Traffic Injury Prevention: A 21st-Century Approach

ch. 8

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ABSTRACT >> *Traffic injuries and deaths exact a huge toll on our finances, our families, and our future. There are opportunities in the upcoming authorization of a new federal transportation bill to promote safety for all travelers. More broadly, safety for all travelers must become a national health and transportation priority. Advocates for injury prevention should collaborate with public health experts (specialists in chronic disease prevention, for example) and partners in other sectors (such as economic development) to promote a broad vision for health and equity in transportation policy.*

The overarching policy goals that support traffic injury prevention are to: (1) promote the safe transportation of all travelers by improving infrastructure in communities; (2) reduce the number of vehicle miles traveled by promoting alternative modes of transportation, including public transportation, walking, and bicycling; and (3) protect drivers and passengers through continued improvements in vehicle safety, occupant protection, and road safety. This paper describes specific strategies to achieve these goals.

Traffic Injury Prevention

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Introduction

While getting off a streetcar in New York City on September 9, 1899, Henry Hale Bliss was struck by an electric-powered taxicab and suffered injuries so severe—his skull and chest were crushed—that he died the next day. Bliss thus became the first person killed by a motor vehicle in the United States. The taxicab driver was arrested and charged with manslaughter but was later acquitted on the grounds that the death was unintentional. While the legal proceedings considered where responsibility for Bliss's death lay, there was no discussion of what could have been done to prevent the crash.[1]

What was unprecedented in 1899 is unremarkable today. Traffic crashes are the leading cause of death in the United States for people ages one to 34,[2] and by 2020, traffic-related deaths will be the third-leading cause of death worldwide.[3]

Traffic injuries and deaths exact an unnecessary economic toll. In 2000, motor vehicle crashes in the United States cost $230.6 billion in emergency services, medical treatment, legal procedures, insurance administration, property damage, lost workers' productivity, and travel delays.[4] That figure represents 2.3 percent of the nation's gross domestic product.[5]

In 1900, motor vehicle travel was considered a novelty, and the risks to health and safety were largely overlooked. Subsequent improvements in manufacturing made cars more affordable and available, benefiting commerce, communications, and personal mobility. In 1900, an estimated 8,000 automobiles were registered in the United States. By 1950 there were 50 million, and by 2001, more than 230 million vehicles and 193 million licensed drivers were on the road.[6] The current number of cars and drivers, along with the extensive networks of roads and highways around the nation, would have been inconceivable in 1899 but are accepted as norms of transportation today. Traffic injuries and deaths are frequently considered uncontrollable aspects of America's love affair with the car. This may account for the fact that traffic crashes are too often ignored as a major contributor of premature death and disability, the consequence of which is a missed opportunity to improve health and reduce costs.

In light of ever-shrinking federal, state, and local budgets, the authorization of a new federal surface transportation bill is an opportunity to structure transportation programs to reduce the burden on the healthcare system, the economy, and society at large. National and international experts on traffic injury prevention, including the U.S. National Highway Traffic Safety Administration (NHTSA), the U.S. Centers for Disease Control and Prevention (CDC), and the World Health Organization, increasingly reject the notion that traffic injuries are the inevitable price we pay for modern travel.[7]

Many transportation policies and practices that lead to traffic injuries also contribute to chronic diseases that result from physical inactivity, poor air quality, and other environmental factors that are the consequences of our car culture. Linkages between injury prevention and other health fields should be developed to foster a national transportation strategy that forges solutions to these intersecting problems. Such strategic partnerships can help catalyze a revamped national transportation strategy that is central to policymakers' efforts to address a range of critical challenges: the economy, climate change, the limited supply of fossil fuels, and soaring healthcare costs. A transportation agenda that emphasizes health, equity, environmental protection, jobs, and an improved quality of life requires collaboration from all sectors.

The overarching policy goals that support traffic injury prevention are to: (1) promote the safe transportation of *all* travelers by improving the physical infrastructure in communities; (2) reduce vehicle miles traveled by promoting alternative modes of transportation, including public transportation, walking, and bicycling;

and (3) protect drivers and passengers through continued improvements in vehicle safety, occupant protection, and road safety.

Achievements in Traffic Injury Prevention

While it is impossible to forecast the exact circumstances of traffic crashes, these incidents are not isolated events but are both predictable and preventable. The news and entertainment media often speak of traffic "accidents," but the word implies—erroneously—that the event is happenstance and arbitrary.

Dr. William Haddon, Jr., the first director of the National Highway Safety Bureau, which in 1970 became the National Highway Traffic Safety Administration, brought an emphasis on injury prevention to the government's transportation policies and practices. Dr. Haddon is also recognized for developing the Haddon Matrix (see table 2).

By deconstructing the sequence of events contributing to traffic-related injuries, Dr. Haddon developed effective strategies to prevent crashes and limit injuries. By integrating education, legislation, and enforcement, health and safety advocates as well as government officials have bolstered Dr. Haddon's research by requiring the

Table 1. ***Traffic Injury Prevention Highlights***

1923: Garrett Augustus Morgan, an African American traffic safety innovator, invents the modern traffic signal to reduce the high risk of collisions he observed on roadways shared by horse-drawn buggies, pedestrians, and automobiles.
1924: President Herbert Hoover convenes the National Conference on Street and Highway Safety, marking the first presidential initiative to bring attention to traffic safety.
1964: Ralph Nader's book *Unsafe at Any Speed: The Designed-In Dangers of the American Automobile* is published—another milestone that attributes injuries not just to driver error but also to vehicle design flaws and describes auto executives' resistance to vehicle safety features, most notably General Motors' Chevrolet Corvair. Following the book's release, public pressure mounts, forcing President Lyndon Johnson to call for tighter regulation.
1966: President Johnson signs *The Traffic and Motor Vehicle Safety Act* and *The Highway Safety Act* into law, authorizing the National Highway Safety Bureau (now the National Highway Traffic Safety Administration (NHTSA)) to set vehicle and road safety standards and to fund research and programs on traffic safety.
1967: The U.S. Department of Transportation (DOT) is created to oversee transportation issues, including traffic safety (NHTSA is housed within the DOT).
1979: *Healthy People – The Surgeon General's Report on Health Promotion and Disease Prevention* is released and is the first call to attention that traffic injury prevention should be part of the country's public health agenda.
1985: Under the direction of Congress, the National Academy of Sciences releases the report *Injury in America* which recommends a major national program of research to address injury as a health problem.
1986: Congress creates a center for injury research, surveillance, and education within the Centers for Disease Control and Prevention (CDC), now called the National Center for Injury Prevention and Control.

Table 2. ***The Haddon Matrix (with examples)***

	Host	Agent/Equipment	Physical Environment	Social Environment
Pre-Event	Drinking	Alcohol ignition lock	Alcohol outlets	Drinking norms
Event	Seat belts and Car seats	Airbags	Safety rails	Speeding
Post-Event			Emergency phones	Healthcare access

The Haddon Matrix delineates factors along the timeline of a traffic incident (pre-event through post-event) with four other elements involved in the occurrence of injury (host [e.g., driver], agent [e.g., vehicle], physical environment, and social environment). Prevention activities can be developed within any of these elements. For example, bicycle lanes separate bicyclists from motorized travelers and can thus prevent a crash in the first place. When a crash does occur, if the bicyclist is wearing a helmet, severe head trauma can be prevented. When trauma occurs, a fast and efficient emergency medical system and healthcare must be in place to treat the injuries and prevent death.

use of seat belts, infant car seats, and motorcycle helmets; implementing safe driving laws; and toughening drunk driving laws. The Spectrum of Prevention (table 3) provides a framework for developing comprehensive approaches to preventing injuries.[8]

Prioritizing Traffic Injury Prevention for *All* Modes of Travel

Diversifying transportation options is emerging as a top priority for policymakers. Preventing injuries, improving air quality, encouraging physical activity, and promoting healthier lifestyles can be addressed by reducing miles traveled via automobile and increasing the use of public transportation, bicycling, and walking. This is no easy feat in a country where the car is king and where driving is central to our identity. Advertising campaigns that associate cars with the desire for affluence and independence reinforce the societal link between mobility and upward mobility. The car has historically been promoted as an instrument of sexuality and power; it's the guy with the "sexy car" who gets the girl. Driving is a rite of passage that marks our lives nearly from cradle to grave. It is an exuberant transition for a teen when he or she gets a driver's license and a moment of loss or fear for the adult who must surrender the car keys. Cars will remain the major source of transportation and continue to pose increasing risks unless other safe and convenient forms of transportation are made generally available to the public.

Building transportation systems for all modes of travel promotes equity. Robert Moses, New York City's storied planner known as the builder of the modern metropolis, reportedly constructed the overpasses on his Long Island parkways too low to accommodate buses as a means of preventing low-income residents of the city—especially blacks and Latinos—from visiting the beaches and parks.[9] Thus, parkways like these served as tools for segregation and economic discrimination by putting suburban communities off limits as places of employment and recreation for someone from the inner city who had no car. Decades later, these thoroughfares

Table 3. ***The Spectrum of Prevention***
The Spectrum of Prevention* is a tool to guide development of comprehensive strategies that encourage movement beyond the educational or "individual skill-building" approach to address broader environmental and systems-level issues. The Spectrum builds on the Haddon Matrix by providing a method for developing strategies to address traffic safety that are beyond the incident itself and approaches that focus on the individual. The tool has been used across injury fields to integrate individual-oriented efforts with systems change to have the greatest overall effect.

Levels of the Spectrum	Description
Influencing policy and legislation	Developing strategies to change laws and policies to influence outcomes in health, education, and justice
Changing organizational practices	Adopting regulations and norms to improve health and safety; creating new models
Fostering coalitions and networks	Bringing together groups and individuals for broader goals and greater impact
Educating providers	Informing providers who will transmit skills and knowledge to others
Promoting community education	Reaching groups of people with information and resources to promote health and safety
Strengthening individual knowledge and skills	Enhancing an individual's ability to prevent injury or illness

Successful injury prevention strategies have been multifaceted and engaged efforts at multiple levels of the Spectrum of Prevention. In fact, traffic injury prevention has emerged as a model example of prevention.

*The Spectrum of Prevention was originally developed by Larry Cohen in 1983 while working as director of prevention programs at the Contra Costa County Health Department. For application of the Spectrum of Prevention to injury prevention: T. Christoffel and S.S. Gallagher, Injury Prevention and Public Health (Sudbury, MA: Jones and Bartlett Publishers, Inc., 2006).

stand as monuments to transportation policies that divided the country rather than healed its divisions.

Generally, the safety of public transportation and non-motorized travel (i.e., bicycling and walking) has received relatively little federal support, yet communities with diverse transportation options have been shown to have fewer traffic injuries and deaths.[10] Contrary to the widespread belief that increased bicycle and foot traffic will lead to more cyclist and pedestrian injuries and deaths, increasing the numbers of non-motorized travelers may actually make walking and bicycling *safer*.[11] There is also evidence that residents of transit oriented communities have lower per capita traffic fatality rates.[12]

Germany and the Netherlands illustrate the benefits of government support for safety improvements for pedestrians and bicyclists.

Per mile and per trip walked, Americans are roughly three times more likely to get killed than German pedestrians and more than six times as likely as Dutch pedestrians. Per mile and per trip cycled, Americans are twice as likely to be killed as German cyclists and more than three times as likely as Dutch cyclists.[13] Furthermore, pedestrian and bicyclist deaths have declined far more in both countries than in the United States. The Netherlands and Germany have invested heavily in high-quality streetscapes for safe walking and bicycling, making non-motorized travel a norm compared to passenger vehicle travel. The United States has seen virtually the opposite—an interplay of land use, housing, and transportation patterns that have promoted low-density sprawl, high-speed roadways, narrow or no sidewalks, unsafe or no crosswalks, the absence of bicycle lanes, and inaccessible or no public transportation at all. All this makes alternatives to cars and driving not only impractical but also less safe.

With its promise of convenience and freedom, the car still has a strong allure. But a growing number of Americans say they want to drive less and walk, bicycle, and use public transportation more. Advocates can use this desire as momentum to raise public awareness about the benefits of these travel options that are good for better health, for the environment, and for the family budget.

The Continuing Burden of Traffic Injuries and Deaths

While there have been reductions in death rates per vehicle mile traveled (VMT) over the past four decades, the declines are far less when deaths are measured per capita because Americans drive more than ever (see graph 1).[14]

In 2007, traffic crashes accounted for 41,059 deaths,[15] 1,755,247 years of lost life,[16] and 2.5 million nonfatal injuries.[17] Bicyclists and pedestrians have a disproportionately higher risk of death in a traffic crash compared to vehicle occupants.[18] This greater vulnerability stems from the fact that bicyclists and pedestrians do not have the buffers and protective measures that vehicles offer drivers and passengers. An analysis of 1995 National Household Travel Survey data indicates that the rate of pedestrian fatalities is 36 times higher than car-occupant fatalities per mile traveled, and bicycling fatalities are 11 times higher.[19]

In 2007, there were 5,504 non-motorized fatalities.[20] While walking and bicycling accounted for only 9.5 percent of all trips in 2001, non-motorized fatalities accounted for more than 13 percent of traffic fatalities nationwide.[21] Pedestrian fatalities accounted for 84.5 percent of all non-motorized fatalities, bicyclist fatalities accounted for 12.7 percent, and the remaining 2.8 percent were skateboard riders, roller skaters, etc.[22]

Contrary to the belief that these statistics make a favorable case for continuing to travel exclusively by car, they highlight the lack of infrastructure to support safe non-motorized travel alongside motorized travel. By implementing strategies that reduce the amount of exposure non-motorized travelers have to moving vehicles and reducing the number of cars on the road, it is possible to dually promote alternative modes of transportation *and* mechanisms to improve the safety of these alternative modes.

Disparities in Traffic Injuries and Deaths

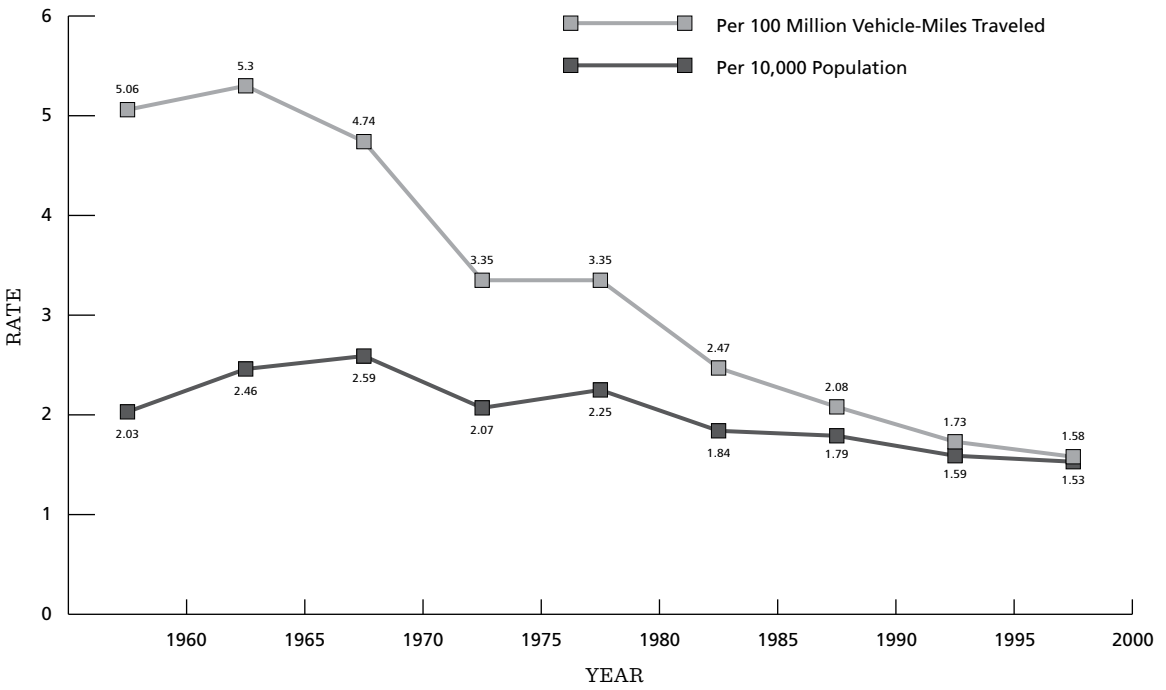
Traffic injuries and deaths are major health concerns for everyone but more so among society's most vulnerable populations. National data from the Centers for Disease Control and Prevention (CDC) indicate that Native Americans are 1.5 times more likely to die from traffic crashes than other Americans.[23] Data collection methods inhibit clarity about the disparate impact of traffic crashes on other racial/ethnic groups, and there is a dearth of data that looks at disparities by income. This is due to the fact

that the primary source of data comes from police reports, which do not collect race and ethnicity data. However, some studies seem to indicate the existence of such disparities across race/ethnicity. Between 1990 and 1998, death rates from motor vehicle crashes declined least for African Americans and Native Americans, who also continued to have higher age-adjusted death rates for motor vehicle crashes than any other racial or ethnic group.[24] An analysis of North Carolina's licensed drivers, ages 16 to 24, puts the fatality rate for Latinos at nearly 1.5 times greater than that for whites.[25]

Pedestrian safety is particularly important for populations that have less access to cars and rely more on walking for transportation. For example, African Americans make up approximately 12 percent of the U.S. population, but they account for 20 percent of pedestrian deaths.[26] Another CDC analysis suggests that the pedestrian fatality rate for Latino men in the Atlanta metropolitan statistical area was six times greater than that for whites between 1994 and 1998.[27] While Latinos made up 28 percent of the population in Orange County, CA, they accounted for 40 percent of all pedestrian injuries and 43 percent of pedestrian deaths in 1999, according to a study done by the *Los Angeles Times*.[28]

While data comparing traffic injury rates by

Graph 1. ***U.S. Traffic Fatalities by VMT and Per 10,000 Population***



Primary data collected by the Bureau of Transportation Statistics (2000), available at http://www.bts.gov/publications/nts/index.html. This graph was originally compiled by Todd Litman, Victoria Transport Policy Institute.

income level are not readily available, people with low incomes may be more vulnerable to traffic injuries and deaths. Low-income often means less access to products that enhance safety, such as newer, safer vehicles or child safety seats; moreover, low-income communities have fewer resources for safe roads and sidewalks, crosswalks, lighting, and traffic enforcement.

Other Populations with Greater Risk

Across all ethnic groups, more males than females die from motor vehicle crashes.[29] Compared to females, males have lower rates of seat belt use; and are more likely to be involved in alcohol-related crashes and be alcohol-impaired (whether as drivers, passengers, pedestrians, or cyclists) at the time of the incident.[30] Drivers under the age of 25 are also more likely to be involved in fatal traffic crashes than any other age group.[31]

Additionally, driving skills decline with age; with older adults representing the fastest-growing segment of the U.S. population, protecting them from injuries caused by collision should be a top priority on any health and safety agenda. Although older motorists drive fewer miles, they are more likely to be killed or injured in a crash of the same severity compared to other age groups.[32] Not only are older drivers typically frailer than others, they also tend to drive older cars, which typically have fewer safety features.[33] Even if older drivers in the future drive at the same modest rates as the current elder population, their growing numbers mean that total miles driven by people ages 65 and older would increase 50 percent by 2020 and more than double by 2040.[34] While strategies can focus on mitigating risks for older drivers, the best safety approach is to provide safe pedestrian facilities and accessible, affordable public transportation.

Transportation Injury Prevention Strategies

Transportation safety practices and policies should be integrated into all relevant agency agendas and across all levels of government. The pending authorization of the federal transportation bill, the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU),* is an opportunity to expand programs that have led to improvements in health and safety. Federal policy has historically succeeded in establishing national standards through a carrot-and-stick approach, encouraging state and local governments to comply with federal targets such as those on seat belt use or car seats by dangling federal funds as the carrot. The federal government thus effectively leverages its resources and expands safety targets.

Land Use

Deciding the best uses for our land has not traditionally been included among injury prevention strategies. However, land use issues strongly influence how we travel, which is a key component in determining our risk for getting hurt in a crash. Zoning laws and general plans influence population density within a community, how streets connect, and the distance between homes and key institutions such as schools and workplaces. These factors affect the feasibility, appeal, and safety of walking, bicycling, or using public transportation to get where we need to go. Smart growth strategies—which encourage compact development combining housing, shops, businesses, and parks—reduce our reliance on car travel, creating communities that are safer, more convenient, and more inclusive of low-income residents, older adults, and people with disabilities. One approach that utilizes smart growth elements is transit oriented development (TOD), which develops compact major activity centers around public transportation hubs.

By limiting the number of alcohol outlets, zoning laws can also help tackle the problem of impaired driving.

Road Design

Road design influences driving behavior and is an important determinant of bicyclists' and pedestrians' exposure to traffic, and thus, risk of injury and death.

Road design strategies should emphasize the safety of both motorized and non-motorized travelers. Many road and street improvements can accomplish this: clear road markings and signage to designate crosswalks, bicycle lanes, demarcations between vehicle lanes, and adequate lighting alongside the road to ensure good visibility.[35] Additionally, sidewalks, bulb-outs at street corners (which shorten crossing distances and slow the speed of traffic), curb cuts, and separate pathways for pedestrians and bicyclists can limit motor vehicle crashes. Road design strategies should also pay particular attention to improving safe access and mobility for older adults and people with disabilities, beyond *Americans with Disabilities Act (ADA)* street design requirements.[36]

Because the risk of death and severe injury in traffic crashes has a direct correlation to speed[37] and because speeding is a factor in one-third of all crashes, environmental changes to encourage slower speeds on our roads are vital. Traffic calming, design approaches that acknowledge the relationship between environmental design and behavioral norms, is one of the most important injury prevention strategies in recent decades. Reducing lane widths, curving streets, and adding trees enhance the roadway experience and lead to slower, safer driving. The construction of raised islands, medians, and roundabouts in the roadway also reduces traffic speeds.

These design improvements must reach *all* neighborhoods. Funds should especially be targeted to low-income communities, where residents are more likely to walk or bicycle for transportation.

Public Transportation

Safe, efficient, and easily accessible public transportation systems will reduce the frequency of injury and death caused by passenger vehicles and truck traffic. Public transportation systems can solve a number of transportation issues simultaneously, e.g., provide equitable access for vulnerable populations such as older adults, people with disabilities, and low-income populations as well as improve air quality by having fewer vehicles on the road.

Funding should be increased for public transportation improvements and expansions. Public transportation must be fast and affordable; it must link people with the places they need to go. Americans will not give up their cars in significant numbers without realistic public transportation alternatives, including safe routes for walking or bicycling to transit stops. Transit operators can help by providing bicycle lockers and racks, elevators, adequate lighting, and security guards or other safety monitors. Road design features such as crosswalks, sidewalks, and conveniently located transit stops (bus stops and transit lines positioned for easy pedestrian access) are also beneficial. Public transportation accessibility and safety will become increasingly important for older Americans as the U.S. population ages.

Speed Limits

As noted earlier, speeding is an important factor in traffic injury and death. The 55-mile-per-hour highway speed limit, established by Congress in 1974 and later adopted by all states, was repealed in 1995. When speed limits are increased on major highways, motorists tend to drive faster on secondary roadways, a process known as "speed adaptation."[38] Reducing speed saves not only lives but also energy because speeding reduces fuel efficiency.

Automobile advertising tends to glorify high-speed driving and risky driving behaviors.[39] Getting drivers to slow down may also require changes in automobile marketing practices.

Impaired Driving Laws

Alcohol-related motor vehicle crashes kill someone in the United States every 39 minutes.[40] Several studies reveal that when alcohol plays a role, crashes tend to be much more severe.[41] Strategies that are effective at preventing impaired driving include:

- Maintain strict enforcement of 0.08 percent blood alcohol content (BAC) laws.[42]
- Consistently enforce the national minimum legal drinking age law and adopt zero tolerance laws (i.e., revoking a driver's license if impaired) for drivers younger than 21 in all states.[43]
- Establish sobriety checkpoints,[44] coupled with extensive media campaigns to increase public awareness.
- Install alcohol ignition interlocks in vehicles.[45]

A number of impaired driving prevention strategies focus on organizational interventions such as alcohol licensing, alcohol availability, alcohol bans, reducing alcohol outlet density and server interventions.[46] Other effective strategies include economic interventions such as raising state and federal alcohol excise taxes and reducing the number of alcohol retailers.[47]

It must be noted that there are higher densities of alcohol retail in low-income communities and communities of color; consequently, strategies should address the saturation of liquor stores in these communities rather than relying exclusively on modifying consumers' behavior.[48]

Driver or pedestrian alcohol use was reported in 47 percent of the traffic crashes that resulted in pedestrian fatalities, with pedestrians more likely to be intoxicated than drivers.[49] As rates of driving continue to decline and other modes become more prevalent, specific solutions must be explored for preventing alcohol-related traffic crashes among bicyclists and pedestrians.

Bicycle Helmet Laws

More than a half-million people are treated annually in hospital emergency rooms in the United States for bicycle-related injuries.[50] Approximately 60 percent of bicycle deaths involve a head injury; research indicates that a helmet can reduce the risk of head injury by up to 85 percent.[51] In 1999, the U.S. Consumer Product Safety Commission issued a mandatory safety standard for bicycle helmets.[52] Twenty-one states and the District of Columbia have helmet laws but require use only among young riders (often under the age of 16).[53] Little political will exists at the federal and state levels to legislate helmets—despite their lifesaving value—for a greater percentage of bicyclists. Municipal ordinances remain the most promising policy approach.

Schools, businesses, and government agencies can also mandate that children and employees wear bicycle helmets when riding to and from school or work. Schools and offices can disseminate information about their importance and value. Stores that sell bicycles and helmets can also be productive partners in this effort, offering reduced-price or free helmets and

distributing information about their proper use and importance in preventing injuries or deaths.

Vehicle Design Standards

Vehicle design standards play a key role in increasing safety for drivers and their passengers and for bicyclists and pedestrians. Examples include improved braking systems, bumpers and external frame requirements, airbags, shatter-resistant windshields, shock-absorbing steering wheels, and automatic seat belts.

Seat Belt Laws

It's been proven that seat belts save lives. Yet the United States ranks among the lowest nations in the developed world for seat belt usage—an 83 percent daytime use rate.[54] Every state except New Hampshire has seat belt use laws, but only 25 states and the District of Columbia allow primary enforcement,[55] which permits officers to ticket a driver for not wearing a seat belt without necessitating another traffic violation. Primary enforcement has been associated with lower fatality rates[56]; in states with such laws, seat belt use is typically 10 percent to 15 percent higher.[57] *SAFETEA-LU* provided more than $500 million in incentive grant money to encourage states to pass primary enforcement seat belt laws, but only a few states have done so. In addition to incentives, federal transportation dollars should be withheld from states that do not adopt such laws. There should also be safeguards for uniform enforcement of primary seat belt laws to address the concern from many opponents that traffic laws have a history of discriminatory enforcement, with targeting of certain racial and ethnic groups.[58] The National Organization of Black Law Enforcement Executives, the nation's leading group of minority law enforcement executives, has recognized that large numbers of African Americans die because they don't use seat belts or child safety seats (discussed below); it supports primary enforcement laws covering both strategies.

Motorcycle Helmet Laws

Motorcycles make up more than three percent of registered vehicles and only 0.4 percent of vehicle miles traveled but 11 percent of traffic fatalities.[59] Helmet use is the most effective measure to protect motorcyclists. Although helmets do not prevent crashes, they offer significant protection against head and brain injuries. States with all-rider helmet laws have a use rate of nearly 100 percent. Twenty-six states have laws that cover only some riders (e.g., up to age 18), which are nearly impossible to enforce; the trend now is toward repealing such laws rather than enacting them. All states should be required to enact an all-rider motorcycle helmet law, and grant funding should provide incentives for promoting motorcyclists' safety.

Child Safety Seat Laws

Child safety seats reduce the risk of death in vehicles by 71 percent for infants and by 54 percent for children ages one to four years.[60] For the past 20 years, child safety seats have been tremendously successful with nearly 100 percent compliance. The CDC Guide to Community Preventive Services presents strong evidence that child safety seat laws, the distribution of safety seats, and education and enforcement

campaigns are effective in increasing child safety seat use.[61]

But more work needs to be done to protect child occupants who remain at heightened risk. The next priority: enacting booster seat laws for children up to age eight, as recommended by the NHTSA. At present, 42 states and the District of Columbia have such laws.[62]

Lack of access to affordable child safety seats makes their use lower in rural and low-income communities.[63] Research reveals, however, that 95 percent of low-income families who own a child safety seat use it.[64] The federal surface transportation bill should help low-income families to purchase booster seats.

Graduated Driver Licensing

Graduated driver licensing (GDL) laws, which require newly licensed youth to "graduate" to full licensing, allow young people to practice before assuming the full rights and responsibilities of driving. Research suggests that comprehensive GDL programs can reduce fatal crashes among 16-year-old drivers by up to 38 percent.[65]

Truck Regulations

Although this paper emphasizes safety for passenger vehicles, truck safety is another important area for injury prevention. Strategies include improving built-in truck safety features, regular inspections, restrictions on hours operators can drive without a break, and regulations limiting load size. Federal transportation policy can make roads safer for everyone by supporting expanded rail transport and reducing reliance on trucks.

Challenges to and Opportunities in Traffic Injury Prevention Policy

The current federal transportation bill, *SAFETEA-LU*, includes programs that advance both health and safety. These programs can benefit greatly from additional funding in the pending authorization of a new bill and an emphasis on expanding best practices and promoting equity. Funding should be prioritized to ensure that injury prevention efforts are designed to benefit the most vulnerable communities. Notably, the Highway Safety Improvement Program (HSIP) was an unprecedented attempt to consolidate safety efforts. Other successes that should be expanded: the Safe Routes to School (SRTS) program, the Transportation Enhancements (TE) program, and The Non-Motorized Transportation Pilot program (see table 4 for details about these programs).

A well-thought-out federal health and safety framework for transportation policy and practice must be reflected at the local level as well. States and locales are the crucibles of change; they do most of the transportation planning and implementation. Yet the quality of safety efforts remains uneven. Without a sufficient federal mandate, some states ignore the imperative for traffic safety, and others have not implemented measures to their greatest potential. Federal mandates should be flexible so locales can choose strategies that best respond to community conditions. HSIP's mandatory strategic highway safety plan process, which requires states to develop safety priorities and targets in order to receive safety funds from the program, is an opportunity for this type of coordinated traffic safety approach.

The federal government should also require states to include in their transportation planning a wide range of voices, including groups concerned with health and community well-being. An important model for this type of multi-sector collaboration is the Safe

Table 4. ***SAFETEA-LU Programs That Support Injury Prevention****

Program	Amount	Description
Highway Safety Improvement Program (HSIP)	$5 billion over 5 years	Achieves a significant reduction in traffic fatalities and serious injuries on all public roads by implementing infrastructure-related highway safety improvements. A portion of these funds can be used for safe behavior enhancement programs.
Safe Routes to School (SRTS)	$612 million over 5 years	Funds infrastructure and programming projects to encourage children and their accompanying guardians to walk or bicycle safely to school every day. This program is one of a few existing models that jointly focuses on increasing rates of walking and bicycling and improving safety conditions for non-motorized travelers. It should be authorized with greater investment.
The Non-Motorized Transportation Pilot Program	$125 million over 5 years	Funds infrastructure and programming in four communities to increase bicycling and walking. Expanding it to fund more communities and conduct further evaluation is the next step. Its authorization should require funded communities to include safety goals in their transportation plans so that every new project focuses on reducing traffic injuries and deaths among bicyclists and pedestrians as well as infrastructure improvements that improve safety for all.
Transportation Enhancements (TE)	$3.5 billion	Funds bicycle and pedestrian trails and rail-trail conversions, which include safety improvements to these environments; these conversions take up about 55% of TE funding. It is a 10% set-aside from another major program in SAFETEA-LU, the Surface Transportation Program. This is the largest source of federal funds for non-motorized projects and should be increased to reflect growing demand.

* Funds for agencies under the U.S. Department of Transportation that address traffic safety and for the State and Community Highway Safety Grant Program, described in table 5, were also authorized under SAFETEA-LU.

Communities Program, funded through Section 402 transportation funds (described in table 5).

Moreover, the authorization should provide states with data, training, and technical assistance to ensure that plans are well tailored to community needs, that they effectively reach low-income communities and communities of color, and that they include a diverse and comprehensive set of strategies. HSIP currently focuses almost exclusively on the safety of motorized travelers. To equitably distribute transportation safety funds, several advocates are calling for a "Fair Share for Safety" provision, requiring states to spend a portion of their funds, proportional to the percentage of non-motorized travelers' deaths, on walking and bicycling safety projects.

A complete streets policy—which emphasizes safe, easy, and efficient mobility for *all* travelers through connected networks of roads, paths,

Table 5. ***Federal and State Government Support for Traffic Injury Prevention***

- **Federal**: The U.S. Department of Transportation (DOT) is the agency responsible for the federal transportation system. One of its primary charges is to ensure the safety and security of the traveling public; safety is among its top three priorities. The National Highway Traffic Safety Administration (NHTSA), the Federal Highway Administration (FHWA), and the Federal Motor Carrier Safety Administration (FMCSA) are the three major agencies under the DOT umbrella that provide national leadership and support on transportation safety issues. The Federal Transit Administration (FTA) addresses safety related to public transportation. Congress has also created the National Center for Injury Prevention and Control (NCIP) within the Centers for Disease Control and Prevention (CDC); it funds injury research, provides grants to state and local health agencies, and works to increase awareness about injury prevention.
- **State**: In addition to the federal agencies and programs dedicated to traffic safety, states also have dedicated funding sources to improve traffic safety. This support comes primarily through Section 402 State and Community Highway Safety Grant Program, first authorized by the Highway Safety Act of 1966 and reauthorized in succeeding federal surface transportation bills. Most state public health departments also support ongoing injury prevention and control programs.

and trails—is not included in *SAFETEA-LU*, but should be incorporated into the new federal transportation bill.[66]

Another policy issue that requires attention is deciding the appropriate mechanisms to distribute funds in order to encourage projects that promote safety and convenience by modes other than passenger vehicle travel. The new federal transportation bill should provide alternatives to the current funding formula, which bases allocations on a state's total number of vehicle miles traveled. One option is to link transportation funds to land use patterns that encourage smart growth development and discourage development patterns that require passenger vehicles for the majority of local travel.

Conclusion

Twenty-first century transportation policy must reflect a new vision of mobility and accessibility. Safe travel for all road users and broader considerations of health and equity must be at the center of policy and practice, which would be a difficult task even without the entrenched interests invested in maintaining the status quo. It requires a strong, committed partnership that spans multiple sectors and disciplines.

Building this partnership requires moving beyond past differences and historical positions. Diverse groups must recognize their common interest in opposing policies centered on building more roads, highways, and sprawling developments at the expense of air quality, bicycle and pedestrian access, smart growth, and safety for everyone.

Notes

Chapter 8: Traffic Injury Prevention: A 21st-Century Approach

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