, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for North Carolina was 99.76, compared to the national PDI of 52.2 and ranked 9th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in North Carolina, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
10	Charlotte-Gastonia-Concord, NC-SC	254	1.65	1.5%	111.74
16	Raleigh-Cary, NC*	165	1.37	1.4%	100.35

Metros marked with an asterisk have a margin of error of over 10 percent for the Journey-To-Work data.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In North Carolina, 34.4 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **76.7 percent of pedestrian fatalities in North Carolina were on roads with a speed limit of 40 mph or higher**, compared to 3.0 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 120 children in North Carolina.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.4 percent of North Carolina's population, adults aged 65 and older account for 12.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in North Carolina is 2.29 per 100,000 people (nationally, 3.19), compared to a rate of 2.27 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in North Carolina suffer at a rate of 2.97 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.6 percent of North Carolina's population, and 7.3 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In North Carolina from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.9. The rate for Hispanic people of any race was 3.44; for black people and African Americans, 2.94; and for American Indians and Alaska Natives, 6.13.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

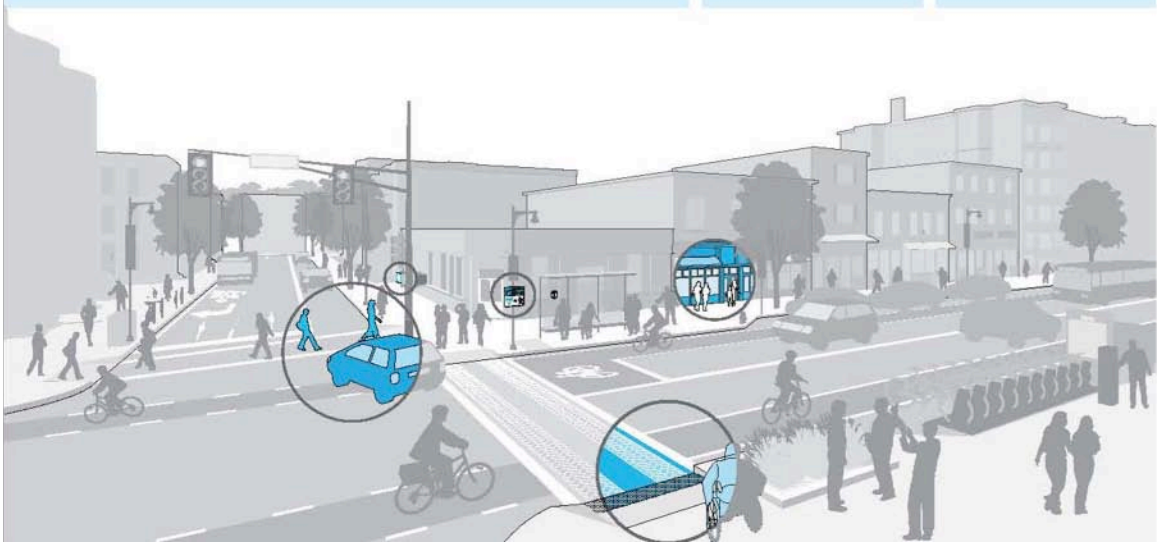
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Asheville, NC	538	54	10.0%	1.32	1.9%	5.8%	69.2%	40.7%
Burlington, NC	182	25	13.7%	1.72	4.0%	4.0%	64.0%	32.0%
Charlotte-Gastonia-Concord, NC-SC	1,751	254	14.5%	1.65	1.6%	6.0%	66.5%	29.1%
Durham-Chapel Hill, NC	580	82	14.1%	1.46	0.0%	6.1%	64.6%	31.7%
Fayetteville, NC	630	99	15.7%	2.78	0.0%	1.0%	82.7%	34.3%
Goldsboro, NC	229	30	13.1%	2.78	0.0%	0.0%	93.3%	53.3%
Greensboro-High Point, NC	970	103	10.6%	1.30	1.0%	3.1%	52.0%	23.3%
Greenville, NC	267	37	13.9%	1.37	0.0%	2.7%	86.5%	48.6%
Hickory-Lenoir-Morganton, NC	595	55	9.2%	1.48	0.0%	1.8%	74.5%	29.1%
Jacksonville, NC	266	38	14.3%	2.15	0.0%	2.6%	94.7%	47.4%
Raleigh-Cary, NC	1,190	165	13.9%	1.37	1.3%	3.8%	81.3%	34.5%
Rocky Mount, NC	355	34	9.6%	2.64	0.0%	0.0%	87.9%	32.4%
Virginia Beach-Norfolk-Newport News, VA-NC	1,334	186	13.9%	1.13	1.6%	11.8%	64.5%	68.5%
Wilmington, NC	567	83	14.6%	2.36	0.0%	0.0%	84.3%	48.2%
Winston-Salem, NC	578	68	11.8%	1.42	1.5%	3.0%	62.7%	25.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Alamance County	182	25	13.7%	1.72	4.0%	4.0%	64.0%	32.0%
Alexander County	68	5	7.4%	1.37	0.0%	0.0%	100.0%	40.0%
Alleghany County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Anson County	74	7	9.5%	2.64	0.0%	0.0%	83.3%	71.4%
Ashe County	41	2	4.9%	0.75	0.0%	0.0%	50.0%	0.0%
Avery County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Beaufort County	112	11	9.8%	2.35	0.0%	0.0%	90.9%	45.5%
Bertie County	79	10	12.7%	4.85	0.0%	0.0%	100.0%	50.0%
Bladen County	128	14	10.9%	4.07	0.0%	0.0%	92.9%	28.6%
Brunswick County	243	25	10.3%	2.54	0.0%	0.0%	84.0%	20.0%
Buncombe County	270	36	13.3%	1.56	2.9%	5.7%	60.0%	41.7%
Burke County	152	13	8.6%	1.44	0.0%	0.0%	76.9%	15.4%
Cabarrus County	194	9	4.6%	0.54	0.0%	11.1%	66.7%	22.2%
Caldwell County	133	10	7.5%	1.23	0.0%	10.0%	90.0%	40.0%
Camden County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Carteret County	117	16	13.7%	2.48	0.0%	12.5%	75.0%	87.5%
Caswell County	64	0	0.0%	0.00	N/A	N/A	N/A	N/A
Catawba County	242	27	11.2%	1.78	0.0%	0.0%	63.0%	29.6%
Chatham County	146	12	8.2%	1.98	0.0%	0.0%	91.7%	50.0%
Cherokee County	52	4	7.7%	1.49	0.0%	0.0%	75.0%	50.0%
Chowan County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clay County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cleveland County	170	23	13.5%	2.36	0.0%	0.0%	73.9%	21.7%
Columbus County	229	18	7.9%	3.19	0.0%	0.0%	100.0%	27.8%
Craven County	147	22	15.0%	2.22	0.0%	0.0%	95.5%	77.3%
Cumberland County	506	87	17.2%	2.78	0.0%	1.2%	83.7%	31.0%
Currituck County	59	9	15.3%	3.94	0.0%	0.0%	88.9%	88.9%
Dare County	64	15	23.4%	4.46	0.0%	0.0%	92.9%	60.0%
Davidson County	293	32	10.9%	2.01	0.0%	6.5%	71.0%	25.0%
Davie County	80	3	3.8%	0.75	0.0%	0.0%	100.0%	100.0%
Duplin County	145	15	10.3%	2.67	0.0%	0.0%	86.7%	6.7%
Durham County	224	41	18.3%	1.60	0.0%	4.9%	48.8%	29.3%
Edgecombe County	103	10	9.7%	1.78	0.0%	0.0%	66.7%	40.0%
Forsyth County	331	53	16.0%	1.56	1.9%	3.8%	53.8%	18.9%
Franklin County	131	11	8.4%	1.92	0.0%	0.0%	100.0%	54.5%
Gaston County	225	25	11.1%	1.25	0.0%	4.0%	68.0%	36.0%
Gates County	43	2	4.7%	1.71	0.0%	0.0%	100.0%	0.0%
Graham County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Granville County	126	9	7.1%	1.58	0.0%	0.0%	66.7%	33.3%
Greene County	46	3	6.5%	1.44	0.0%	0.0%	100.0%	66.7%
Guilford County	550	70	12.7%	1.49	0.0%	0.0%	47.0%	14.3%
Halifax County	138	21	15.2%	3.80	0.0%	9.5%	71.4%	9.5%
Harnett County	247	27	10.9%	2.49	0.0%	0.0%	92.6%	40.7%
Haywood County	87	3	3.4%	0.52	0.0%	0.0%	100.0%	66.7%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Henderson County	146	14	9.6%	1.37	0.0%	7.7%	84.6%	35.7%
Hertford County	74	5	6.8%	2.07	0.0%	20.0%	60.0%	40.0%
Hoke County	124	12	9.7%	2.76	0.0%	0.0%	75.0%	58.3%
Hyde County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Iredell County	259	28	10.8%	1.86	0.0%	0.0%	85.7%	32.1%
Jackson County	75	5	6.7%	1.30	0.0%	20.0%	40.0%	80.0%
Johnston County	361	32	8.9%	2.04	0.0%	3.2%	87.1%	25.0%
Jones County	26	2	7.7%	1.98	0.0%	0.0%	50.0%	100.0%
Lee County	143	15	10.5%	2.75	0.0%	0.0%	53.3%	26.7%
Lenoir County	121	9	7.4%	1.52	0.0%	0.0%	88.9%	55.6%
Lincoln County	121	9	7.4%	1.21	11.1%	11.1%	88.9%	33.3%
Macon County	50	4	8.0%	1.21	0.0%	0.0%	100.0%	75.0%
Madison County	35	1	2.9%	0.49	0.0%	0.0%	100.0%	0.0%
Martin County	68	6	8.8%	2.45	0.0%	0.0%	83.3%	16.7%
McDowell County	81	4	4.9%	0.90	0.0%	0.0%	100.0%	25.0%
Mecklenburg County	729	159	21.8%	1.84	1.3%	6.3%	64.6%	20.8%
Mitchell County	26	3	11.5%	1.91	0.0%	0.0%	100.0%	33.3%
Montgomery County	75	4	5.3%	1.45	0.0%	0.0%	100.0%	50.0%
Moore County	140	11	7.9%	1.30	0.0%	0.0%	63.6%	18.2%
Nash County	252	24	9.5%	2.57	0.0%	0.0%	95.8%	29.2%
New Hanover County	216	49	22.7%	2.53	0.0%	0.0%	81.6%	63.3%
Northampton County	72	7	9.7%	3.18	0.0%	0.0%	100.0%	42.9%
Onslow County	266	38	14.3%	2.27	0.0%	2.6%	94.7%	47.4%
Orange County	144	21	14.6%	1.64	0.0%	14.3%	71.4%	28.6%
Pamlico County	27	6	22.2%	4.60	0.0%	0.0%	100.0%	16.7%
Pasquotank County	47	7	14.9%	1.79	0.0%	0.0%	71.4%	57.1%
Pender County	108	9	8.3%	1.83	0.0%	0.0%	100.0%	44.4%
Perquimans County	25	1	4.0%	0.78	0.0%	0.0%	100.0%	100.0%
Person County	66	8	12.1%	2.07	0.0%	0.0%	87.5%	25.0%
Pitt County	221	34	15.4%	2.15	0.0%	2.9%	85.3%	47.1%
Polk County	35	1	2.9%	0.50	0.0%	0.0%	100.0%	0.0%
Randolph County	234	16	6.8%	1.15	6.3%	6.3%	56.3%	50.0%
Richmond County	119	11	9.2%	2.37	0.0%	0.0%	63.6%	63.6%
Robeson County	557	85	15.3%	6.50	0.0%	0.0%	91.8%	11.8%
Rockingham County	186	17	9.1%	1.83	0.0%	12.5%	68.8%	35.3%
Rowan County	231	20	8.7%	1.47	0.0%	0.0%	65.0%	40.0%
Rutherford County	106	12	11.3%	1.81	8.3%	8.3%	66.7%	41.7%
Sampson County	203	20	9.9%	3.20	5.0%	5.0%	85.0%	45.0%
Scotland County	84	6	7.1%	1.66	0.0%	0.0%	83.3%	33.3%
Stanly County	104	9	8.7%	1.51	0.0%	0.0%	88.9%	22.2%
Stokes County	86	10	11.6%	2.14	0.0%	0.0%	100.0%	40.0%
Surry County	156	8	5.1%	1.09	0.0%	0.0%	62.5%	62.5%
Swain County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Transylvania County	59	1	1.7%	0.31	0.0%	0.0%	100.0%	100.0%
Tyrrell County	12	2	16.7%	4.60	0.0%	0.0%	100.0%	0.0%
Union County	236	23	9.7%	1.26	4.5%	4.5%	68.2%	34.8%
Vance County	76	5	6.6%	1.12	0.0%	0.0%	60.0%	80.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Wake County	698	122	17.5%	1.47	1.7%	4.2%	78.0%	35.2%
Warren County	78	4	5.1%	1.93	0.0%	0.0%	100.0%	75.0%
Washington County	22	3	13.6%	2.27	0.0%	0.0%	33.3%	33.3%
Watauga County	62	4	6.5%	0.82	0.0%	0.0%	100.0%	50.0%
Wayne County	229	30	13.1%	2.51	0.0%	0.0%	93.3%	53.3%
Wilkes County	136	5	3.7%	0.73	0.0%	0.0%	100.0%	60.0%
Wilson County	156	14	9.0%	1.77	0.0%	0.0%	100.0%	35.7%
Yadkin County	81	2	2.5%	0.53	0.0%	0.0%	50.0%	0.0%
Yancey County	26	1	3.8%	0.56	0.0%	0.0%	100.0%	100.0%
State total	**14,486**	**1,683**	**11.6%**	**1.84**	**0.7%**	**3.0%**	**76.7%**	**34.4%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
North Dakota

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

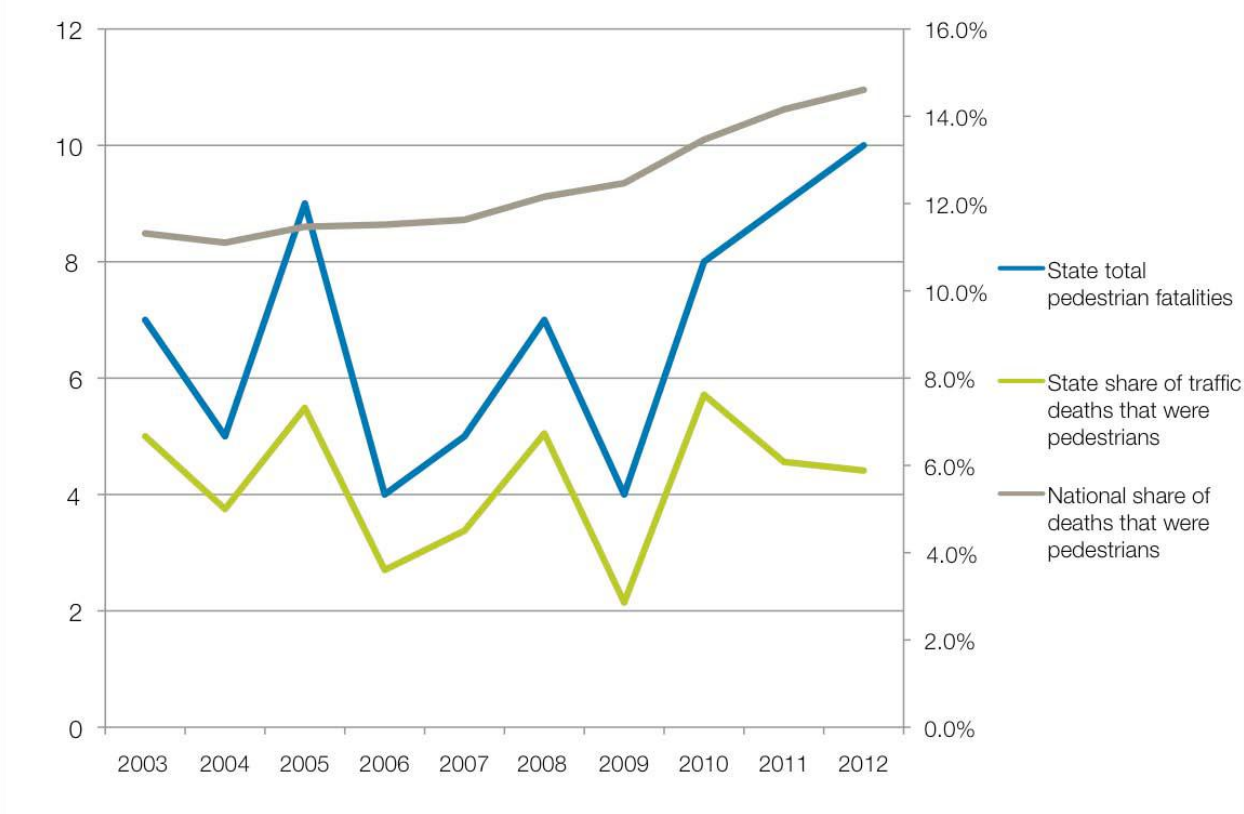
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **68 people died while walking in North Dakota**.

FIGURE 1

Pedestrian fatalities in North Dakota, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in North Dakota

In North Dakota from 2003–2012, 68 people were killed while walking, resulting in a fatality rate of 1.03 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.6 percent in North Dakota.

Within North Dakota, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for North Dakota was 28.94, compared to the national PDI of 52.2 and ranked 34th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In North Dakota, 48.5 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **58.9 percent of pedestrian fatalities in North Dakota were on roads with a speed limit of 40 mph or higher**, compared to 20.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 14.6 percent of North Dakota's population, adults aged 65 and older account for 33.8 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in North Dakota is 3.15 per 100,000 people (nationally, 3.19), compared to a rate of 1.05 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in North Dakota suffer at a rate of 3.24 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.7 percent of North Dakota's population, and 18.3 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In North Dakota from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.01. The rate for American Indians and Alaska Natives was 7.77. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

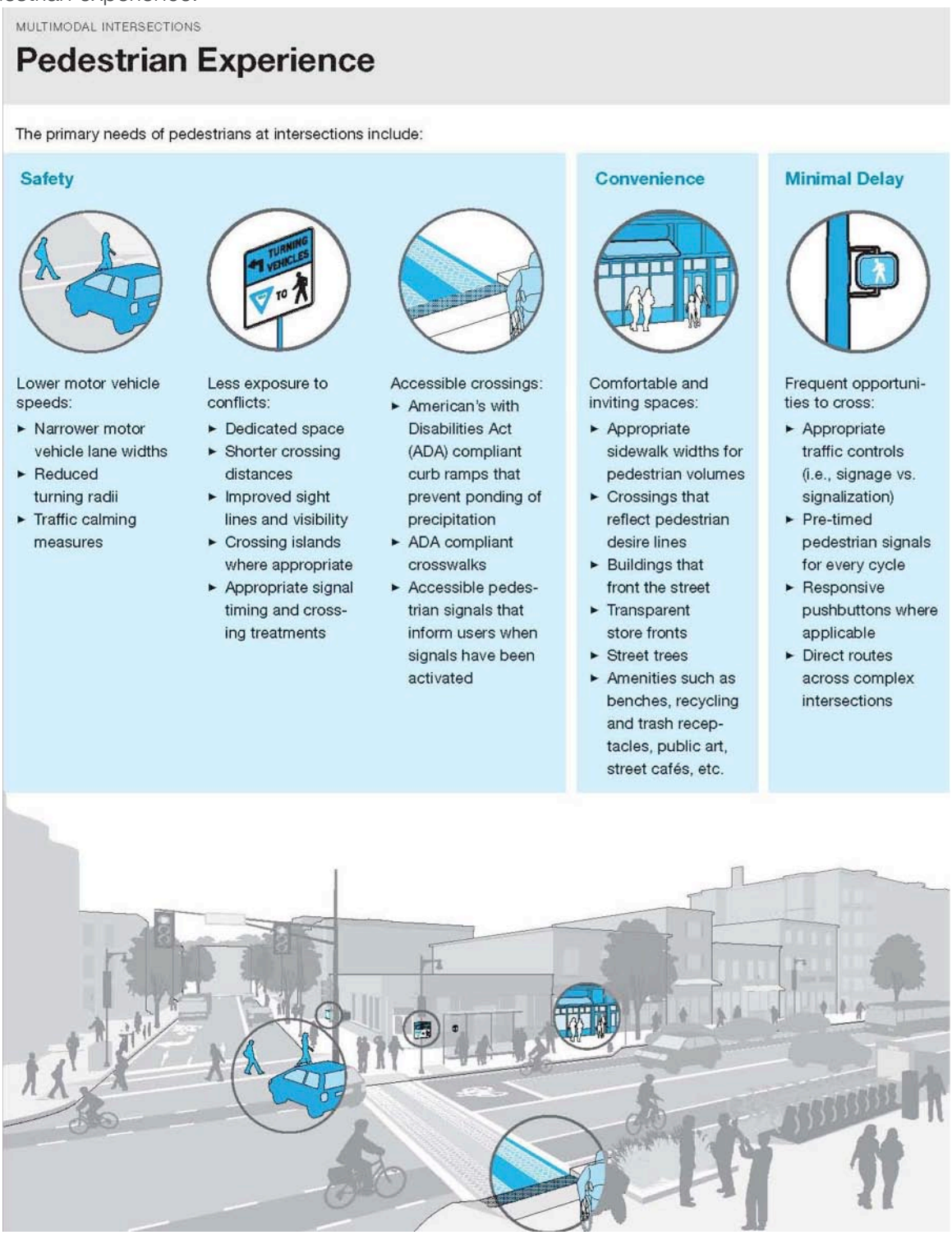
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bismarck, ND	95	9	9.5%	0.55	0.0%	55.6%	33.3%	77.8%
Fargo, ND-MN	133	17	12.8%	1.05	6.3%	12.5%	50.0%	47.1%
Grand Forks, ND-MN	119	1	0.8%	0.20	0.0%	0.0%	0.0%	100.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Barnes County	24	1	4.2%	0.90	0.0%	0.0%	100.0%	0.0%
Benson County	49	4	8.2%	5.97	33.3%	33.3%	66.7%	50.0%
Billings County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bottineau County	16	2	12.5%	3.06	50.0%	0.0%	0.0%	0.0%
Bowman County	14	1	7.1%	3.21	0.0%	100.0%	0.0%	100.0%
Burke County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Burleigh County	52	6	11.5%	0.77	0.0%	66.7%	16.7%	83.3%
Cass County	77	14	18.2%	0.98	7.7%	15.4%	46.2%	50.0%
Cavalier County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dickey County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Divide County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dunn County	26	1	3.8%	2.82	N/A	N/A	N/A	0.0%
Eddy County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Emmons County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Foster County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Golden Valley County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grand Forks County	59	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Griggs County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hettinger County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kidder County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
LaMoure County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Logan County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
McHenry County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
McIntosh County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
McKenzie County	78	0	0.0%	0.00	0.0%	0.0%	0.0%	N/A
McLean County	30	1	3.3%	1.12	0.0%	0.0%	100.0%	0.0%
Mercer County	18	2	11.1%	2.38	0.0%	0.0%	100.0%	0.0%
Morton County	43	3	7.0%	1.13	0.0%	33.3%	66.7%	66.7%
Mountrail County	56	3	5.4%	4.09	0.0%	33.3%	66.7%	66.7%
Nelson County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Oliver County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pembina County	17	1	5.9%	1.31	0.0%	0.0%	100.0%	0.0%
Pierce County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ramsey County	22	1	4.5%	0.88	0.0%	0.0%	0.0%	100.0%
Ransom County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Renville County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Richland County	31	1	3.2%	0.60	0.0%	100.0%	0.0%	100.0%
Rolette County	59	7	11.9%	5.06	0.0%	0.0%	100.0%	42.9%
Sargent County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sheridan County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sioux County	33	5	15.2%	12.07	0.0%	0.0%	100.0%	80.0%
Slope County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Stark County	39	3	7.7%	1.27	0.0%	33.3%	66.7%	66.7%
Steele County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stutsman County	43	3	7.0%	1.43	0.0%	66.7%	33.3%	33.3%
Towner County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Traill County	14	1	7.1%	1.22	0.0%	0.0%	100.0%	0.0%
Walsh County	35	2	5.7%	1.76	0.0%	0.0%	50.0%	50.0%
Ward County	78	5	6.4%	0.83	0.0%	25.0%	25.0%	40.0%
Wells County	19	1	5.3%	2.29	0.0%	100.0%	0.0%	0.0%
Williams County	60	0	0.0%	0.00	N/A	N/A	N/A	N/A
State total	**1,217**	**68**	**5.6%**	**1.03**	**8.2%**	**20.5%**	**58.9%**	**48.5%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Ohio

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

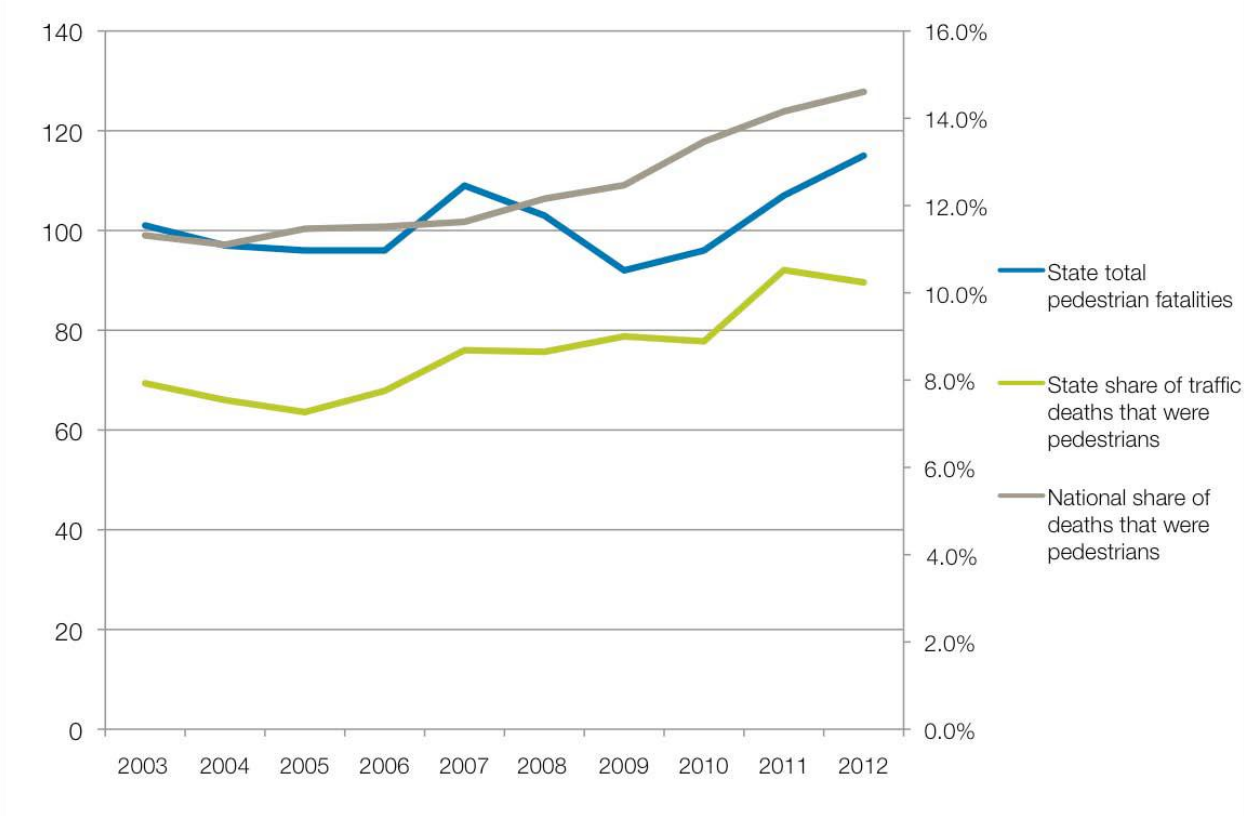
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,012 people died while walking in Ohio**.

FIGURE 1

Pedestrian fatalities in Ohio, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Ohio

In Ohio from 2003–2012, 1,012 people were killed while walking, resulting in a fatality rate of 0.88 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 8.6 percent in Ohio.

Within Ohio, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Ohio was 38.96, compared to the national PDI of 52.2 and ranked 24th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Ohio, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
32	Columbus, OH	187	1.20	2.1%	56.29
40	Cincinnati-Middletown, OH-KY-IN	187	0.84	2.1%	39.54
42	Cleveland-Elyria-Mentor, OH	142	0.73	2.1%	34.37

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Ohio, 37.8 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **53.7 percent of pedestrian fatalities in Ohio were on roads with a speed limit of 40 mph or higher**, compared to 15.4 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 106 children in Ohio.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.6 percent of Ohio's population, adults aged 65 and older account for 20.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Ohio is 1.85 per 100,000 people (nationally, 3.19), compared to a rate of 1.13 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Ohio suffer at a rate of 2.48 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.6 percent of Ohio's population, and 13.4 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Ohio from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.14. The rate for Hispanic people of any race was 1.66; for black people and African Americans, 1.73; and for Asians and Pacific Islanders, 0.71.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

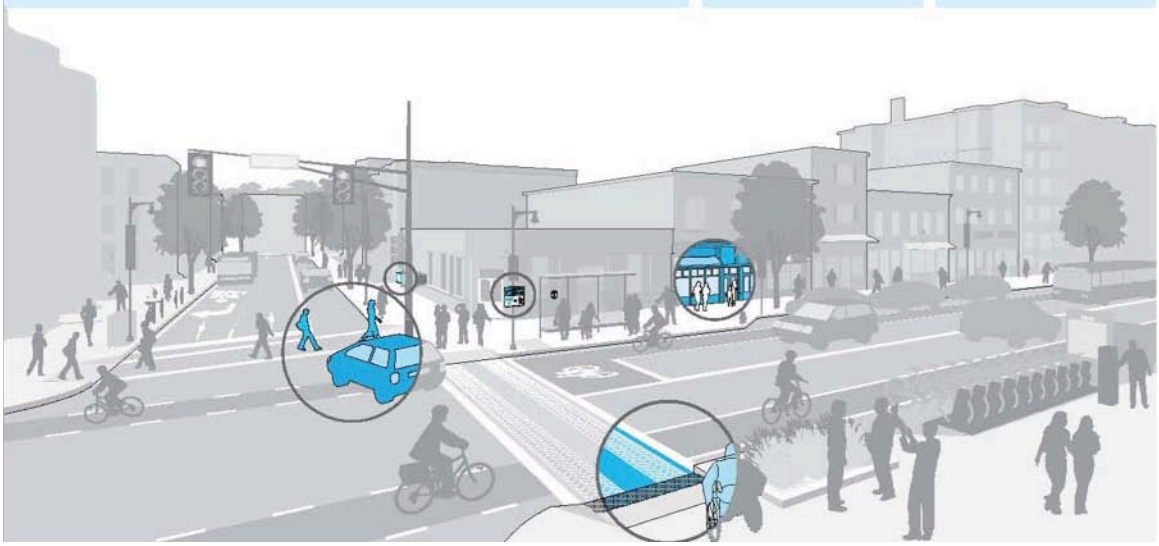
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Akron, OH	541	64	11.8%	0.83	0.0%	21.3%	57.4%	34.4%
Canton-Massillon, OH	382	30	7.9%	0.49	0.0%	37.9%	41.4%	46.7%
Cincinnati-Middletown, OH-KY-IN	1,962	187	9.5%	0.84	0.5%	20.3%	47.3%	36.4%
Cleveland-Elyria-Mentor, OH	1,309	142	10.8%	0.73	0.0%	32.9%	32.9%	36.2%
Columbus, OH	1,656	187	11.3%	1.20	1.6%	9.3%	55.7%	47.6%
Dayton, OH	859	73	8.5%	0.85	0.0%	12.5%	40.3%	47.9%
Huntington-Ashland, WV-KY-OH	468	32	6.8%	1.11	0.0%	15.6%	59.4%	53.1%
Lima, OH	117	8	6.8%	0.19	0.0%	25.0%	75.0%	12.5%
Mansfield, OH	124	5	4.0%	0.00	0.0%	20.0%	40.0%	20.0%
Parkersburg-Marietta-Vienna, WV-OH	220	12	5.5%	0.12	0.0%	0.0%	75.0%	41.7%
Sandusky, OH	88	7	8.0%	0.78	0.0%	0.0%	100.0%	42.9%
Springfield, OH	199	20	10.1%	1.59	5.3%	21.1%	63.2%	5.0%
Toledo, OH	763	80	10.5%	1.14	1.4%	8.3%	61.1%	55.1%
Weirton-Steubenville, WV-OH	109	7	6.4%	0.16	0.0%	28.6%	57.1%	71.4%
Youngstown-Warren-Boardman, OH-PA	701	68	9.7%	1.24	0.0%	20.0%	56.9%	44.8%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	63	4	6.3%	1.40	0.0%	0.0%	100.0%	25.0%
Allen County	117	8	6.8%	0.75	0.0%	25.0%	75.0%	12.5%
Ashland County	85	7	8.2%	1.32	0.0%	14.3%	71.4%	28.6%
Ashtabula County	188	17	9.0%	1.67	0.0%	17.6%	58.8%	41.2%
Athens County	91	4	4.4%	0.62	0.0%	0.0%	100.0%	75.0%
Auglaize County	72	3	4.2%	0.65	0.0%	33.3%	33.3%	0.0%
Belmont County	101	7	6.9%	1.00	0.0%	16.7%	83.3%	14.3%
Brown County	73	3	4.1%	0.68	0.0%	0.0%	100.0%	0.0%
Butler County	302	28	9.3%	0.78	3.8%	19.2%	65.4%	25.0%
Carroll County	41	2	4.9%	0.69	0.0%	50.0%	50.0%	50.0%
Champaign County	70	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clark County	199	20	10.1%	1.43	5.3%	21.1%	63.2%	5.0%
Clermont County	200	18	9.0%	0.93	0.0%	5.6%	77.8%	55.6%
Clinton County	91	3	3.3%	0.71	0.0%	0.0%	100.0%	0.0%
Columbiana County	139	14	10.1%	1.29	0.0%	7.7%	76.9%	28.6%
Coshocton County	64	3	4.7%	0.81	0.0%	66.7%	0.0%	0.0%
Crawford County	68	1	1.5%	0.22	0.0%	0.0%	100.0%	0.0%
Cuyahoga County	665	99	14.9%	0.76	0.0%	42.3%	19.6%	34.7%
Darke County	98	3	3.1%	0.57	0.0%	33.3%	66.7%	33.3%
Defiance County	68	3	4.4%	0.77	0.0%	0.0%	66.7%	66.7%
Delaware County	171	6	3.5%	0.37	0.0%	16.7%	66.7%	66.7%
Erie County	88	7	8.0%	0.90	0.0%	0.0%	100.0%	42.9%
Fairfield County	142	11	7.7%	0.77	0.0%	0.0%	45.5%	36.4%
Fayette County	50	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	807	147	18.2%	1.29	1.4%	10.5%	52.4%	51.0%
Fulton County	102	8	7.8%	1.87	0.0%	0.0%	87.5%	28.6%
Gallia County	35	2	5.7%	0.65	0.0%	0.0%	50.0%	100.0%
Geauga County	103	6	5.8%	0.64	0.0%	16.7%	66.7%	0.0%
Greene County	158	5	3.2%	0.31	0.0%	60.0%	40.0%	20.0%
Guernsey County	61	4	6.6%	0.99	0.0%	0.0%	100.0%	0.0%
Hamilton County	560	77	13.8%	0.95	0.0%	33.8%	20.3%	37.7%
Hancock County	88	6	6.8%	0.81	0.0%	16.7%	33.3%	20.0%
Hardin County	55	2	3.6%	0.63	0.0%	0.0%	100.0%	50.0%
Harrison County	38	1	2.6%	0.63	0.0%	0.0%	100.0%	0.0%
Henry County	77	3	3.9%	1.05	0.0%	0.0%	100.0%	66.7%
Highland County	79	3	3.8%	0.69	0.0%	0.0%	100.0%	66.7%
Hocking County	43	1	2.3%	0.34	0.0%	100.0%	0.0%	0.0%
Holmes County	57	6	10.5%	1.43	0.0%	0.0%	100.0%	16.7%
Huron County	91	4	4.4%	0.67	0.0%	25.0%	50.0%	25.0%
Jackson County	60	2	3.3%	0.60	0.0%	0.0%	100.0%	50.0%
Jefferson County	60	2	3.3%	0.28	0.0%	0.0%	50.0%	50.0%
Knox County	86	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lake County	123	11	8.9%	0.48	0.0%	27.3%	45.5%	54.5%
Lawrence County	75	4	5.3%	0.64	0.0%	0.0%	50.0%	50.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Licking County	202	12	5.9%	0.74	8.3%	8.3%	75.0%	16.7%
Logan County	97	7	7.2%	1.52	0.0%	0.0%	100.0%	14.3%
Lorain County	252	18	7.1%	0.60	0.0%	5.6%	72.2%	50.0%
Lucas County	403	63	15.6%	1.41	1.8%	10.9%	50.9%	62.9%
Madison County	88	1	1.1%	0.24	0.0%	0.0%	100.0%	0.0%
Mahoning County	237	22	9.3%	0.91	0.0%	13.6%	36.4%	52.4%
Marion County	81	5	6.2%	0.75	0.0%	16.7%	50.0%	40.0%
Medina County	166	8	4.8%	0.47	0.0%	0.0%	62.5%	25.0%
Meigs County	41	3	7.3%	1.27	0.0%	0.0%	100.0%	66.7%
Mercer County	80	5	6.3%	1.22	0.0%	20.0%	60.0%	0.0%
Miami County	118	2	1.7%	0.20	0.0%	0.0%	100.0%	50.0%
Monroe County	29	2	6.9%	1.35	0.0%	0.0%	100.0%	100.0%
Montgomery County	482	62	12.9%	1.15	0.0%	9.8%	37.7%	53.2%
Morgan County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Morrow County	76	4	5.3%	1.16	0.0%	0.0%	100.0%	50.0%
Muskingum County	135	11	8.1%	1.28	0.0%	9.1%	54.5%	18.2%
Noble County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Ottawa County	78	2	2.6%	0.48	0.0%	0.0%	100.0%	50.0%
Paulding County	59	2	3.4%	1.02	0.0%	0.0%	100.0%	100.0%
Perry County	76	5	6.6%	1.40	0.0%	0.0%	100.0%	40.0%
Pickaway County	117	5	4.3%	0.92	0.0%	0.0%	60.0%	40.0%
Pike County	67	3	4.5%	1.05	0.0%	0.0%	100.0%	100.0%
Portage County	175	18	10.3%	1.13	0.0%	12.5%	81.3%	27.8%
Preble County	101	4	4.0%	0.94	0.0%	0.0%	50.0%	0.0%
Putnam County	50	3	6.0%	0.87	0.0%	0.0%	66.7%	0.0%
Richland County	124	5	4.0%	0.40	0.0%	20.0%	40.0%	20.0%
Ross County	142	10	7.0%	1.30	0.0%	10.0%	90.0%	20.0%
Sandusky County	101	3	3.0%	0.49	0.0%	33.3%	66.7%	0.0%
Scioto County	116	8	6.9%	1.02	0.0%	25.0%	50.0%	28.6%
Seneca County	97	5	5.2%	0.88	0.0%	16.7%	50.0%	20.0%
Shelby County	68	2	2.9%	0.41	0.0%	0.0%	100.0%	0.0%
Stark County	341	28	8.2%	0.74	0.0%	37.0%	40.7%	46.4%
Summit County	366	46	12.6%	0.85	0.0%	24.4%	48.9%	37.0%
Trumbull County	248	30	12.1%	1.40	0.0%	31.0%	55.2%	40.0%
Tuscarawas County	111	5	4.5%	0.54	0.0%	0.0%	60.0%	60.0%
Union County	53	1	1.9%	0.20	0.0%	0.0%	100.0%	0.0%
Van Wert County	38	1	2.6%	0.34	0.0%	100.0%	0.0%	100.0%
Vinton County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Warren County	159	12	7.5%	0.59	0.0%	0.0%	83.3%	33.3%
Washington County	81	3	3.7%	0.48	0.0%	0.0%	100.0%	0.0%
Wayne County	137	11	8.0%	0.96	0.0%	0.0%	100.0%	9.1%
Williams County	79	1	1.3%	0.26	0.0%	0.0%	100.0%	0.0%
Wood County	180	7	3.9%	0.56	0.0%	0.0%	100.0%	14.3%
Wyandot County	60	2	3.3%	0.88	0.0%	0.0%	100.0%	100.0%
State total	**11,807**	**1,012**	**8.6%**	**0.88**	**0.6%**	**15.4%**	**53.7%**	**37.8%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Oklahoma

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

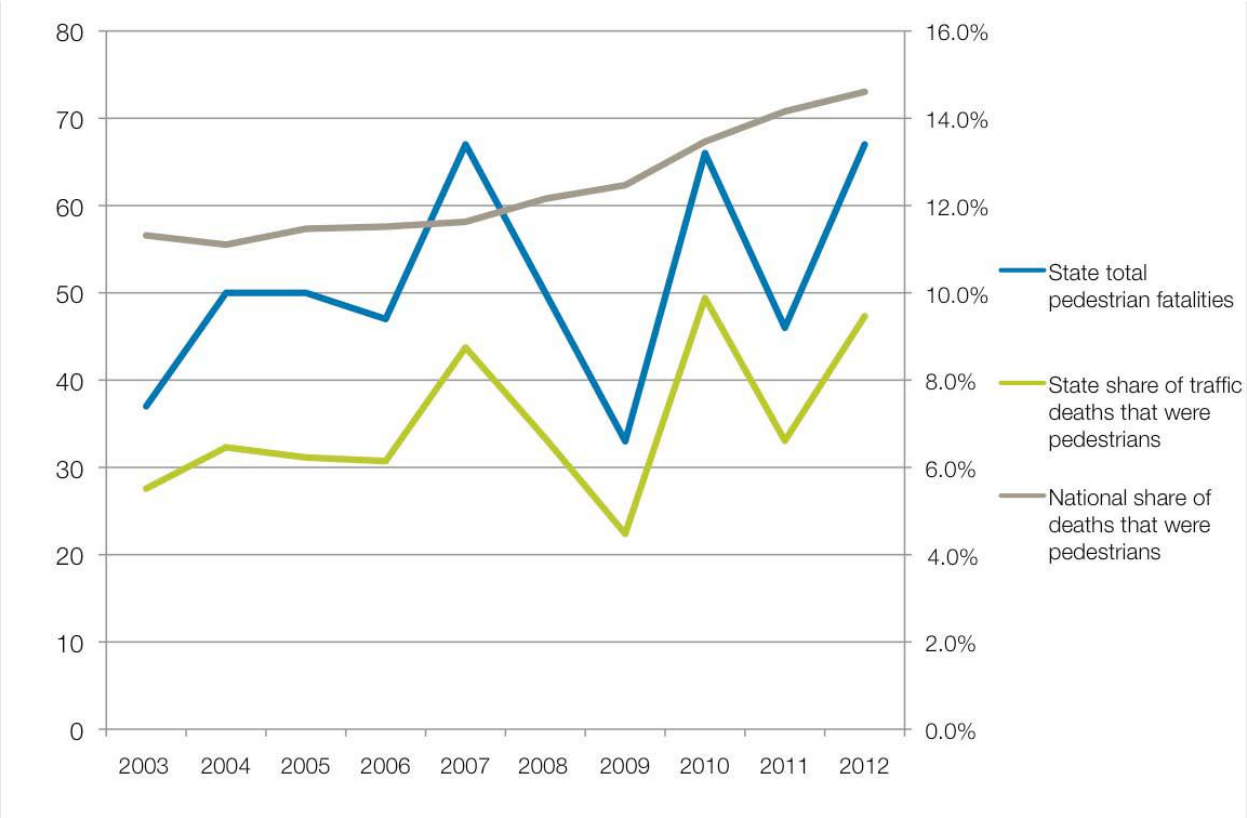
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **513 people died while walking in Oklahoma**.

FIGURE 1

Pedestrian fatalities in Oklahoma, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Oklahoma

In Oklahoma from 2003–2012, 513 people were killed while walking, resulting in a fatality rate of 1.40 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.0 percent in Oklahoma.

Within Oklahoma, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Oklahoma was 73.30, compared to the national PDI of 52.2 and ranked 16th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Oklahoma, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
20	Oklahoma City, OK	177	1.43	1.6%	87.16

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Oklahoma, 41.7 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **80.2 percent of pedestrian fatalities in Oklahoma were on roads with a speed limit of 40 mph or higher**, compared to 6.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 31 children in Oklahoma.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.3 percent of Oklahoma's population, adults aged 65 and older account for 16.4 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Oklahoma is 2.24 per 100,000 people (nationally, 3.19), compared to a rate of 1.74 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Oklahoma suffer at a rate of 2.67 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.1 percent of Oklahoma's population, and 9.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Oklahoma from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.67. The rate for Hispanic people of any race was 1.53; for black people and African Americans, 2.02; and for American Indians and Alaska Natives, 3.07.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

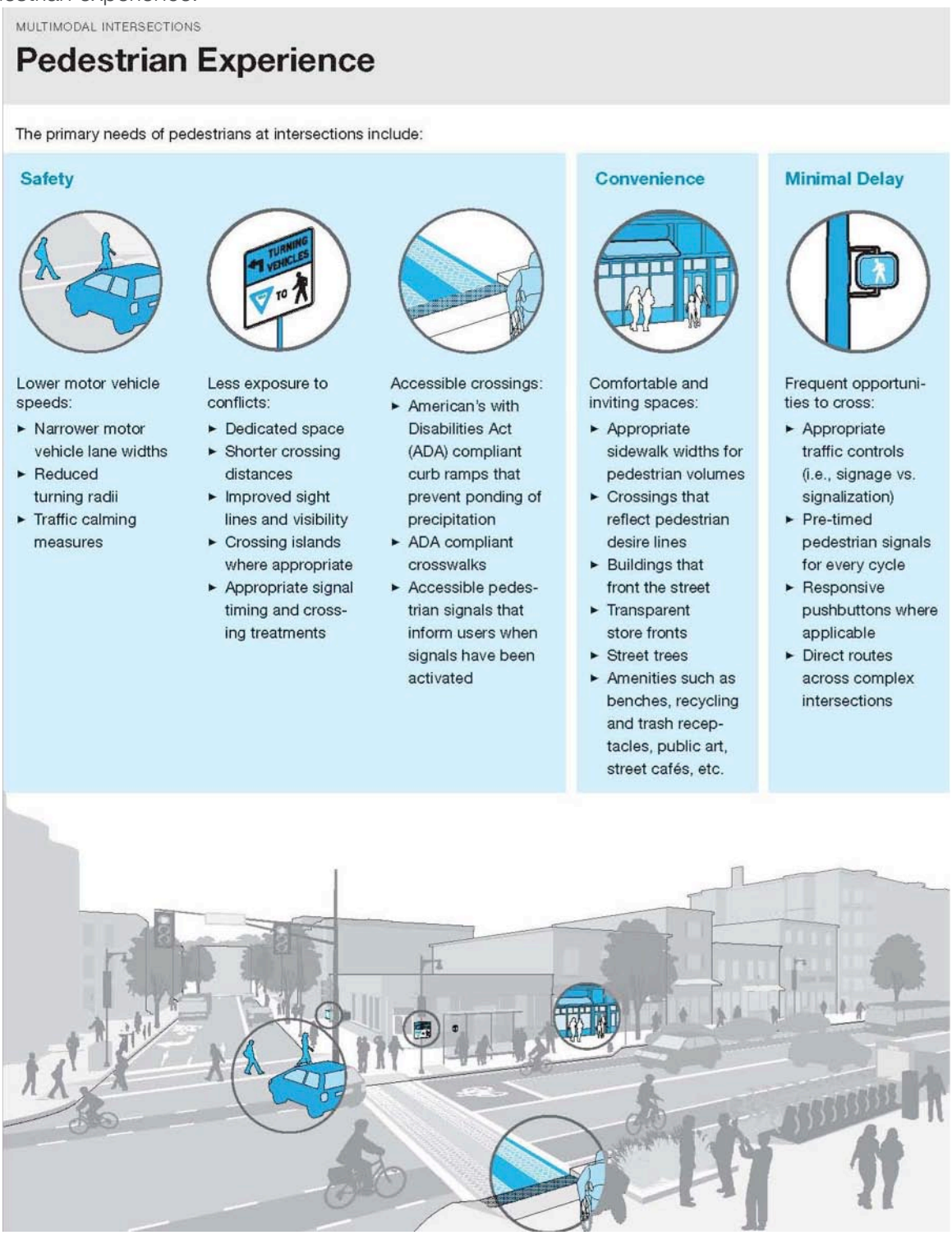
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Fort Smith, AR-OK	535	32	6.0%	1.34	3.2%	6.5%	61.3%	37.5%
Lawton, OK	132	15	11.4%	1.79	0.0%	13.3%	86.7%	46.7%
Oklahoma City, OK	1,571	177	11.3%	1.43	0.0%	5.1%	82.9%	34.7%
Tulsa, OK	1,457	144	9.9%	1.37	0.0%	6.4%	81.4%	45.8%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adair County	55	1	1.8%	0.45	0.0%	0.0%	100.0%	0.0%
Alfalfa County	15	1	6.7%	1.76	0.0%	0.0%	0.0%	0.0%
Atoka County	51	2	3.9%	1.42	0.0%	0.0%	100.0%	50.0%
Beaver County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Beckham County	97	4	4.1%	1.89	0.0%	0.0%	50.0%	25.0%
Blaine County	50	1	2.0%	0.89	0.0%	0.0%	100.0%	0.0%
Bryan County	103	11	10.7%	2.71	0.0%	0.0%	90.9%	45.5%
Caddo County	118	5	4.2%	1.71	0.0%	20.0%	80.0%	60.0%
Canadian County	184	13	7.1%	1.20	0.0%	0.0%	92.3%	15.4%
Carter County	146	6	4.1%	1.28	0.0%	0.0%	100.0%	16.7%
Cherokee County	103	4	3.9%	0.87	0.0%	0.0%	100.0%	50.0%
Choctaw County	51	3	5.9%	1.97	0.0%	0.0%	100.0%	66.7%
Cimarron County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cleveland County	181	12	6.6%	0.49	0.0%	0.0%	100.0%	45.5%
Coal County	20	2	10.0%	3.42	0.0%	0.0%	50.0%	50.0%
Comanche County	132	15	11.4%	1.26	0.0%	13.3%	86.7%	46.7%
Cotton County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Craig County	45	4	8.9%	2.69	0.0%	0.0%	75.0%	25.0%
Creek County	173	5	2.9%	0.73	0.0%	0.0%	100.0%	60.0%
Custer County	84	2	2.4%	0.75	0.0%	0.0%	100.0%	100.0%
Delaware County	113	3	2.7%	0.74	0.0%	0.0%	100.0%	33.3%
Dewey County	27	2	7.4%	4.25	0.0%	0.0%	100.0%	0.0%
Ellis County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Garfield County	82	7	8.5%	1.19	0.0%	0.0%	28.6%	57.1%
Garvin County	93	4	4.3%	1.46	0.0%	25.0%	75.0%	25.0%
Grady County	131	7	5.3%	1.38	0.0%	0.0%	71.4%	42.9%
Grant County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Greer County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harmon County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harper County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Haskell County	49	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hughes County	47	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jefferson County	25	2	8.0%	3.10	0.0%	0.0%	100.0%	0.0%
Johnston County	30	2	6.7%	1.86	0.0%	0.0%	100.0%	0.0%
Kay County	122	9	7.4%	1.94	0.0%	0.0%	100.0%	44.4%
Kingfisher County	37	2	5.4%	1.36	0.0%	0.0%	100.0%	0.0%
Kiowa County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Latimer County	42	0	0.0%	0.00	N/A	N/A	N/A	N/A
Le Flore County	153	6	3.9%	1.21	0.0%	16.7%	50.0%	50.0%
Lincoln County	115	5	4.3%	1.49	0.0%	0.0%	80.0%	0.0%
Logan County	94	13	13.8%	3.30	0.0%	25.0%	41.7%	23.1%
Love County	52	2	3.8%	2.16	0.0%	0.0%	100.0%	0.0%
Major County	39	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Marshall County	67	2	3.0%	1.32	0.0%	100.0%	0.0%	50.0%
Mayes County	122	6	4.9%	1.48	0.0%	0.0%	83.3%	16.7%
McClain County	116	8	6.9%	2.46	0.0%	0.0%	100.0%	12.5%
McCurtain County	140	4	2.9%	1.20	0.0%	0.0%	100.0%	50.0%
McIntosh County	92	5	5.4%	2.50	0.0%	0.0%	100.0%	75.0%
Murray County	46	2	4.3%	1.52	0.0%	100.0%	0.0%	0.0%
Muskogee County	118	7	5.9%	1.00	0.0%	0.0%	42.9%	42.9%
Noble County	66	4	6.1%	3.48	0.0%	0.0%	100.0%	0.0%
Nowata County	27	2	7.4%	1.87	0.0%	0.0%	50.0%	50.0%
Okfuskee County	45	2	4.4%	1.66	0.0%	50.0%	50.0%	0.0%
Oklahoma County	750	119	15.9%	1.69	0.0%	5.1%	83.9%	39.5%
Okmulgee County	126	2	1.6%	0.50	0.0%	0.0%	100.0%	50.0%
Osage County	116	6	5.2%	1.28	0.0%	0.0%	100.0%	83.3%
Ottawa County	115	4	3.5%	1.24	0.0%	0.0%	100.0%	50.0%
Pawnee County	50	2	4.0%	1.21	0.0%	0.0%	100.0%	100.0%
Payne County	139	7	5.0%	0.93	0.0%	16.7%	83.3%	28.6%
Pittsburg County	142	9	6.3%	2.00	12.5%	12.5%	62.5%	55.6%
Pontotoc County	79	5	6.3%	1.37	0.0%	20.0%	60.0%	60.0%
Pottawatomie County	189	12	6.3%	1.75	0.0%	0.0%	66.7%	33.3%
Pushmataha County	69	3	4.3%	2.62	0.0%	33.3%	66.7%	66.7%
Roger Mills County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rogers County	195	7	3.6%	0.84	0.0%	0.0%	71.4%	28.6%
Seminole County	105	1	1.0%	0.40	0.0%	0.0%	100.0%	0.0%
Sequoyah County	104	9	8.7%	2.18	12.5%	12.5%	87.5%	22.2%
Stephens County	94	3	3.2%	0.68	0.0%	0.0%	100.0%	100.0%
Texas County	54	2	3.7%	1.00	0.0%	100.0%	0.0%	0.0%
Tillman County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Tulsa County	685	115	16.8%	1.96	0.0%	8.0%	78.6%	41.7%
Wagoner County	112	7	6.3%	1.02	0.0%	0.0%	100.0%	71.4%
Washington County	77	2	2.6%	0.40	0.0%	0.0%	50.0%	100.0%
Washita County	67	0	0.0%	0.00	N/A	N/A	N/A	N/A
Woods County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Woodward County	56	1	1.8%	0.51	0.0%	0.0%	100.0%	0.0%
State total	**7,338**	**513**	**7.0%**	**1.40**	**0.4%**	**6.5%**	**80.2%**	**41.7%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Oregon

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

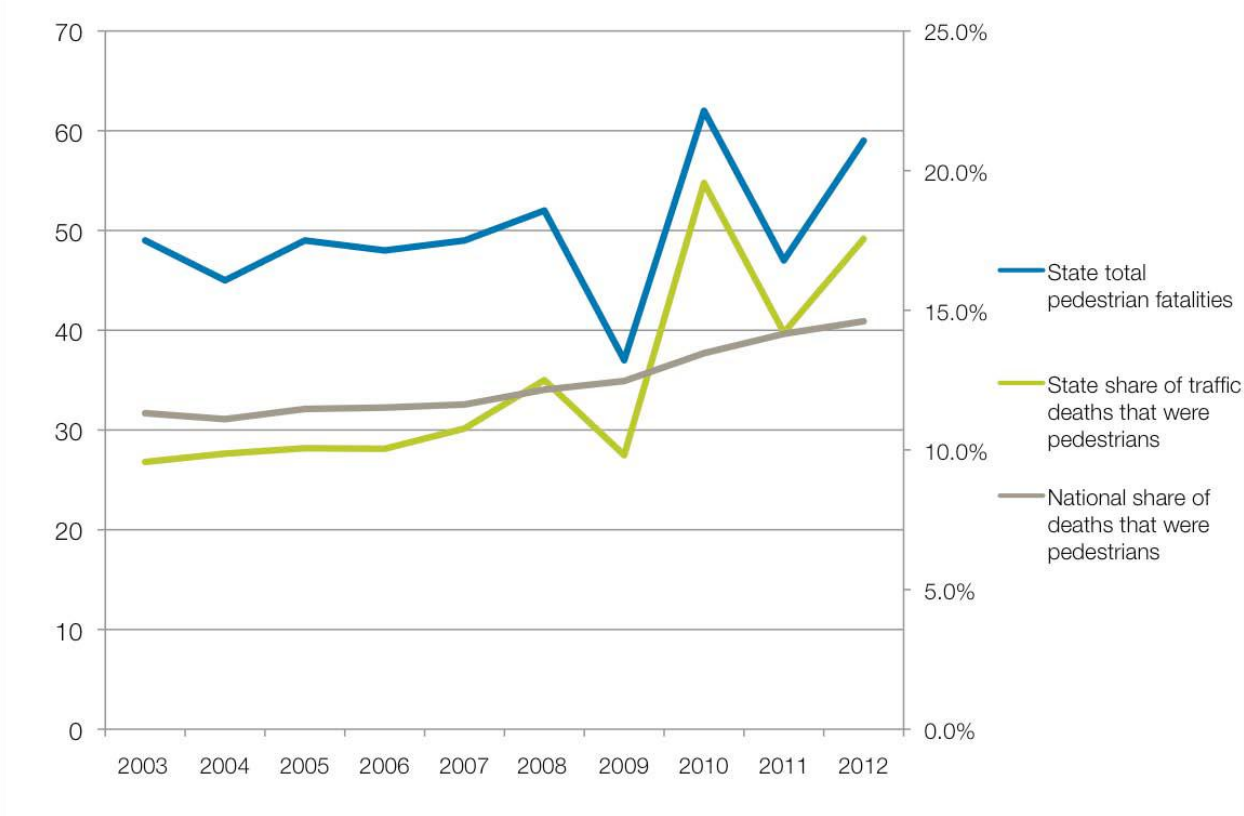
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **497 people died while walking in Oregon**.

FIGURE 1

Pedestrian fatalities in Oregon, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Oregon

In Oregon from 2003–2012, 497 people were killed while walking, resulting in a fatality rate of 1.33 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 11.9 percent in Oregon.

Within Oregon, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Oregon was 32.97, compared to the national PDI of 52.2 and ranked 30th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Oregon, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
45	Portland-Vancouver-Beaverton, OR-WA	250	1.12	3.5%	32.19

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Oregon, 60.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **56.2 percent of pedestrian fatalities in Oregon were on roads with a speed limit of 40 mph or higher**, compared to 12.6 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 40 children in Oregon.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.3 percent of Oregon's population, adults aged 65 and older account for 21.8 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Oregon is 2.9 per 100,000 people (nationally, 3.19), compared to a rate of 1.59 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Oregon suffer at a rate of 3.37 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.4 percent of Oregon's population, and 12.3 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Oregon from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.82. The rate for Hispanic people of any race was 1.53; for Asians and Pacific Islanders, 0.81; and for American Indians and Alaska Natives, 3.67. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

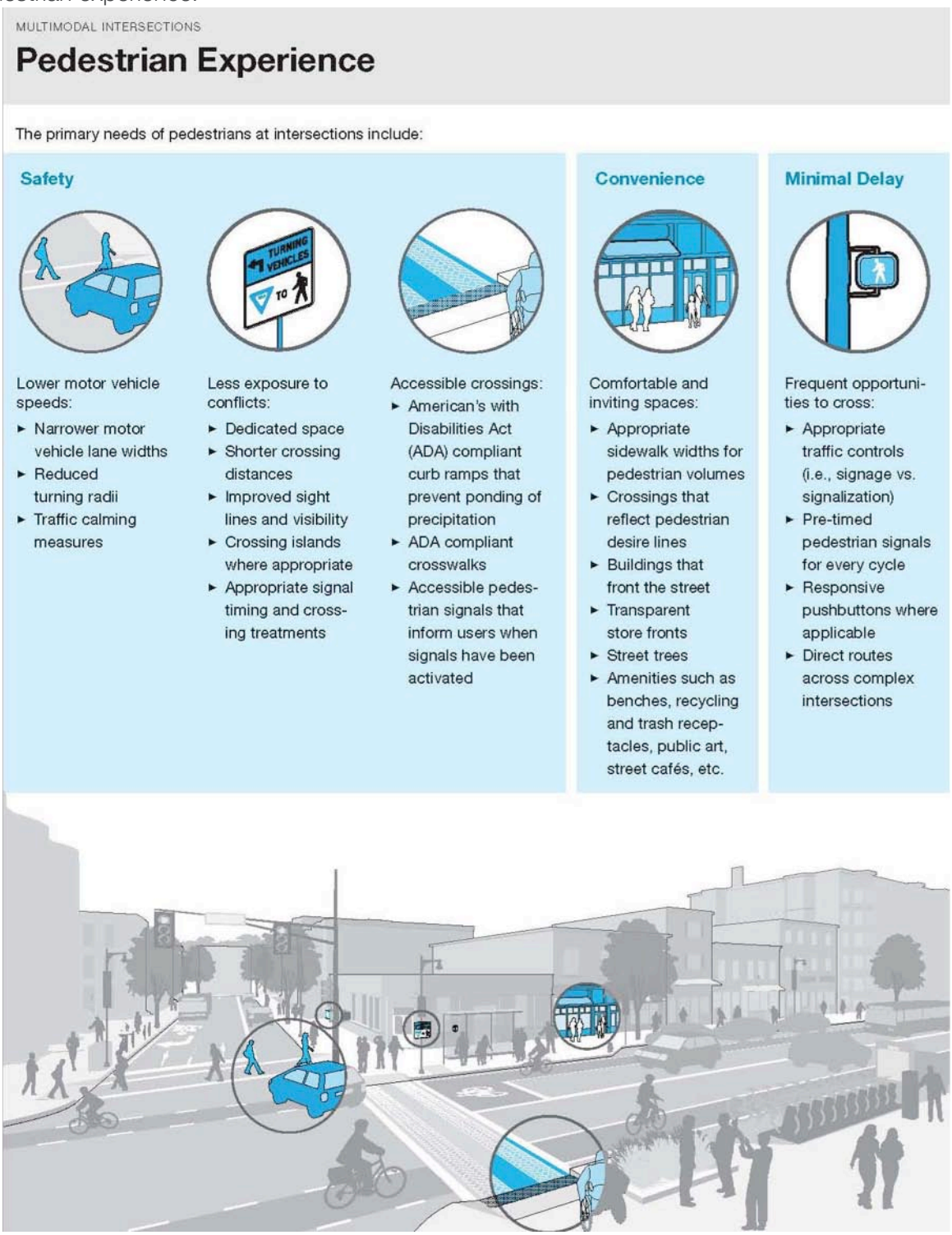
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bend, OR	182	16	8.8%	1.26	0.0%	12.5%	68.8%	87.5%
Corvallis, OR	58	5	8.6%	0.70	0.0%	40.0%	40.0%	80.0%
Eugene-Springfield, OR	375	54	14.4%	1.42	0.0%	10.0%	64.0%	64.8%
Medford, OR	229	27	11.8%	1.28	7.4%	14.8%	63.0%	63.0%
Portland-Vancouver-Beaverton, OR-WA	1,366	250	18.3%	1.12	1.8%	13.8%	50.0%	65.2%
Salem, OR	393	48	12.2%	1.23	0.0%	9.1%	61.4%	58.3%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Baker County	50	3	6.0%	1.86	0.0%	0.0%	100.0%	0.0%
Benton County	58	5	8.6%	0.60	0.0%	40.0%	40.0%	80.0%
Clackamas County	296	39	13.2%	1.06	0.0%	6.1%	81.8%	59.0%
Clatsop County	71	7	9.9%	1.91	50.0%	50.0%	16.7%	71.4%
Columbia County	69	6	8.7%	1.24	0.0%	0.0%	83.3%	83.3%
Coos County	108	11	10.2%	1.74	0.0%	40.0%	50.0%	63.6%
Crook County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Curry County	37	7	18.9%	3.13	0.0%	0.0%	100.0%	85.7%
Deschutes County	182	16	8.8%	1.07	0.0%	12.5%	68.8%	87.5%
Douglas County	231	19	8.2%	1.79	0.0%	5.9%	58.8%	42.1%
Gilliam County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harney County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hood River County	45	2	4.4%	0.93	0.0%	0.0%	50.0%	0.0%
Jackson County	229	27	11.8%	1.36	7.4%	14.8%	63.0%	63.0%
Jefferson County	78	3	3.8%	1.41	0.0%	33.3%	66.7%	100.0%
Josephine County	172	18	10.5%	2.21	0.0%	0.0%	92.3%	66.7%
Klamath County	162	7	4.3%	1.06	16.7%	50.0%	50.0%	71.4%
Lake County	38	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lane County	375	54	14.4%	1.57	0.0%	10.0%	64.0%	64.8%
Lincoln County	76	7	9.2%	1.54	0.0%	0.0%	50.0%	71.4%
Linn County	198	20	10.1%	1.77	0.0%	16.7%	72.2%	70.0%
Malheur County	72	3	4.2%	0.96	0.0%	66.7%	33.3%	33.3%
Marion County	291	44	15.1%	1.43	0.0%	7.3%	61.0%	59.1%
Morrow County	21	1	4.8%	0.89	N/A	N/A	N/A	100.0%
Multnomah County	416	115	27.6%	1.62	1.0%	17.3%	28.8%	71.3%
Polk County	102	4	3.9%	0.55	0.0%	33.3%	66.7%	50.0%
Sherman County	29	1	3.4%	5.82	0.0%	0.0%	100.0%	0.0%
Tillamook County	73	3	4.1%	1.20	0.0%	0.0%	100.0%	33.3%
Umatilla County	127	14	11.0%	1.87	0.0%	25.0%	50.0%	57.1%
Union County	35	2	5.7%	0.79	0.0%	0.0%	100.0%	0.0%
Wallowa County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wasco County	56	3	5.4%	1.22	0.0%	50.0%	50.0%	33.3%
Washington County	242	49	20.2%	0.96	4.9%	9.8%	65.9%	59.2%
Wheeler County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Yamhill County	104	7	6.7%	0.73	16.7%	50.0%	16.7%	42.9%
State total	**4,165**	**497**	**11.9%**	**1.33**	**2.3%**	**12.6%**	**56.2%**	**60.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Pennsylvania

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

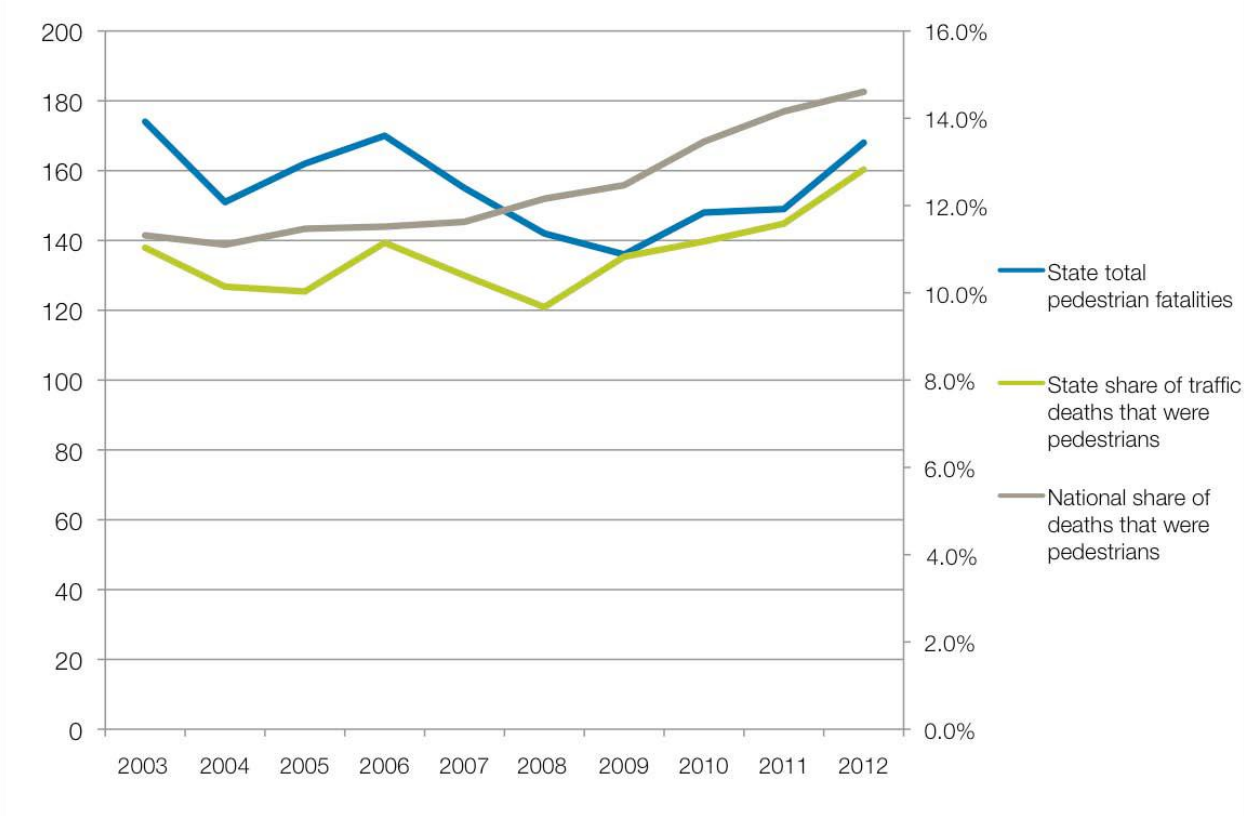
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,555 people died while walking in Pennsylvania**.

FIGURE 1

Pedestrian fatalities in Pennsylvania, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Pennsylvania

In Pennsylvania from 2003–2012, 1,555 people were killed while walking, resulting in a fatality rate of 1.24 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 10.8 percent in Pennsylvania.

Within Pennsylvania, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Pennsylvania was 29.99, compared to the national PDI of 52.2 and ranked 33rd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Pennsylvania, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
34	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	959	1.64	3.7%	44.27
50	Pittsburgh, PA	234	0.90	3.6%	25.10

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Pennsylvania, 56.7 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **44.5 percent of pedestrian fatalities in Pennsylvania were on roads with a speed limit of 40 mph or higher**, compared to 23.2 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 139 children in Pennsylvania.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 15.3 percent of Pennsylvania's population, adults aged 65 and older account for 28.5 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Pennsylvania is 2.97 per 100,000 people (nationally, 3.19), compared to a rate of 1.34 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Pennsylvania suffer at a rate of 3.92 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.9 percent of Pennsylvania's population, and 19.4 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Pennsylvania from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.50. The rate for Hispanic people of any race was 1.87; for black people and African Americans, 2.23; and for Asians and Pacific Islanders, 1.20.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

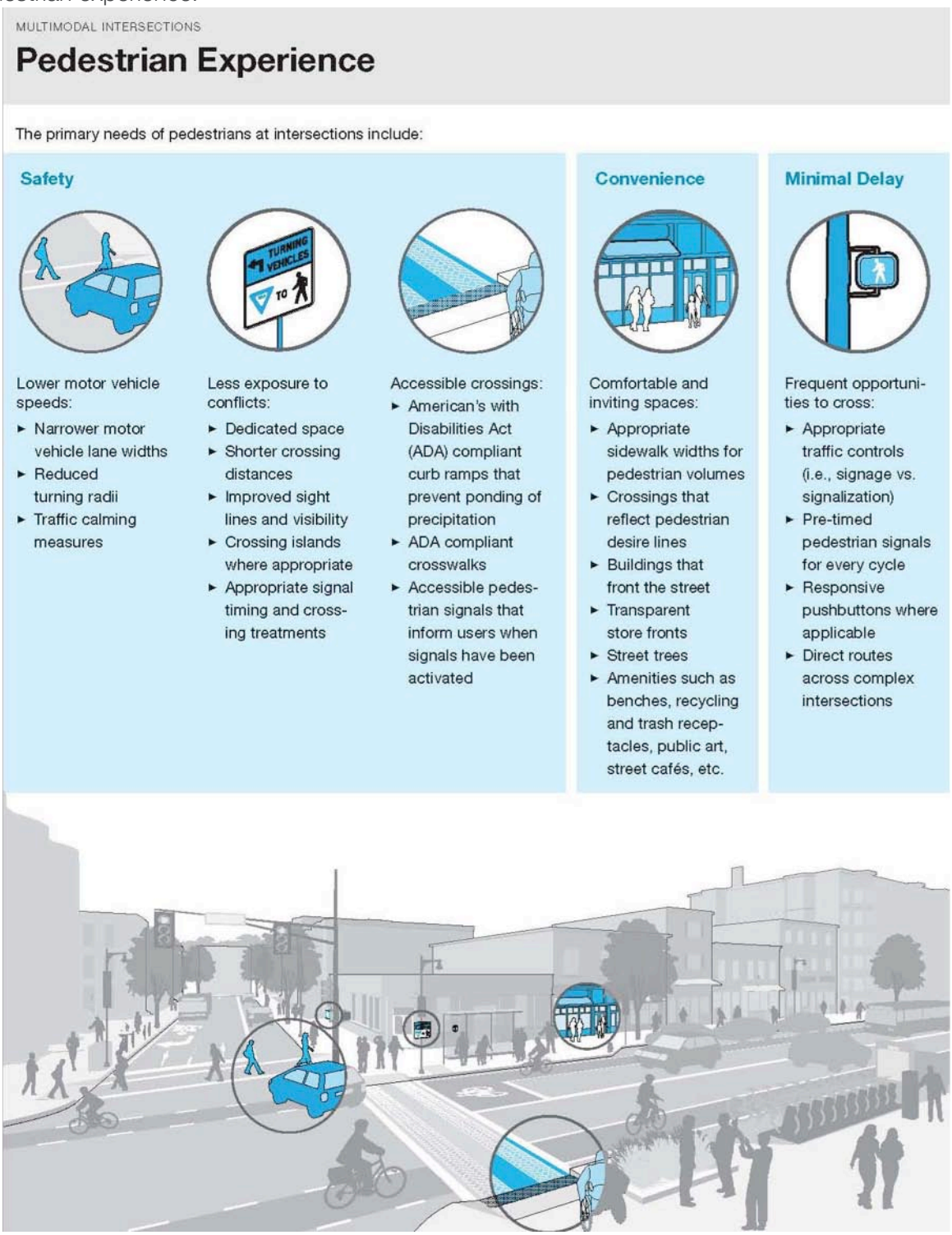
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Allentown-Bethlehem-Easton, PA-NJ	887	97	10.9%	1.14	1.1%	12.8%	45.7%	51.5%
Altoona, PA	171	22	12.9%	2.20	0.0%	18.2%	59.1%	63.6%
Erie, PA	313	26	8.3%	0.71	4.0%	28.0%	36.0%	73.1%
Harrisburg-Carlisle, PA	692	74	10.7%	1.53	0.0%	21.6%	45.9%	51.4%
Johnstown, PA	171	9	5.3%	0.70	0.0%	44.4%	44.4%	44.4%
Lancaster, PA	588	46	7.8%	0.85	0.0%	17.4%	58.7%	45.7%
Lebanon, PA	190	13	6.8%	0.75	0.0%	38.5%	38.5%	38.5%
New York-Northern New Jersey-Long Island, NY-NJ-PA	10,414	3,384	32.5%	1.76	0.7%	17.1%	37.7%	61.1%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	4,984	959	19.2%	1.64	0.7%	20.1%	54.9%	66.4%
Pittsburgh, PA	2,302	234	10.2%	0.90	2.2%	39.1%	32.4%	50.6%
Reading, PA	521	53	10.2%	1.41	0.0%	19.2%	50.0%	56.6%
Scranton--Wilkes-Barre, PA	674	79	11.7%	1.24	1.3%	33.8%	35.1%	55.7%
State College, PA	183	12	6.6%	0.65	0.0%	30.8%	15.4%	41.7%
Williamsport, PA	196	11	5.6%	0.86	0.0%	0.0%	63.6%	100.0%
York-Hanover, PA	452	41	9.1%	0.97	0.0%	25.0%	45.0%	58.5%
Youngstown-Warren-Boardman, OH-PA	701	68	9.7%	1.24	0.0%	20.0%	56.9%	44.8%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	194	8	4.1%	0.80	0.0%	50.0%	50.0%	87.5%
Allegheny County	750	125	16.7%	1.02	1.7%	52.5%	18.3%	42.7%
Armstrong County	120	10	8.3%	1.43	10.0%	20.0%	70.0%	80.0%
Beaver County	172	14	8.1%	0.81	0.0%	46.2%	15.4%	64.3%
Bedford County	166	8	4.8%	1.61	0.0%	37.5%	62.5%	0.0%
Berks County	521	53	10.2%	1.31	0.0%	19.2%	50.0%	56.6%
Blair County	171	22	12.9%	1.73	0.0%	18.2%	59.1%	63.6%
Bradford County	113	3	2.7%	0.48	0.0%	33.3%	33.3%	100.0%
Bucks County	619	101	16.3%	1.63	0.0%	7.1%	71.7%	72.0%
Butler County	256	17	6.6%	0.93	0.0%	17.6%	58.8%	58.8%
Cambria County	171	9	5.3%	0.62	0.0%	44.4%	44.4%	44.4%
Cameron County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Carbon County	124	7	5.6%	1.10	0.0%	14.3%	28.6%	85.7%
Centre County	183	12	6.6%	0.80	0.0%	30.8%	15.4%	41.7%
Chester County	442	32	7.2%	0.66	0.0%	15.6%	65.6%	59.4%
Clarion County	102	8	7.8%	1.98	0.0%	12.5%	75.0%	62.5%
Clearfield County	198	16	8.1%	1.95	0.0%	18.8%	68.8%	37.5%
Clinton County	86	7	8.1%	1.80	0.0%	0.0%	71.4%	42.9%
Columbia County	133	5	3.8%	0.75	20.0%	20.0%	20.0%	60.0%
Crawford County	163	11	6.7%	1.24	0.0%	0.0%	72.7%	63.6%
Cumberland County	260	26	10.0%	1.13	0.0%	23.1%	61.5%	38.5%
Dauphin County	305	44	14.4%	1.67	0.0%	20.5%	36.4%	59.1%
Delaware County	275	58	21.1%	1.04	1.8%	21.4%	39.3%	65.5%
Elk County	82	2	2.4%	0.61	0.0%	50.0%	50.0%	50.0%
Erie County	313	26	8.3%	0.93	4.0%	28.0%	36.0%	73.1%
Fayette County	257	13	5.1%	0.93	0.0%	8.3%	58.3%	61.5%
Forest County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	237	14	5.9%	0.97	0.0%	14.3%	57.1%	71.4%
Fulton County	58	2	3.4%	1.36	0.0%	0.0%	100.0%	0.0%
Greene County	97	5	5.2%	1.28	0.0%	0.0%	60.0%	20.0%
Huntingdon County	89	3	3.4%	0.65	0.0%	66.7%	0.0%	100.0%
Indiana County	160	11	6.9%	1.24	0.0%	0.0%	81.8%	54.5%
Jefferson County	73	5	6.8%	1.11	0.0%	20.0%	60.0%	80.0%
Juniata County	58	2	3.4%	0.82	0.0%	0.0%	0.0%	0.0%
Lackawanna County	207	29	14.0%	1.36	0.0%	57.1%	28.6%	51.7%
Lancaster County	588	46	7.8%	0.91	0.0%	17.4%	58.7%	45.7%
Lawrence County	115	4	3.5%	0.44	0.0%	25.0%	25.0%	25.0%
Lebanon County	190	13	6.8%	1.00	0.0%	38.5%	38.5%	38.5%
Lehigh County	364	55	15.1%	1.61	1.9%	11.1%	42.6%	49.1%
Luzerne County	398	48	12.1%	1.51	2.1%	21.3%	38.3%	58.3%
Lycoming County	196	11	5.6%	0.94	0.0%	0.0%	63.6%	100.0%
McKean County	70	4	5.7%	0.91	0.0%	0.0%	75.0%	0.0%
Mercer County	216	16	7.4%	1.36	0.0%	7.1%	92.9%	43.8%
Mifflin County	69	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Monroe County	338	29	8.6%	1.75	3.6%	3.6%	89.3%	62.1%
Montgomery County	500	78	15.6%	0.99	0.0%	17.8%	45.2%	59.0%
Montour County	28	4	14.3%	2.20	0.0%	0.0%	100.0%	100.0%
Northampton County	267	25	9.4%	0.86	0.0%	21.7%	34.8%	44.0%
Northumberland	137	8	5.8%	0.85	0.0%	50.0%	50.0%	75.0%
Perry County	127	4	3.1%	0.88	0.0%	25.0%	50.0%	50.0%
Philadelphia County	1,036	331	31.9%	2.19	1.6%	36.6%	21.4%	61.3%
Pike County	87	4	4.6%	0.72	0.0%	25.0%	50.0%	25.0%
Potter County	30	1	3.3%	0.56	0.0%	100.0%	0.0%	100.0%
Schuylkill County	292	26	8.9%	1.76	0.0%	23.1%	53.8%	61.5%
Snyder County	74	7	9.5%	1.79	0.0%	14.3%	71.4%	100.0%
Somerset County	163	8	4.9%	1.02	0.0%	0.0%	75.0%	50.0%
Sullivan County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Susquehanna County	111	3	2.7%	0.70	0.0%	0.0%	33.3%	100.0%
Tioga County	103	2	1.9%	0.48	0.0%	50.0%	50.0%	0.0%
Union County	74	5	6.8%	1.13	0.0%	20.0%	60.0%	60.0%
Venango County	108	6	5.6%	1.08	0.0%	16.7%	33.3%	66.7%
Warren County	90	7	7.8%	1.67	0.0%	0.0%	85.7%	42.9%
Washington County	277	19	6.9%	0.92	5.6%	33.3%	38.9%	63.2%
Wayne County	90	4	4.4%	0.78	0.0%	50.0%	50.0%	75.0%
Westmoreland County	470	36	7.7%	0.98	2.9%	20.0%	51.4%	50.0%
Wyoming County	69	2	2.9%	0.71	0.0%	0.0%	50.0%	50.0%
York County	452	41	9.1%	0.97	0.0%	25.0%	45.0%	58.5%
State total	**14,341**	**1,555**	**10.8%**	**1.24**	**1.0%**	**23.2%**	**44.5%**	**56.7%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Rhode Island

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **121 people died while walking in Rhode Island**.

FIGURE 1

Pedestrian fatalities in Rhode Island, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Rhode Island

In Rhode Island from 2003–2012, 121 people were killed while walking, resulting in a fatality rate of 1.14 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 15.7 percent in Rhode Island.

Within Rhode Island, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Rhode Island was 31.05, compared to the national PDI of 52.2 and ranked 32nd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Rhode Island, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
39	Providence-New Bedford-Fall River, RI-MA	198	1.26	3.2%	39.94

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Rhode Island, 55.5 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **29.2 percent of pedestrian fatalities in Rhode Island were on roads with a speed limit of 40 mph or higher**, compared to 45.0 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 14.1 percent of Rhode Island's population, adults aged 65 and older account for 31.9 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Rhode Island is 3.09 per 100,000 people (nationally, 3.19), compared to a rate of 1.08 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Rhode Island suffer at a rate of 4.06 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.5 percent of Rhode Island's population, and 22.4 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Rhode Island from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.38. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

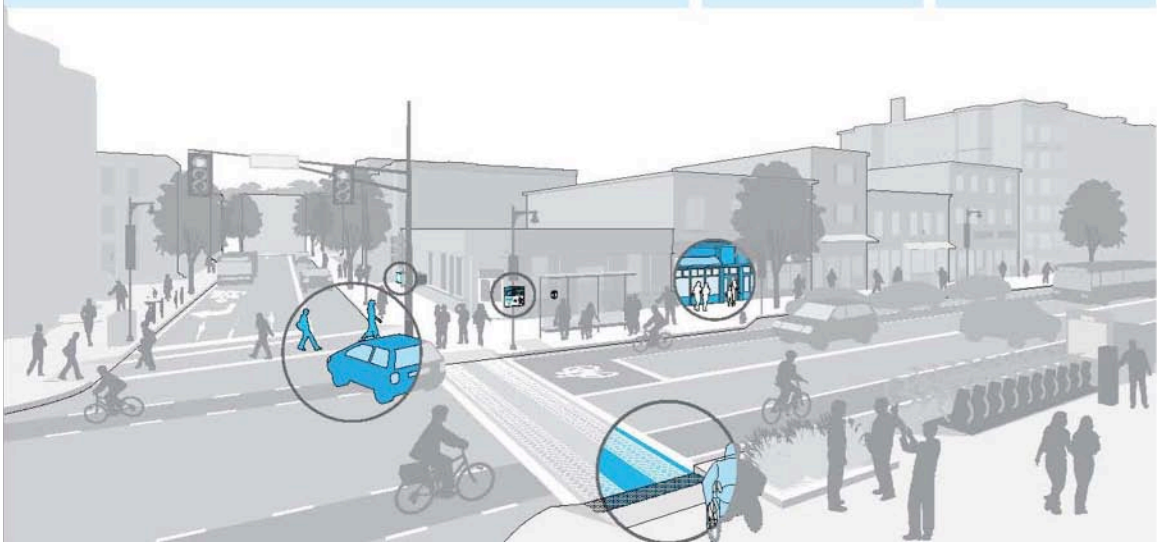
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Providence-New Bedford-Fall River, RI-MA	1,273	198	15.6%	1.26	0.5%	28.5%	32.6%	49.7%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bristol County	25	3	12.0%	0.59	0.0%	66.7%	0.0%	66.7%
Kent County	121	16	13.2%	0.95	0.0%	20.0%	33.3%	62.5%
Newport County	67	9	13.4%	1.08	0.0%	88.9%	0.0%	100.0%
Providence County	425	80	18.8%	1.27	0.0%	43.6%	26.9%	49.4%
Washington County	131	13	9.9%	1.02	0.0%	38.5%	53.8%	61.5%
State total	**769**	**121**	**15.7%**	**1.14**	**0.0%**	**45.0%**	**29.2%**	**55.5%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
South Carolina

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **1,020 people died while walking in South Carolina**.

FIGURE 1

Pedestrian fatalities in South Carolina, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in South Carolina

In South Carolina from 2003–2012, 1,020 people were killed while walking, resulting in a fatality rate of 2.29 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 10.7 percent in South Carolina.

Within South Carolina, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for South Carolina was 110.39, compared to the national PDI of 52.2 and ranked 4th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In South Carolina, 58.8 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **78.8 percent of pedestrian fatalities in South Carolina were on roads with a speed limit of 40 mph or higher**, compared to 1.9 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 56 children in South Carolina.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.9 percent of South Carolina's population, adults aged 65 and older account for 12.4 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in South Carolina is 2.43 per 100,000 people (nationally, 3.19), compared to a rate of 2.54 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in South Carolina suffer at a rate of 2.8 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.6 percent of South Carolina's population, and 6.2 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In South Carolina from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.93. The rate for Hispanic people of any race was 4.87; and for black people and African Americans, 3.56.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

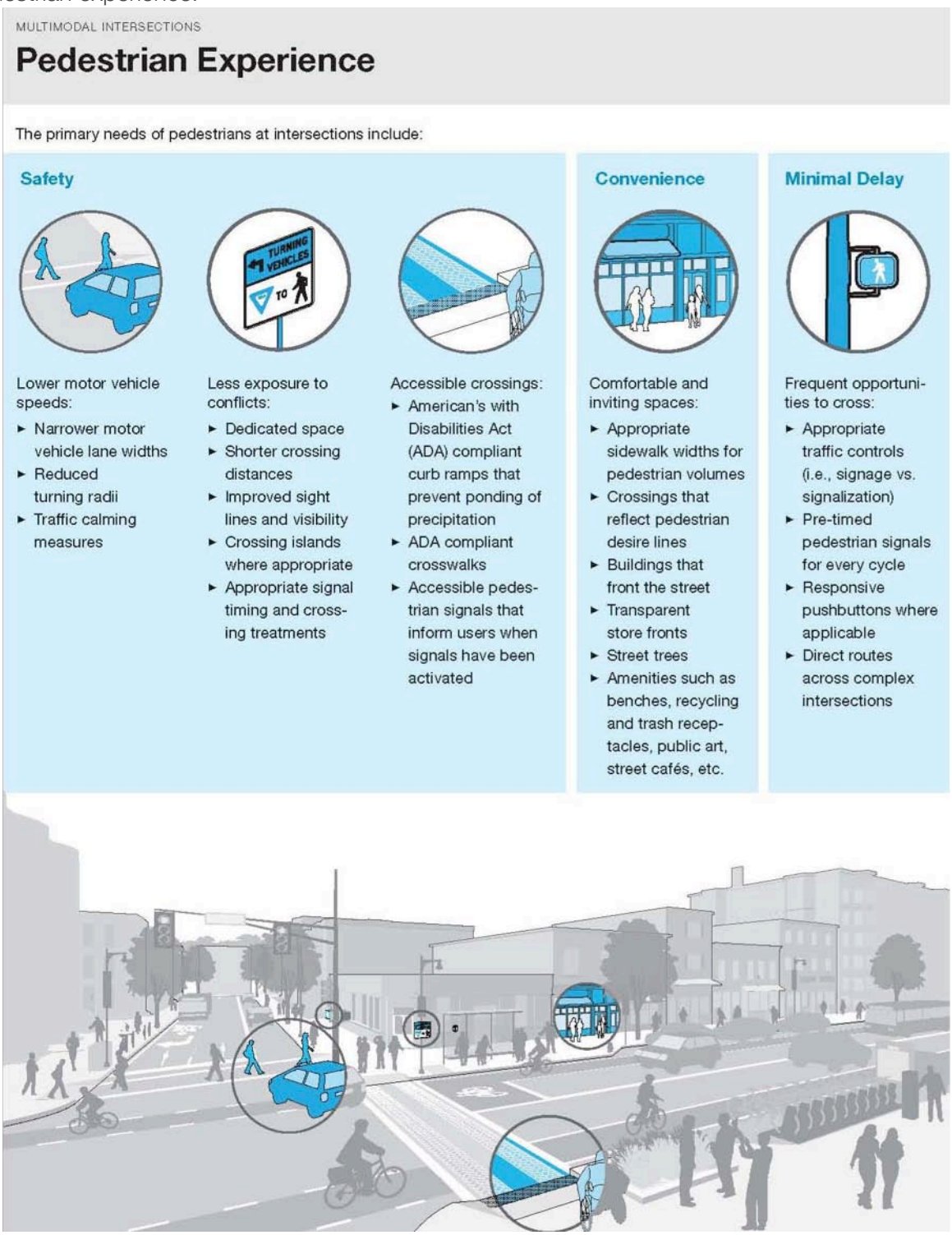
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Anderson, SC	409	37	9.0%	2.14	0.0%	2.8%	61.1%	64.9%
Augusta-Richmond County, GA-SC	962	119	12.4%	2.59	0.0%	0.8%	78.8%	58.8%
Charleston-North Charleston-Summerville, SC	1,111	144	13.0%	2.06	0.0%	4.3%	81.4%	60.8%
Charlotte-Gastonia-Concord, NC-SC	1,751	254	14.5%	1.65	1.6%	6.0%	66.5%	29.1%
Columbia, SC	1,362	161	11.8%	2.14	0.0%	1.9%	71.3%	59.5%
Florence, SC	545	50	9.2%	2.34	0.0%	2.1%	87.5%	45.8%
Greenville-Mauldin-Easley, SC	1,040	113	10.9%	1.97	0.9%	6.4%	71.8%	59.3%
Myrtle Beach-North Myrtle Beach-Conway, SC	620	92	14.8%	3.32	0.0%	3.3%	85.6%	69.3%
Spartanburg, SC	481	61	12.7%	2.60	0.0%	6.7%	73.3%	50.0%
Sumter, SC	241	31	12.9%	3.54	0.0%	0.0%	88.9%	70.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Abbeville County	48	1	2.1%	0.39	N/A	N/A	N/A	100.0%
Aiken County	310	30	9.7%	1.93	0.0%	0.0%	79.3%	64.3%
Allendale County	30	2	6.7%	1.87	0.0%	0.0%	100.0%	50.0%
Anderson County	409	37	9.0%	2.04	0.0%	2.8%	61.1%	64.9%
Bamberg County	38	1	2.6%	0.62	0.0%	0.0%	100.0%	100.0%
Barnwell County	71	5	7.0%	2.20	0.0%	0.0%	80.0%	100.0%
Beaufort County	199	32	16.1%	2.11	0.0%	3.1%	87.5%	71.0%
Berkeley County	376	30	8.0%	1.79	0.0%	3.4%	89.7%	58.6%
Calhoun County	88	9	10.2%	5.92	0.0%	0.0%	100.0%	12.5%
Charleston County	532	99	18.6%	2.90	0.0%	3.1%	80.2%	67.7%
Cherokee County	139	15	10.8%	2.75	0.0%	0.0%	66.7%	40.0%
Chester County	114	7	6.1%	2.11	0.0%	0.0%	85.7%	14.3%
Chesterfield County	140	14	10.0%	3.07	0.0%	0.0%	92.9%	53.8%
Clarendon County	161	14	8.7%	4.08	0.0%	0.0%	84.6%	42.9%
Colleton County	212	8	3.8%	2.07	0.0%	0.0%	83.3%	62.5%
Darlington County	205	12	5.9%	1.75	0.0%	9.1%	81.8%	58.3%
Dillon County	122	14	11.5%	4.44	0.0%	0.0%	100.0%	41.7%
Dorchester County	203	15	7.4%	1.19	0.0%	13.3%	73.3%	20.0%
Edgefield County	61	4	6.6%	1.52	0.0%	0.0%	75.0%	25.0%
Fairfield County	119	11	9.2%	4.59	0.0%	0.0%	63.6%	27.3%
Florence County	340	38	11.2%	2.84	0.0%	0.0%	89.2%	41.7%
Georgetown County	144	20	13.9%	3.34	0.0%	0.0%	88.9%	78.9%
Greenville County	662	88	13.3%	2.04	1.2%	5.8%	69.8%	62.5%
Greenwood County	95	6	6.3%	0.87	0.0%	16.7%	33.3%	33.3%
Hampton County	68	2	2.9%	0.95	0.0%	0.0%	50.0%	50.0%
Horry County	620	92	14.8%	3.67	0.0%	3.3%	85.6%	69.3%
Jasper County	206	21	10.2%	8.98	0.0%	0.0%	90.5%	38.1%
Kershaw County	156	8	5.1%	1.35	0.0%	0.0%	62.5%	57.1%
Lancaster County	165	5	3.0%	0.70	0.0%	0.0%	100.0%	40.0%
Laurens County	177	10	5.6%	1.49	0.0%	0.0%	90.0%	20.0%
Lee County	79	6	7.6%	3.06	0.0%	0.0%	80.0%	80.0%
Lexington County	462	48	10.4%	1.93	0.0%	0.0%	85.1%	64.6%
Marion County	117	8	6.8%	2.38	0.0%	0.0%	75.0%	87.5%
Marlboro County	80	9	11.3%	3.14	0.0%	0.0%	77.8%	62.5%
McCormick County	28	2	7.1%	1.98	0.0%	0.0%	50.0%	50.0%
Newberry County	100	9	9.0%	2.43	0.0%	0.0%	88.9%	37.5%
Oconee County	156	6	3.8%	0.83	0.0%	0.0%	16.7%	40.0%
Orangeburg County	395	50	12.7%	5.43	0.0%	0.0%	95.8%	66.0%
Pickens County	201	15	7.5%	1.28	0.0%	14.3%	71.4%	66.7%
Richland County	485	84	17.3%	2.28	0.0%	3.6%	63.1%	65.1%
Saluda County	52	1	1.9%	0.51	0.0%	0.0%	0.0%	100.0%
Spartanburg County	481	61	12.7%	2.22	0.0%	6.7%	73.3%	50.0%
Sumter County	241	31	12.9%	2.91	0.0%	0.0%	88.9%	70.0%
Union County	48	1	2.1%	0.34	0.0%	0.0%	100.0%	100.0%

Williamsburg County	118	8	6.8%	2.29	0.0%	0.0%	100.0%	62.5%
York County	293	31	10.6%	1.49	3.2%	6.5%	71.0%	54.8%
State total	**9,546**	**1,020**	**10.7%**	**2.29**	**0.2%**	**1.9%**	**78.8%**	**58.8%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
South Dakota

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

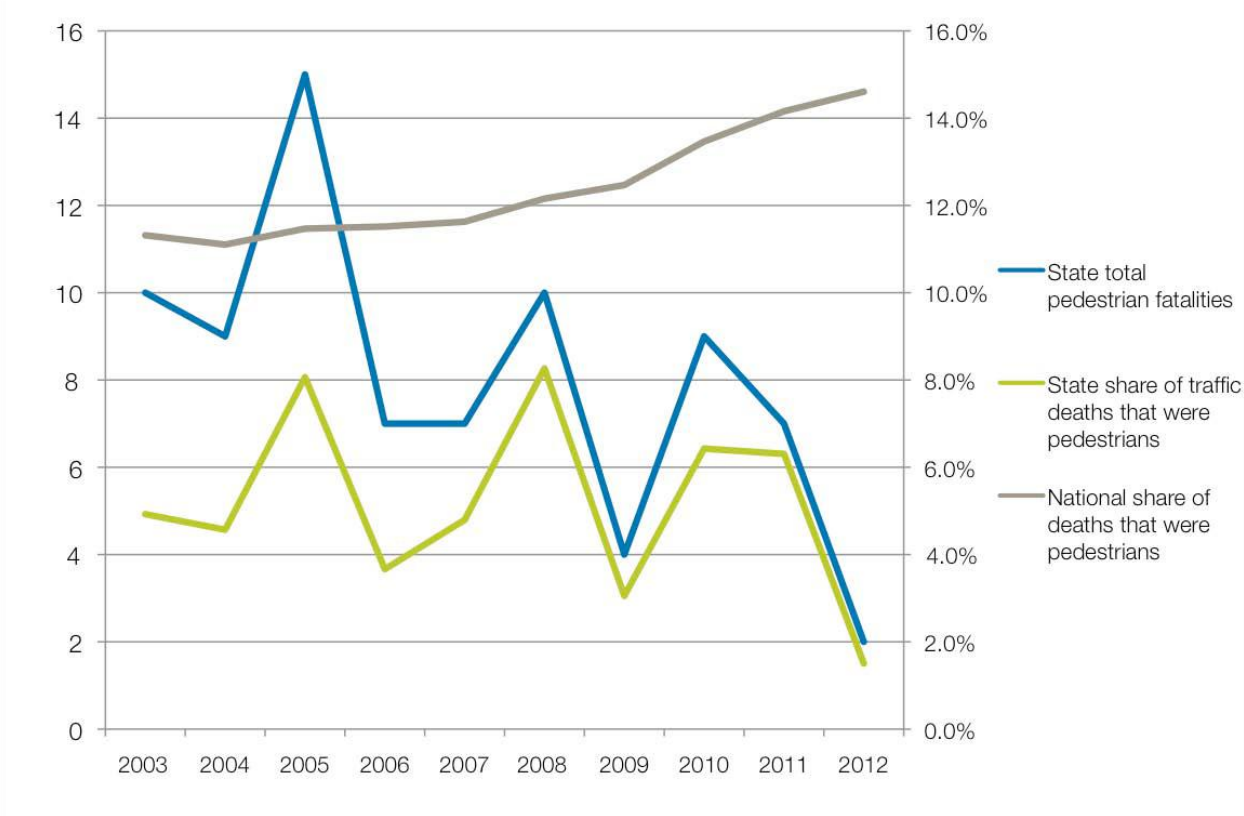
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **80 people died while walking in South Dakota**.

FIGURE 1

Pedestrian fatalities in South Dakota, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in South Dakota

In South Dakota from 2003–2012, 80 people were killed while walking, resulting in a fatality rate of 1.00 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.1 percent in South Dakota.

Within South Dakota, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for South Dakota was 18.35, compared to the national PDI of 52.2 and ranked 47th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In South Dakota, 43.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **57.9 percent of pedestrian fatalities in South Dakota were on roads with a speed limit of 40 mph or higher**, compared to 17.1 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 14.2 percent of South Dakota's population, adults aged 65 and older account for 17.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in South Dakota is 2.35 per 100,000 people (nationally, 3.19), compared to a rate of 1.87 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in South Dakota suffer at a rate of 3.45 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.4 percent of South Dakota's population, and 13.1 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In South Dakota from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.15. The rate for American Indians and Alaska Natives was 10.09. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

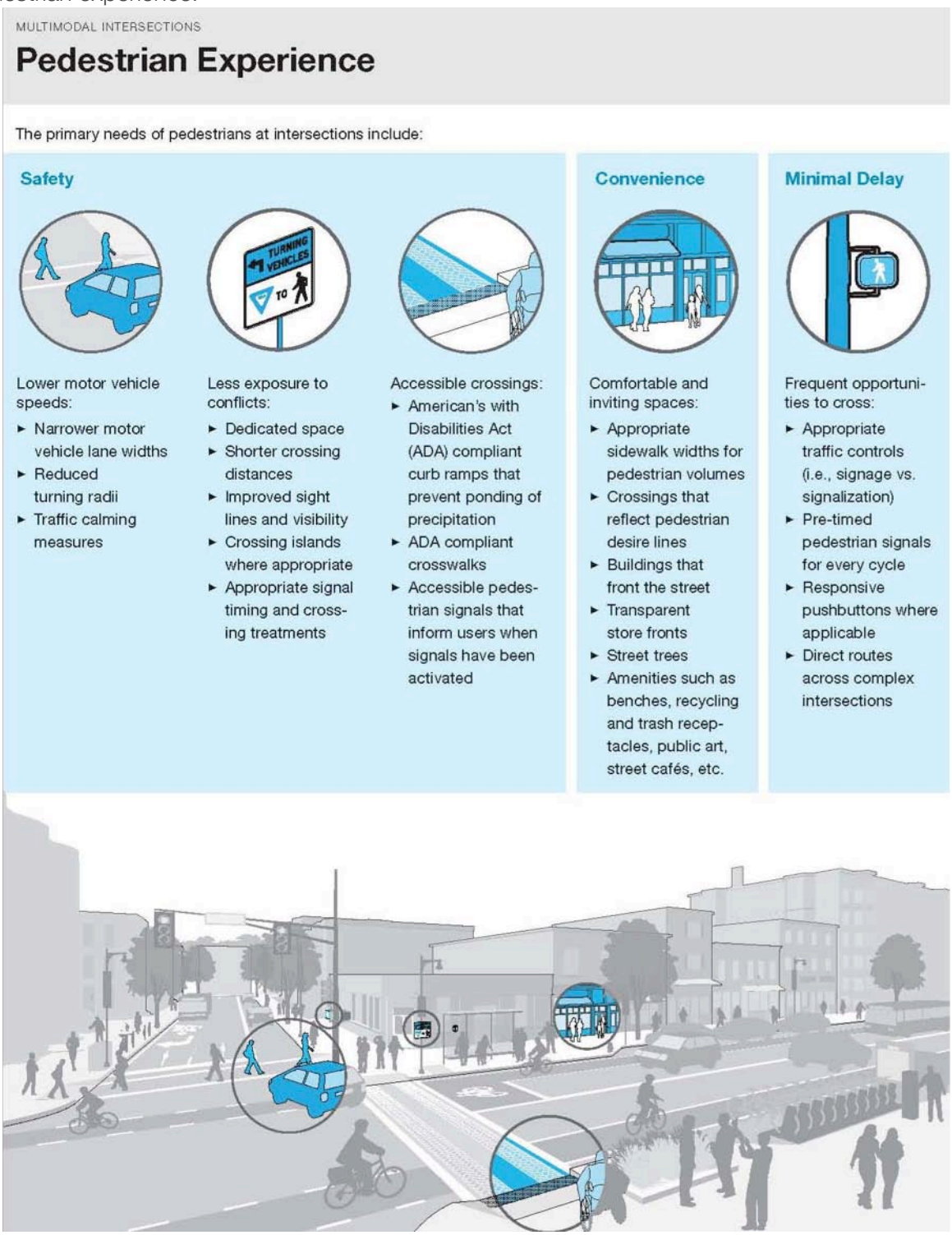
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Rapid City, SD	174	14	8.0%	0.79	0.0%	7.7%	53.8%	35.7%
Sioux City, IA-NE-SD	156	13	8.3%	0.98	0.0%	33.3%	33.3%	7.7%
Sioux Falls, SD	237	11	4.6%	0.35	27.3%	27.3%	18.2%	36.4%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Aurora County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Beadle County	18	2	11.1%	1.19	50.0%	50.0%	0.0%	50.0%
Bennett County	22	1	4.5%	2.88	0.0%	0.0%	100.0%	0.0%
Bon Homme County	13	2	15.4%	2.84	0.0%	0.0%	100.0%	100.0%
Brookings County	39	1	2.6%	0.32	0.0%	0.0%	100.0%	0.0%
Brown County	26	1	3.8%	0.28	0.0%	100.0%	0.0%	100.0%
Brule County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Buffalo County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Butte County	19	1	5.3%	1.02	0.0%	0.0%	0.0%	0.0%
Campbell County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Charles Mix County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clark County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clay County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Codington County	40	1	2.5%	0.37	0.0%	0.0%	100.0%	0.0%
Corson County	35	2	5.7%	4.87	0.0%	0.0%	100.0%	50.0%
Custer County	24	1	4.2%	1.25	0.0%	0.0%	0.0%	0.0%
Davison County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Day County	20	1	5.0%	1.74	0.0%	0.0%	0.0%	0.0%
Deuel County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dewey County	26	1	3.8%	1.82	0.0%	0.0%	100.0%	100.0%
Douglas County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Edmunds County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fall River County	24	1	4.2%	1.41	0.0%	0.0%	100.0%	0.0%
Faulk County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grant County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gregory County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Haakon County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hamlin County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hand County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hanson County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Harding County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hughes County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hutchinson County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hyde County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	38	3	7.9%	9.95	0.0%	0.0%	100.0%	33.3%
Jerauld County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jones County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kingsbury County	8	1	12.5%	1.91	100.0%	100.0%	0.0%	0.0%
Lake County	17	1	5.9%	0.91	0.0%	0.0%	100.0%	100.0%
Lawrence County	61	1	1.6%	0.43	100.0%	100.0%	0.0%	0.0%
Lincoln County	54	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lyman County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Marshall County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
McCook County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
McPherson County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Meade County	60	1	1.7%	0.40	0.0%	0.0%	100.0%	0.0%
Mellette County	28	5	17.9%	24.43	0.0%	0.0%	75.0%	80.0%
Miner County	10	1	10.0%	4.10	0.0%	100.0%	0.0%	0.0%
Minnehaha County	143	9	6.3%	0.55	22.2%	22.2%	22.2%	33.3%
Moody County	25	2	8.0%	3.08	0.0%	0.0%	100.0%	0.0%
Pennington County	114	13	11.4%	1.34	0.0%	8.3%	50.0%	38.5%
Perkins County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Potter County	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Roberts County	40	2	5.0%	1.99	0.0%	0.0%	100.0%	50.0%
Sanborn County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Shannon County	116	18	15.5%	13.40	11.8%	11.8%	76.5%	38.9%
Spink County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stanley County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sully County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Todd County	47	1	2.1%	1.04	0.0%	0.0%	100.0%	100.0%
Tripp County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Turner County	18	2	11.1%	2.38	50.0%	50.0%	0.0%	50.0%
Union County	27	1	3.7%	0.73	0.0%	0.0%	100.0%	0.0%
Walworth County	12	2	16.7%	3.66	0.0%	50.0%	0.0%	50.0%
Yankton County	25	2	8.0%	0.90	50.0%	50.0%	50.0%	100.0%
Ziebach County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
State total	**1,559**	**80**	**5.1%**	**1.00**	**11.8%**	**17.1%**	**57.9%**	**43.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Tennessee

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

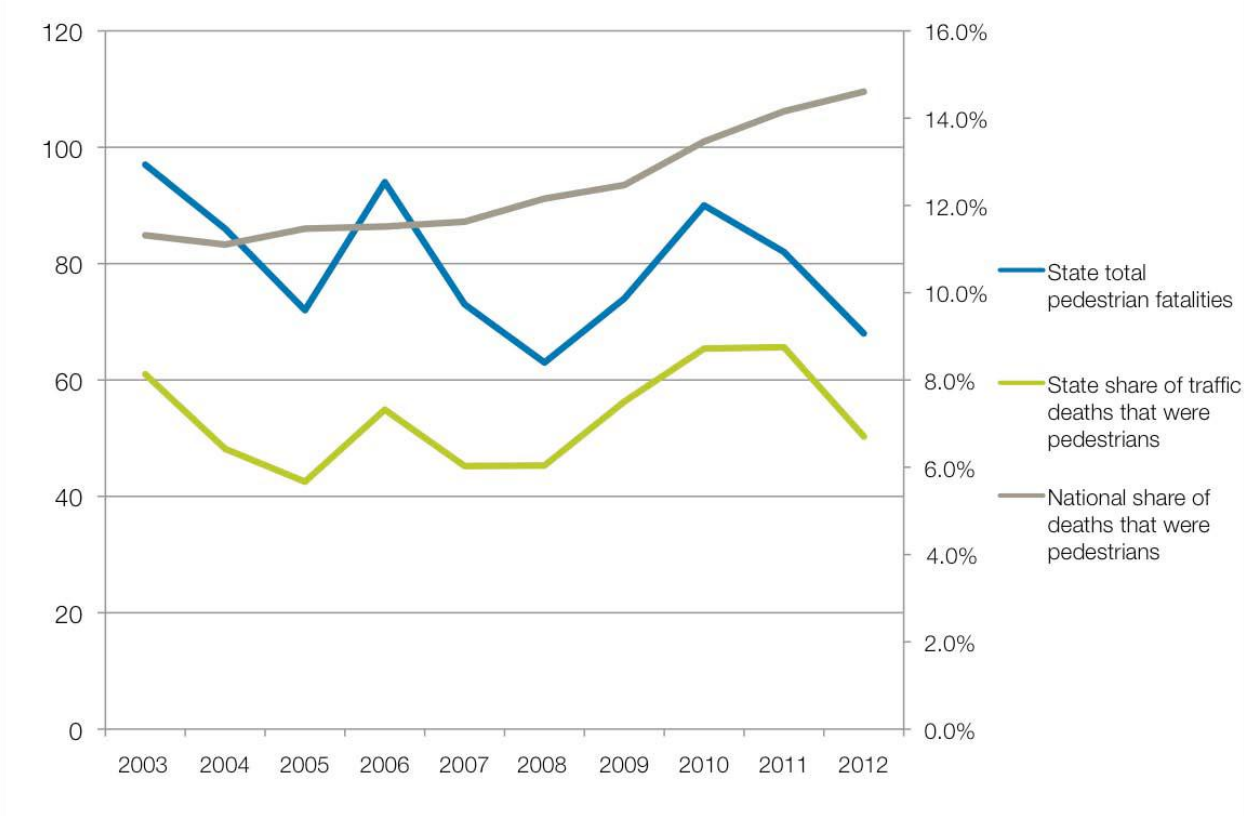
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **799 people died while walking in Tennessee**.

FIGURE 1

Pedestrian fatalities in Tennessee, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Tennessee

In Tennessee from 2003–2012, 799 people were killed while walking, resulting in a fatality rate of 1.29 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.1 percent in Tennessee.

Within Tennessee, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Tennessee was 88.65, compared to the national PDI of 52.2 and ranked 11th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Tennessee, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
5	Memphis, TN-MS-AR	239	1.72	1.3%	131.26
15	Nashville-Davidson--Murfreesboro--Franklin, TN	210	1.25	1.2%	100.79

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Tennessee, 60.7 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **71.8 percent of pedestrian fatalities in Tennessee were on roads with a speed limit of 40 mph or higher**, compared to 3.8 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 64 children in Tennessee.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.9 percent of Tennessee's population, adults aged 65 and older account for 16.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Tennessee is 2.16 per 100,000 people (nationally, 3.19), compared to a rate of 1.63 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Tennessee suffer at a rate of 2.94 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.7 percent of Tennessee's population, and 9.8 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Tennessee from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.52. The rate for Hispanic people of any race was 2.1; for black people and African Americans, 2.46; and for Asians and Pacific Islanders, 1.55.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

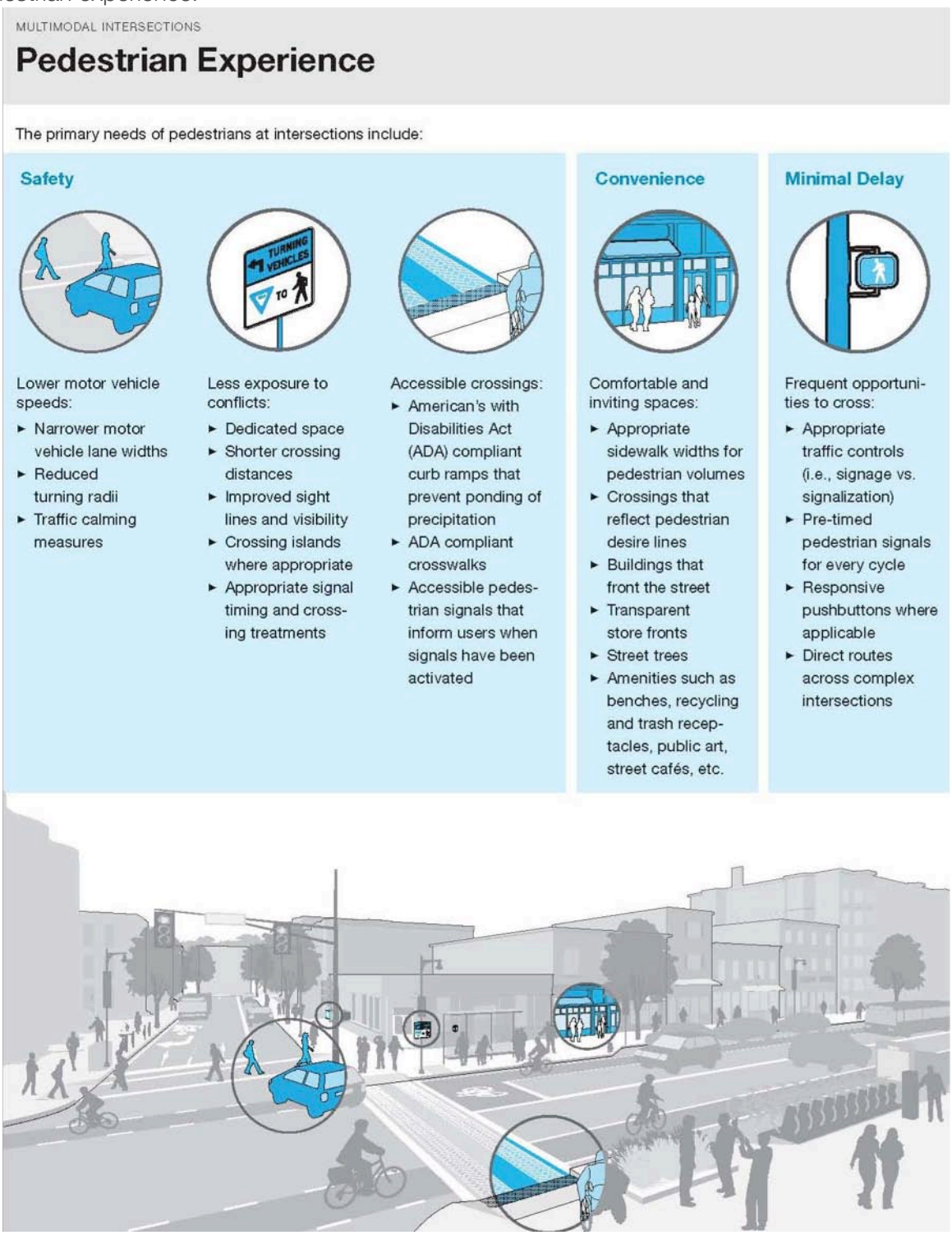
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Chattanooga, TN-GA	826	58	7.0%	0.95	1.8%	10.7%	66.1%	69.0%
Clarksville, TN-KY	464	37	8.0%	1.53	2.7%	5.4%	86.5%	78.4%
Cleveland, TN	210	11	5.2%	0.86	0.0%	0.0%	63.6%	45.5%
Jackson, TN	247	22	8.9%	1.39	0.0%	0.0%	71.4%	59.1%
Johnson City, TN	299	20	6.7%	0.50	10.5%	15.8%	31.6%	50.0%
Kingsport-Bristol-Bristol, TN-VA	521	36	6.9%	1.17	2.9%	17.1%	62.9%	50.0%
Knoxville, TN	1,131	72	6.4%	1.00	1.4%	5.6%	61.1%	48.6%
Memphis, TN-MS-AR	2,007	239	11.9%	1.72	0.9%	1.7%	77.4%	54.8%
Morristown, TN	280	11	3.9%	1.32	9.1%	9.1%	81.8%	45.5%
Nashville-Davidson--Murfreesboro--Franklin, TN	2,270	210	9.3%	1.25	0.5%	0.5%	71.8%	60.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Anderson County	136	6	4.4%	0.81	0.0%	16.7%	83.3%	33.3%
Bedford County	93	2	2.2%	0.46	0.0%	0.0%	100.0%	100.0%
Benton County	58	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bledsoe County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Blount County	219	9	4.1%	0.75	0.0%	0.0%	66.7%	22.2%
Bradley County	149	9	6.0%	0.94	0.0%	0.0%	55.6%	33.3%
Campbell County	138	7	5.1%	1.73	0.0%	0.0%	71.4%	28.6%
Cannon County	38	2	5.3%	1.48	0.0%	0.0%	100.0%	0.0%
Carroll County	70	3	4.3%	1.05	0.0%	0.0%	100.0%	66.7%
Carter County	115	8	7.0%	1.39	14.3%	14.3%	14.3%	50.0%
Cheatham County	94	2	2.1%	0.52	0.0%	0.0%	100.0%	0.0%
Chester County	43	4	9.3%	2.40	0.0%	0.0%	75.0%	50.0%
Claiborne County	103	7	6.8%	2.22	0.0%	14.3%	71.4%	100.0%
Clay County	25	1	4.0%	1.27	0.0%	0.0%	100.0%	100.0%
Cocke County	108	9	8.3%	2.56	0.0%	0.0%	100.0%	55.6%
Coffee County	132	11	8.3%	2.12	0.0%	0.0%	90.9%	54.5%
Crockett County	42	3	7.1%	2.07	0.0%	0.0%	66.7%	66.7%
Cumberland County	148	4	2.7%	0.74	0.0%	0.0%	75.0%	25.0%
Davidson County	814	137	16.8%	2.25	0.0%	0.0%	67.2%	65.7%
Decatur County	48	1	2.1%	0.86	0.0%	0.0%	0.0%	100.0%
DeKalb County	60	3	5.0%	1.62	0.0%	0.0%	66.7%	66.7%
Dickson County	150	13	8.7%	2.70	7.7%	7.7%	76.9%	61.5%
Dyer County	77	5	6.5%	1.32	0.0%	0.0%	100.0%	80.0%
Fayette County	88	2	2.3%	0.55	0.0%	0.0%	100.0%	50.0%
Fentress County	60	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	75	4	5.3%	0.98	0.0%	0.0%	100.0%	50.0%
Gibson County	108	7	6.5%	1.43	0.0%	0.0%	71.4%	85.7%
Giles County	82	5	6.1%	1.70	0.0%	0.0%	100.0%	20.0%
Grainger County	75	3	4.0%	1.35	0.0%	0.0%	100.0%	33.3%
Greene County	175	13	7.4%	1.93	0.0%	0.0%	76.9%	53.8%
Grundy County	69	2	2.9%	1.44	0.0%	50.0%	0.0%	0.0%
Hamblen County	97	5	5.2%	0.82	20.0%	20.0%	60.0%	60.0%
Hamilton County	428	46	10.7%	1.40	2.2%	11.1%	62.2%	76.1%
Hancock County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hardeman County	70	1	1.4%	0.36	0.0%	0.0%	100.0%	100.0%
Hardin County	75	4	5.3%	1.55	0.0%	0.0%	75.0%	100.0%
Hawkins County	120	5	4.2%	0.89	0.0%	0.0%	60.0%	60.0%
Haywood County	71	2	2.8%	1.05	0.0%	0.0%	100.0%	0.0%
Henderson County	121	2	1.7%	0.73	0.0%	0.0%	100.0%	0.0%
Henry County	97	4	4.1%	1.25	0.0%	0.0%	66.7%	0.0%
Hickman County	59	1	1.7%	0.41	0.0%	0.0%	100.0%	100.0%
Houston County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Humphreys County	62	3	4.8%	1.64	0.0%	0.0%	100.0%	100.0%
Jackson County	25	1	4.0%	0.87	0.0%	0.0%	100.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Jefferson County	108	3	2.8%	0.60	0.0%	0.0%	100.0%	33.3%
Johnson County	38	1	2.6%	0.55	0.0%	0.0%	100.0%	100.0%
Knox County	635	52	8.2%	1.24	0.0%	3.8%	55.8%	55.8%
Lake County	7	1	14.3%	1.28	0.0%	0.0%	100.0%	0.0%
Lauderdale County	75	1	1.3%	0.36	0.0%	0.0%	100.0%	0.0%
Lawrence County	114	4	3.5%	0.97	0.0%	0.0%	50.0%	25.0%
Lewis County	25	3	12.0%	2.52	0.0%	0.0%	50.0%	33.3%
Lincoln County	92	5	5.4%	1.53	0.0%	0.0%	60.0%	80.0%
Loudon County	88	3	3.4%	0.65	0.0%	0.0%	100.0%	33.3%
Macon County	54	1	1.9%	0.46	0.0%	0.0%	100.0%	0.0%
Madison County	204	18	8.8%	1.86	0.0%	0.0%	70.6%	61.1%
Marion County	129	2	1.6%	0.71	0.0%	0.0%	100.0%	0.0%
Marshall County	73	4	5.5%	1.36	0.0%	0.0%	50.0%	50.0%
Maury County	154	11	7.1%	1.42	0.0%	0.0%	72.7%	45.5%
McMinn County	155	2	1.3%	0.39	0.0%	0.0%	100.0%	100.0%
McNairy County	86	2	2.3%	0.78	0.0%	0.0%	0.0%	0.0%
Meigs County	39	2	5.1%	1.74	0.0%	0.0%	100.0%	100.0%
Monroe County	106	3	2.8%	0.69	0.0%	0.0%	66.7%	100.0%
Montgomery County	248	28	11.3%	1.74	3.6%	3.6%	85.7%	89.3%
Moore County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Morgan County	68	1	1.5%	0.47	0.0%	0.0%	0.0%	0.0%
Obion County	77	0	0.0%	0.00	N/A	N/A	N/A	N/A
Overton County	59	0	0.0%	0.00	N/A	N/A	N/A	N/A
Perry County	33	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pickett County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A
Polk County	61	2	3.3%	1.21	0.0%	0.0%	100.0%	100.0%
Putnam County	124	6	4.8%	0.86	0.0%	0.0%	83.3%	66.7%
Rhea County	55	3	5.5%	0.97	0.0%	0.0%	100.0%	66.7%
Roane County	124	4	3.2%	0.74	0.0%	25.0%	75.0%	50.0%
Robertson County	144	8	5.6%	1.27	0.0%	0.0%	75.0%	50.0%
Rutherford County	296	21	7.1%	0.86	0.0%	0.0%	76.2%	57.1%
Scott County	56	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sequatchie County	50	2	4.0%	1.48	0.0%	0.0%	100.0%	50.0%
Sevier County	202	10	5.0%	1.17	0.0%	0.0%	50.0%	80.0%
Shelby County	1,082	168	15.5%	1.82	0.0%	0.0%	74.9%	70.8%
Smith County	69	1	1.4%	0.53	0.0%	0.0%	100.0%	100.0%
Stewart County	44	1	2.3%	0.77	0.0%	0.0%	100.0%	0.0%
Sullivan County	246	18	7.3%	1.16	5.6%	27.8%	61.1%	61.1%
Sumner County	207	6	2.9%	0.39	0.0%	0.0%	66.7%	83.3%
Tipton County	93	7	7.5%	1.19	0.0%	0.0%	100.0%	57.1%
Trousdale County	37	3	8.1%	3.93	0.0%	0.0%	66.7%	33.3%
Unicoi County	33	1	3.0%	0.55	0.0%	0.0%	100.0%	0.0%
Union County	53	2	3.8%	1.05	50.0%	50.0%	50.0%	50.0%
Van Buren County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Warren County	99	3	3.0%	0.76	0.0%	0.0%	100.0%	66.7%
Washington County	151	11	7.3%	0.93	9.1%	18.2%	36.4%	54.5%
Wayne County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Weakley County	49	1	2.0%	0.29	0.0%	0.0%	100.0%	100.0%
White County	73	3	4.1%	1.19	0.0%	33.3%	33.3%	66.7%
Williamson County	119	2	1.7%	0.12	0.0%	0.0%	100.0%	50.0%
Wilson County	189	13	6.9%	1.21	0.0%	0.0%	92.3%	23.1%
State total	**11,309**	**799**	**7.1%**	**1.29**	**1.0%**	**3.8%**	**71.8%**	**60.7%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Texas

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

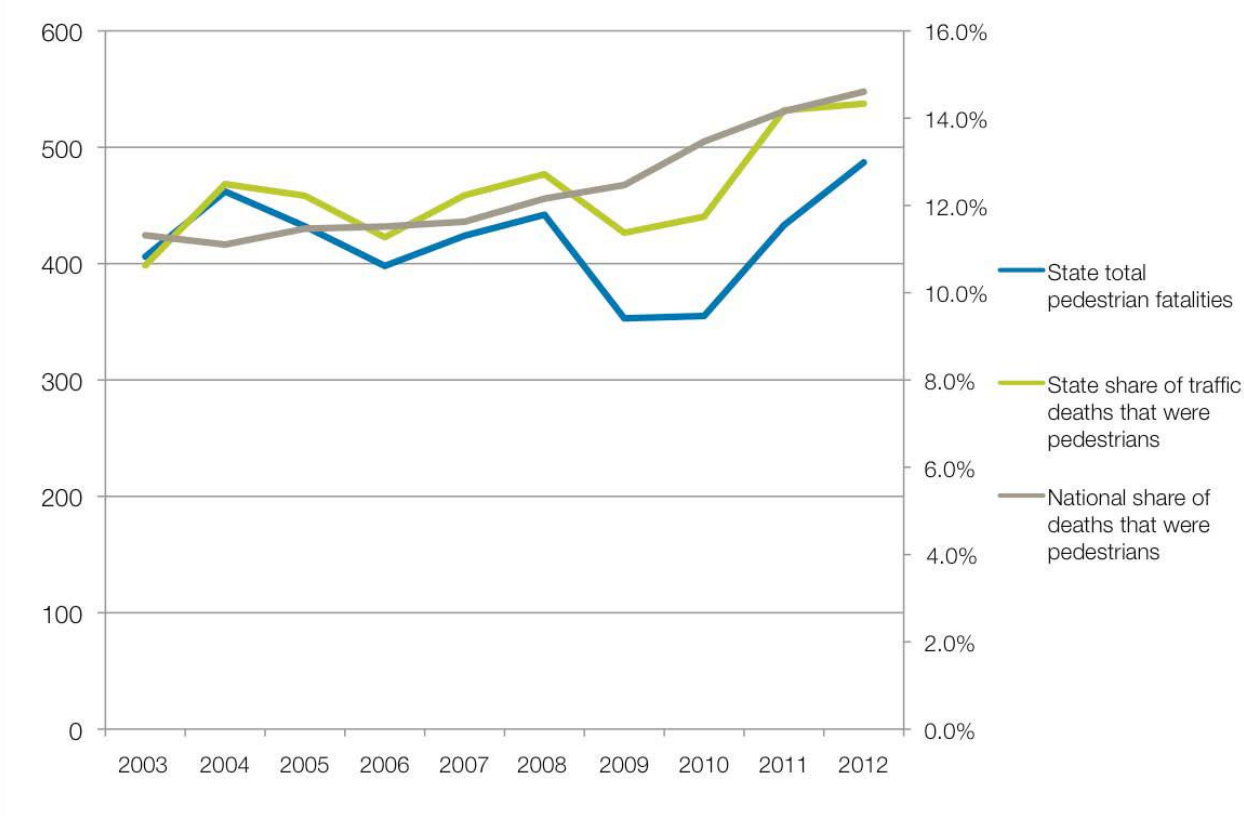
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **4,192 people died while walking in Texas**.

FIGURE 1

Pedestrian fatalities in Texas, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Texas

In Texas from 2003–2012, 4,192 people were killed while walking, resulting in a fatality rate of 1.74 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 12.3 percent in Texas.

Within Texas, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Texas was 97.49, compared to the national PDI of 52.2 and ranked 10th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Texas, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
7	Houston-Sugar Land-Baytown, TX	1,034	1.70	1.4%	119.64
12	Dallas-Fort Worth-Arlington, TX	900	1.31	1.2%	107.54
18	San Antonio, TX	373	1.86	1.9%	96.87
24	Austin-Round Rock, TX	251	1.44	1.8%	78.58

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Texas, 32.5 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **71.5 percent of pedestrian fatalities in Texas were on roads with a speed limit of 40 mph or higher**, compared to 0.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 353 children in Texas.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 10.1 percent of Texas's population, adults aged 65 and older account for 14.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Texas is 3.12 per 100,000 people (nationally, 3.19), compared to a rate of 2.07 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Texas suffer at a rate of 3.79 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 4.5 percent of Texas's population, and 7.8 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Texas from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 2.01. The rate for Hispanic people of any race was 2.3; for black people and African Americans, 2.72; for Asians and Pacific Islanders, 0.86; and for American Indians and Alaska Natives, 1.85.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

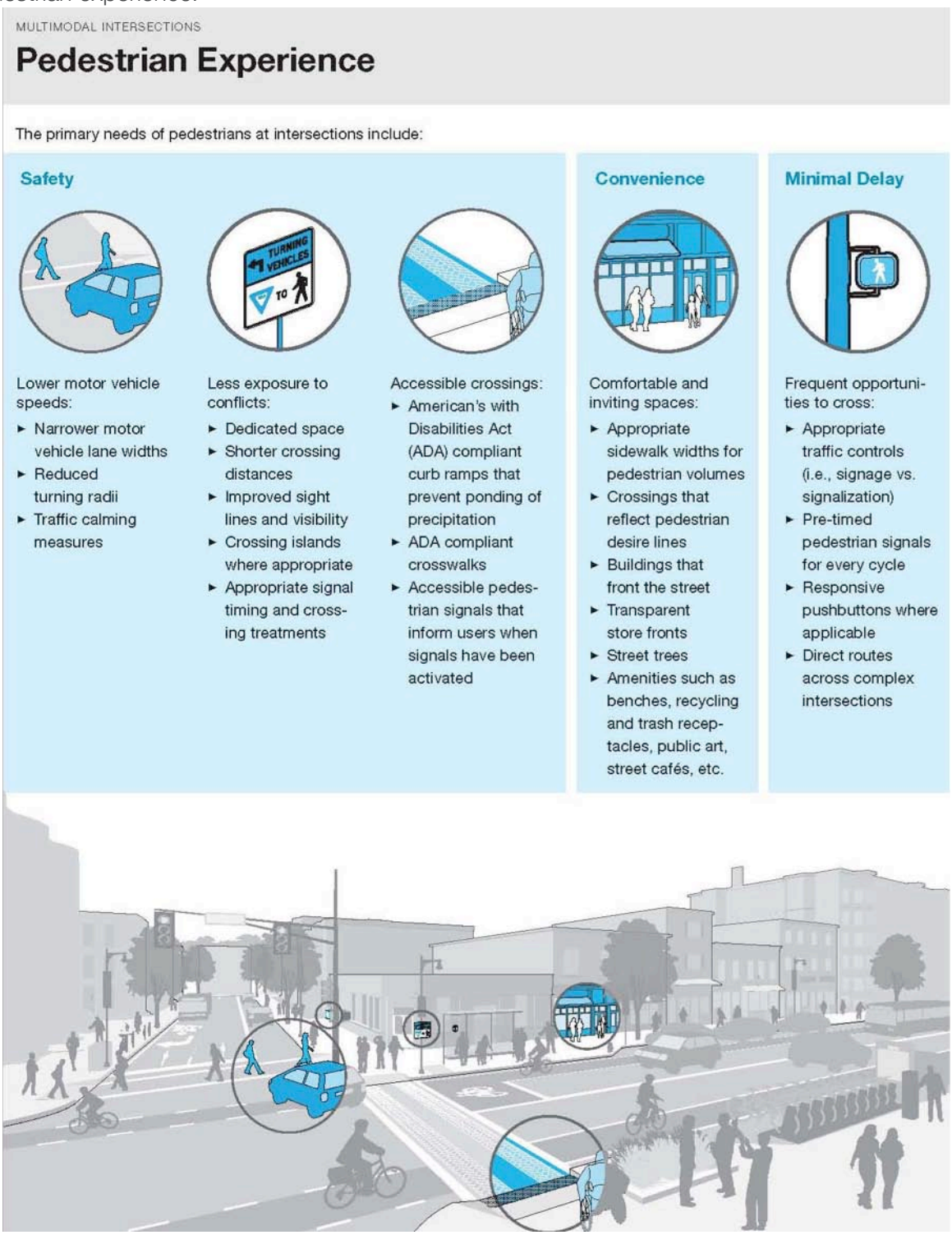
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Abilene, TX	305	22	7.2%	1.21	0.0%	0.0%	71.4%	18.2%
Amarillo, TX	457	54	11.8%	2.08	0.0%	0.0%	59.3%	35.3%
Austin-Round Rock, TX	1,793	251	14.0%	1.44	0.0%	0.9%	77.9%	24.9%
Beaumont-Port Arthur, TX	803	110	13.7%	2.27	0.0%	0.0%	80.0%	40.4%
Brownsville-Harlingen, TX	361	65	18.0%	1.77	3.2%	3.2%	46.8%	49.2%
College Station-Bryan, TX	437	38	8.7%	1.40	0.0%	2.6%	78.9%	60.5%
Corpus Christi, TX	550	111	20.2%	2.84	2.8%	2.8%	59.4%	31.5%
Dallas-Fort Worth-Arlington, TX	5,838	900	15.4%	1.31	0.7%	0.7%	72.9%	19.8%
El Paso, TX	658	159	24.2%	2.15	1.9%	3.2%	60.3%	37.3%
Houston-Sugar Land-Baytown, TX	6,201	1,034	16.7%	1.70	0.5%	0.7%	63.7%	23.7%
Killeen-Temple-Fort Hood, TX	555	71	12.8%	1.77	0.0%	0.0%	88.7%	54.9%
Laredo, TX	218	52	23.9%	1.84	0.0%	0.0%	43.1%	28.8%
Longview, TX	614	55	9.0%	2.52	0.0%	0.0%	81.8%	63.6%
Lubbock, TX	369	46	12.5%	1.83	0.0%	0.0%	81.8%	39.1%
McAllen-Edinburg-Mission, TX	754	109	14.5%	1.60	1.8%	1.8%	66.1%	28.7%
Midland, TX	230	19	8.3%	1.44	0.0%	0.0%	73.7%	26.3%
Odessa, TX	281	35	12.5%	3.18	2.8%	2.8%	80.6%	38.2%
San Angelo, TX	119	11	9.2%	1.07	0.0%	0.0%	54.5%	45.5%
San Antonio, TX	2,297	373	16.2%	1.86	0.0%	0.0%	72.8%	23.1%
Sherman-Denison, TX	293	26	8.9%	1.66	3.8%	3.8%	73.1%	53.8%
Texarkana, TX-Texarkana, AR	302	32	10.6%	1.91	0.0%	0.0%	84.4%	43.8%
Tyler, TX	488	40	8.2%	1.91	0.0%	0.0%	87.5%	82.5%
Victoria, TX	226	13	5.8%	0.86	0.0%	0.0%	53.8%	69.2%
Waco, TX	393	59	15.0%	3.15	0.0%	0.0%	84.7%	37.3%
Wichita Falls, TX	233	21	9.0%	1.33	0.0%	0.0%	76.2%	30.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Anderson County	161	5	3.1%	0.87	0.0%	0.0%	80.0%	50.0%
Andrews County	76	1	1.3%	0.71	0.0%	0.0%	100.0%	100.0%
Angelina County	171	11	6.4%	1.30	0.0%	0.0%	100.0%	90.9%
Aransas County	50	8	16.0%	3.43	0.0%	0.0%	87.5%	87.5%
Archer County	34	1	2.9%	1.11	0.0%	0.0%	100.0%	100.0%
Armstrong County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Atascosa County	119	9	7.6%	2.05	0.0%	0.0%	77.8%	22.2%
Austin County	92	7	7.6%	2.56	0.0%	0.0%	71.4%	16.7%
Bailey County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bandera County	66	2	3.0%	1.00	0.0%	0.0%	100.0%	100.0%
Bastrop County	207	12	5.8%	1.68	0.0%	0.0%	100.0%	75.0%
Baylor County	17	2	11.8%	5.25	0.0%	0.0%	100.0%	100.0%
Bee County	58	4	6.9%	1.24	0.0%	0.0%	100.0%	75.0%
Bell County	426	61	14.3%	2.11	0.0%	0.0%	90.2%	54.1%
Bexar County	1,583	332	21.0%	2.04	0.0%	0.0%	73.0%	21.4%
Blanco County	55	2	3.6%	2.01	0.0%	0.0%	100.0%	100.0%
Borden County	10	1	10.0%	15.82	0.0%	0.0%	100.0%	0.0%
Bosque County	47	1	2.1%	0.55	0.0%	0.0%	100.0%	0.0%
Bowie County	179	22	12.3%	2.42	0.0%	0.0%	86.4%	36.4%
Brazoria County	363	38	10.5%	1.29	2.6%	2.6%	78.9%	44.7%
Brazos County	216	25	11.6%	1.37	0.0%	4.0%	76.0%	48.0%
Brewster County	14	1	7.1%	1.11	0.0%	0.0%	100.0%	100.0%
Briscoe County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Brooks County	58	7	12.1%	9.48	0.0%	0.0%	71.4%	66.7%
Brown County	60	2	3.3%	0.53	0.0%	0.0%	100.0%	100.0%
Burleson County	69	4	5.8%	2.34	0.0%	0.0%	75.0%	50.0%
Burnet County	140	5	3.6%	1.21	0.0%	0.0%	80.0%	25.0%
Caldwell County	96	11	11.5%	2.96	0.0%	0.0%	90.9%	54.5%
Calhoun County	41	2	4.9%	0.95	0.0%	0.0%	50.0%	50.0%
Callahan County	61	7	11.5%	5.24	0.0%	0.0%	85.7%	28.6%
Cameron County	361	65	18.0%	1.67	3.2%	3.2%	46.8%	49.2%
Camp County	40	2	5.0%	1.65	0.0%	0.0%	50.0%	0.0%
Carson County	51	3	5.9%	4.76	0.0%	0.0%	66.7%	66.7%
Cass County	92	1	1.1%	0.33	0.0%	0.0%	100.0%	0.0%
Castro County	22	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chambers County	156	14	9.0%	4.38	0.0%	0.0%	100.0%	50.0%
Cherokee County	174	7	4.0%	1.41	0.0%	0.0%	83.3%	57.1%
Childress County	16	1	6.3%	1.40	0.0%	0.0%	100.0%	100.0%
Clay County	52	2	3.8%	1.82	0.0%	0.0%	100.0%	100.0%
Cochran County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Coke County	19	1	5.3%	2.93	0.0%	0.0%	100.0%	0.0%
Coleman County	34	2	5.9%	2.27	0.0%	0.0%	100.0%	50.0%
Collin County	438	27	6.2%	0.38	3.4%	3.4%	79.3%	25.9%
Collingsworth County	14	0	0.0%	0.00	N/A	N/A	N/A	N/A

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Colorado County	111	5	4.5%	2.42	0.0%	0.0%	100.0%	0.0%
Comal County	176	13	7.4%	1.29	0.0%	0.0%	69.2%	30.8%
Comanche County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Concho County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cooke County	83	6	7.2%	1.57	0.0%	0.0%	100.0%	33.3%
Coryell County	77	6	7.8%	0.81	0.0%	0.0%	83.3%	50.0%
Cottle County	8	1	12.5%	6.39	0.0%	0.0%	100.0%	N/A
Crane County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Crockett County	32	1	3.1%	2.65	0.0%	0.0%	100.0%	0.0%
Crosby County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Culberson County	38	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dallam County	18	2	11.1%	3.09	0.0%	0.0%	50.0%	0.0%
Dallas County	2,168	476	22.0%	2.05	0.8%	0.8%	64.8%	13.0%
Dawson County	26	1	3.8%	0.72	0.0%	0.0%	100.0%	100.0%
Deaf Smith County	41	4	9.8%	2.11	0.0%	0.0%	100.0%	75.0%
Delta County	21	4	19.0%	7.58	0.0%	0.0%	100.0%	25.0%
Denton County	420	40	9.5%	0.65	0.0%	0.0%	89.5%	30.8%
DeWitt County	43	1	2.3%	0.50	0.0%	0.0%	100.0%	100.0%
Dickens County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dimmit County	38	1	2.6%	1.00	0.0%	0.0%	100.0%	100.0%
Donley County	17	1	5.9%	2.67	0.0%	0.0%	100.0%	100.0%
Duval County	58	6	10.3%	4.96	0.0%	0.0%	100.0%	16.7%
Eastland County	76	4	5.3%	2.16	0.0%	0.0%	100.0%	0.0%
Ector County	281	35	12.5%	2.65	2.8%	2.8%	80.6%	38.2%
Edwards County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
El Paso County	658	159	24.2%	2.08	1.9%	3.2%	60.3%	37.3%
Ellis County	207	15	7.2%	1.07	0.0%	0.0%	80.0%	26.7%
Erath County	107	3	2.8%	0.81	0.0%	0.0%	100.0%	33.3%
Falls County	58	3	5.2%	1.68	0.0%	0.0%	100.0%	66.7%
Fannin County	90	4	4.4%	1.19	0.0%	0.0%	75.0%	25.0%
Fayette County	96	3	3.1%	1.25	0.0%	0.0%	100.0%	0.0%
Fisher County	12	1	8.3%	2.47	0.0%	0.0%	100.0%	0.0%
Floyd County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Foard County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fort Bend County	364	46	12.6%	0.87	2.2%	2.2%	71.7%	39.1%
Franklin County	22	1	4.5%	0.96	0.0%	0.0%	100.0%	0.0%
Freestone County	92	5	5.4%	2.60	0.0%	0.0%	100.0%	20.0%
Frio County	53	2	3.8%	1.18	0.0%	0.0%	100.0%	0.0%
Gaines County	51	0	0.0%	0.00	N/A	N/A	N/A	N/A
Galveston County	358	58	16.2%	2.04	0.0%	0.0%	67.3%	57.9%
Garza County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gillespie County	72	1	1.4%	0.42	0.0%	0.0%	100.0%	100.0%
Glasscock County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Goliad County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Gonzales County	86	4	4.7%	2.04	0.0%	0.0%	100.0%	25.0%
Gray County	66	3	4.5%	1.34	0.0%	0.0%	100.0%	33.3%
Grayson County	293	26	8.9%	2.20	3.8%	3.8%	73.1%	53.8%

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					Under 20 mph	Under 30 mph	40 mph and over	
Gregg County	299	41	13.7%	3.46	0.0%	0.0%	78.0%	65.9%
Grimes County	143	4	2.8%	1.54	0.0%	0.0%	100.0%	75.0%
Guadalupe County	135	8	5.9%	0.67	0.0%	0.0%	57.1%	50.0%
Hale County	75	4	5.3%	1.11	0.0%	0.0%	75.0%	50.0%
Hall County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hamilton County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hansford County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hardeman County	12	1	8.3%	2.34	0.0%	0.0%	100.0%	100.0%
Hardin County	125	12	9.6%	2.28	0.0%	0.0%	91.7%	66.7%
Harris County	3,697	762	20.6%	1.95	0.3%	0.4%	58.6%	15.7%
Harrison County	218	18	8.3%	2.79	0.0%	0.0%	94.1%	61.1%
Hartley County	32	1	3.1%	1.68	0.0%	0.0%	0.0%	0.0%
Haskell County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hays County	202	26	12.9%	1.82	0.0%	0.0%	92.0%	20.0%
Hemphill County	28	0	0.0%	0.00	N/A	N/A	N/A	N/A
Henderson County	184	12	6.5%	1.54	16.7%	16.7%	83.3%	25.0%
Hidalgo County	754	109	14.5%	1.50	1.8%	1.8%	66.1%	28.7%
Hill County	105	11	10.5%	3.17	0.0%	0.0%	90.9%	27.3%
Hockley County	38	1	2.6%	0.44	0.0%	0.0%	100.0%	0.0%
Hood County	86	4	4.7%	0.82	0.0%	0.0%	100.0%	25.0%
Hopkins County	121	14	11.6%	4.09	0.0%	0.0%	92.9%	14.3%
Houston County	65	4	6.2%	1.70	0.0%	0.0%	100.0%	50.0%
Howard County	67	5	7.5%	1.46	0.0%	0.0%	60.0%	80.0%
Hudspeth County	69	3	4.3%	8.81	0.0%	0.0%	100.0%	0.0%
Hunt County	230	23	10.0%	2.73	0.0%	0.0%	87.0%	27.3%
Hutchinson County	41	1	2.4%	0.45	0.0%	0.0%	0.0%	0.0%
Irion County	21	2	9.5%	12.40	0.0%	0.0%	100.0%	100.0%
Jack County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	54	3	5.6%	2.14	0.0%	0.0%	100.0%	50.0%
Jasper County	92	6	6.5%	1.69	0.0%	0.0%	100.0%	66.7%
Jeff Davis County	13	1	7.7%	4.37	0.0%	0.0%	100.0%	0.0%
Jefferson County	449	72	16.0%	2.88	0.0%	0.0%	71.6%	26.8%
Jim Hogg County	21	1	4.8%	1.92	0.0%	0.0%	100.0%	100.0%
Jim Wells County	111	9	8.1%	2.21	0.0%	0.0%	37.5%	66.7%
Johnson County	236	16	6.8%	1.10	0.0%	0.0%	100.0%	43.8%
Jones County	53	1	1.9%	0.50	0.0%	0.0%	0.0%	0.0%
Karnes County	57	2	3.5%	1.34	0.0%	0.0%	100.0%	50.0%
Kaufman County	241	19	7.9%	1.99	0.0%	0.0%	100.0%	58.8%
Kendall County	66	1	1.5%	0.32	0.0%	0.0%	100.0%	0.0%
Kenedy County	21	1	4.8%	23.45	0.0%	0.0%	100.0%	100.0%
Kent County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kerr County	91	4	4.4%	0.83	0.0%	0.0%	100.0%	25.0%
Kimble County	31	1	3.2%	2.19	0.0%	0.0%	100.0%	0.0%
King County	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Kinney County	29	1	3.4%	2.85	0.0%	0.0%	100.0%	100.0%
Kleberg County	40	4	10.0%	1.27	0.0%	0.0%	75.0%	50.0%
Knox County	8	0	0.0%	0.00	N/A	N/A	N/A	N/A

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La Salle County	55	2	3.6%	3.00	0.0%	0.0%	100.0%	0.0%
Lamar County	93	8	8.6%	1.62	0.0%	0.0%	100.0%	87.5%
Lamb County	46	1	2.2%	0.70	0.0%	0.0%	100.0%	100.0%
Lampasas County	52	4	7.7%	2.05	0.0%	0.0%	75.0%	75.0%
Lavaca County	63	1	1.6%	0.52	0.0%	0.0%	100.0%	0.0%
Lee County	67	3	4.5%	1.82	0.0%	0.0%	100.0%	33.3%
Leon County	124	4	3.2%	2.43	0.0%	0.0%	100.0%	100.0%
Liberty County	245	25	10.2%	3.34	0.0%	4.0%	80.0%	72.0%
Limestone County	79	7	8.9%	3.02	0.0%	0.0%	42.9%	42.9%
Lipscomb County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Live Oak County	75	9	12.0%	7.77	0.0%	0.0%	88.9%	11.1%
Llano County	45	1	2.2%	0.53	0.0%	0.0%	100.0%	100.0%
Loving County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lubbock County	356	46	12.9%	1.71	0.0%	0.0%	81.8%	39.1%
Lynn County	27	0	0.0%	0.00	N/A	N/A	N/A	N/A
Madison County	71	3	4.2%	2.24	0.0%	0.0%	66.7%	0.0%
Marion County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Martin County	44	6	13.6%	12.94	0.0%	0.0%	100.0%	0.0%
Mason County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Matagorda County	77	6	7.8%	1.63	0.0%	0.0%	66.7%	0.0%
Maverick County	40	7	17.5%	1.34	0.0%	0.0%	57.1%	42.9%
McCulloch County	17	2	11.8%	2.44	0.0%	0.0%	100.0%	50.0%
McLennan County	393	59	15.0%	2.58	0.0%	0.0%	84.7%	37.3%
McMullen County	24	1	4.2%	13.45	0.0%	0.0%	100.0%	0.0%
Medina County	80	5	6.3%	1.12	0.0%	0.0%	75.0%	40.0%
Menard County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Midland County	230	19	8.3%	1.45	0.0%	0.0%	73.7%	26.3%
Milam County	95	4	4.2%	1.61	0.0%	0.0%	100.0%	75.0%
Mills County	15	2	13.3%	4.09	0.0%	0.0%	50.0%	50.0%
Mitchell County	50	3	6.0%	3.21	0.0%	0.0%	66.7%	0.0%
Montague County	60	5	8.3%	2.54	0.0%	0.0%	40.0%	20.0%
Montgomery County	694	69	9.9%	1.66	1.4%	1.4%	84.1%	34.8%
Moore County	40	4	10.0%	1.90	0.0%	0.0%	75.0%	75.0%
Morris County	54	5	9.3%	3.84	0.0%	0.0%	100.0%	60.0%
Motley County	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nacogdoches County	192	13	6.8%	2.07	0.0%	0.0%	92.3%	61.5%
Navarro County	118	6	5.1%	1.27	0.0%	0.0%	100.0%	50.0%
Newton County	71	2	2.8%	1.38	0.0%	0.0%	100.0%	0.0%
Nolan County	52	2	3.8%	1.33	0.0%	0.0%	100.0%	0.0%
Nueces County	390	90	23.1%	2.70	3.5%	3.5%	55.3%	23.3%
Ochiltree County	27	1	3.7%	1.02	0.0%	0.0%	0.0%	0.0%
Oldham County	48	2	4.2%	9.82	0.0%	0.0%	100.0%	0.0%
Orange County	229	26	11.4%	3.15	0.0%	0.0%	96.2%	65.4%
Palo Pinto County	95	2	2.1%	0.72	0.0%	0.0%	100.0%	50.0%
Panola County	118	2	1.7%	0.85	0.0%	0.0%	100.0%	0.0%
Parker County	205	7	3.4%	0.64	0.0%	0.0%	71.4%	0.0%
Parmer County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A

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					Under 20 mph	Under 30 mph	40 mph and over	
Pecos County	92	5	5.4%	3.23	0.0%	0.0%	100.0%	40.0%
Polk County	197	15	7.6%	3.30	0.0%	0.0%	93.3%	86.7%
Potter County	241	39	16.2%	3.25	0.0%	0.0%	51.3%	43.2%
Presidio County	21	1	4.8%	1.31	0.0%	0.0%	0.0%	0.0%
Rains County	23	1	4.3%	0.93	0.0%	0.0%	100.0%	100.0%
Randall County	152	12	7.9%	1.03	0.0%	0.0%	83.3%	0.0%
Reagan County	7	1	14.3%	3.05	0.0%	0.0%	100.0%	0.0%
Real County	31	0	0.0%	0.00	N/A	N/A	N/A	N/A
Red River County	57	2	3.5%	1.53	0.0%	0.0%	50.0%	0.0%
Reeves County	120	2	1.7%	1.51	0.0%	0.0%	100.0%	100.0%
Refugio County	38	1	2.6%	1.34	0.0%	0.0%	100.0%	100.0%
Roberts County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Robertson County	152	9	5.9%	5.46	0.0%	0.0%	88.9%	100.0%
Rockwall County	55	6	10.9%	0.86	0.0%	0.0%	100.0%	33.3%
Runnels County	33	1	3.0%	0.94	0.0%	0.0%	0.0%	100.0%
Rusk County	168	12	7.1%	2.33	0.0%	0.0%	91.7%	50.0%
Sabine County	44	1	2.3%	0.95	0.0%	0.0%	100.0%	100.0%
San Augustine County	56	1	1.8%	1.11	0.0%	0.0%	100.0%	0.0%
San Jacinto County	96	6	6.3%	2.33	0.0%	0.0%	100.0%	100.0%
San Patricio County	110	13	11.8%	1.97	0.0%	0.0%	69.2%	53.8%
San Saba County	28	2	7.1%	3.32	0.0%	0.0%	100.0%	0.0%
Schleicher County	12	1	8.3%	3.13	0.0%	0.0%	100.0%	100.0%
Scurry County	40	1	2.5%	0.61	0.0%	0.0%	100.0%	100.0%
Shackelford County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Shelby County	119	4	3.4%	1.57	0.0%	0.0%	75.0%	100.0%
Sherman County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Smith County	488	40	8.2%	1.99	0.0%	0.0%	87.5%	82.5%
Somervell County	34	3	8.8%	3.72	33.3%	33.3%	66.7%	66.7%
Starr County	116	13	11.2%	2.18	0.0%	0.0%	90.9%	76.9%
Stephens County	16	1	6.3%	1.05	0.0%	0.0%	0.0%	100.0%
Sterling County	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Stonewall County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sutton County	30	1	3.3%	2.40	0.0%	0.0%	100.0%	0.0%
Swisher County	17	0	0.0%	0.00	N/A	N/A	N/A	N/A
Tarrant County	1,409	260	18.5%	1.51	0.4%	0.4%	78.0%	23.9%
Taylor County	191	14	7.3%	1.08	0.0%	0.0%	69.2%	14.3%
Terrell County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Terry County	33	1	3.0%	0.80	0.0%	0.0%	100.0%	100.0%
Throckmorton County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Titus County	75	8	10.7%	2.60	0.0%	0.0%	100.0%	50.0%
Tom Green County	98	9	9.2%	0.83	0.0%	0.0%	44.4%	33.3%
Travis County	955	178	18.6%	1.84	0.0%	1.2%	72.0%	15.7%
Trinity County	49	2	4.1%	1.39	0.0%	0.0%	100.0%	100.0%
Tyler County	78	3	3.8%	1.41	0.0%	0.0%	100.0%	33.3%
Upshur County	147	2	1.4%	0.52	0.0%	0.0%	100.0%	100.0%
Upton County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Uvalde County	61	7	11.5%	2.66	0.0%	0.0%	57.1%	85.7%

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					Under 20 mph	Under 30 mph	40 mph and over	
Val Verde County	54	8	14.8%	1.67	0.0%	12.5%	50.0%	62.5%
Van Zandt County	191	11	5.8%	2.11	0.0%	0.0%	100.0%	18.2%
Victoria County	142	11	7.7%	1.28	0.0%	0.0%	54.5%	72.7%
Walker County	133	8	6.0%	1.21	0.0%	0.0%	100.0%	37.5%
Waller County	136	9	6.6%	2.23	0.0%	0.0%	77.8%	0.0%
Ward County	53	4	7.5%	3.82	0.0%	0.0%	75.0%	25.0%
Washington County	85	4	4.7%	1.22	0.0%	0.0%	100.0%	75.0%
Webb County	218	52	23.9%	2.20	0.0%	0.0%	43.1%	28.8%
Wharton County	136	13	9.6%	3.17	0.0%	0.0%	91.7%	46.2%
Wheeler County	47	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wichita County	147	18	12.2%	1.37	0.0%	0.0%	72.2%	17.6%
Wilbarger County	43	3	7.0%	2.20	0.0%	0.0%	33.3%	0.0%
Willacy County	39	3	7.7%	1.39	0.0%	0.0%	100.0%	66.7%
Williamson County	333	24	7.2%	0.63	0.0%	0.0%	87.0%	60.9%
Wilson County	72	3	4.2%	0.74	0.0%	0.0%	66.7%	33.3%
Winkler County	19	1	5.3%	1.45	0.0%	0.0%	100.0%	0.0%
Wise County	208	7	3.4%	1.22	0.0%	0.0%	100.0%	57.1%
Wood County	99	5	5.1%	1.22	0.0%	0.0%	80.0%	60.0%
Yoakum County	19	1	5.3%	1.31	0.0%	0.0%	0.0%	0.0%
Young County	34	2	5.9%	1.10	50.0%	50.0%	0.0%	50.0%
Zapata County	52	5	9.6%	3.71	0.0%	0.0%	40.0%	60.0%
Zavala County	48	1	2.1%	0.86	0.0%	0.0%	0.0%	100.0%
State total	**34,107**	**4,192**	**12.3%**	**1.74**	**0.7%**	**0.5%**	**71.5%**	**32.5%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Utah

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **279 people died while walking in Utah**.

FIGURE 1

Pedestrian fatalities in Utah, 2003–2012

1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Utah

In Utah from 2003–2012, 279 people were killed while walking, resulting in a fatality rate of 1.07 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 10.3 percent in Utah.

Within Utah, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Utah was 37.76, compared to the national PDI of 52.2 and ranked 25th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Utah, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
33	Salt Lake City, UT	132	1.26	2.3%	55.28

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Utah, 28.0 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **59.0 percent of pedestrian fatalities in Utah were on roads with a speed limit of 40 mph or higher**, compared to 11.1 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 46 children in Utah.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 8.8 percent of Utah's population, adults aged 65 and older account for 20.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Utah is 3.51 per 100,000 people (nationally, 3.19), compared to a rate of 1.33 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Utah suffer at a rate of 4.98 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 4.0 percent of Utah's population, and 13.2 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Utah from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.50. The rate for Hispanic people of any race was 1.50; and for Asians and Pacific Islanders, 1.96. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

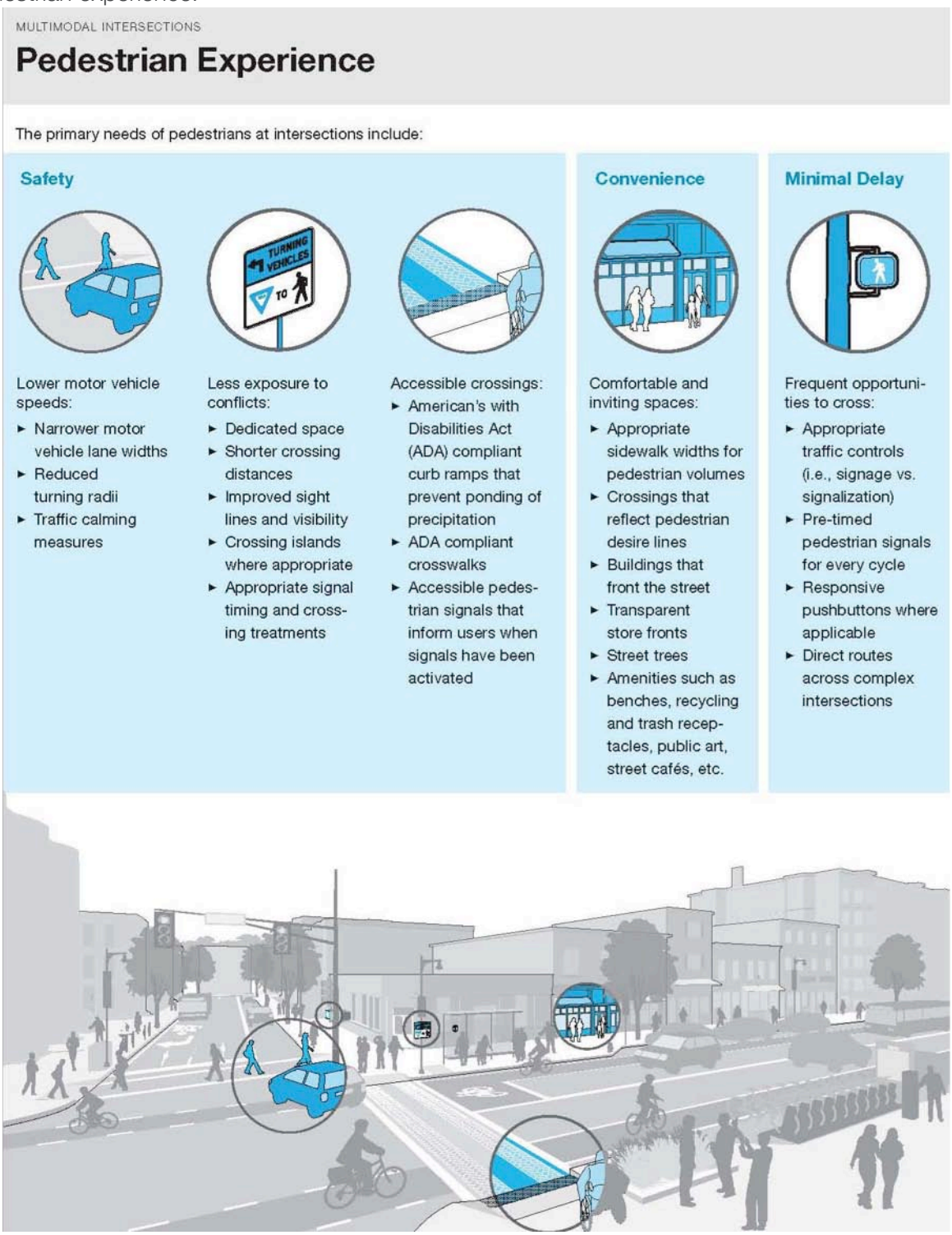
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Logan, UT-ID	96	7	7.3%	0.48	0.0%	16.7%	66.7%	57.1%
Ogden-Clearfield, UT	321	53	16.5%	0.95	0.0%	11.3%	62.3%	34.0%
Provo-Orem, UT	332	43	13.0%	0.95	0.0%	12.2%	56.1%	25.6%
Salt Lake City, UT	842	132	15.7%	1.26	1.6%	11.8%	57.5%	28.8%
St. George, UT	159	11	6.9%	0.29	0.0%	18.2%	72.7%	9.1%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Beaver County	26	0	0.0%	0.00	N/A	N/A	N/A	N/A
Box Elder County	125	5	4.0%	1.05	0.0%	0.0%	80.0%	40.0%
Cache County	77	7	9.1%	0.66	0.0%	16.7%	66.7%	57.1%
Carbon County	39	2	5.1%	0.97	0.0%	0.0%	100.0%	50.0%
Daggett County	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Davis County	130	25	19.2%	0.87	0.0%	12.0%	52.0%	28.0%
Duchesne County	59	2	3.4%	1.17	0.0%	0.0%	50.0%	50.0%
Emery County	76	2	2.6%	1.87	0.0%	0.0%	50.0%	100.0%
Garfield County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Grand County	60	2	3.3%	2.24	0.0%	0.0%	50.0%	100.0%
Iron County	79	4	5.1%	0.93	0.0%	25.0%	50.0%	75.0%
Juab County	59	2	3.4%	2.08	0.0%	0.0%	50.0%	50.0%
Kane County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Millard County	96	3	3.1%	2.45	0.0%	0.0%	66.7%	0.0%
Morgan County	16	0	0.0%	0.00	N/A	N/A	N/A	N/A
Piute County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rich County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Salt Lake County	612	122	19.9%	1.23	1.7%	12.0%	57.3%	27.0%
San Juan County	82	1	1.2%	0.70	0.0%	0.0%	100.0%	100.0%
Sanpete County	42	4	9.5%	1.53	0.0%	25.0%	50.0%	50.0%
Sevier County	59	1	1.7%	0.50	0.0%	0.0%	100.0%	0.0%
Summit County	78	2	2.6%	0.57	0.0%	0.0%	50.0%	100.0%
Tooele County	152	8	5.3%	1.48	0.0%	12.5%	62.5%	37.5%
Uintah County	72	4	5.6%	1.32	0.0%	25.0%	0.0%	0.0%
Utah County	273	41	15.0%	0.86	0.0%	12.8%	56.4%	24.4%
Wasatch County	62	3	4.8%	1.39	0.0%	33.3%	66.7%	66.7%
Washington County	159	11	6.9%	0.85	0.0%	18.2%	72.7%	9.1%
Wayne County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Weber County	175	28	16.0%	1.27	0.0%	10.7%	71.4%	39.3%
State total	**2,706**	**279**	**10.3%**	**1.07**	**0.7%**	**11.1%**	**59.0%**	**28.0%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Vermont

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

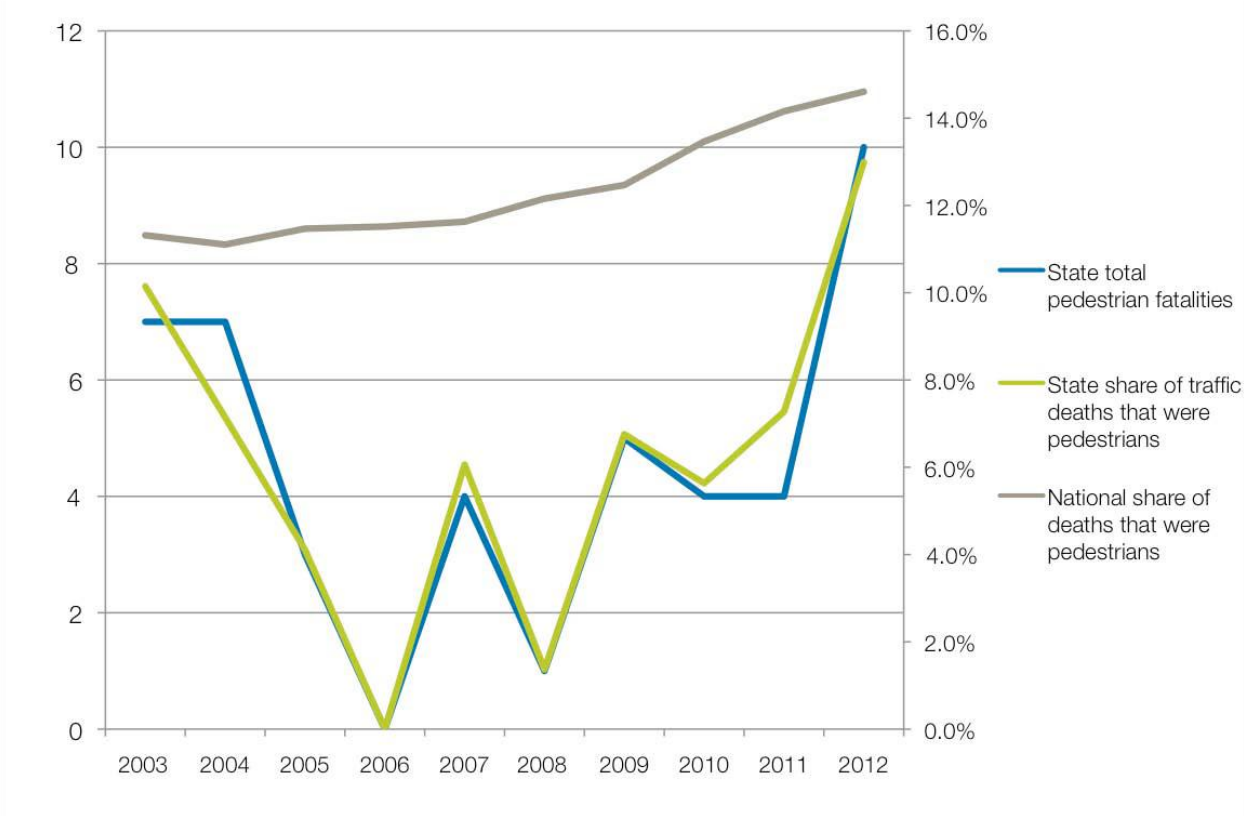
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **45 people died while walking in Vermont**.

FIGURE 1

Pedestrian fatalities in Vermont, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Vermont

In Vermont from 2003–2012, 45 people were killed while walking, resulting in a fatality rate of 0.72 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 6.1 percent in Vermont.

Within Vermont, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Vermont was 13.04, compared to the national PDI of 52.2 and ranked 51st nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Vermont, 44.2 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **41.3 percent of pedestrian fatalities in Vermont were on roads with a speed limit of 40 mph or higher**, compared to 26.1 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.6 percent of Vermont's population, adults aged 65 and older account for 24.4 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Vermont is 1.63 per 100,000 people (nationally, 3.19), compared to a rate of 0.79 for people under 65 years old (nationally, 1.75).[8]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Vermont from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 0.92. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[9] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[10]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

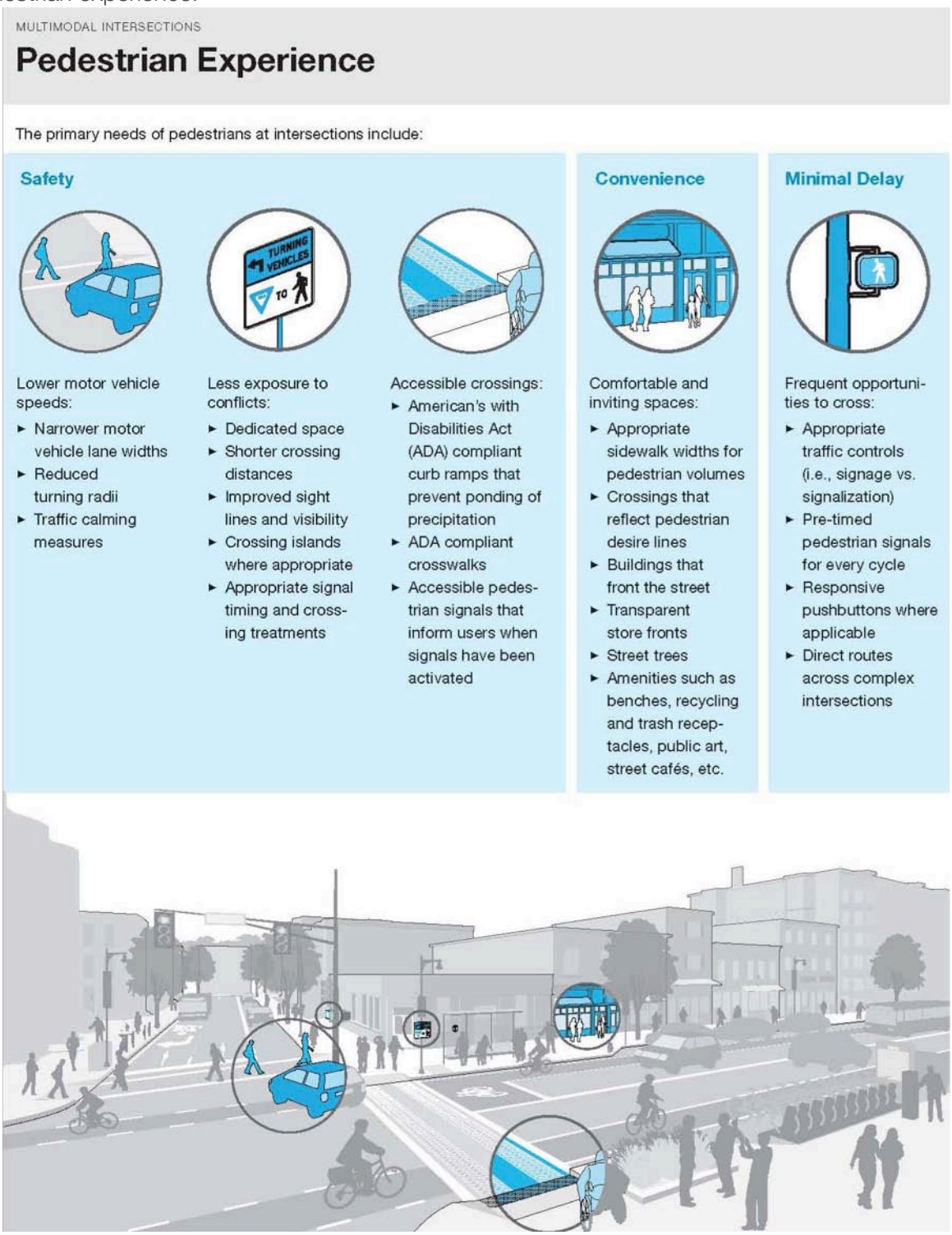
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

9 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

10 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Burlington-South Burlington, VT	167	14	8.4%	0.57	0.0%	28.6%	28.6%	61.5%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Addison County	46	4	8.7%	1.09	0.0%	25.0%	50.0%	50.0%
Bennington County	48	1	2.1%	0.27	0.0%	0.0%	100.0%	100.0%
Caledonia County	56	0	0.0%	0.00	N/A	N/A	N/A	N/A
Chittenden County	88	9	10.2%	0.58	0.0%	22.2%	33.3%	50.0%
Essex County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	69	3	4.3%	0.63	0.0%	66.7%	0.0%	66.7%
Grand Isle County	10	2	20.0%	2.81	0.0%	0.0%	50.0%	100.0%
Lamoille County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Orange County	35	0	0.0%	0.00	N/A	N/A	N/A	N/A
Orleans County	55	3	5.5%	1.10	0.0%	33.3%	66.7%	0.0%
Rutland County	68	9	13.2%	1.45	0.0%	11.1%	22.2%	33.3%
Washington County	75	4	5.3%	0.67	0.0%	0.0%	66.7%	25.0%
Windham County	68	6	8.8%	1.35	0.0%	50.0%	33.3%	50.0%
Windsor County	72	4	5.6%	0.70	0.0%	50.0%	50.0%	25.0%
State total	**743**	**45**	**6.1%**	**0.72**	**0.0%**	**26.1%**	**41.3%**	**44.2%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Virginia

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

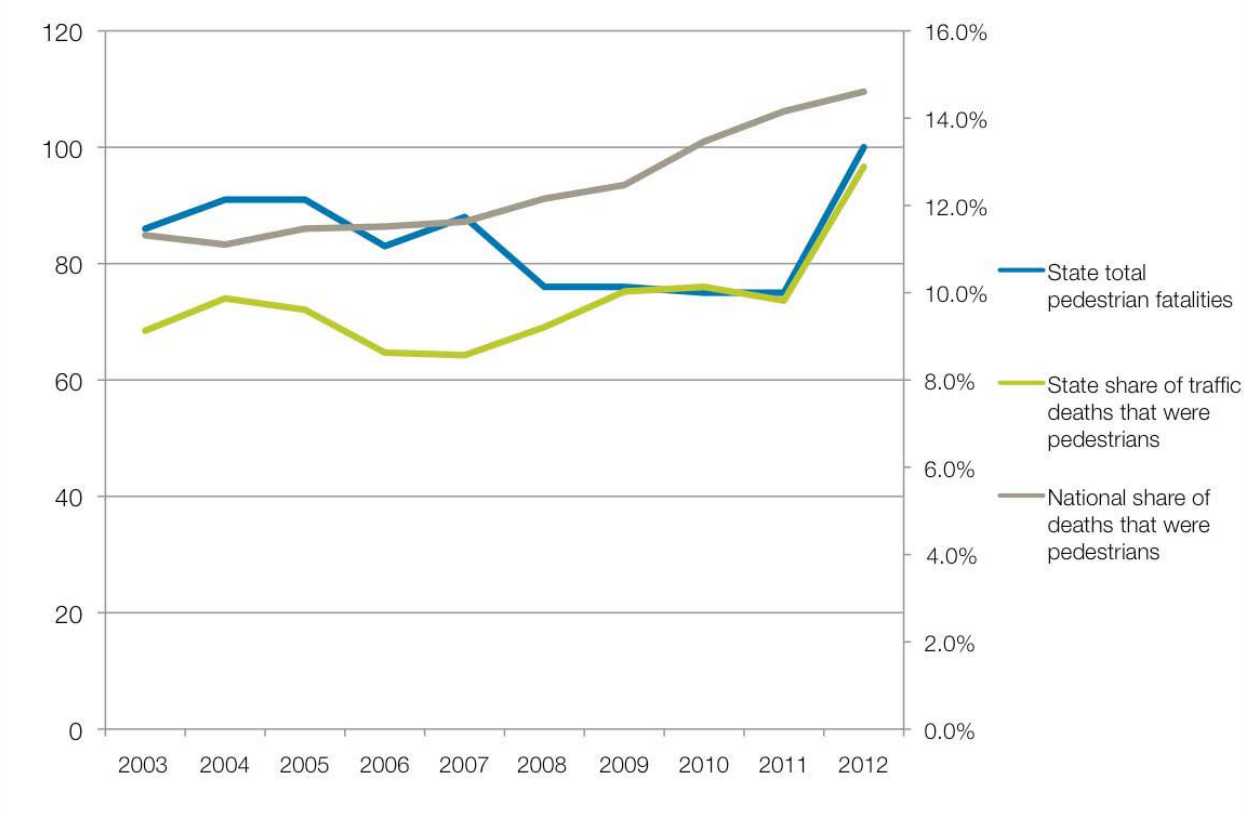
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **841 people died while walking in Virginia**.

FIGURE 1

Pedestrian fatalities in Virginia, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Virginia

In Virginia from 2003–2012, 841 people were killed while walking, resulting in a fatality rate of 1.08 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 9.7 percent in Virginia.

Within Virginia, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Virginia was 43.64, compared to the national PDI of 52.2 and ranked 22nd nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Virginia, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
19	Richmond, VA	167	1.32	1.4%	94.98
35	Washington-Arlington-Alexandria, DC-VA-MD-WV	843	1.41	3.2%	44.06
36	Virginia Beach-Norfolk-Newport News, VA-NC	186	1.13	2.6%	43.60

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Virginia, 63.2 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **67.0 percent of pedestrian fatalities in Virginia were on roads with a speed limit of 40 mph or higher**, compared to 10.7 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 47 children in Virginia.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.7 percent of Virginia's population, adults aged 65 and older account for 22.3 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Virginia is 2.58 per 100,000 people (nationally, 3.19), compared to a rate of 1.19 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Virginia suffer at a rate of 2.98 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.3 percent of Virginia's population, and 11.7 percent of pedestrian fatalities.[10]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a

4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Virginia from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.19. The rate for Hispanic people of any race was 2.01; for black people and African Americans, 1.66; and for Asians and Pacific Islanders, 1.27.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

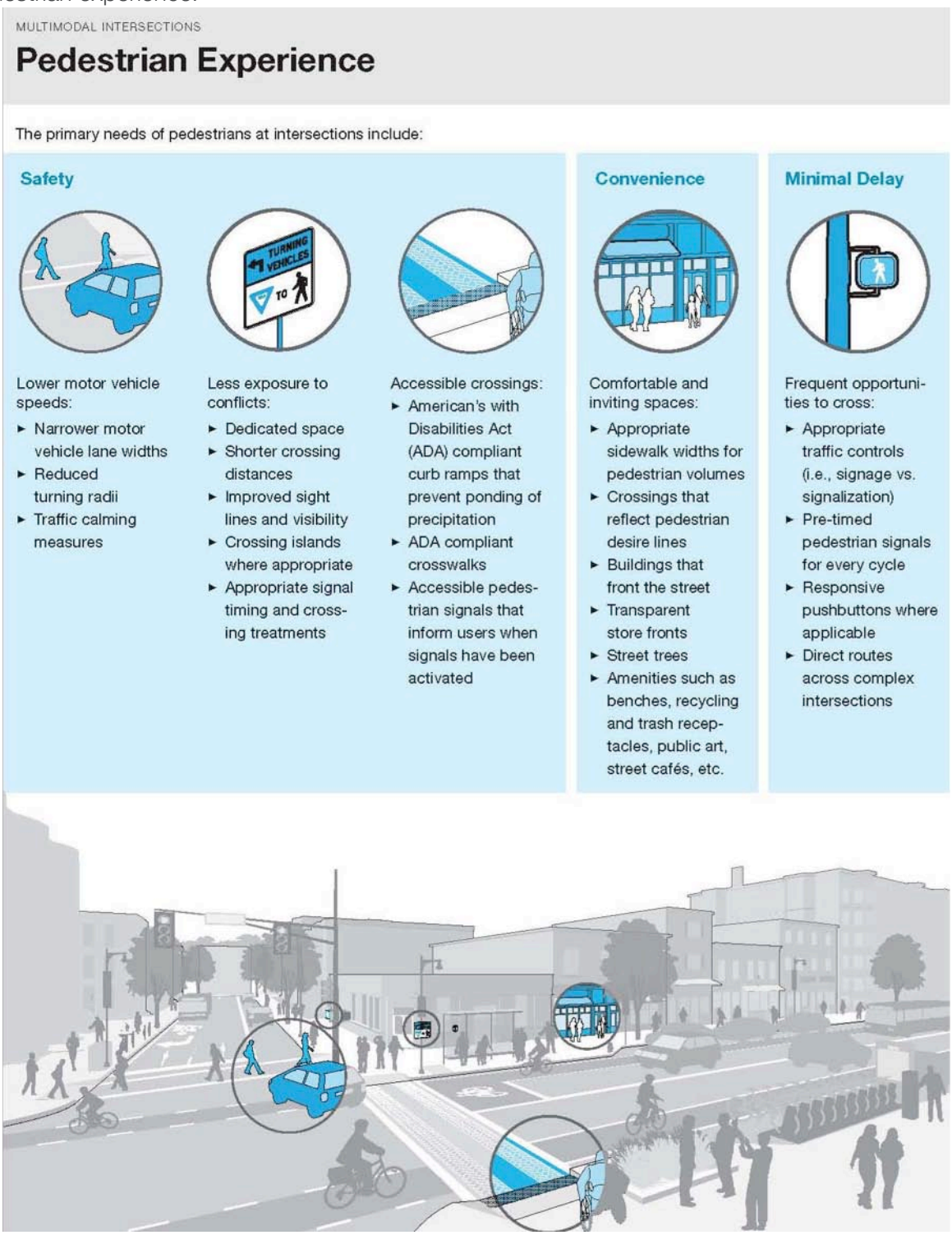
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Blacksburg-Christiansburg-Radford, VA	168	12	7.1%	0.86	0.0%	16.7%	66.7%	41.7%
Charlottesville, VA	298	20	6.7%	0.69	0.0%	10.0%	80.0%	70.0%
Danville, VA	166	11	6.6%	1.50	0.0%	0.0%	81.8%	90.9%
Harrisonburg, VA	168	11	6.5%	1.12	0.0%	36.4%	54.5%	33.3%
Kingsport-Bristol-Bristol, TN-VA	521	36	6.9%	1.17	2.9%	17.1%	62.9%	50.0%
Lynchburg, VA	350	20	5.7%	0.87	0.0%	10.0%	55.0%	52.9%
Richmond, VA	1,579	167	10.6%	1.32	0.6%	10.4%	73.8%	64.0%
Roanoke, VA	364	26	7.1%	1.10	0.0%	15.4%	42.3%	64.0%
Virginia Beach-Norfolk-Newport News, VA-NC	1,334	186	13.9%	1.13	1.6%	11.8%	64.5%	68.5%
Washington-Arlington-Alexandria, DC-VA-MD-WV	4,204	843	20.1%	1.41	0.2%	18.8%	51.4%	56.1%
Winchester, VA-WV	200	6	3.0%	0.47	0.0%	0.0%	40.0%	50.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Accomack County	123	11	8.9%	3.18	0.0%	0.0%	90.0%	72.7%
Albemarle County	149	11	7.4%	1.15	0.0%	9.1%	81.8%	72.7%
Alexandria city	27	12	44.4%	0.89	0.0%	33.3%	16.7%	66.7%
Alleghany County	47	3	6.4%	1.82	0.0%	0.0%	100.0%	0.0%
Amelia County	55	3	5.5%	2.43	0.0%	0.0%	100.0%	66.7%
Amherst County	38	7	18.4%	2.18	0.0%	0.0%	71.4%	50.0%
Appomattox County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Arlington County	63	24	38.1%	1.21	0.0%	25.0%	33.3%	59.1%
Augusta County	147	10	6.8%	1.39	0.0%	10.0%	90.0%	55.6%
Bath County	17	1	5.9%	2.08	0.0%	0.0%	0.0%	100.0%
Bedford city	4	0	0.0%	0.00	N/A	N/A	N/A	N/A
Bedford County	132	3	2.3%	0.45	0.0%	33.3%	66.7%	33.3%
Bland County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Botetourt County	70	3	4.3%	0.92	0.0%	0.0%	100.0%	66.7%
Bristol city	16	2	12.5%	1.13	0.0%	0.0%	100.0%	50.0%
Brunswick County	77	2	2.6%	1.13	0.0%	0.0%	100.0%	0.0%
Buchanan County	74	1	1.4%	0.40	0.0%	0.0%	100.0%	0.0%
Buckingham County	42	0	0.0%	0.00	N/A	N/A	N/A	N/A
Buena Vista city	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Campbell County	100	3	3.0%	0.56	0.0%	0.0%	66.7%	66.7%
Caroline County	76	3	3.9%	1.11	0.0%	0.0%	100.0%	0.0%
Carroll County	86	6	7.0%	2.01	0.0%	0.0%	66.7%	50.0%
Charles City County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Charlotte County	42	6	14.3%	4.77	0.0%	0.0%	66.7%	83.3%
Charlottesville city	14	2	14.3%	0.48	0.0%	50.0%	0.0%	100.0%
Chesapeake city	186	20	10.8%	0.92	5.0%	10.0%	65.0%	64.7%
Chesterfield County	264	38	14.4%	1.25	0.0%	0.0%	84.2%	70.3%
Clarke County	43	1	2.3%	0.72	0.0%	0.0%	100.0%	100.0%
Colonial Heights city	8	0	0.0%	0.00	N/A	N/A	N/A	N/A
Covington city	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Craig County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Culpeper County	88	8	9.1%	1.80	0.0%	14.3%	85.7%	71.4%
Cumberland County	19	0	0.0%	0.00	N/A	N/A	N/A	N/A
Danville city	26	5	19.2%	1.13	0.0%	0.0%	60.0%	100.0%
Dickenson County	23	1	4.3%	0.63	0.0%	0.0%	100.0%	100.0%
Dinwiddie County	83	6	7.2%	2.22	0.0%	0.0%	100.0%	50.0%
Emporia city	9	2	22.2%	3.47	50.0%	50.0%	50.0%	100.0%
Essex County	25	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fairfax city	14	4	28.6%	1.82	0.0%	0.0%	0.0%	100.0%
Fairfax County	502	106	21.1%	1.01	0.0%	7.5%	67.0%	75.5%
Falls Church city	4	2	50.0%	1.73	0.0%	100.0%	0.0%	100.0%
Fauquier County	136	6	4.4%	0.94	0.0%	50.0%	50.0%	33.3%
Floyd County	27	1	3.7%	0.67	0.0%	0.0%	100.0%	100.0%
Fluvanna County	53	1	1.9%	0.40	0.0%	0.0%	100.0%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Franklin city	2	0	0.0%	0.00	N/A	N/A	N/A	N/A
Franklin County	109	1	0.9%	0.19	0.0%	0.0%	100.0%	0.0%
Frederick County	119	4	3.4%	0.54	0.0%	0.0%	25.0%	75.0%
Fredericksburg city	19	2	10.5%	0.85	0.0%	50.0%	0.0%	0.0%
Galax city	3	0	0.0%	0.00	N/A	N/A	N/A	N/A
Giles County	27	2	7.4%	1.17	0.0%	0.0%	100.0%	50.0%
Gloucester County	72	11	15.3%	3.02	0.0%	9.1%	72.7%	50.0%
Goochland County	57	2	3.5%	0.98	0.0%	0.0%	100.0%	0.0%
Grayson County	35	1	2.9%	0.63	0.0%	0.0%	100.0%	0.0%
Greene County	38	2	5.3%	1.12	0.0%	0.0%	100.0%	50.0%
Greensville County	43	1	2.3%	0.83	0.0%	0.0%	100.0%	0.0%
Halifax County	112	5	4.5%	1.38	0.0%	0.0%	80.0%	60.0%
Hampton city	98	16	16.3%	1.15	0.0%	12.5%	50.0%	71.4%
Hanover County	143	13	9.1%	1.32	0.0%	0.0%	92.3%	38.5%
Harrisonburg city	9	4	44.4%	0.85	0.0%	75.0%	0.0%	33.3%
Henrico County	242	49	20.2%	1.65	0.0%	0.0%	83.3%	79.6%
Henry County	128	11	8.6%	2.00	0.0%	10.0%	60.0%	63.6%
Highland County	7	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hopewell city	13	2	15.4%	0.89	0.0%	0.0%	0.0%	100.0%
Isle of Wight County	68	0	0.0%	0.00	N/A	N/A	N/A	N/A
James City County	52	4	7.7%	0.64	0.0%	0.0%	100.0%	25.0%
King and Queen County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
King George County	40	3	7.5%	1.36	0.0%	0.0%	100.0%	100.0%
King William County	23	0	0.0%	0.00	N/A	N/A	N/A	N/A
Lancaster County	21	1	4.8%	0.87	0.0%	0.0%	100.0%	100.0%
Lee County	73	1	1.4%	0.39	0.0%	0.0%	100.0%	0.0%
Lexington city	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Loudoun County	168	16	9.5%	0.56	0.0%	18.8%	75.0%	66.7%
Louisa County	103	1	1.0%	0.32	0.0%	0.0%	0.0%	100.0%
Lunenburg County	36	2	5.6%	1.55	0.0%	0.0%	100.0%	0.0%
Lynchburg city	40	7	17.5%	0.97	0.0%	14.3%	28.6%	60.0%
Madison County	34	0	0.0%	0.00	N/A	N/A	N/A	N/A
Manassas city	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Manassas Park city	1	0	0.0%	0.00	N/A	N/A	N/A	N/A
Martinsville city	8	1	12.5%	0.71	0.0%	100.0%	0.0%	N/A
Mathews County	18	2	11.1%	2.22	0.0%	0.0%	100.0%	0.0%
Mecklenburg County	73	4	5.5%	1.23	0.0%	25.0%	50.0%	33.3%
Middlesex County	14	2	14.3%	1.87	0.0%	0.0%	50.0%	50.0%
Montgomery County	90	7	7.8%	0.76	0.0%	28.6%	71.4%	42.9%
Nelson County	44	4	9.1%	2.68	0.0%	0.0%	100.0%	75.0%
New Kent County	55	5	9.1%	2.90	0.0%	0.0%	100.0%	20.0%
Newport News city	117	24	20.5%	1.32	0.0%	0.0%	80.0%	79.2%
Norfolk city	157	27	17.2%	1.11	0.0%	29.6%	33.3%	51.9%
Northampton County	39	4	10.3%	3.18	0.0%	0.0%	100.0%	75.0%
Northumberland	28	2	7.1%	1.61	0.0%	0.0%	100.0%	50.0%
Norton city	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Nottoway County	46	1	2.2%	0.63	0.0%	100.0%	0.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Orange County	55	2	3.6%	0.63	0.0%	0.0%	100.0%	50.0%
Page County	27	1	3.7%	0.42	0.0%	0.0%	100.0%	0.0%
Patrick County	55	2	3.6%	1.07	0.0%	0.0%	50.0%	50.0%
Petersburg city	20	2	10.0%	0.62	0.0%	0.0%	50.0%	50.0%
Pittsylvania County	140	6	4.3%	0.95	0.0%	0.0%	100.0%	83.3%
Poquoson city	0	0	N/A	0.00	N/A	N/A	N/A	N/A
Portsmouth city	48	7	14.6%	0.72	0.0%	42.9%	0.0%	57.1%
Powhatan County	42	2	4.8%	0.74	0.0%	0.0%	100.0%	100.0%
Prince Edward County	65	8	12.3%	3.62	0.0%	25.0%	75.0%	25.0%
Prince George County	76	4	5.3%	1.13	0.0%	0.0%	100.0%	50.0%
Prince William County	253	44	17.4%	1.17	0.0%	6.8%	77.3%	88.6%
Pulaski County	46	3	6.5%	0.86	0.0%	0.0%	33.3%	33.3%
Radford city	5	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rappahannock County	29	1	3.4%	1.35	0.0%	0.0%	0.0%	100.0%
Richmond city	169	33	19.5%	1.64	3.0%	51.5%	24.2%	62.5%
Richmond County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Roanoke city	58	10	17.2%	1.05	0.0%	10.0%	50.0%	60.0%
Roanoke County	105	9	8.6%	0.99	0.0%	22.2%	22.2%	75.0%
Rockbridge County	70	2	2.9%	0.91	0.0%	0.0%	50.0%	0.0%
Rockingham County	159	7	4.4%	0.94	0.0%	14.3%	85.7%	33.3%
Russell County	71	2	2.8%	0.70	0.0%	0.0%	100.0%	100.0%
Salem city	10	3	30.0%	1.22	0.0%	33.3%	0.0%	66.7%
Scott County	51	3	5.9%	1.30	0.0%	0.0%	100.0%	33.3%
Shenandoah County	73	5	6.8%	1.23	0.0%	0.0%	60.0%	0.0%
Smyth County	43	0	0.0%	0.00	N/A	N/A	N/A	N/A
Southampton County	68	5	7.4%	2.74	0.0%	0.0%	100.0%	100.0%
Spotsylvania County	150	18	12.0%	1.52	0.0%	16.7%	72.2%	47.1%
Stafford County	107	6	5.6%	0.49	0.0%	0.0%	83.3%	60.0%
Staunton city	11	2	18.2%	0.84	0.0%	50.0%	0.0%	100.0%
Suffolk city	132	16	12.1%	1.98	0.0%	6.3%	75.0%	87.5%
Surry County	19	1	5.3%	1.44	0.0%	0.0%	100.0%	0.0%
Sussex County	79	4	5.1%	3.31	0.0%	0.0%	100.0%	25.0%
Tazewell County	81	2	2.5%	0.45	0.0%	0.0%	100.0%	100.0%
Virginia Beach city	245	45	18.4%	1.03	4.5%	11.4%	72.7%	79.1%
Warren County	55	4	7.3%	1.10	0.0%	25.0%	50.0%	75.0%
Washington County	88	8	9.1%	1.49	0.0%	12.5%	50.0%	25.0%
Waynesboro city	13	3	23.1%	1.44	0.0%	0.0%	100.0%	66.7%
Westmoreland County	34	3	8.8%	1.75	0.0%	0.0%	100.0%	100.0%
Williamsburg city	3	1	33.3%	0.75	0.0%	0.0%	100.0%	0.0%
Winchester city	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wise County	59	1	1.7%	0.24	0.0%	0.0%	100.0%	100.0%
Wythe County	86	5	5.8%	1.74	0.0%	0.0%	80.0%	25.0%
York County	60	3	5.0%	0.47	0.0%	0.0%	66.7%	66.7%
State total	**8,663**	**841**	**9.7%**	**1.08**	**0.6%**	**10.7%**	**67.0%**	**63.2%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Washington

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

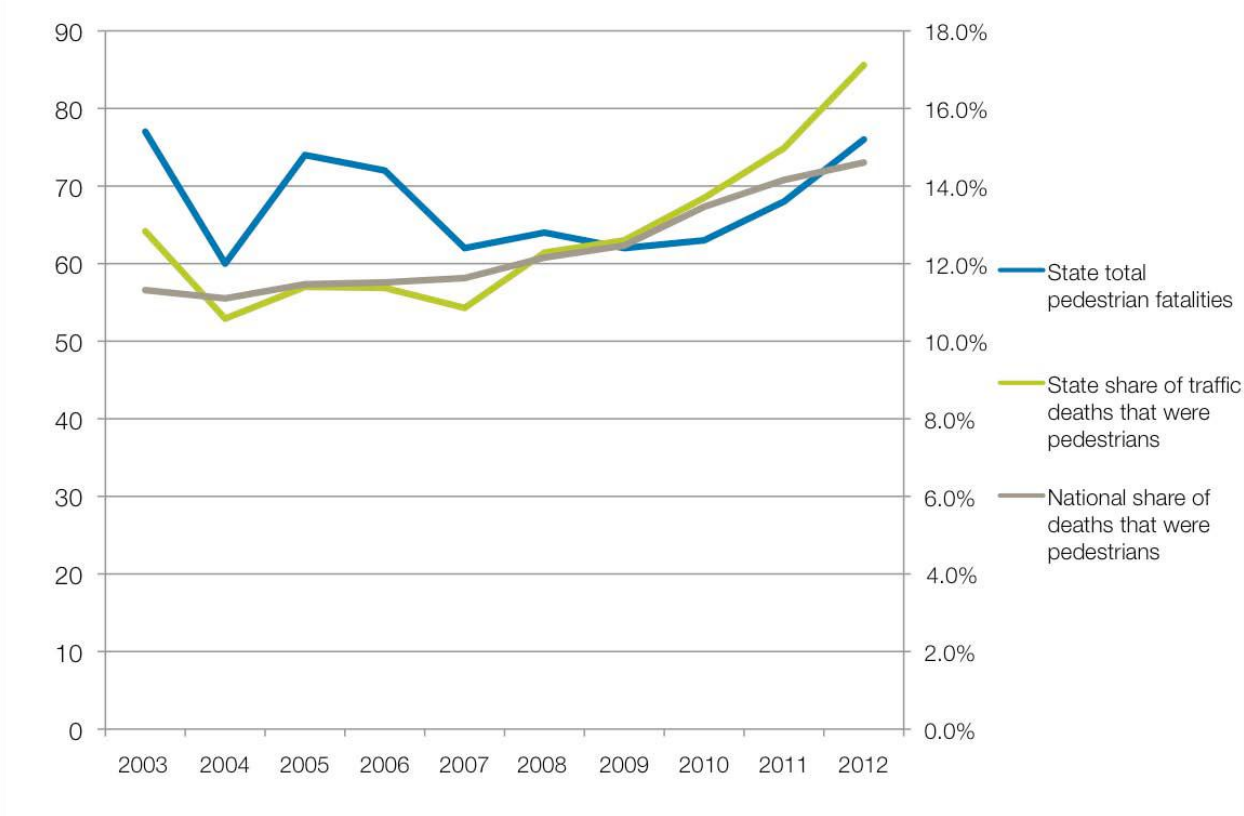
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **678 people died while walking in Washington**.

FIGURE 1

Pedestrian fatalities in Washington, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Washington

In Washington from 2003–2012, 678 people were killed while walking, resulting in a fatality rate of 1.04 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 12.6 percent in Washington.

Within Washington, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Washington was 28.46, compared to the national PDI of 52.2 and ranked 36th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Washington, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
45	Portland-Vancouver-Beaverton, OR-WA	250	1.12	3.5%	32.19
49	Seattle-Tacoma-Bellevue, WA	375	0.96	3.6%	26.81

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Washington, 48.9 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **45.4 percent of pedestrian fatalities in Washington were on roads with a speed limit of 40 mph or higher**, compared to 12.5 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 41 children in Washington.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 11.7 percent of Washington's population, adults aged 65 and older account for 26.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Washington is 3.27 per 100,000 people (nationally, 3.19), compared to a rate of 1.22 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Washington suffer at a rate of 4.4 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 5.5 percent of Washington's population, and 16.7 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Washington from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.36. The rate for Hispanic people of any race was 1.43; for black people and African Americans, 1.64; for Asians and Pacific Islanders, 1.25; and for American Indians and Alaska Natives, 6.77.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

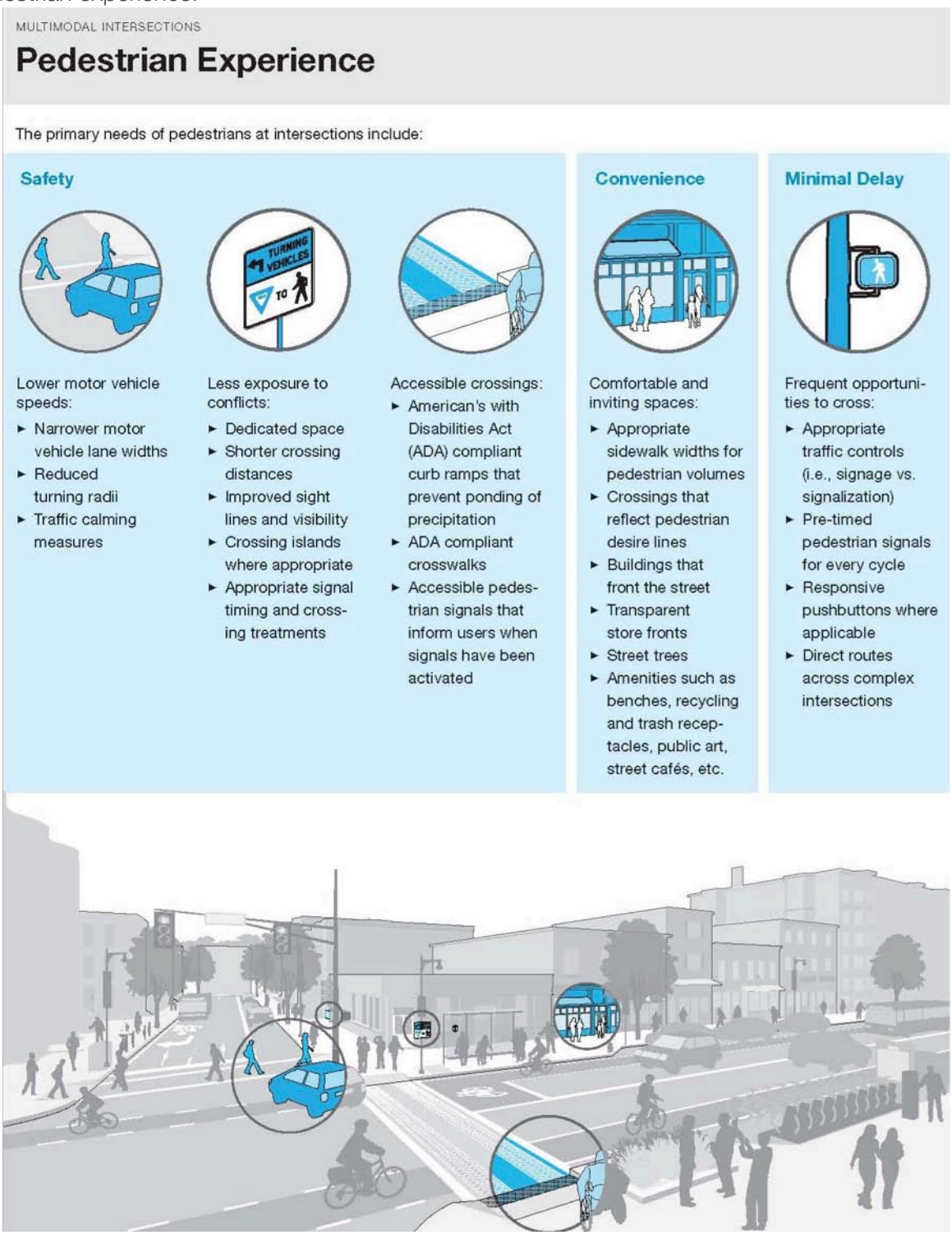
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Bellingham, WA	150	23	15.3%	1.39	9.1%	31.8%	36.4%	34.8%
Bremerton-Silverdale, WA	188	19	10.1%	1.03	0.0%	5.9%	47.1%	44.4%
Kennewick-Pasco-Richland, WA	177	12	6.8%	0.31	0.0%	16.7%	33.3%	16.7%
Lewiston, ID-WA	91	6	6.6%	1.31	0.0%	50.0%	33.3%	66.7%
Longview, WA	96	9	9.4%	0.98	0.0%	22.2%	33.3%	33.3%
Mount Vernon-Anacortes, WA	153	14	9.2%	1.02	0.0%	7.1%	78.6%	21.4%
Olympia, WA	220	17	7.7%	0.79	0.0%	11.8%	52.9%	76.5%
Portland-Vancouver-Beaverton, OR-WA	1,366	250	18.3%	1.12	1.8%	13.8%	50.0%	65.2%
Seattle-Tacoma-Bellevue, WA	1,968	375	19.1%	0.96	0.3%	12.9%	39.4%	51.5%
Spokane, WA	293	43	14.7%	1.15	0.0%	16.3%	25.6%	58.1%
Wenatchee-East Wenatchee, WA	143	7	4.9%	0.72	0.0%	33.3%	16.7%	42.9%
Yakima, WA	347	44	12.7%	1.90	0.0%	4.7%	72.1%	38.6%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	57	3	5.3%	1.69	0.0%	0.0%	66.7%	0.0%
Asotin County	10	0	0.0%	0.00	N/A	N/A	N/A	N/A
Benton County	118	8	6.8%	0.48	0.0%	12.5%	25.0%	12.5%
Chelan County	89	6	6.7%	0.85	0.0%	20.0%	20.0%	50.0%
Clallam County	88	8	9.1%	1.14	12.5%	37.5%	12.5%	25.0%
Clark County	210	34	16.2%	0.83	0.0%	11.8%	64.7%	61.8%
Columbia County	6	0	0.0%	0.00	N/A	N/A	N/A	N/A
Cowlitz County	96	9	9.4%	0.90	0.0%	22.2%	33.3%	33.3%
Douglas County	54	1	1.9%	0.27	0.0%	100.0%	0.0%	0.0%
Ferry County	29	1	3.4%	1.33	0.0%	0.0%	100.0%	0.0%
Franklin County	59	4	6.8%	0.57	0.0%	25.0%	50.0%	25.0%
Garfield County	8	1	12.5%	4.44	0.0%	0.0%	100.0%	100.0%
Grant County	179	10	5.6%	1.18	0.0%	0.0%	90.0%	80.0%
Grays Harbor County	101	7	6.9%	0.98	0.0%	14.3%	28.6%	28.6%
Island County	59	4	6.8%	0.51	0.0%	0.0%	75.0%	100.0%
Jefferson County	52	0	0.0%	0.00	N/A	N/A	N/A	N/A
King County	1,000	206	20.6%	1.10	0.5%	12.7%	38.7%	50.0%
Kitsap County	188	19	10.1%	0.77	0.0%	5.9%	47.1%	44.4%
Kittitas County	113	7	6.2%	1.78	0.0%	0.0%	71.4%	0.0%
Klickitat County	55	3	5.5%	1.50	0.0%	0.0%	100.0%	66.7%
Lewis County	136	14	10.3%	1.90	0.0%	14.3%	50.0%	35.7%
Lincoln County	29	1	3.4%	0.96	0.0%	0.0%	0.0%	100.0%
Mason County	96	5	5.2%	0.86	0.0%	20.0%	80.0%	80.0%
Okanogan County	110	2	1.8%	0.50	0.0%	0.0%	100.0%	100.0%
Pacific County	34	2	5.9%	0.95	0.0%	50.0%	50.0%	0.0%
Pend Oreille County	27	1	3.7%	0.79	0.0%	0.0%	100.0%	100.0%
Pierce County	550	86	15.6%	1.11	0.0%	16.5%	29.4%	56.5%
San Juan County	17	1	5.9%	0.65	0.0%	0.0%	0.0%	0.0%
Skagit County	153	14	9.2%	1.23	0.0%	7.1%	78.6%	21.4%
Skamania County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Snohomish County	418	83	19.9%	1.21	0.0%	9.8%	51.2%	50.0%
Spokane County	293	43	14.7%	0.94	0.0%	16.3%	25.6%	58.1%
Stevens County	78	1	1.3%	0.23	0.0%	0.0%	100.0%	0.0%
Thurston County	220	17	7.7%	0.71	0.0%	11.8%	52.9%	76.5%
Wahkiakum County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Walla Walla County	59	5	8.5%	0.87	0.0%	20.0%	40.0%	60.0%
Whatcom County	150	23	15.3%	1.19	9.1%	31.8%	36.4%	34.8%
Whitman County	61	5	8.2%	1.14	0.0%	20.0%	80.0%	60.0%
Yakima County	347	44	12.7%	1.87	0.0%	4.7%	72.1%	38.6%
State total	**5,391**	**678**	**12.6%**	**1.04**	**0.6%**	**12.5%**	**45.4%**	**48.9%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
West Virginia

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

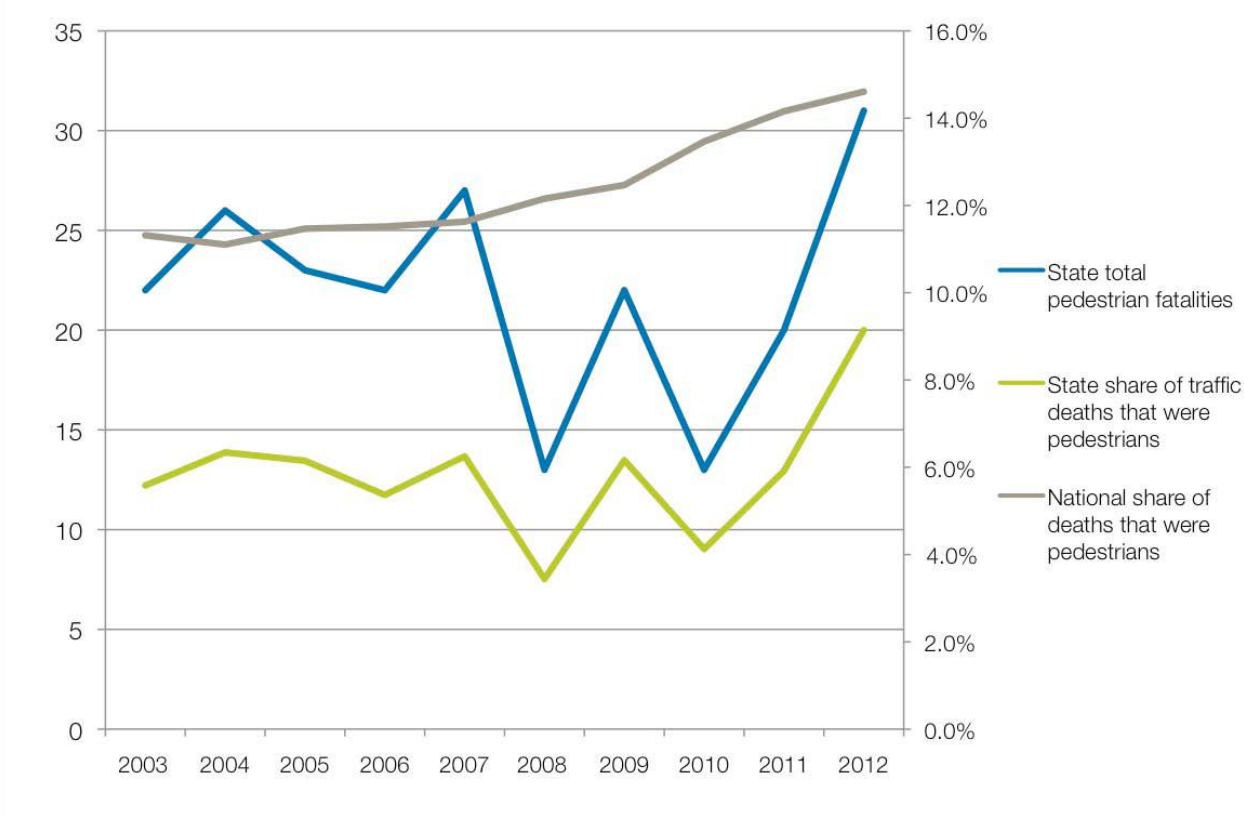
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **219 people died while walking in West Virginia**.

FIGURE 1

Pedestrian fatalities in West Virginia, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in West Virginia

In West Virginia from 2003–2012, 219 people were killed while walking, resulting in a fatality rate of 1.19 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 5.8 percent in West Virginia.

Within West Virginia, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for West Virginia was 37.08, compared to the national PDI of 52.2 and ranked 26th nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In West Virginia, 55.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **75.0 percent of pedestrian fatalities in West Virginia were on roads with a speed limit of 40 mph or higher**, compared to 13.0 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 17 children in West Virginia.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 15.7 percent of West Virginia's population, adults aged 65 and older account for 19.9 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in West Virginia is 2.18 per 100,000 people (nationally, 3.19), compared to a rate of 1.63 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in West Virginia suffer at a rate of 2.35 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 7.3 percent of West Virginia's population, and 10.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In West Virginia from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.69. The rate for black people and African Americans was 2.29. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:

MULTIMODAL INTERSECTIONS

Pedestrian Experience

The primary needs of pedestrians at intersections include:

Safety

Lower motor vehicle speeds:

- Narrower motor vehicle lane widths
- Reduced turning radii
- Traffic calming measures

Less exposure to conflicts:

- Dedicated space
- Shorter crossing distances
- Improved sight lines and visibility
- Crossing islands where appropriate
- Appropriate signal timing and crossing treatments

Accessible crossings:

- American's with Disabilities Act (ADA) compliant curb ramps that prevent ponding of precipitation
- ADA compliant crosswalks
- Accessible pedestrian signals that inform users when signals have been activated

Convenience

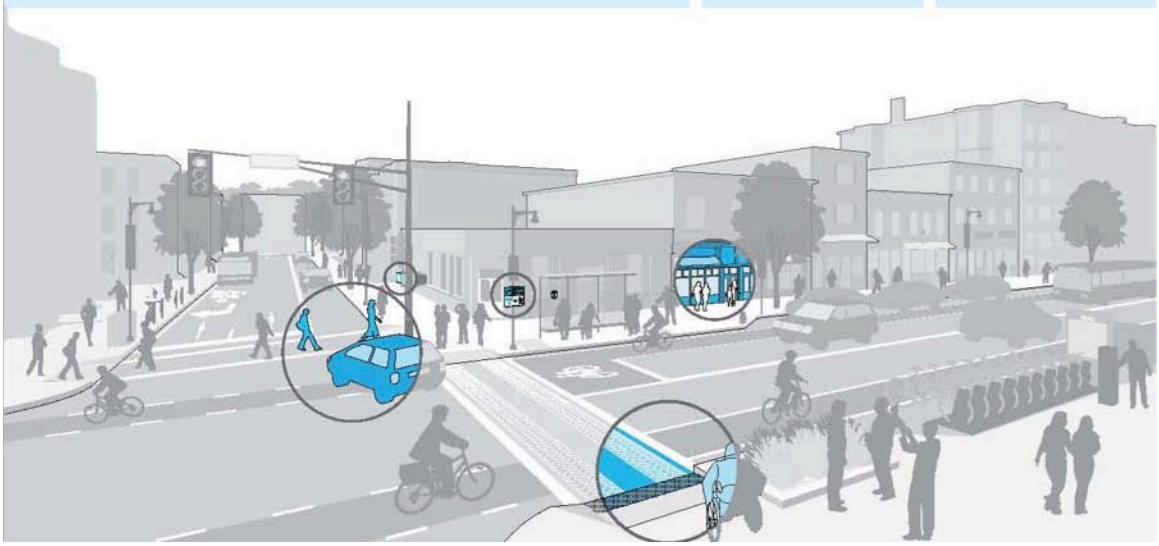
Comfortable and inviting spaces:

- Appropriate sidewalk widths for pedestrian volumes
- Crossings that reflect pedestrian desire lines
- Buildings that front the street
- Transparent store fronts
- Street trees
- Amenities such as benches, recycling and trash receptacles, public art, street cafés, etc.

Minimal Delay

Frequent opportunities to cross:

- Appropriate traffic controls (i.e., signage vs. signalization)
- Pre-timed pedestrian signals for every cycle
- Responsive pushbuttons where applicable
- Direct routes across complex intersections



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Charleston, WV	586	59	10.1%	2.04	1.8%	12.3%	82.5%	59.3%
Cumberland, MD-WV	152	7	4.6%	0.58	0.0%	14.3%	71.4%	42.9%
Hagerstown-Martinsburg, MD-WV	414	35	8.5%	0.82	0.0%	11.8%	73.5%	62.9%
Huntington-Ashland, WV-KY-OH	468	32	6.8%	1.11	0.0%	15.6%	59.4%	53.1%
Morgantown, WV	207	18	8.7%	1.54	0.0%	31.3%	68.8%	50.0%
Parkersburg-Marietta-Vienna, WV-OH	220	12	5.5%	0.12	0.0%	0.0%	75.0%	41.7%
Washington-Arlington-Alexandria, DC-VA-MD-WV	4,204	843	20.1%	1.41	0.2%	18.8%	51.4%	56.1%
Weirton-Steubenville, WV-OH	109	7	6.4%	0.16	0.0%	28.6%	57.1%	71.4%
Wheeling, WV-OH	182	10	5.5%	0.81	0.0%	11.1%	77.8%	30.0%
Winchester, VA-WV	200	6	3.0%	0.47	0.0%	0.0%	40.0%	50.0%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Barbour County	32	1	3.1%	0.62	0.0%	0.0%	100.0%	100.0%
Berkeley County	178	17	9.6%	1.73	0.0%	17.6%	64.7%	76.5%
Boone County	85	4	4.7%	1.60	0.0%	0.0%	100.0%	75.0%
Braxton County	60	2	3.3%	1.37	0.0%	50.0%	50.0%	0.0%
Brooke County	20	3	15.0%	1.23	0.0%	0.0%	100.0%	66.7%
Cabell County	139	8	5.8%	0.84	0.0%	12.5%	62.5%	62.5%
Calhoun County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Clay County	31	3	9.7%	3.11	0.0%	0.0%	100.0%	0.0%
Doddridge County	13	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fayette County	116	5	4.3%	1.08	0.0%	0.0%	100.0%	80.0%
Gilmer County	22	1	4.5%	1.21	N/A	N/A	N/A	0.0%
Grant County	39	3	7.7%	2.54	0.0%	50.0%	0.0%	0.0%
Greenbrier County	87	3	3.4%	0.85	0.0%	0.0%	100.0%	33.3%
Hampshire County	75	2	2.7%	0.87	0.0%	0.0%	100.0%	0.0%
Hancock County	29	2	6.9%	0.64	0.0%	100.0%	0.0%	100.0%
Hardy County	38	1	2.6%	0.73	0.0%	0.0%	100.0%	100.0%
Harrison County	124	6	4.8%	0.88	0.0%	0.0%	66.7%	50.0%
Jackson County	93	1	1.1%	0.35	0.0%	0.0%	100.0%	0.0%
Jefferson County	98	7	7.1%	1.37	0.0%	0.0%	100.0%	71.4%
Kanawha County	311	38	12.2%	1.97	2.8%	16.7%	80.6%	65.8%
Lewis County	67	4	6.0%	2.43	0.0%	50.0%	50.0%	50.0%
Lincoln County	82	5	6.1%	2.28	0.0%	0.0%	80.0%	60.0%
Logan County	87	4	4.6%	1.09	0.0%	0.0%	100.0%	25.0%
Marion County	75	3	4.0%	0.53	0.0%	0.0%	66.7%	66.7%
Marshall County	36	2	5.6%	0.60	0.0%	0.0%	50.0%	50.0%
Mason County	80	1	1.3%	0.37	0.0%	0.0%	0.0%	0.0%
McDowell County	77	7	9.1%	3.06	0.0%	0.0%	57.1%	57.1%
Mercer County	165	11	6.7%	1.78	0.0%	9.1%	90.9%	81.8%
Mineral County	54	2	3.7%	0.72	0.0%	50.0%	50.0%	0.0%
Mingo County	93	0	0.0%	0.00	N/A	N/A	N/A	N/A
Monongalia County	140	15	10.7%	1.62	0.0%	23.1%	76.9%	60.0%
Monroe County	24	0	0.0%	0.00	N/A	N/A	N/A	N/A
Morgan County	35	2	5.7%	1.17	0.0%	0.0%	100.0%	100.0%
Nicholas County	74	2	2.7%	0.76	0.0%	0.0%	100.0%	50.0%
Ohio County	45	1	2.2%	0.22	0.0%	0.0%	100.0%	100.0%
Pendleton County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pleasants County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pocahontas County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Preston County	67	3	4.5%	0.92	0.0%	66.7%	33.3%	0.0%
Putnam County	77	9	11.7%	1.65	0.0%	11.1%	77.8%	44.4%
Raleigh County	171	14	8.2%	1.78	0.0%	0.0%	83.3%	57.1%
Randolph County	54	1	1.9%	0.34	0.0%	100.0%	0.0%	0.0%
Ritchie County	29	1	3.4%	0.96	0.0%	0.0%	100.0%	100.0%
Roane County	33	1	3.0%	0.66	0.0%	100.0%	0.0%	0.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Summers County	44	2	4.5%	1.44	0.0%	0.0%	100.0%	100.0%
Taylor County	27	2	7.4%	1.20	0.0%	0.0%	50.0%	50.0%
Tucker County	21	0	0.0%	0.00	N/A	N/A	N/A	N/A
Tyler County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Upshur County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wayne County	119	8	6.7%	1.88	0.0%	25.0%	62.5%	62.5%
Webster County	12	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wetzel County	28	1	3.6%	0.60	N/A	N/A	N/A	0.0%
Wirt County	11	0	0.0%	0.00	N/A	N/A	N/A	N/A
Wood County	110	9	8.2%	1.04	0.0%	0.0%	66.7%	55.6%
Wyoming County	77	2	2.6%	0.83	0.0%	0.0%	100.0%	0.0%
State total	**3,747**	**219**	**5.8%**	**1.19**	**0.5%**	**13.0%**	**75.0%**	**55.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Wisconsin

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

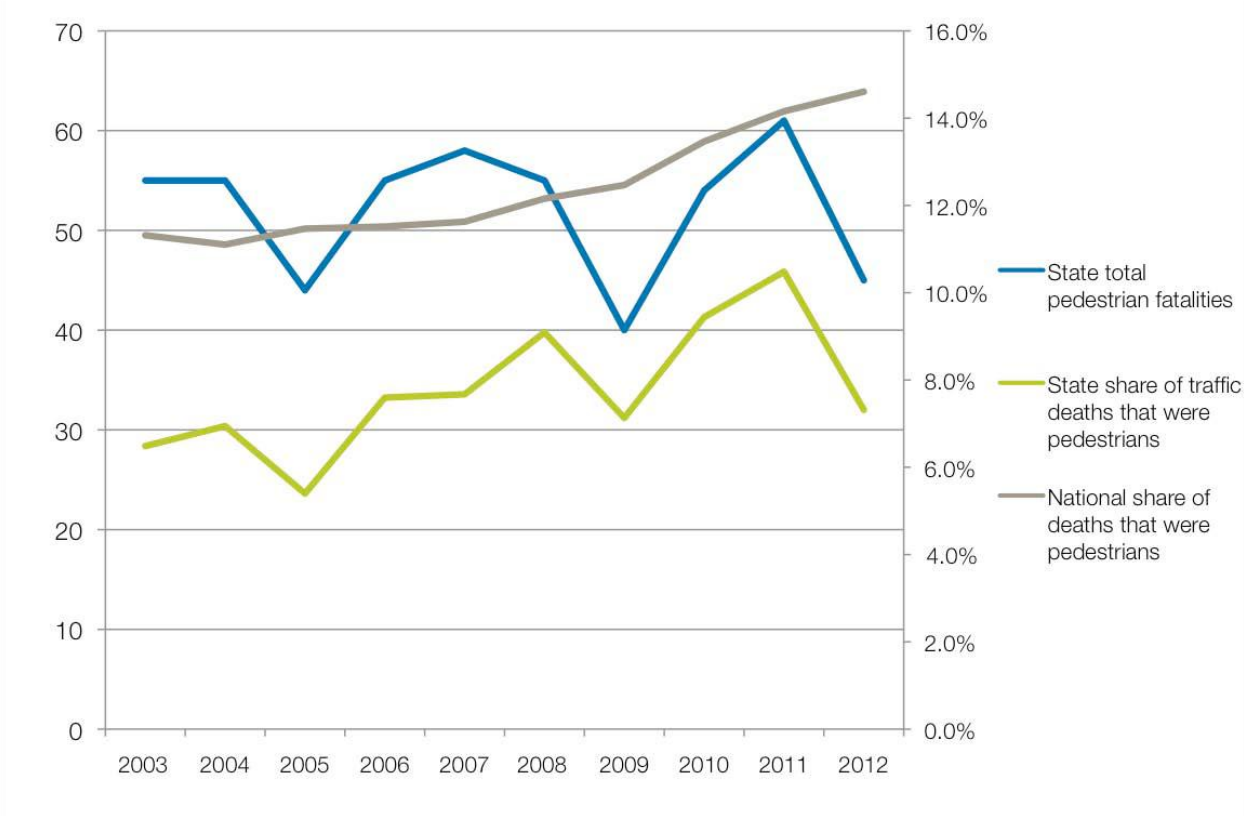
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **522 people died while walking in Wisconsin**.

FIGURE 1

Pedestrian fatalities in Wisconsin, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Wisconsin

In Wisconsin from 2003–2012, 522 people were killed while walking, resulting in a fatality rate of 0.93 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 7.6 percent in Wisconsin.

Within Wisconsin, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Wisconsin was 27.12, compared to the national PDI of 52.2 and ranked 37th nationally.

The PDI can be applied to large metropolitan areas as well. Table 1 lists these areas, ranked by their PDI scores.

TABLE 1

Large metro areas in Wisconsin, ranked by PDI

National Rank	Metropolitan area	Total pedestrian fatalities (2003-2012)	Annual pedestrian deaths per 100,000 (2008-2012)	Percent of people commuting by foot (2008-2012)	Pedestrian Danger Index (2008-2012)
41	Milwaukee-Waukesha-West Allis, WI	183	1.07	2.8%	38.79

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Wisconsin, 59.4 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **41.3 percent of pedestrian fatalities in Wisconsin were on roads with a speed limit of 40 mph or higher**, compared to 22.3 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available). This includes 43 children in Wisconsin.

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 13.3 percent of Wisconsin's population, adults aged 65 and older account for 26.2 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Wisconsin is 2.36 per 100,000 people (nationally, 3.19), compared to a rate of 1.02 for people under 65 years old (nationally, 1.75).[8] Those 75 and older in Wisconsin suffer at a rate of 3.24 fatalities per 100,000 capita, which compares to a national rate of 3.96.[9] People 75 years and older account for 6.6 percent of Wisconsin's population, and 18.0 percent of pedestrian fatalities.[10]

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

9 Ibid.

10 Ibid.

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Wisconsin from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.1. The rate for Hispanic people of any race was 0.78; for black people and African Americans, 2.35; for Asians and Pacific Islanders, 1.21; and for American Indians and Alaska Natives, 3.84.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[11] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[12]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

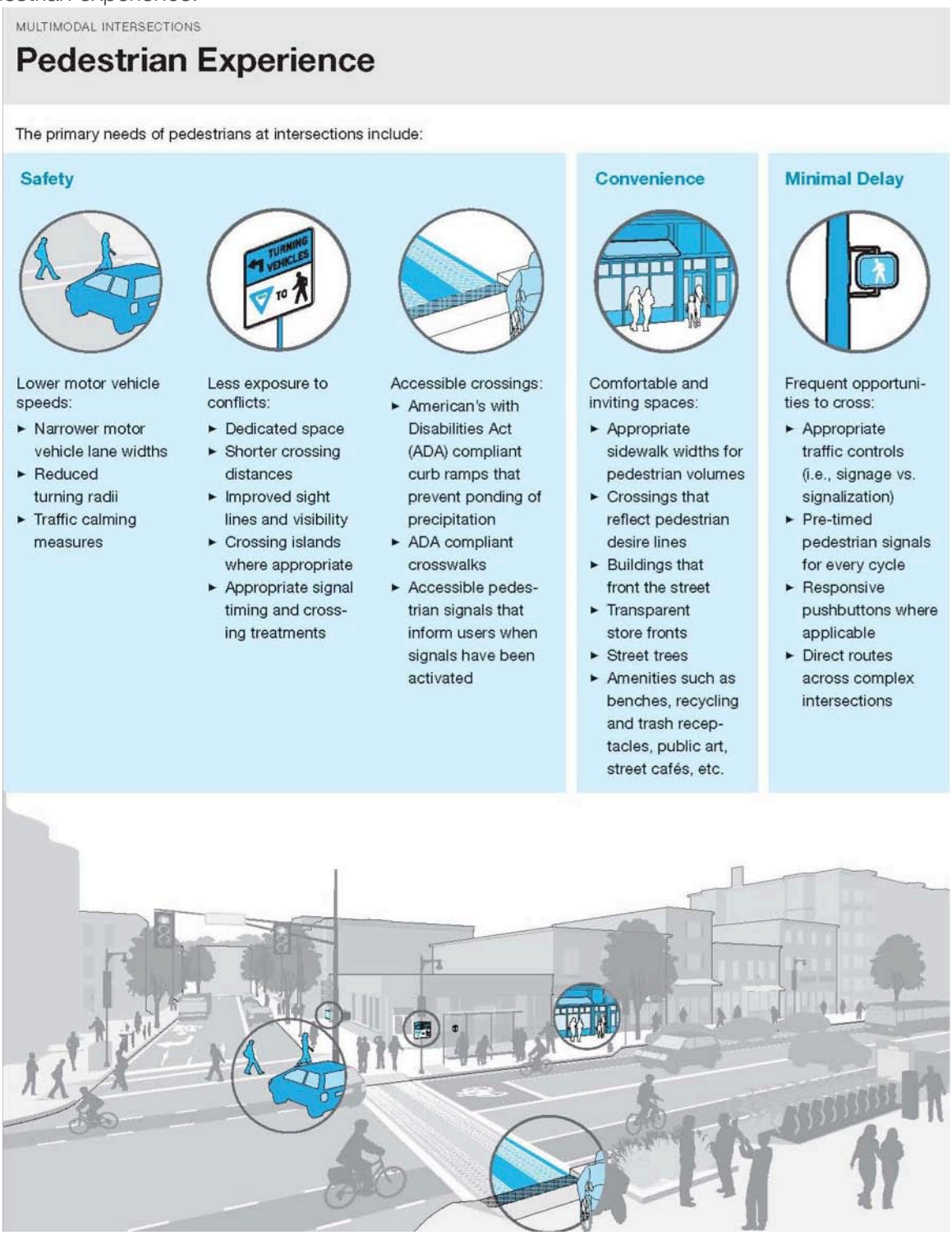
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

11 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

12 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Appleton, WI	209	11	5.3%	0.27	0.0%	10.0%	50.0%	36.4%
Chicago-Naperville-Joliet, IL-IN-WI	6,370	1,165	18.3%	1.03	1.9%	6.3%	35.0%	54.1%
Duluth, MN-WI	299	20	6.7%	0.64	0.0%	10.0%	50.0%	60.0%
Eau Claire, WI	185	8	4.3%	0.62	0.0%	14.3%	42.9%	50.0%
Fond du Lac, WI	136	9	6.6%	0.79	0.0%	44.4%	55.6%	55.6%
Green Bay, WI	348	27	7.8%	0.72	0.0%	15.4%	57.7%	61.5%
Janesville, WI	254	12	4.7%	0.50	0.0%	41.7%	50.0%	66.7%
La Crosse, WI-MN	95	11	11.6%	1.20	0.0%	27.3%	36.4%	72.7%
Madison, WI	610	54	8.9%	1.05	1.9%	30.2%	43.4%	59.3%
Milwaukee-Waukesha-West Allis, WI	1,037	183	17.6%	1.07	1.7%	21.9%	14.0%	73.1%
Minneapolis-St. Paul-Bloomington, MN-WI	2,016	249	12.4%	0.72	2.0%	3.7%	53.3%	59.0%
Oshkosh-Neenah, WI	139	18	12.9%	1.08	0.0%	18.8%	62.5%	33.3%
Racine, WI	171	15	8.8%	0.92	0.0%	0.0%	38.5%	66.7%
Sheboygan, WI	110	10	9.1%	1.04	0.0%	44.4%	44.4%	20.0%
Wausau, WI	202	6	3.0%	0.15	0.0%	16.7%	50.0%	66.7%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Adams County	57	3	5.3%	1.43	0.0%	0.0%	100.0%	100.0%
Ashland County	23	2	8.7%	1.23	0.0%	0.0%	100.0%	50.0%
Barron County	90	3	3.3%	0.65	0.0%	33.3%	66.7%	33.3%
Bayfield County	46	2	4.3%	1.32	0.0%	50.0%	50.0%	0.0%
Brown County	211	21	10.0%	0.86	0.0%	20.0%	50.0%	60.0%
Buffalo County	23	2	8.7%	1.46	0.0%	0.0%	100.0%	100.0%
Burnett County	44	0	0.0%	0.00	N/A	N/A	N/A	N/A
Calumet County	57	3	5.3%	0.63	0.0%	0.0%	33.3%	33.3%
Chippewa County	86	4	4.7%	0.66	0.0%	25.0%	75.0%	75.0%
Clark County	67	2	3.0%	0.58	0.0%	0.0%	50.0%	50.0%
Columbia County	136	12	8.8%	2.14	0.0%	45.5%	45.5%	33.3%
Crawford County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Dane County	419	40	9.5%	0.84	2.5%	25.0%	42.5%	65.0%
Dodge County	151	7	4.6%	0.79	0.0%	28.6%	57.1%	42.9%
Door County	36	0	0.0%	0.00	N/A	N/A	N/A	N/A
Douglas County	59	2	3.4%	0.46	0.0%	100.0%	0.0%	50.0%
Dunn County	64	4	6.3%	0.93	0.0%	50.0%	50.0%	50.0%
Eau Claire County	99	4	4.0%	0.41	0.0%	0.0%	0.0%	25.0%
Florence County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fond du Lac County	136	9	6.6%	0.90	0.0%	44.4%	55.6%	55.6%
Forest County	23	1	4.3%	1.04	0.0%	0.0%	0.0%	100.0%
Grant County	88	3	3.4%	0.59	0.0%	0.0%	100.0%	66.7%
Green County	66	1	1.5%	0.28	0.0%	100.0%	0.0%	100.0%
Green Lake County	25	2	8.0%	1.05	0.0%	50.0%	50.0%	0.0%
Iowa County	55	2	3.6%	0.85	0.0%	50.0%	50.0%	100.0%
Iron County	18	0	0.0%	0.00	N/A	N/A	N/A	N/A
Jackson County	61	3	4.9%	1.49	0.0%	0.0%	100.0%	66.7%
Jefferson County	119	3	2.5%	0.37	0.0%	33.3%	66.7%	33.3%
Juneau County	77	2	2.6%	0.76	0.0%	0.0%	100.0%	0.0%
Kenosha County	214	19	8.9%	1.17	0.0%	15.8%	36.8%	63.2%
Kewaunee County	32	1	3.1%	0.49	0.0%	0.0%	100.0%	0.0%
La Crosse County	79	11	13.9%	0.98	0.0%	27.3%	36.4%	72.7%
Lafayette County	48	4	8.3%	2.39	0.0%	25.0%	75.0%	100.0%
Langlade County	40	3	7.5%	1.48	0.0%	0.0%	66.7%	66.7%
Lincoln County	54	4	7.4%	1.37	0.0%	0.0%	75.0%	50.0%
Manitowoc County	103	14	13.6%	1.72	0.0%	23.1%	69.2%	28.6%
Marathon County	202	6	3.0%	0.46	0.0%	16.7%	50.0%	66.7%
Marinette County	138	4	2.9%	0.95	0.0%	0.0%	100.0%	50.0%
Marquette County	48	4	8.3%	2.61	0.0%	0.0%	100.0%	50.0%
Menominee County	15	0	0.0%	0.00	N/A	N/A	N/A	N/A
Milwaukee County	574	154	26.8%	1.64	1.3%	21.2%	7.9%	76.6%
Monroe County	70	2	2.9%	0.46	0.0%	50.0%	50.0%	100.0%
Oconto County	105	5	4.8%	1.33	0.0%	0.0%	80.0%	80.0%
Oneida County	63	1	1.6%	0.27	0.0%	0.0%	0.0%	100.0%

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Outagamie County	152	8	5.3%	0.46	0.0%	14.3%	57.1%	37.5%
Ozaukee County	71	5	7.0%	0.58	0.0%	0.0%	40.0%	80.0%
Pepin County	9	0	0.0%	0.00	N/A	N/A	N/A	N/A
Pierce County	87	1	1.1%	0.25	0.0%	100.0%	0.0%	100.0%
Polk County	96	2	2.1%	0.45	0.0%	0.0%	50.0%	50.0%
Portage County	84	3	3.6%	0.43	0.0%	0.0%	100.0%	100.0%
Price County	30	1	3.3%	0.69	0.0%	100.0%	0.0%	100.0%
Racine County	171	15	8.8%	0.77	0.0%	0.0%	38.5%	66.7%
Richland County	29	0	0.0%	0.00	N/A	N/A	N/A	N/A
Rock County	254	12	4.7%	0.76	0.0%	41.7%	50.0%	66.7%
Rusk County	29	3	10.3%	2.02	0.0%	33.3%	33.3%	66.7%
Sauk County	100	9	9.0%	1.49	0.0%	12.5%	62.5%	44.4%
Sawyer County	47	5	10.6%	3.01	0.0%	0.0%	80.0%	20.0%
Shawano County	102	1	1.0%	0.24	0.0%	0.0%	100.0%	0.0%
Sheboygan County	110	10	9.1%	0.87	0.0%	44.4%	44.4%	20.0%
St. Croix County	128	5	3.9%	0.62	0.0%	40.0%	60.0%	40.0%
Taylor County	27	4	14.8%	1.96	0.0%	25.0%	75.0%	75.0%
Trempealeau County	46	5	10.9%	1.76	0.0%	20.0%	80.0%	60.0%
Vernon County	71	0	0.0%	0.00	N/A	N/A	N/A	N/A
Vilas County	54	2	3.7%	0.92	0.0%	0.0%	50.0%	0.0%
Walworth County	167	9	5.4%	0.89	0.0%	57.1%	42.9%	44.4%
Washburn County	50	0	0.0%	0.00	N/A	N/A	N/A	N/A
Washington County	134	9	6.7%	0.70	0.0%	25.0%	75.0%	50.0%
Waukesha County	258	15	5.8%	0.39	7.1%	35.7%	35.7%	46.7%
Waupaca County	107	3	2.8%	0.57	0.0%	0.0%	100.0%	0.0%
Waushara County	64	0	0.0%	0.00	N/A	N/A	N/A	N/A
Winnebago County	139	18	12.9%	1.10	0.0%	18.8%	62.5%	33.3%
Wood County	75	8	10.7%	1.07	0.0%	50.0%	25.0%	87.5%
State total	**6,870**	**522**	**7.6%**	**0.93**	**0.8%**	**22.3%**	**41.3%**	**59.4%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.

Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Dangerous by Design 2014
Wyoming

May 2014

The **National Complete Streets Coalition**, a program of Smart Growth America, seeks to fundamentally transform the look, feel and function of the roads and streets in our community, by changing the way most roads are planned, designed and constructed. Complete Streets policies direct transportation planners and engineers to consistently plan and design streets with all users in mind.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods.

This report was made possible with support from AARP and the American Society of Landscape Architects.

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This report, including data for each state and an interactive map of 47,000+ pedestrian fatalities from 2003 to 2012, can be found online at www.smartgrowthamerica.org/dangerous-by-design

Cover photo: Oran Viriyincy

Overview

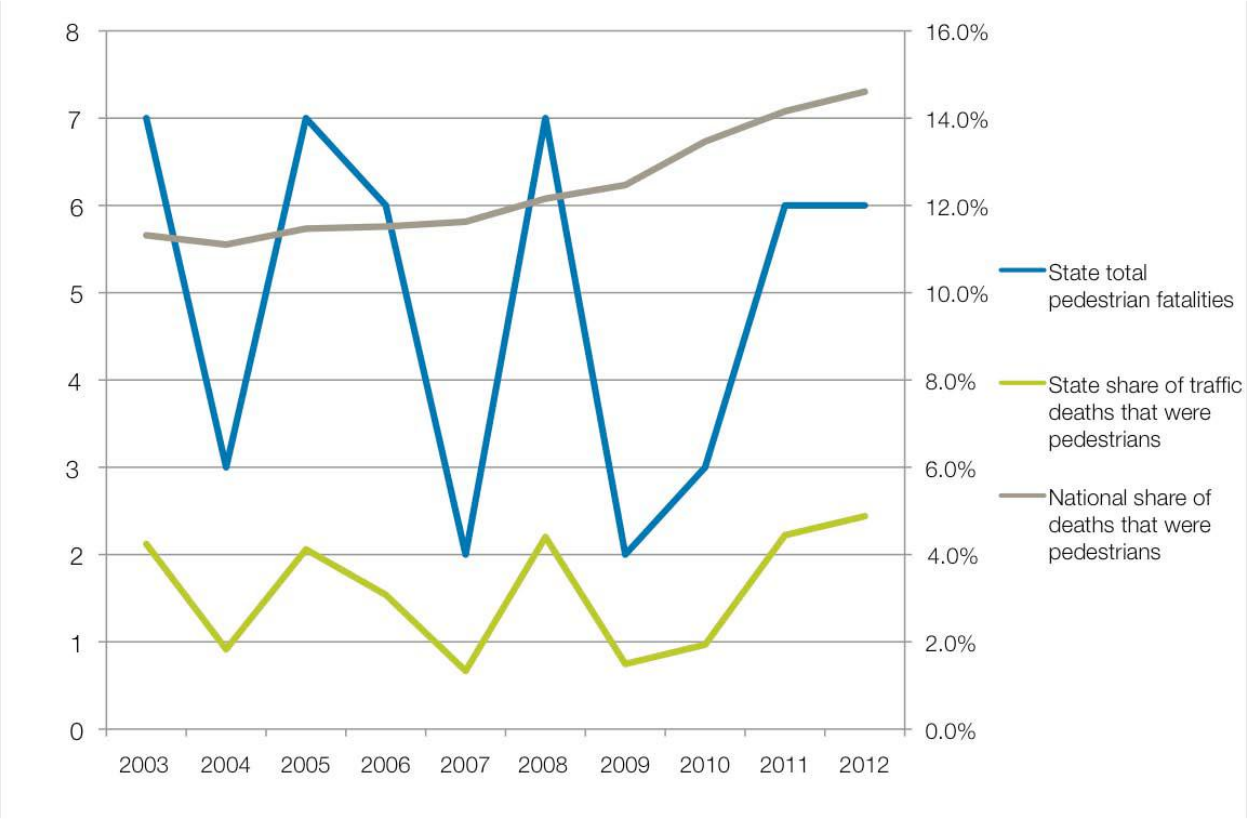
American communities are poised for a renaissance in walking. We're walking more often, for fun and to get to places in our neighborhood. We turn to WalkScore.com when figuring out where to live and our most walkable places often are among the most economically vibrant in the country. Hundreds of cities have adopted Complete Streets policies to ensure walking is in the forefront of our decisions regarding street design. Public health organizations from the U.S. Centers for Disease Control and the Office of the Surgeon General to the local doctor's office are encouraging us to get out for a walk for physical activity and to combat chronic disease. And indeed, we are walking: 6 of 10 people walk for physical activity, and the share of adults who said they walk for transportation grew 6 percent from 2005 to 2010, according to the most recent data available.[1]

But we are still dealing with a legacy of roadways that fail to account for the safety of people on foot.

In the decade from 2003 through 2012, **49 people died while walking in Wyoming**.

FIGURE 1

Pedestrian fatalities in Wyoming, 2003–2012



1 U.S. Centers for Disease Control and Prevention. (August 2012). More People Walk to Better Health. CDC Vital Signs. Retrieved from http://www.cdc.gov/vitalsigns/pdf/2012-08-vitalsigns.pdf

Nationally, 47,025 pedestrians died while walking on our streets, representing 12.3 percent of total traffic deaths over that decade. But the national fatality numbers have increased recently. A total of 4,280 people walking died in traffic crashes in 2010. That number increased to 4,432 in 2011, and went up *again* in 2012 to 4,743. In 2012, people on foot represented nearly 15 percent of all traffic fatalities.

We have seen for people in cars that a focus on safety and protective design can pay off. The number of drivers and passengers of vehicles who died in traffic crashes dropped by a third from 2003 to 2012. We realized this significant drop by focusing on vehicle design, encouraging and enforcing seat belt use, cracking down on drunk driving, and curbing distracted driving—saving thousands of loved ones.

While pedestrian deaths are labeled "accidents," the data reviewed here indicate we can prevent the majority of them by taking deliberate steps to do so, through better policy, design, practice and regulation—just as we have done with vehicle deaths. The majority of pedestrian deaths occur on arterial roadways, planned and engineered for speeding automobiles with little consideration for the diversity of people—young, old, with and without disabilities, walking, and bicycling—who rely on these streets to get them from point A to point B. The lion's share of these roadways were built with federal money and designed to federal specifications, so fixing the legacy of dangerous conditions undoubtedly will need to be a national project with federal support.

A national response is needed

The fundamental function of government is the protection of its people. National transportation policy has long been based in the agreed-upon belief that our roadways should be safe. For decades, "safe" has been defined to include people walking, bicycling and driving. Yet taxpayer money distributed to the states through the federal government often has not been applied to projects that would in fact improve safety for all. Of the 45,284 pedestrian deaths from 2003–2012 for which roadway classification information was collected, almost 68 percent occurred on federal-aid roadways—roads that follow federal guidelines or oversight that are eligible to receive federal funds. Nationally, from 2009 to 2013, less than one-half of one percent of available federal safety-related funds was obligated to projects that improve safety for people walking.

Cities and towns, counties, regions, and states across the country recognize the importance of safe streets. More than 600 of them have adopted policies that establish a clear vision for streets that are safe, comfortable and convenient for people walking. Such policies direct city and transportation leaders to include the needs of all users in the planning and design of local streets. But when these communities attempt to fulfill that vision by implementing those policies, they find state and national laws and practices block their efforts. They often face obstacles in gaining access to federal funding or making design changes, and their residents suffer.

Pedestrian danger in Wyoming

In Wyoming from 2003–2012, 49 people were killed while walking, resulting in a fatality rate of 0.91 deaths per 100,000 residents. Nationally, the pedestrian fatality rate was 1.56. Of all traffic deaths, pedestrians represent 3.2 percent in Wyoming.

Within Wyoming, the fatality rate varies from region to region—and even between counties within the same region—depending in part on the design of the transportation system and how comfortable and convenient it is for walking. Appendix B provides detailed statistics for all metro regions and Appendix C offers information for all counties in this state.

Fatality rates offer a limited picture: to better understand the relative danger for pedestrians, this report uses a pedestrian danger index (PDI) based on the share of local commuters who walk to work—the best available measure of how many people are likely to be out walking each day—and the most recent five years of data on pedestrian fatalities. The more dangerous places are those with a higher PDI—where a high number of pedestrians are killed despite low walking rates. The most dangerous regions tend to be those that grew in the post-war period, mostly through rapid spread of low-density neighborhoods that rely on wider streets with higher speeds to connect homes, shops and schools—roads that tend to be more dangerous for people walking.

From 2003–2012, the statewide PDI for Wyoming was 23.48, compared to the national PDI of 52.2 and ranked 41st nationally.

The characteristics of dangerous roads

The examination of data in the federal Fatality Analysis Reporting System (FARS) reveals that people on foot were most often killed on higher capacity and higher speed roads classified as "arterial." In transportation planning and engineering, arterial roads are expected to move the most automobile traffic possible with minimal delay over longer distances, meaning they often are made wide, fast, and flat to serve the purpose of quick automobile travel. At the same time, however, these arterials have become the "main streets" of our communities, and typically are flanked by apartment complexes, shopping centers and office parks. Design guidelines do provide some flexibility, but too often, the needs of people and communities have been secondary concerns or simply left out of the process entirely.

Indeed, the majority—52.3 percent—of the 45,284 pedestrian deaths nationally (for which roadway classification data were recorded) over the last decade occurred on arterial roadways. **In Wyoming, 42.6 percent of pedestrian deaths were on arterials.**

As of 2008, the overwhelming majority (83.3 percent) of arterials in rural areas and over a third of urban arterials are part of the National Highway System (NHS),[2] and thus eligible for federal transportation funding. Under the 2012 federal transportation law, known as MAP-21, another 230,000 lane miles—including a large share of urban arterials—are expected to be included in NHS.[3]

In the decade from 2003 through 2012, almost 68 percent of all pedestrian fatalities nationwide were on roadways funded in some part by federal money and designed in accordance with federal guidelines.

> "The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

Vehicle speed is a major factor in all types of crashes, and has especially serious consequences for people on foot. Where the posted speed limit was recorded, **73.5 percent of pedestrian fatalities in Wyoming were on roads with a speed limit of 40 mph or higher**, compared to 8.2 percent on streets with a speed limit of 30 mph or under. Nationally, 61.3 percent of pedestrian fatalities were on roads with a speed limit of 40 mph or higher and 9.0 percent were on streets with a 30 mph or under speed limit.

2 Federal Highway Administration, 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

3 Federal Highway Administration, National Highway System Questions & Answers. Retrieved from http://www.fhwa.dot.gov/map21/qandas/qanhs.cfm

The most threatened populations

Overwhelmingly, children, older adults and people of color suffer disproportionately from traffic violence, according to an examination of data from the U.S. Centers for Disease Control and Prevention.

Children

Fatal pedestrian injury remains a leading cause of death for those 15 years and younger. Nearly 18,000 children each year are admitted to the hospital for pedestrian injury nationwide, a figure that accounts for 31 to 61 percent of all injury-related hospital admissions. Eleven percent of those 18,000 children require surgical intervention for their injuries.[4] Children are especially vulnerable to pedestrian injury because their smaller size makes them less visible to motorists. But they are also at risk because their ability to judge the travel speed of oncoming traffic is not yet fully developed. A recent perceptual study of children aged 6 to 11 found that they lack the ability to detect vehicles moving faster than 20 mph.[5] They just don't see the cars coming.

Nationally, 4,394 children aged 1 to 15 were killed as pedestrians from 2003 through 2010 (the most recent year for which data was available).

Federal, state, and local efforts through the Safe Routes to School program, which helped re-design streets near elementary schools and encourage kids to walk to school, show promising results: in census tracts with such programs, pedestrian injuries for children aged 5 to 19 declined by 44 percent during school hours. This compares to virtually no change in census tracts without SRTS projects.[6]

Older adults

Older adults suffer disproportionately from pedestrian deaths nationally. **While comprising 12.2 percent of Wyoming's population, adults aged 65 and older account for 13.7 percent of pedestrian fatalities across the state from 2003-2010.**[7] Nationally, this age group is just 12.6 percent of the total population and represents nearly 21 percent of all pedestrian fatalities. The pedestrian fatality rate for older adults in Wyoming is 1.93 per 100,000 people (nationally, 3.19), compared to a rate of 1.69 for people under 65 years old (nationally, 1.75).[8]

Older adults face more risks as pedestrians because they may be less able to react quickly to an oncoming vehicle. Once struck, their increased frailty makes them less likely to recover from a serious collision. As this age group continues to grow, doubling nationally over then next 30 years, street design decisions must accommodate their desire to age in their communities, remain independent and access destinations on foot as well as by car.

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4 Merrell, G.A., Driscoll, J.C., Degutis, L.C., Renshaw, T.S. "Prevention of Childhood Pedestrian Trauma: A Study of Interventions over Six Years." *J Bone Joint Surg Am. 2002; 84-A(5): 863-867.*

5 Wann, J., Poulter, D., and Purcell, C. "Reduced Sensitivity to Visual Looming Inflates the Risk Posed by Speeding Vehicles When Children Try to Cross the Road." *Psychological Science*. 2011; XX(X): 1-6.

6 DiMaggio, C., and Li, G. "Effectiveness of a Safe Routes to School Program in Preventing Child Pedestrian Injury." *Pediatrics* 2013; 131; 290.

7 Analysis of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), 2003-2010.

8 Ibid.

People of Color

Like older adults, people of color are disproportionately represented among pedestrian fatalities. Nationally, non-Hispanic whites have a pedestrian fatality rate of 1.66 per 100,000 capita, while African Americans suffer a rate 60 percent higher, at 2.65 per 100,000 capita, and Hispanics of any race have a rate nearly 43 percent higher: 2.37 per 100,000 capita.

In Wyoming from 2003 to 2010, the non-Hispanic white pedestrian fatality rate was 1.5. The rate for American Indians and Alaska Natives was 12.40. There was insufficient data to calculate rates for other races and ethnic groups in the state.

Street design improves safety

The data show that street design matters. When the needs of all users—all ages, all abilities and all modes of travel—are properly balanced, our streets are safer and easier to navigate for everyone.

In recognition of this fact, and the desire of many communities to promote health and safety, professional organizations that guide transportation engineering and planning decisions in recent years have introduced new best-practice manuals that emphasize the importance of providing safer streets and are backed by a growing body of research. Using the best and latest in design standards is especially important for the millions of miles of arterial roadways in our rural and urban communities.

> "Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems."
>
> *– U.S. DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, March 2010*

The National Association of City Transportation Officials' recently released *Urban Street Design Guide* recognizes that a community's streets are fundamentally different than the roads and highways between communities, and provides transportation professionals guidance and additional flexibility to design streets that are not only safe for people walking, but also welcoming for everyone. As of early May 2014, the states of California, Massachusetts, Minnesota, Washington, Utah, the District of Columbia and more than thirty cities have endorsed the *Guide*.

Transportation professionals can also turn to the Institute of Transportation Engineers recommended practice *Walkable Urban Thoroughfares: A Context Sensitive Approach*; new crossing treatments proven to improve safety included in the *Manual on Uniform Traffic Control Devices*, published by the Federal Highway Administration; and the *Urban Bikeway Design Guide*, issued by NACTO.

The Federal Highway Administration offers comprehensive information and tools for transportation agencies in designing roadways that are safe for pedestrians. In addition to the research document *Countermeasures That Work*, its *Pedestrian Safety Guide and Countermeasure Selection System* is particularly useful in helping practitioners understand and apply 55 engineering and design approaches that have proven effective in improving pedestrian safety.

Generally, designing for safe, walkable communities begins with understanding how people use—and want to use—streets and public spaces to access destinations. From there flow general considerations such as: separate people walking from people driving vehicles; keep traffic speeds low; ensure all sidewalks and curb ramps are accessible to people with disabilities; and clarify where each road user should be expected to travel. With these principles set, transportation planners and engineers can select from a large set of nationally-used appropriate design elements, including but not limited to: wide sidewalks, curb extensions, refuge islands, pedestrian countdown signals, leading pedestrian interval signal timing, midblock crossings (especially at transit stops), pedestrian hybrid beacons, narrow travel lanes, planting street trees, restricted right turns on red, compact intersections, back-in angled parking and smaller curb radii.

Some common practices intended to improve safety sometimes have had the opposite effect: promoting speeding on streets intended for lower speeds and putting everyone on the road at risk.

Nationally, speeding is a leading cause of preventable deaths, causing nearly one-third of all traffic fatalities each year, or close to 10,000 lives. Speeding not only increases the likelihood of crashes with people on foot, it increases the probability that those crashes will cause injuries that are far more serious.[9] At 20 mph, the risk of death to a person on foot struck by the driver of a vehicle is just 6 percent. At 45 mph, the risk of death is 65 percent—11 times greater than at 20 mph. When struck by a car going 50 mph, pedestrian fatality rates are 75 percent and injury rates are above 90 percent.[10]

Changing conventional practice by instead setting a vision for safer, slower streets allows transportation agency staff to find the appropriate design solutions, regardless of prevailing speed. They can design and redesign streets to include features to encourage safer—and slower—driving and to provide people walking with sidewalks, frequent safe opportunities to cross streets, and, where possible, greater separation from traffic with landscaped buffers, protected bike lanes, and/or parked cars. In some cases, this means changing city or state policy to allow for lower speed limits, especially in residential areas or near parks and schools, regardless of prevailing speeds.

We must use every tool available to improve safety, through a concerted, collaborative approach among government officials, transportation staff, law enforcement, community members, public health professionals and private companies. These groups can work together to better track injuries and identify dangerous blocks and intersections. Improving enforcement efforts to ensure drivers understand that they will face a penalty for breaking the law also is important in changing culture and preventing injuries and deaths.

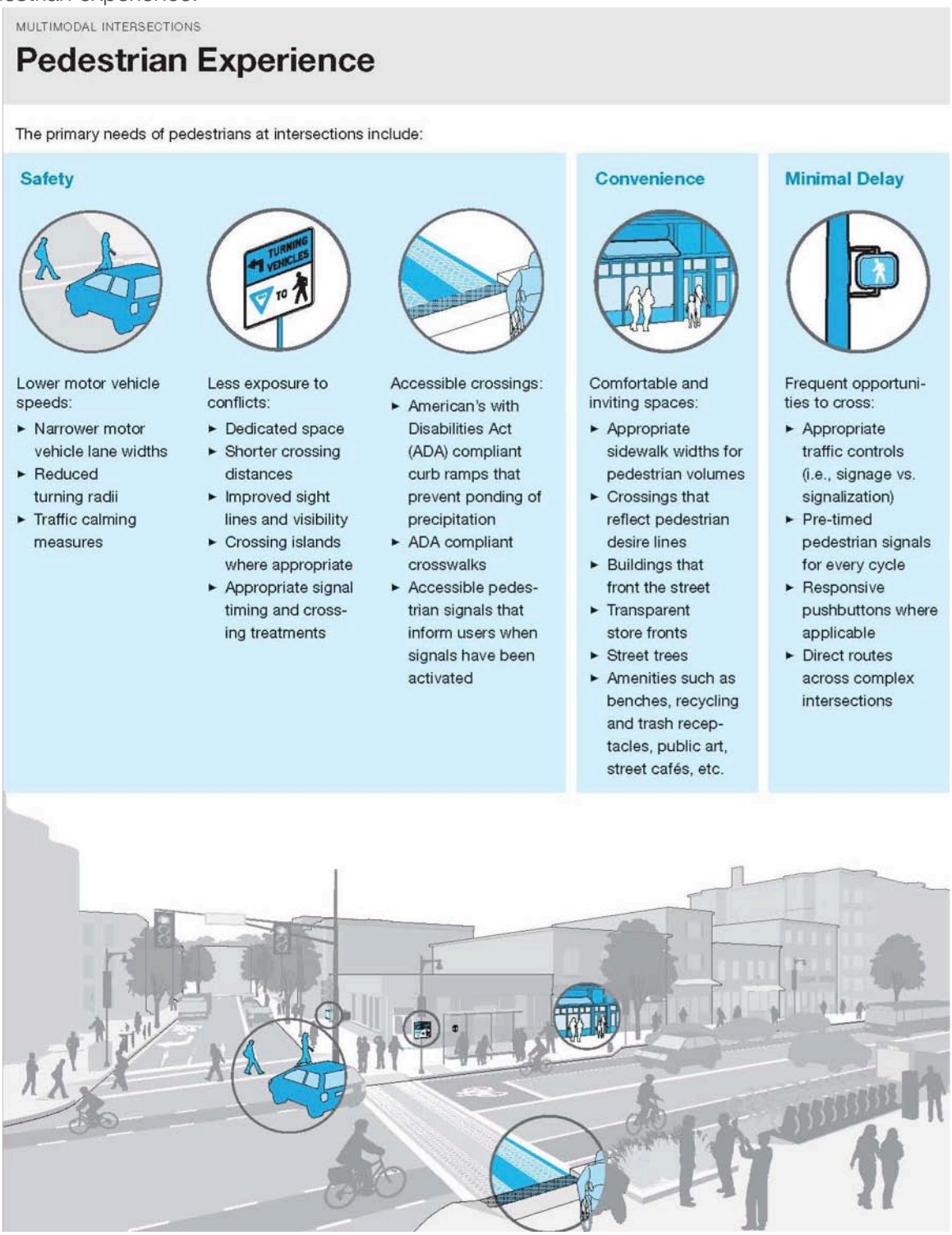
Planning and designing our streets for people on foot, in addition to those traveling by public transportation, bicycle and automobile, is the most important approach to improving street safety. Without sidewalks, safe and convenient street crossings, and slower design speeds, no amount of programmatic or regulatory efforts will curb the epidemic of pedestrian deaths.

Indianapolis, by Eric Fischer

9 Leaf, W.A. and D.F. Preusser. (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. U.S. Department of Transportation National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.gov/people/injury/research/pub/HS809012.html

10 Tefft, B. (2013). Impact Speed and a Pedestrian's Risk of Severe Injury or Death. *Accident Analysis and Prevention*, 50, 871-878.

Boston's *Complete Streets Design Guidelines* defines the primary design elements relevant to the pedestrian experience:



Boston Transportation Department

Recommendations: A national call to action

The Obama Administration and Congress have several near-term opportunities to help communities save lives and improve the safety and comfort for everyone who uses our roadways. Although almost 68 percent of all pedestrian fatalities occur on roads that are eligible for federal aid, from 2009 to 2013, less than one-half of one percent of all available federal safety-related funds was obligated to projects that improve safety for people walking. Federal transportation policy must help improve safety for all users—and put an end to the national epidemic of preventable pedestrian fatalities.

Strengthen the Transportation Alternatives Program (TAP). Since 1991, federal surface transportation laws have included funds specific to biking and walking projects, including its current iteration in the Transportation Alternatives Program (TAP). Investment of these dollars has helped cities and states improve safety, public health and the vitality of local economies. TAP should be retained in future laws and strengthened in several key ways. MAP-21 combined the popular Safe Routes to School, Transportation Enhancement and Recreational Trails programs to create TAP and unfortunately funding for combined program is much lower than the dedicated funding for the three programs under previous law. Specifically, funding was reduced from $1.12 billion to $808 million. Investment of TAP funding has helped cities and states improve safety, public health and the vitality of local economies. The program should be retained in future and strengthened by ensuring local communities have greater control over deciding how to invest these funds through increased sub-allocation of funding. Funding eligibilities should be extended to non-profits.

The U.S. Department of Transportation (USDOT) should follow Congressional intent and hold states accountable for traffic fatalities and serious injuries. In MAP-21, Congress required states to begin setting targets for performance, with safety a primary goal. However, USDOT's proposed rules could undermine the intent of that legislation. The proposed rules not only do not require separate measures for non-motorized and motorized travelers, but they also allow states to fail to achieve as many as half of their safety targets, with a definition of "significant progress" that could define an increase in deaths as progress. And those targets aren't based on a real vision for improved safety: They're based on historical trends. USDOT must require states to set, work toward and be held accountable for achieving real targets in reducing fatalities and serious injuries among people walking, bicycling, driving or riding in a bus or car.

Make safety for people on foot or bicycle a clear performance measure for future federal transportation law. Though the intent to provide for those walking and bicycling is clear in MAP-21, the section related to performance measures doesn't spell out the need for a separate target for non-motorized modes. In the reauthorization bill this year, Congress should require states to set and meet goals that reduce the number of people who are seriously injured or die while walking and bicycling. That goal should be separate from the goal to continue significantly reducing the number of vehicle drivers and passengers who are seriously injured or die.

Adopt a national Complete Streets policy. Congress should require all federally funded road projects consider the safety of all travelers, including those who are walking, taking public transportation, bicycling and driving, regardless of age or ability. Doing so fulfills our national responsibility to make roads safe. The Safe Streets Act (S. 2004/H.R. 2468) will ensure

consistency and flexibility in the processes and standards that direct road-building at all levels of governance and reflects the 600-plus local- and state-level Complete Streets policies already adopted. A national Complete Streets policy is a forward-looking strategy, applied to new and reconstruction projects, to gradually improve roads through cost-effective best practices and proven safety measures.

Increase the federal cost share for certain safety programs. The safety of all users of the transportation system is critical. Safety project investments are some of the most important projects that communities invest in. A 100 percent cost share eligibility should be extended to pedestrian hybrid beacons, medians and pedestrian crossing islands, and Safe Routes to Schools Projects.

Ensure better data collection. Without more complete information about who is killed and injured on our streets—including better measures of where and how often—our ability to effectively prevent these tragic deaths is limited. Federal data collection should be improved with a uniform methodology to include additional information about fatalities and injuries with additional clarity from states regarding how they spend their federal safety funds to improve walking environments. A recommended system to routinely collect more information about how often and where people walk, in addition to commuting, and the number and location of fatalities and injuries suffered, will help transportation agencies better plan for walking and understand high-risk areas.

State activities to improve pedestrian safety

While the federal government sets the tone for a national approach to safety, states—as recipients of federal transportation funds—have the ultimate responsibility to reduce pedestrian fatalities and injuries and should set aggressive goals to do so. With that goal in place, they can then align all other plans, policies and processes to achieve it. Below are some suggested activities to improve safety from the state level.

Adopt a Complete Streets policy and comprehensive implementation plan. States can commit to a Complete Streets vision that fully integrates the needs of all users, regardless of mode, age or ability into the project development and delivery system and then develop a plan to examine and update their processes, manuals and practices to remove barriers to improved pedestrian safety; ensure staff at every level understand and follow this goal in their everyday work; and collect and measure the outcomes of their projects as they relate to non-motorized as well as motorized users.

Emphasize walking and bicycling in the Strategic Highway Safety Plan (SHSP). States are required to develop data-driven SHSPs, which define state safety goals, rank dangerous locations and include a list of projects. States use the SHSP to decide how to spend the money allotted in the federal Highway Safety Improvement Program. In the past, these plans have failed to emphasize non-motorized safety, so very little available money was spent to make walking and bicycling safer. MAP-21 doubled the amount of money available for states to spend on improving roadway safety and made clear that eligible projects included those to make streets safer for people walking and bicycling and those with disabilities. States should capitalize on this opportunity by prioritizing and funding such projects through their SHSPs.

Maximize the use of all federal funding programs for walking and bicycling projects. MAP-21 allows states to spend money from several other major programs on walking and

bicycling projects, including the Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) program, and the Transportation Alternatives Program (TAP). TAP funds, particularly, should be reserved to help those who are walking or bicycling. In addition to planning and building streets, states should employ full-time staff to provide policy, planning and technical expertise related to walking and bicycling facilities.

Reform methods for evaluating roadway performance to account for the needs of all travelers. Measures of congestion such as "level of service," or LOS, are often cited as a major reason for making expensive capacity additions—sometimes to the detriment of people walking. LOS only measures whether drivers can move quickly along a specific stretch of roadway. Redefining LOS to look at overall corridor travel speed and time, to consider "person delay" rather than vehicle delay and/or to account for the needs of people who are walking, bicycling and taking public transportation will help ensure that streets through communities are better planned and designed for walking, as well as driving.

Use practical design and Context Sensitive Solutions (CSS). Rather than a one-size-fits-all approach with rigid minimum requirements and outputs, states can design projects to be context sensitive, taking into account the surrounding community, environment, and specific transportation needs. Effective CSS initiatives involve a commitment to changing both agency culture and the way the agency communicates with the public. To ensure design flexibility, CSS may require a review and update of existing state design standards or the introduction of new design standards (below).

Update design policies and standards. While groups such as the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO) and others have produced guidelines and recommended practices for context-sensitive, multimodal design, many state-level guidelines follow conservative minimums for walking and bicycling and preclude responsible design flexibility. DOTs can achieve better design outcomes by reviewing and revising their existing standards, allowing the use of a wider range of guidelines (including those from ITE and NACTO), and providing additional support to explore feasible design alternatives. Agency guidelines are helpful for local and county transportation agencies as well.

Map existing infrastructure, including facilities under local jurisdiction, to identify gaps in the walking and bicycling network. Working with regional and local agencies and plans, states can identify state-owned roads, state-owned lands (such as parks) and state-funded projects under local jurisdiction that can provide missing links in the network. Such connections are especially important where employment centers, retail destinations or residential developments are only accessible by using a state highway or state-funded roadway. These gaps, as well as high-crash locations, can inform priorities and projects in the SHSP.

Gather good data. States should develop and implement a plan to collect and analyze data related to non-motorized use and crashes that is complete, accurate, uniform and accessible. Activities could include regular statewide surveys of socioeconomic characteristics and travel behavior of households and of knowledge and attitudes about pedestrian and bicycle safety. States can work within and across agencies to link crash, injury, violation and registration records to better their understanding of all traffic crashes and fatalities, including pedestrians.

Reform policy for establishing speed limits to provide local control. State legislation can prevent local governments from controlling the safety of their streets by forcing them to submit to arduous processes and expensive engineering studies to lower speed limits; setting minimum speed limits above 20 mph; or mandating that the limits be set at the speeds that 85 percent of drivers are currently traveling on a street. Local governments are most familiar with their roadways, so allowing them to set safe and reasonable speed limits on their own streets is a common-sense move.

Encourage collaboration across transportation, public health and law enforcement agencies. State transportation agencies should lead these efforts, but other agencies and organizations must work collaboratively with them. Health departments, state and regional transportation professional organizations, law enforcement, academia, media and other public interest groups can collaborate on data collection efforts, public outreach and educational campaigns.

Appendix A: Resources for transportation professionals

Transportation planners, engineers and designers play a key role in making streets safe and comfortable for people traveling by foot or wheelchair. They may look to dozens of resources and guidance. A sampling of recent resources and nationally recognized best practices are listed here.

State-of-the-practice design guidance

- *Urban Street Design Guidelines*, National Association of City Transportation Officials (2013)
- *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice*, Institute of Transportation Engineers and the Congress for the New Urbanism (2010)
- *A Policy on Geometric Design of Highways and Streets, 6th Edition*, American Association of State Highway and Transportation Officials (2011)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (2009, with revisions)
- *Proposed Guidelines for Pedestrian Facilities in the Public Right of Way*, US Access Board (2011)
- *U.S. Traffic Calming Manual*, APA Planners Press (2009)
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition*, American Association of State Highway and Transportation Officials (2004, update forthcoming)

Template design guidance

- *Complete Streets, Complete Networks: A Manual for the Design of Active Transportation*, Active Transportation Alliance (2012)
- *Model Design Guide for Livable Streets*, Los Angeles County Department of Public Health (2011)
- *Re:Streets*, National Endowment for the Arts (n.d.)

Sample design guides

- *Active Design Guidelines*, New York City (2010)
- *Better Streets Plan: Policies and Guidelines for the Pedestrian Realm*, City and County of San Francisco (2010)
- *Boston Complete Streets Design Guidelines*, City of Boston (2013)
- *Complete Streets Chicago: Design Guidelines*, City of Chicago (2013)
- *Urban Street Design Guidelines*, City of Charlotte (2007)

Research and reports

- *Practice-Ready Papers*, Transportation Research Board. These peer-reviewed research papers contribute to the solution of current or future transportation problems or issues for practitioners. Information is ready for immediate implementation or requires minimal additional research or implementation effort. Recent papers related to non-motorized transportation can be found online: http://prp.trb.org/results.aspx?q=&subject=Pedestrians+and+Bicyclists#
- *Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration (2013)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Seventh Edition*, Federal Highway Administration (2013)
- *Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research*, Pedestrian and Bicycle Information Center for Federal Highway Administration (2013)
- *Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers*, America Walks and Sam Schwartz Engineering (2012)
- *The Innovative DOT: A Handbook of Policy and Practice*, State Smart Transportation Institute and Smart Growth America (2014)
- *Public Policies for Pedestrian and Bicycle Safety and Mobility: An Implementation Project of the Pedestrian and Bicyclist Safety and Mobility International Scan*, Federal Highway Administration (2010)
- *Planning Complete Streets for an Aging America*, AARP (2009)
- *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration (2006)

Appendix B: Metropolitan-level data

Metropolitan Area	Total traffic fatalities (2003–2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percentage of pedestrian fatalities by posted speed limit (2003–2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Casper, WY	122	6	4.9%	1.05	16.7%	16.7%	33.3%	66.7%
Cheyenne, WY	123	7	5.7%	0.65	0.0%	0.0%	85.7%	28.6%

Appendix C: County-level data

County	Total traffic fatalities (2003-2012)	Total pedestrian fatalities (2003-2012)	Percentage of traffic deaths that were pedestrians (2003-2012)	Annual pedestrian deaths per 100,000 (2003-2012)	Percentage of pedestrian fatalities by posted speed limit (2003-2012)			Percentage of pedestrian fatalities on arterials (2003-2012)
					Under 20 mph	Under 30 mph	40 mph and over	
Albany County	94	4	4.3%	1.15	0.0%	0.0%	100.0%	25.0%
Big Horn County	39	0	0.0%	0.00	N/A	N/A	N/A	N/A
Campbell County	102	7	6.9%	1.66	0.0%	14.3%	71.4%	71.4%
Carbon County	111	3	2.7%	1.93	0.0%	0.0%	66.7%	33.3%
Converse County	50	0	0.0%	0.00	N/A	N/A	N/A	N/A
Crook County	41	0	0.0%	0.00	N/A	N/A	N/A	N/A
Fremont County	159	11	6.9%	2.85	0.0%	0.0%	100.0%	27.3%
Goshen County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Hot Springs County	20	0	0.0%	0.00	N/A	N/A	N/A	N/A
Johnson County	67	1	1.5%	1.23	0.0%	0.0%	100.0%	0.0%
Laramie County	123	7	5.7%	0.79	0.0%	0.0%	85.7%	28.6%
Lincoln County	61	0	0.0%	0.00	N/A	N/A	N/A	N/A
Natrona County	122	6	4.9%	0.82	16.7%	16.7%	33.3%	66.7%
Niobrara County	30	0	0.0%	0.00	N/A	N/A	N/A	N/A
Park County	59	1	1.7%	0.37	0.0%	0.0%	0.0%	100.0%
Platte County	37	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sheridan County	53	1	1.9%	0.35	0.0%	0.0%	0.0%	0.0%
Sublette County	48	0	0.0%	0.00	N/A	N/A	N/A	N/A
Sweetwater County	172	4	2.3%	0.96	0.0%	50.0%	50.0%	0.0%
Teton County	54	0	0.0%	0.00	N/A	N/A	N/A	N/A
Uinta County	54	2	3.7%	0.99	0.0%	0.0%	100.0%	0.0%
Washakie County	9	1	11.1%	1.22	0.0%	0.0%	0.0%	100.0%
Weston County	22	1	4.5%	1.44	0.0%	0.0%	100.0%	100.0%
State total	**1,550**	**49**	**3.2%**	**0.91**	**2.0%**	**8.2%**	**73.5%**	**42.6%**
US Total	**383,489**	**47,025**	**12.3%**	**1.56**	**1.0%**	**9.8%**	**61.3%**	**52.3%**

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring better development to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For more information visit www.smartgrowthamerica.org.