

Chapter 3. Policies that Reduce Motor Vehicle-Related Injuries and Fatalities



3 Introduction: Policies that Reduce Motor Vehicle-Related Injuries and Fatalities

Through much of 1960s, 70s, and 80s, 40,000 to 50,000 people were killed each year in traffic crashes.³⁰⁰ However, in the following decades, as effects were felt from major improvements in highway design, vehicle design, seat belt and anti-drunk driving laws, enforcement, and education, the number of fatalities began to drop. Even as vehicle miles traveled rose rapidly—tripling in the space of four decades³⁰¹—the number of fatalities and injuries per mile driven

³⁰⁰ Historical Statistics of the United States. *Motor Vehicle Traffic Fatalities and Fatality Rates: 1900–1995*. Historical Statistics of the United States, Millennial Edition. Available at: <http://hsus.cambridge.org/HSUSWeb/toc/showTable.do?id=Df184-577> [accessed June 16, 2011].

³⁰¹ Historical Statistics of the United States. *Distance Traveled by Motor Vehicle Type and Highway Category: 1921-995*. Historical Statistics of the United States, Millennial Edition. Available at: <http://hsus.cambridge.org/HSUSWeb/toc/showTable.do?id=Df184-577> [accessed June 16, 2011].

dropped by nearly 80 percent, a truly dramatic achievement.³⁰² In 2009, there were 33,808 traffic fatalities, the lowest number since 1950.

This progress was due to concerted policy efforts. For example, the use of seat belts in passenger vehicles alone saved an estimated 75,000 lives or more between 2004 and 2008.³⁰³ Despite these successes, motor vehicle crashes continue to be the leading cause of fatality and injury for Americans age 1 to 34. In addition to the 33,808 deaths in 2009, there were more than 2 million injuries.³⁰⁴ In 2000, crash-related costs (property damage, lost productivity, and medical expenses) totaled more than \$230 billion.³⁰⁵

The dramatic reduction in the rate of traffic fatalities and injuries over the past decades and the more recent reduction in the absolute number of fatalities and injuries have been the result of targeted application of policies focused on three broad strategies:

- Preventing a traffic crash from happening in the first place (e.g., preventing alcohol-impaired driving, controlling speed, improving safe driving behavior, and improved vehicle handling)
- Reducing the level of injury in the event of a crash (e.g., increased use of seat belts, improvement in child restraint systems, and improvement in vehicle design in absorbing energy of a crash)
- Increasing the speed and quality of medical care after a crash has occurred (e.g., improving emergency medical services, reducing response times, improving care on site, and improved emergency hospital care).

Opportunities for Further Traffic Fatality and Injury Reductions

Very substantial additional progress can be achieved by a combination of improving and continuing to apply policies that have contributed to past success and developing and implementing new ones. We have identified 15 policies within seven areas where substantial reductions can be achieved in traffic fatalities and injuries. The seven areas are:

- Driving under the influence (DUI)
- Distracted driving

³⁰² U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Highlights of 2009 Motor Vehicle Crashes*. DOT HS 811 363.

³⁰³ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Lives Saved in 2008 by Restraint Use and Minimum Drinking Age Laws*. DOT HS 811 153.

³⁰⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Highlights of 2009 Motor Vehicle Crashes*. DOT HS 811 363.

³⁰⁵ Centers for Disease Control and Prevention. Injury Prevention & Control. *Injury Fact Sheet*. Available at: http://www.cdc.gov/ncipc/anniversary/media/fs_trans.htm [accessed May 23, 2011].

- Younger drivers driving beyond their skills
- Older drivers driving beyond their abilities
- Excessive speed
- Failure to wear seat belts
- Inappropriate or no use of child restraint systems

Driving under the Influence (DUI)

Driving under the influence (DUI) is defined as driving with a blood alcohol concentration (BAC) equal to or greater than .08 grams per deciliter (g/dL), or 0.08 percent. The percentage of fatalities that occurred in DUI crashes decreased from 53 percent in 1982 to 34 percent in 1997. It then leveled off for two years, increased by 1 percent in 2000, and remained at that level for two years before it decreased to 33 percent in 2005.³⁰⁶ In 2009, DUI-related crash fatalities still numbered almost 11,000. The drop in the DUI fatality rate is a public health success story that can be built upon by extending the use of ignition interlocks, increasing the use of sobriety checkpoints, maintaining and increasing enforcement of the national minimum drinking age at 21, and strengthening zero-tolerance laws for young drivers.

Distracted Driving

Distracted driving is playing an increasing role in traffic crashes. In 2005, driver distraction was a factor in 10 percent of all fatal crashes and 22 percent of all injury crashes. In 2009 distracted driving was a factor in 16 percent of all fatal crashes and 21 percent of injury crashes, resulting in 5,474 deaths and 448,000 injuries.³⁰⁷ The rise in the use of cell phones and other electronic devices while driving has created a new form of distracted driving, and a large number of drivers admit to using cell phones or texting while driving. Countermeasures for reducing these distractions are in the early stages of implementation and evaluation. However, based on the success of similar policies in increasing seat belt use, providing incentives for states to pass cell phone laws and providing funds for enforcement and education should help reduce distracted driving collisions.

³⁰⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. *Statistical Analysis of Alcohol-Related Driving Trends, 1982-2005*. DOT HS 180 942.

³⁰⁷ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Distracted Driving 2009*. DOT HS 811 379.

Younger Drivers Driving Beyond Their Skills

Motor vehicle crashes are the leading cause of death for adolescents in the U.S. In 2009, motor vehicle crashes killed 2,336 drivers age 15 to 20 and injured 196,000.³⁰⁸ The crash rate per mile driven for 16- to 19-year-olds is four times that of older drivers. The risk is highest at age 16—twice as high as for 18- to 19-year-olds.³⁰⁹ Strong graduated driver licensing (GDL) programs for new drivers are highly effective in reducing their crash risk.³¹⁰ GDL requires young drivers to drive under supervision and limits their exposure to hazardous situations until they gain necessary driving skills. While all states have GDL programs in place, increased benefits can be achieved by ensuring compliance and testing.

Older Drivers Driving Beyond Their Cognitive and Physical Abilities

The number of older (age 65 and over) licensed drivers increased 23 percent between 1999 and 2009; there were a total of 33 million licensed drivers age 65 and older in 2009. In 2008, they comprised 13 percent of all licensed drivers.^{311,312} Drivers age 70 and older have (per capita and per mile traveled) elevated risk of being at fault for fatal crashes.^{313,314} In addition, older adults have an increased susceptibility to injury and medical complications when involved in a crash.³¹⁵ For older drivers, the use of license evaluation for identifying perceptual or cognitive deficits reduces crashes.³¹⁶

³⁰⁸ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Young Drivers*. DOT HS 811 400.

³⁰⁹ Insurance Institute for Highway Safety. *Fatality Facts 2009: Teenagers*. Available at: http://www.iihs.org/research/fatality_facts_2009/teenagers.html [accessed March 30, 2011].

³¹⁰ Williams, A.F. and Shults, R.A. 2010. Graduated Driver Licensing Research, 2007-Present: A Review and Commentary. *Journal of Safety Research*, 41: 77-84.

³¹¹ Stutts, J., Martell, C. and Staplin, L. 2009. *Identifying Behaviors and Situations Associated With Increased Crash Risk for Older Drivers*. Available at: <http://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/811093.pdf> [accessed May 23, 2011].

³¹² Insurance Institute for Highway Safety. 2010. *Fatality Facts 2009. Older people*. Available at: http://www.iihs.org/research/fatality_facts_2009/olderpeople.html [accessed April 7, 2011].

³¹³ Stutts, J., Martell, C. and Staplin, L. 2009. *Identifying Behaviors and Situations Associated With Increased Crash Risk for Older Drivers*. Available at: <http://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/811093.pdf> [accessed May 23, 2011].

³¹⁴ Insurance Institute for Highway Safety. 2010. *Fatality Facts 2009. Older people*. Available at: http://www.iihs.org/research/fatality_facts_2009/olderpeople.html [accessed April 7, 2011].

³¹⁵ Centers for Disease Control and Prevention. Injury Prevention & Control: Motor Vehicle Safety. *Older Adult Drivers: Fact Sheet*. Available at: http://www.cdc.gov/MotorVehicleSafety/Older_Adult_Drivers/adult-drivers_factsheet.html [accessed May 23, 2011].

³¹⁶ Nasvadi, G.C. and Wister, A. 2009. Do Restricted Driver's Licenses Lower Crash Risk Among Older Drivers? A Survival Analysis of Insurance Data From British Columbia. *The Gerontologist*, 49.4: 474-84. Available at: <http://gerontologist.oxfordjournals.org/content/49/4/474.abstract> [accessed June 10, 2010].

Speeding

In the most recent National Survey of Speeding and Unsafe Driving Attitudes and Behavior by the National Highway Traffic Safety Administration (NHTSA), more than 25 percent of drivers reported speeding on the day of the interview.³¹⁷ Speeding contributes to nearly one-third of fatal crashes. Under extreme weather-related road conditions, such as snow, slush, and ice, speeding is a factor in more than one-half of fatal crashes—54 percent on snowy or slushy roads and 59 percent on icy roads.³¹⁸ Encouraging use of automated speed enforcement cameras where appropriate and when used as an adjunct to traditional enforcement methods and engineering approaches is an important strategy for reducing excess speed.^{319,320} Use of traffic calming methods can also reduce speed and increase safety and is particularly effective in reducing risk for vulnerable road users.³²¹

Seat Belt Use

Studies on seat belt use have shown that they reduce the risk of fatal injury to front-seat passengers by 45 percent and reduce the risk of moderate to critical injury by 50 percent.³²² In 2010, nationwide seat belt use rose to 85 percent as measured by the NHTSA National Occupant Protection Use Survey (NOPUS).³²³ However, a large number of deaths and injury occur each year because occupants are not wearing seat belts. A 2009 U.S. Department of Transportation study estimated that 1,652 additional lives could be saved and 22,372 serious injuries prevented annually in the U.S. if seat belt use rates rose to 90 percent in all states.³²⁴ Although estimates of the impact vary, NHTSA estimates that each 1 percent increase in seat belt use could save 270 lives annually.³²⁵

³¹⁷ Royal, D. 2003. *National Survey of Speeding and Unsafe Driving Attitudes and Behavior: 2002, Volume II*, NHTSA, Washington, D.C. DOT HS 809 688.

³¹⁸ U.S. Department of Transportation National Highway Traffic Safety Administration. 2007. Traffic Safety Facts. *Speeding*. DOT HS 810 998.

³¹⁹ Pilkington, P. and Kinra, S. 2005. Effectiveness of Speed Cameras in Preventing Road Traffic Collisions and Related Casualties: Systematic Review. *British Medical Journal*, 330: 331-34.

³²⁰ Rodier, C.J.; Shaheen, S.A. and Cavanagh, E. 2007. *Automated Speed Enforcement in the U.S.: A Review of the Literature on Benefits and Barriers to Implementation*. Transportation Research Board Annual Meeting. Available at: http://pubs.its.ucdavis.edu/download_pdf.php?id=1097 [accessed July 27, 2010].

³²¹ Victoria Transport Policy Institute. *Traffic Calming*. Available at: <http://www.vtpi.org/tm/tm4.htm> [accessed May 23, 2011].

³²² U.S. Department of Transportation National Highway Traffic Safety Administration. 2000. *Fatality Reduction by Safety Belts for Front Seat Occupants of Cars and Light Trucks: Updated and Expanded Estimates Based on 1986-99 FARS Data*. DOT HS 809 199.

³²³ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Seat Belt Use in 2010—Overall Results*. DOT HS 911 378.

³²⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. Traffic Safety Facts: 2009. *The Increase in Lives Saved, Injuries Prevented, and Cost Savings if Seat Belt Use Rose to at Least 90 Percent in All States*. DOT HS 811 140.

³²⁵ U.S. Department of Transportation National Highway Traffic Safety Administration. 2006. *FY2006 Budget Request Statement*. Dr. Jeff W. Runge, NHTSA Administrator. Available at: www.nhtsa.dot.gov/nhtsa/whatis/BB/2006/pages/AdminStmnt.htm. [accessed May 11, 2011].

Seat belt use is perhaps the single most striking transportation safety success in recent decades. Expanding primary seat belt laws to all 50 states and increased funding for well-crafted enforcement will have significant paybacks in terms of increased safety.

Use of Age- and Size-Appropriate Child Safety Seats and Booster Seats

In the United States, 1,314 children age 14 and younger died in traffic crashes in 2009. For those children whose restraint use was known, 23 percent were unrestrained. NHTSA estimates that 309 children age 5 and under were saved by restraint use in 2009. An additional 63 lives could have been saved if child restraints had been used by all children age 5 and under. When used correctly, child safety seats reduce fatality rates in passenger vehicles by 71 percent for infants less than a year old and by 54 percent for toddlers age one to 4.³²⁶ Surveys have found very high rates of inappropriate use of child safety seats and booster seats.³²⁷ In 1999, NHTSA estimated that 68 deaths and 874 nonfatal injuries could be prevented each year if misuse of child restraints were eliminated.³²⁸ NHTSA has developed age-based standards for their use, and incentives to states to adopt them, along with incentives for standards in child restraint designs would, along with increased funding for education and enforcement, help reduce deaths and injuries among child passengers.

Chapter 3 at a Glance

In this chapter we examine seven policies that could reduce motor vehicle-related injuries and fatalities. They are:

3.1 Decrease Driving Under the Influence (DUI)

3.2 Decrease Distracted Driving

3.3 Reduce the Incidence of Younger Drivers Driving Beyond Their Skills

3.4 Reduce the Incidence of Older Drivers Driving Beyond Their Cognitive and Physical Abilities

3.5 Reduce Speeding

3.6 Increase Seat Belt Use

3.7 Increase Use of Age- and Size-Appropriate Child Safety Seats and Booster Seats

³²⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Children*. DOT HS 811 387.

³²⁷ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Child Restraint Use in 2008 – Use of Correct Restraint Types*. DOT HS 811 132.

³²⁸ U.S. Department of Transportation National Highway Traffic Safety Administration. 1999. *Final Economic Assessment, FMVSS No. 213 and 225, Child Restraint Systems, Child Restraint Anchorage Systems*, Office of Regulatory Analysis. Available at: <http://www.nhtsa.gov/cars/rules/rulings/ucra-omb-j08/econ/regeval.213.225.html> [accessed May 21, 2011].

3.1 Decrease Driving Under the Influence (DUI)

3.1.1 Background: Decrease DUI

Prevalence of DUI

There has been a steady decline in the number of drivers found to be over the legal limit of 0.08 BAC in periodic national roadside surveys. In 1973, the figure was 7.8 percent; in 2007, it was 2.2 percent. (The surveys provide a relative measure, rather than an absolute measure, because they are carried out at specific times. Typically, DUI rates fluctuate depending on the time of day and day of the week.)³²⁹

Impact on Crash Risk

The risk of a fatal vehicle crash increases along with the driver's BAC among all groups.³³⁰ Cognitive impairment sufficient to erode driving skills to dangerous levels begins at 0.02 BAC,³³¹ continuing to rise steeply as BAC exceeds 0.08, and becoming extremely high at a BAC greater than 0.15.³³²

Impact on Fatality

DUI crash fatalities decreased from 53 percent of all fatalities in 1982 to 34 percent in 1997.³³³ However, since the mid-1990s, the percentage of fatalities attributed to DUI has leveled off, and in 2009 DUI contributed to 32 percent of all traffic fatalities, for a total of 10,839.³³⁴

Potential for Lives Saved

If all drivers on the road had BACs below 0.08 in 2009, 7,440 deaths would have been prevented.³³⁵

329 Compton, R. and Berning, A. 2009. *Results of the 2007 National Roadside Survey of Alcohol and Drug Use by Drivers*. U.S. Department of Transportation National Highway Traffic Safety Administration. Washington, DC. DOT HS-811-175.

330 Zador, P.L., Krawchuk, S.A., Voas, R.B. 2000. *Relative Risk of Fatal and Crash Involvement by BAC, Age and Gender*. U.S. Department of Transportation National Highway Traffic Safety Administration. DOT HS 809 050.

331 Zador, P.L.; Krawchuk, S.A.; and Voas, R.B. 2000. Alcohol-Related Relative Risk of Driver Fatalities and Driver Involvement in Fatal Crashes in Relation to Driver Age and Gender: An Update Using 1996 Data. *Journal of Studies on Alcohol*. May 2000: 387-395.

332 Peck, R.C.; Gebers, M.A.; Voas, R.B.; and Romano, E. 2008. The Relationship Between Blood Alcohol Concentration (BAC), Age, and Crash Risk. *Journal of Safety Research*, 39: 311-19.

333 U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. *Statistical Analysis of Alcohol-Related Driving Trends, 1982-2005*. DOT HS 180 942.

334 U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Alcohol-Impaired Driving*. DOT HS 811 385.

335 Insurance Institute for Highway Safety. 2011. Q&A's Alcohol #7 *What Proportion of Motor Vehicle Crashes Involves Alcohol?* Available at: http://www.iihs.org/research/qanda/alcohol_general.html [accessed May 23, 2011].

Policies for Reducing DUI

Over the past several decades, a number of policies and programs have been effective in reducing DUI fatalities and injuries but the number of DUI crashes remains unacceptably high. It is crucial to maintain or extend policies that have been successful and develop and deploy new policies to further reduce DUI-related injury and fatality. Below are four policies recommended to maintain and expand on the substantial gains made so far.³³⁶

Policy 1: Extend use of interlocks

Policy 2: Increase use of sobriety checkpoints

Policy 3: Maintain minimum drinking age law of age 21

Policy 4: Strengthen implementation and enforcement of zero-tolerance laws for young drivers

3.1.2 Impact of Policies: Decrease DUI

Policy 1—Extend use of ignition interlocks

Definition

Ignition interlocks prevent drivers from starting a motor vehicle if their blood alcohol concentration is above a specified level. Interlocks generally consist of four components: an alcohol detector, a system to retest the driver periodically (e.g., every 20-30 minutes) to ensure sobriety, tamper-proofing, and a log that records BAC levels.³³⁷

History of Deployment

The first use of ignition interlocks took place in 1986 in California. In 1992, NHTSA published “Model Specifications for Breath Alcohol Ignition Interlock Devices.”³³⁸

As of 2011, 49 states had enacted laws that permit the use of interlocks for at least some DUI offenders. In some states, interlocks are optional; others limit their use to offenders with excessively high BAC levels; some mandate them for first-time offenses; others only for repeat offenders. Eleven states mandate interlocks for all DUI offenders. The number of interlocks in use in the U.S. more than doubled between 2006 and 2010, from approximately 100,000 to

³³⁶ Centers for Disease Control and Prevention. 2011. *Policy Impact: Alcohol Impaired Driving*. National Center for Injury Prevention and Control, Division of Unintended Injury Prevention. Available at: <http://www.cdc.gov/motorvehiclesafety/pdf/PolicyImpact-Alcohol-a.pdf> [accessed May 19, 2011].

³³⁷ Marques, Paul R., and Voas, Robert B. 2010. *Key Features for Ignition Interlock Programs*. DOT HS 811 262.

³³⁸ Ibid.

212,000. Nevertheless, in many states with interlock laws, only 10 to 20 percent of offenders who are eligible for interlocks have them installed.³³⁹

Effectiveness and Impact

A 2005 study concluded that if all the drivers with previous DUI convictions within three years prior to the crash were restricted to a BAC of below 0.08, 777 lives could be saved.³⁴⁰ A review conducted by the Centers for Disease Control and Prevention in the Guide for Community Preventive Services concluded that ignition interlocks are effective in reducing re-arrest rates for DUI, but the impact is limited because the device is used in a relatively small number of cases, and re-arrest rates revert once the device is removed.³⁴¹ Offering them as an option to less appealing alternatives, such as home confinement, could dramatically increase their use.³⁴²

Economic Factors

In most states, offenders bear the cost of purchasing and installing the interlock devices. Governments incur operational costs in supervising and enforcing the program. In some states, these costs are offset by fees collected from DUI offenders.³⁴³ One estimate places the benefits at between three and seven times the costs of a program, with the larger benefits derived when interlocks are used on repeat offenders.³⁴⁴

Conclusion

Ignition interlocks are highly effective in preventing re-arrests for DUI, and evidence suggests that they reduce DUI crashes.³⁴⁵ Increasing the number of interlocks and increasing the duration of their installation could significantly increase the number of DUI fatalities and injuries prevented.³⁴⁶

³³⁹ National Conference of State Legislatures. *State Ignition Interlock Laws*. Available at: <http://www.ncsl.org/default.aspx?tabid=13558> [accessed May 23, 2011].

³⁴⁰ Lund, A.K.; McCartt, A.T.; and Farmer, C.M. 2007. *Contribution of Alcohol-Impaired Driving to Motor Vehicle Crash Deaths in 2005*. Proceedings of the 18th International Conference on Alcohol, Drugs, and Traffic Safety (CD-ROM). Oslo, Norway: International Council on Alcohol, Drugs, and Traffic Safety.

³⁴¹ Elder, R.W., Voas, R., Beirness, D., et al. 2011. Effectiveness of Ignition Interlocks for Preventing Alcohol-Impaired Driving and Alcohol-Related Crashes. *American Journal of Preventive Medicine*, 40 (3): 362-376.

³⁴² Roth, R., Marques, R.P. and Voas, R.B. 2009. A Note on the Effectiveness of the House-arrest Alternative for Motivating DWI Offenders to Install Ignition Interlocks. *Journal of Safety Research*, 40 (6): 437-41.

³⁴³ Ibid.

³⁴⁴ Sprattler, Karen. 2009. *Ignition Interlocks-What You Need to Know: A Toolkit for Policymakers, Highway Safety Professionals, and Advocates*. DOT HS 811 246.

³⁴⁵ Elder, R.W., Voas, R., Beirness, D., et al. 2011. Effectiveness of Ignition Interlocks for Preventing Alcohol-Impaired Driving and Alcohol-Related Crashes. *American Journal of Preventive Medicine*, 40 (3): 362-376.

³⁴⁶ Task Force on Community Preventive Services. Recommendations on the Effectiveness of Ignition Interlocks for Preventing Alcohol-Related Driving and Alcohol-Related Crashes. *American Journal of Preventive Medicine*, 40 (3): 377.

Policy 2—Increase use of sobriety checkpoints

Definition

Sobriety checkpoints are law enforcement-conducted roadblocks where cars are stopped on a systematic basis to identify alcohol-impaired drivers. Once the driver is stopped, law enforcement personnel determine whether there is reason to suspect impairment. Only after that determination has been made can law enforcement personnel require the driver to submit to a sobriety test. This method is known as “selective testing.” (When all drivers who are stopped are tested, it is known as “random testing.”)³⁴⁷

Sobriety checkpoints are typically conducted in places and times when the number of alcohol-impaired drivers tends to be highest: in the late evening and on weekends. Sobriety checkpoints utilize the principle of general deterrence.³⁴⁸ The checkpoints themselves net only a small number of DUI drivers; rather, the major purpose is to deter drunk driving before it occurs by increasing the perceived risk of arrest.³⁴⁹ Publicity surrounding sobriety checkpoint programs serves to enhance the deterrent effect. Additionally, drivers’ observations of checkpoints, or their experience of passing through them, can also have a deterrent effect.³⁵⁰

History of Deployment

As of June 2011, sobriety checkpoints were legal in 38 states and the District of Columbia. In 12 states, they are either explicitly prohibited by state law, or they are illegal under the state constitution, or the state does not have the authority to conduct them. Few states use them frequently; as many as 12 report carrying them out on a weekly basis, weather permitting.³⁵¹

Effectiveness and Impact

Sobriety checkpoints are effective in reducing DUI and DUI-related crashes: one review of numerous programs found a median reduction of 20 percent in DUI fatal and injury crashes.³⁵² A

³⁴⁷ Elder, R.W., Shults, R.A., Sleet, D.A., Nichols J.L., Zaza S. and Thompson R.S. 2002. Effectiveness of Sobriety Checkpoints for Reducing Alcohol-Involved Crashes. *Traffic Injury Prevention*, 3 (4): 266-74.

³⁴⁸ Fell, J.C., Lacey, J.H. and Voas, R.B. 2004. Sobriety Checkpoints: Evidence of Effectiveness is Strong, but Use is Limited. *Traffic Injury Prevention*, 5 (3): 220-227.

³⁴⁹ Elder, R.W., Shults, R.A., Sleet D.A., Nichols J.L., Zaza S. and Thompson R.S. 2002. Effectiveness of Sobriety Checkpoints for Reducing Alcohol-Involved Crashes. *Traffic Injury Prevention*, 3 (4): 266-74.

³⁵⁰ Fell, J.C., Lacey, J.H. and Voas, R.B. 2004. Sobriety Checkpoints: Evidence of Effectiveness is Strong, but Use is Limited. *Traffic Injury Prevention*, 5 (3): 220-227.

³⁵¹ Governors Highway Safety Association. 2010. *Sobriety Checkpoint Laws*. Available at: http://www.ghsa.org/html/stateinfo/laws/checkpoint_laws.html [accessed May 23, 2011].

³⁵² U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Countermeasures That Work: A Highway Safety Countermeasure Guide For State Highway Offices*. Fifth Edition.

co-benefit of sobriety checkpoints is a reduction in other dangerous behavior, such as driving without a valid license.³⁵³

Economic Factors

NHTSA's high-visibility enforcement incentive grants can be used to fund sobriety checkpoints.³⁵⁴ Implementation costs vary widely, depending on the size of the checkpoint, the type and number of personnel used, and the salary scales of the agency.³⁵⁵ Many local agencies over-estimate the budget and staffing needed to conduct checkpoint operations.³⁵⁶ One common misconception is that an effective checkpoint requires 15 to 20 personnel.³⁵⁷ However, a highly effective and efficient sobriety checkpoint can be carried out with as few as three to five officers.³⁵⁸ Studies show that sobriety checkpoints have a positive benefit:^{359,360} one estimated a six-to-one return.³⁶¹

Conclusion

Sobriety checkpoints are highly effective, and substantial benefits could be derived by expanding their use by: (i) encouraging states that do not have legal authority to do checkpoints to work toward gaining it; (ii) expanding the number of checkpoints through increased funding; and (iii) expanding awareness of how they work.

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- ³⁵³ Elder, R.W., Shults, R.A., Sleet, D.A., Nichols J.L., Zaza S. and Thompson R.S. 2002. Effectiveness of Sobriety Checkpoints for Reducing Alcohol-Involved Crashes. *Traffic Injury Prevention*, 3 (4): 266-74.
- ³⁵⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. *Fact Sheets: Section 410 SAFETEA-LU Fact Sheet*. Available at: <http://www.nhtsa.gov/Laws+&+Regulations/Section+410+SAFETEA-LU+Fact+Sheet> [accessed May 21, 2011].
- ³⁵⁵ Miller, T.R. and Levy, D.T. 2000. Cost-Outcome Analysis in Injury Prevention and Control: Eighty-Four Recent Estimates for the United States. *Medical Care*, 38 (6): 562-582.
- ³⁵⁶ Fell, J.C., Lacey, J.H. and Voas, R.B. 2004. Sobriety Checkpoints: Evidence of Effectiveness is Strong, but Use is Limited. *Traffic Injury Prevention*, 5 (3): 220-227.
- ³⁵⁷ Lacey, J.H., Ferguson, S.A., Kelley-Baker, T. and Rider, R.P. 2006. Low-manpower checkpoints: Can they provide effective DUI enforcement in small communities? *Traffic Injury Prevention*, 7 (3): 213-218.
- ³⁵⁸ Fell, J.C., Lacey, J.H. and Voas, R.B. 2004. Sobriety Checkpoints: Evidence of Effectiveness is Strong, but Use is Limited. *Traffic Injury Prevention*, 5 (3): 220-227.
- ³⁵⁹ Stuster, J.W. and Blowers, P.A. 1995. *Experimental Evaluation of Sobriety Checkpoint Programs*. DOT HS-808-287. U.S. Department of Transportation National Highway Traffic Safety Administration. Washington, D.C.
- ³⁶⁰ Shults, R.A., et al. and Task Force on Community Preventive Services. 2001. Reviews of Evidence Regarding Interventions to Reduce Alcohol-Impaired Driving. *American Journal of Preventive Medicine*, 21 (4 [S1]): 66-88.
- ³⁶¹ Miller, T.R., Galbraith, M.S. and Lawrence, B.A. 1998. Costs and Benefits of a Community Sobriety Checkpoint Program. *Journal of Studies on Alcohol*, 59 (4): 462-68.

Policy 3—Maintain national minimum legal drinking age law of age 21

Definition

The National Minimum Legal Drinking Age (MLDA) Act of 1984 withheld a portion of federal highway funding if states did not adopt legislation to prohibit persons under age 21 from purchasing or publicly possessing alcohol.³⁶²

History of Deployment

States are free to set their own MLDA, because the federal government does not have the authority. Before the passage of the 1984 act, state MLDA varied. By 1988, the MLDA in all 50 states and the District of Columbia had been set at age 21, although states differ in how they regulate alcohol use, possession, and purchase by underage persons.³⁶³

Effectiveness and Impact

An MLDA of age 21 is effective in reducing fatal crashes in the short and long term:³⁶⁴ with a median reduction of 17 percent.³⁶⁵ NHTSA estimates that since 1975, an estimated 27,677 lives have been saved as a result of the change to an age 21 MDLA, and in 2009 alone, 623 lives were saved.³⁶⁶ Lowering the MLDA to age 18 or 19 would likely increase the number of traffic fatalities dramatically, particularly in this age group. Even under current laws, as recently as 2009, 33 percent of drivers between ages 15 and 20 who were involved in fatal crashes had been drinking.³⁶⁷ MLDA laws of age 21 provide benefits that extend beyond traffic safety: people under age 21 consume less alcohol overall and continue this behavior through their early 20s.³⁶⁸ Although many underage youth continue to consume alcohol, they drink less and experience fewer alcohol-related injuries and deaths than before the minimum age was raised to 21.³⁶⁹

³⁶² Toomey, T.L., Nelson, T.F. and Lenk, K.M. 2009. The Age-21 Minimum Legal Drinking Age: A Case Study Linking Past and Current Debates. *Addiction*, 104 (12): 1958-1965.

³⁶³ Ibid.

³⁶⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. 2011. Traffic Safety Facts. *Lives Saved in 2008 by Restraint Use and Minimum Drinking Age Laws*. DOT HS 811 153.

³⁶⁵ Shults RA et al. Review of the Evidence Regarding Interventions to Reduce Alcohol-Impaired Driving. *American Journal of Preventive Medicine*, 2001: 21 (45).

³⁶⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Young Drivers*. DOT HS 811 400.

³⁶⁷ Ibid.

³⁶⁸ O'Malley, P.M. and Wagenaar, A.C. 1991. Effects of Minimum Drinking Age Laws on Alcohol Use, Related Behaviors and Traffic Crash Involvement Among American Youth: 1976-1987. *Journal of Studies on Alcohol and Drugs* 52: 478-491.

³⁶⁹ Wagenaar, A.C. 1993. Minimum Drinking Age and Alcohol Availability to Youth: Issues and Research Needs. In: Hilton, M.E. and Bloss, G., eds. *Economics and the Prevention of Alcohol-Related Problems*. National Institute on Alcohol Abuse and Alcoholism (NIAAA) Research Monograph No. 25, NIH Pub. No. 93-3513. Bethesda, MD: NIAAA. 1993: 175-200.

Economic Factors

The costs to enforce an MLDA of age 21 are incurred across a wide range of agencies (e.g., alcohol control and licensing entities, local, and state police). There appear to have been no attempts to develop a comprehensive estimate of the costs of implementing and enforcing this policy. Benefits can be inferred by the numbers of lives saved as noted earlier.

Conclusion

Age 21 MLDA laws are in effect in all 50 states and have had a demonstrable effect in reducing traffic fatalities among underage drivers and alcohol consumption among underage youth. The evidence is overwhelming that the age 21 MLDA should be maintained. Given that underage drivers are still involved in a large number of alcohol-impaired crashes, intensified enforcement of this policy would have significant benefits.

Policy 4—Strengthen implementation and enforcement of zero-tolerance laws for young drivers

Definition

Zero-tolerance laws set a maximum BAC of 0.02 for drivers under age 21, and impose immediate penalties such as license suspension and fines.³⁷⁰

History of Deployment

Under the 1995 National Highway Systems Designation Act, federal highway funding was withheld from states that did not adopt zero-tolerance laws. By 1998, all 50 states and the District of Columbia were in compliance.³⁷¹

Effectiveness and Impact

Zero-tolerance laws result in a reduction of 9 to 24 percent in the fatal crash rate³⁷² despite difficulty in enforcement because low BAC impairment can be difficult to detect.³⁷³ While youths indicate that zero-tolerance laws would be strong deterrents, knowledge that they exist is limited in the general population.³⁷⁴

³⁷⁰ Carpenter, C. 2004. . How Do Zero Tolerance Drunk Driving Laws Work? *Journal of Health Economics* 23 (1): 61-83.

³⁷¹ Shults, Ruth, et al. 2001. Reviews of Evidence Regarding Interventions to Reduce Alcohol-Impaired Driving. *American Journal of Preventive Medicine* 21 (4S): 66-88.

³⁷² Guide to Community Preventive Services. *Reducing Alcohol-Impaired Driving: Lower BAC for Young or Inexperienced Drivers*. Available at: <http://www.thecommunityguide.org/mvoi/aid/lowerbaclaws.html> [accessed May 23, 2011].

³⁷³ Shults, Ruth, et al. 2001. Reviews of Evidence Regarding Interventions to Reduce Alcohol-Impaired Driving. *American Journal of Preventive Medicine*, 21(4S) (2001): 66-88.

³⁷⁴ Voas, R.B., Tippetts, A.S. and Fell, J.C. 2003. Assessing the Effectiveness of Minimum Legal Drinking Age and Zero Tolerance Laws in the United States. *Accident Analysis and Prevention*, 35: 579-587.

Economic Factors

As with the MLDA, administration and enforcement costs associated with zero-tolerance laws are incurred across a wide range of agencies. One study put the cost at \$29 (in 1997 dollars) per each underage driver. While it found that the laws resulted in net benefits, they were not quantified.³⁷⁵

Conclusion

Zero-tolerance laws have been in place in all states since 1998 and have proven to be effective in helping reduce alcohol-impaired crashes and fatalities among underage drivers. Increased benefits of zero-tolerance laws can be realized by increased funds for education and enforcement.

3.1.3 Conclusions: Decrease Driving Under the Influence (DUI)

DUI crash fatalities decreased from 53 percent in 1982 to 32 percent of all traffic fatalities in 2009.^{376,377} Since 1995, the incidence of DUI has stabilized, yet the level remains unacceptably high,³⁷⁸ and the 10,839 alcohol-related traffic fatalities that occurred in 2009 indicate there is still room for significant progress. Our review shows that significant additional savings in lives and dollars could be achieved through (i) expanding interlock programs, (ii) increasing the use of sobriety checkpoints, (iii) maintaining the MDLA 21 policy and expanding enforcement, and (iv) strengthening enforcement of zero-tolerance laws.

3.2 Decrease Distracted Driving

3.2.1 Background: Decrease Distracted Driving

Prevalence of Distracted Driving

In 2009, driver distraction was involved in 16 percent of all fatal crashes and 20 percent of all injury crashes. Cell phone use was involved in 18 percent of distracted driving crash deaths and 5 percent of the injuries, making it the single largest category of distracted driving behavior resulting in crashes. These numbers are believed to understate the problem, considering that cell

³⁷⁵ Miller, T.R. 2001. The Effectiveness Review Trials of Hercules and Some Economic Estimates for the Stables. *American Journal of Preventive Medicine*, 2 1 (4S): 11.

³⁷⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. *Statistical Analysis of Alcohol-Related Driving Trends, 1982-2005*. DOT HS 180 942.

³⁷⁷ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Alcohol-Impaired Driving*. DOT HS 811 385.

³⁷⁸ Williams, A.F. 2006. Alcohol-Impaired Driving and Its Consequences in the United States: The Past 25 years. *Journal of Safety Research*, 37: 123-138.

phone ownership has grown dramatically in recent years, from 13 percent in 1995 to 87 percent today.³⁷⁹

Impact on Crash Risk

In a study that included minor and non-injury crashes, as well as near-crashes, 80 percent of all crashes involved the driver looking away (the standard measure for distraction) immediately before the crash, as did 65 percent of near-crashes.³⁸⁰

Impact on Fatality and Injury

In 2009, driver distraction was involved in 16 percent of all fatal crashes and 20 percent of all injury crashes, resulting in 5,474 deaths and 448,000 injuries.³⁸¹

Potential for Lives/Injury Saved

No large-scale studies have been conducted, in part because of the relatively short time that laws against distracted driving (generally targeting cell phone use) have been in effect.

Policies for Decreasing Distracted Driving

Policy 1: Provide incentive grants to states to pass cell phone laws

Policy 2: Fund enforcement programs for cell phone and other distracted driving violations

Policy 3: Fund distracted driving education programs

3.2.2 Impact of Policies: Decrease Distracted Driving

Policy 1—Provide incentive grants to states to pass cell phone laws

Definition

Federal incentive grants offer additional incentive funds or make certain portions of a state's federal transportation dollars contingent on a state passing a specific traffic safety law—in this

³⁷⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Distracted Driving 2009*. DOT HS 811 379.

³⁸⁰ U.S. Department of Transportation National Highway Traffic Safety Administration. 2006. *The 100-Car Naturalistic Driving Study. Phase II*. Available at: <http://www.distraction.gov/research/PDF-Files/The-100-Car-Naturalistic-Driving-Study%20.pdf> [accessed June 13, 2011].

³⁸¹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Distracted Driving 2009*. DOT HS 811 379.

case, banning cell phone use while driving.³⁸² Incentive programs have already been used to raise the minimum drinking age, lower the legal BAC to 0.08, and implement seat belt laws.

History of Deployment

Several bills were introduced during the 2009-2010 Congress to encourage states to regulate cell phone use while driving.³⁸³ Already, 33 states, the District of Columbia, and Guam have passed some kind of ban on text messaging while driving; but only eight states, the District of Columbia, and the Virgin Islands prohibit drivers from using hand-held phones. The laws differ by type of driver (e.g., commercial, private vehicle), age (e.g., novice drivers), and other factors (e.g., primary or secondary enforcement). Federal incentives could accelerate this process and provide uniformity across jurisdictions.³⁸⁴ The U.S. Department of Transportation (U.S. DOT) convened Distracted Driving Summits in 2009 and 2010 to bring together experts in the field to discuss this emerging problem.³⁸⁵ In October of 2009, the president issued an executive order banning federal employees from texting while driving on the job,³⁸⁶ and the U.S. DOT banned texting by commercial drivers the following year.³⁸⁷

Effectiveness Studies

There is evidence that laws against cell phone use tend to discourage drivers from talking on cell phones in the short run.³⁸⁸ Given the success of incentive grants for encouraging DUI and seat belt laws, it is likely that incentive grants would be effective for accelerating the passage of uniform cell phone laws. Given the impact of driver distraction on crash risk, it is likely that cell phone laws will be effective in reducing fatalities, but systematic research is needed.

Projected Impact

A majority of respondents in one survey reported having engaged in talking on handheld phones, sending a text message, or email while driving.³⁸⁹ Cell phone laws are relatively new and studies should be conducted on the effectiveness of bans on their use while driving, but early studies

³⁸² The Library of Congress. *S.1938—Distracted Driving Prevention Act of 2009* (Reference Change Senate – RCS) Available at: <http://thomas.loc.gov/cgi-bin/query/z?c111:S.1938.RCS>: [accessed May 18, 2011].

³⁸³ Ibid.

³⁸⁴ U.S. Department of Transportation. *State Laws on Distracted Driving*. Available at: <http://www.distraction.gov/state-laws/> [accessed June 13, 2011].

³⁸⁵ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Transportation Secretary Ray LaHood Kicks Off Second National Distracted Driving Summit*. NHTSA press release. September 21, 2010.

³⁸⁶ The White House Office of the Press Secretary. *Federal Leadership on Reducing Text Messaging while Driving*. October 1, 2009.

³⁸⁷ U.S. Department of Transportation. 2010. *Transportation Secretary Ray LaHood Announces Federal Ban on Texting for Commercial Truck Drivers*. Press release. January 26, 2010.

³⁸⁸ Braitman, K.A. and McCartt, A.T. 2010. National Reported Patterns of Driver Cellphone Use. *Traffic Injury Prevention*, 11 (6): 543-548.

³⁸⁹ Stutts J.C., et al. 2003. *The Role of Driver Distraction in Traffic Crashes*. Prepared for the AAA Traffic Safety Foundation. Available at: <http://www.aaafoundation.org/pdf/distraction.pdf> [accessed July 9, 2010].

suggest they reduce crashes under a number of common driving conditions.³⁹⁰ Cell phone use (either handheld or hands-free) reduces the amount of brain activity available for tasks associated with undisturbed driving by 37 percent³⁹¹ and delays a driver's reactions as much as having a legally impaired BAC of 0.08.³⁹² Risk of a collision increases by a factor of four when a cell phone is being used,³⁹³ and risk is also associated with a hands-free phone.³⁹⁴

Economic Factors

Costs of implementation and enforcing cell phone laws are likely to be similar to implementing and enforcing laws regarding seat belt use.

Conclusion

The past success of incentive grants in strengthening other driver safety laws and developing uniformity across jurisdictions suggests this approach would work for cell phone regulations as well.

Policy 2—Fund enforcement programs for cell phone and other distracted driving violations

Definition

Enforcement programs use public education and outreach combined with law enforcement activities such as checkpoints or enforcement drives to create “general deterrence,” in which the proscribed behavior is reduced due to a general increased awareness of the law and increased perceived probability of being apprehended when breaking the law. This is the model used by the very successful federally funded Click It or Ticket (CIOT) seat belt enforcement program.³⁹⁵

³⁹⁰ Kolko, J.D. 2009. The Effects of Mobile Phones and Hands-Free Laws on Traffic Fatalities. *The B.E. Journal of Economic Analysis & Policy*, 9 (1).

³⁹¹ Just, M.A., Keller, T.A. and Cynkar, J. 2008. A Decrease in Brain Activation Associated With Driving When Listening to Someone Speak. *Brain Research*, 1205: 70-80.

³⁹² Strayer, D.L., Drews, F.A., Crouch, D.J. and Johnston, W.Q. 2006. *Why Do Cell Phone Conversations Interfere with Driving?*

³⁹³ Redelmeier D.A., and Tibshirani R.J. 1997. Association between cellular-telephone calls and motor vehicle collisions. *New England Journal of Medicine*, 336: 453-8.

³⁹⁴ McCart AT, Helling LA, Bratiman KA. 2006. Cell phones and driving: Review of research. *Traffic Injury Prevention*, 7 (2): 89-106.

³⁹⁵ U.S. Department of Transportation National Highway Traffic Safety Administration. 2002. *Evaluation of Click it or Ticket Model Programs*. Available at: http://www.nhtsa.gov/people/injury/airbags/clickit_ticket/clickitcomposite/clickit_composite.pdf [accessed May 23, 2011].

History of Deployment

To date, there have been no major dedicated federal funding programs for enforcing cell phone or other distracted driving laws.³⁹⁶ NHTSA is currently conducting and evaluating demonstration programs in Hartford, CT and Syracuse, NY to test the applicability of the same enforcement model used in CIOT to handheld cell phone use while driving.³⁹⁷

Effectiveness Studies

Enforcement of bans on hand-held cell phones has led to greater compliance,^{398,399,400} but there is little experience in enforcing bans on hands-free devices.^{401,402}

Projected Impact

Using CIOT as a proxy for a nationwide distracted driving enforcement program, consistent, vigorous, and well-publicized enforcement is the single most effective strategy for changing behavior.⁴⁰³ There is nothing to indicate the same would not hold true for distracted driving.⁴⁰⁴

Economic Factors

There would be benefits from reducing distracted driving crashes. Costs would be more difficult to estimate, given the wide range of individual agency practices.⁴⁰⁵

Conclusion

Federally funded enforcement has proven effective in the CIOT seat belt enforcement program. For cell phone use in particular, enforcement increases compliance. A national enforcement

³⁹⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts Research Note. *High Visibility Enforcement Demonstration Programs in Connecticut and New York Reduce Hand-Held Phone Use*. DOT HS 811 376.

³⁹⁷ U.S. Department of Transportation. *Transportation Secretary Ray LaHood Announces First Enforcement Crackdown Campaign on Distracted Driving: Pilot Programs in Hartford, CT and Syracuse, NY Are Latest Effort in DOT's Fight Against Distracted Driving*. Press Release. Available at: <http://www.distraction.gov/files/for-media/4.08.10-Demo.pdf> [accessed May 23, 2011].

³⁹⁸ McCartt, A.T., et al. 2007. Longer Term Effects of Washington, D.C. Law on Drivers' Hand-Held Cell Phone Use. *Traffic Inj Prev*, 8 (2): 199-204.

³⁹⁹ McCartt A.T., et al. 2004. Longer Term Effects of New York's Law on Drivers' Hand-Held Phone Use. *Inj Prev*, 10 (1): 11-5.

⁴⁰⁰ McCartt, A.T., et al. 2006. Effects of Washington, D.C. Law on Drivers' Hand-Held Cell Phone Use. *Traffic Inj Prev*, 7 (1): 1-5.

⁴⁰¹ Jacobsen, D., et al. 2010. Reducing Distracted Driving – Regulation and Education to Reduce Traffic Injuries and Fatalities. *JAMA*, 303 (14): 1419-1420.

⁴⁰² National Safety Council. 2010. *Understanding the Distracted Brain: Why Driving While Using Hands-Free Cell Phones is Risky Behavior*. White Paper.

⁴⁰³ Reinfurt, D.W. 2004. Documenting the Sustainability of a Mature Click it or Ticket Program: The North Carolina Experience. *Journal of Safety Research*, 35 (2): 181-188

⁴⁰⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Distracted Driving*. Available at: <http://www.nhtsa.gov/Distracted> [accessed May 28, 2010].

⁴⁰⁵ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *U.S. DOT Targets 45 Million Americans Not Buckling Up*. Press Release May 24, 2010. Available at: <http://www.nhtsa.gov/PR/DOT-101-10> [accessed July 16, 2010].

campaign, using intense, short-duration, highly publicized enforcement periods could reduce the incidence of distracted driving.

Policy 3—Fund distracted driving education programs

Definition

A distracted driving education program would include campaigns to educate drivers about the dangers of distracted driving via media messages.

History of Deployment

There is no dedicated distracted driving education program. NHTSA is developing a media program that it intends to make available in 2011.⁴⁰⁶

Effectiveness Studies

Little is known about the effectiveness of educational campaigns about the dangers of distracted driving. Generally, education or public awareness campaigns alone do not change driver behavior.⁴⁰⁷ They are effective when combined with enforcement campaigns.⁴⁰⁸

Projected Impact

There is little information with which to evaluate the impact of distracted driving education programs; any such programs should be accompanied by rigorous evaluation.

Economic Factors

There is insufficient information at this time to determine the resultant savings and benefits, though the scale of the costs could be suggested by the fact that a recent nationwide advertising campaign promoting seat belt use cost \$8 million.⁴⁰⁹

Conclusion

Given the lack of available data on the value of public education campaigns, the exact potential value of a campaign against distracted driving cannot be accurately determined. Nonetheless, the

⁴⁰⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Overview of the National Highway Traffic Safety Administrations Driver Distraction Program*. DOT HS 811 299.

⁴⁰⁷ Insurance Institute for Highway Safety. 2001. *Insurance Institute for Highway Safety Status Report, May 2001*. Available at: <http://www.iihs.org/externaldata/srdata/docs/sr3605.pdf> [accessed May 23, 2011].

⁴⁰⁸ Vasudevan, V., Nambisan, S.S., Singh, A.K., and Pearl, T. 2009. Effectiveness of Media and Enforcement Campaigns in Increasing Seat Belt Usage Rates in a State with a Secondary Seat Belt Law. *Traffic Inj Prev*, 10 (4): 330-9.

⁴⁰⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *U.S. DOT Targets 45 Million Americans Not Buckling Up*. Press Release May 24, 2010. Available at: <http://www.nhtsa.gov/PR/DOT-101-10> [accessed May 23, 2011].

success of similar campaigns in other areas when combined with enforcement suggests that this approach would be effective in reducing distracted driving as well.

3.2.3 Conclusions: Decrease Distracted Driving

Distracted driving is involved in 16 percent of all fatal crashes and 20 percent of all injury crashes. Three policies at the federal level have potential for reducing this risk: (1) incentive grants to states to pass rigorous and effective bans, (2) grants to support high-visibility enforcement, and (3) support for driving education programs in conjunction with enforcement.

3.3 Reduce Incidence of Younger Drivers Driving Beyond Their Skills

3.3.1 Background: Reduce Incidence Younger Drivers Driving Beyond Their Skills

Prevalence of Younger Drivers Driving Beyond Their Skills

Drivers between age 15 and 20 comprised 6.4 percent (13.3 million) of the total number of licensed drivers in the U.S. in 2008, a 5.1 percent increase over the 12.7 million young drivers in 1999.⁴¹⁰ While there is no direct measure of the share of younger drivers driving beyond their skills, their lack of experience and lack of driving skills has shown a strong association with increased crash risk.⁴¹¹

Impact on Crash Risk

The crash rate per mile driven for 16- to 19-year-olds is four times that of older drivers. It peaks for drivers age 16—who experience a crash rate twice as high as 18- to 19-year-olds.⁴¹²

Impact on Fatality and Injury

Motor vehicle crashes are the leading cause of death for 15- to 20-year-olds in the U.S. In 2009, this age group accounted for 11 percent of motor vehicle crash deaths.⁴¹³ In 2009, motor vehicle crashes killed 2,336 drivers age 15 to 20 and injured 196,000.⁴¹⁴

⁴¹⁰ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010 Traffic Safety Facts. 2009 Data *Young Drivers*. DOT HS 811 400.

⁴¹¹ Mayhew D.R. and Simpson H.M. 1990. *New to the Road Young Drivers and Novice Drivers: Similar Problems and Solutions*. Ottawa. Traffic Injury Research Foundation.

⁴¹² Insurance Institute for Highway Safety. *Fatality Facts 2009: Teenagers*. Available at: http://www.iihs.org/research/qanda/alcohol_gener Available at: http://www.iihs.org/research/fatality_facts_2009/teenagers.html [accessed March 30, 2011].

⁴¹³ *Ibid.*

⁴¹⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Young Drivers*. DOT HS 811 400.

Potential for Lives/Injury Saved

Reducing younger drivers' level of risk per mile driven to the level of the overall driving population's risk per mile would prevent a large number of fatalities and injuries.

Policy for Reducing Incidence Younger Drivers Driving Beyond Their Skills

Policy 1: Strengthen graduated licensing for new drivers

3.3.2 Impact of Policy: Reduce Incidence of Younger Drivers Driving Beyond Their Skills

Policy 1—Strengthen graduated licensing for new drivers

Definition

Graduated Driver Licensing (GDL) programs require young drivers to drive under supervision and limit their driving privileges while they gain necessary driving skills.⁴¹⁵ There are three stages of a GDL system. The learner stage involves supervised driving, culminating in a licensing test for restricted driving privileges. The intermediate stage involves unsupervised driving limited to less hazardous situations and times of day. The full privilege stage culminates with successfully passing a licensing test for full licensure.⁴¹⁶ Seven key components of a successful GDL program have been identified. They include setting a sufficiently high minimum age for learner's permits and establishing minimum periods for the time required before passing to the next stage, including minimum numbers of supervised hours, and restrictions on night driving and passengers.

History of Deployment

Currently, 49 states and the District of Columbia employ three-stage GDL programs, which were instituted after federal guidelines were issued in the mid-1990s.⁴¹⁷

Effectiveness Studies

States whose GDL programs had at least five of the seven elements had greater reductions in fatal crashes of 16-year-olds.⁴¹⁸ GDL programs result in double-digit reductions in the number of crashes among young drivers as a whole, with specific figures varying, depending on how many

⁴¹⁵ Traffic Injury Research Foundation. 2006. *Reducing the Crash Risk for Young Drivers*. Available at: <http://www.aaafoundation.org/pdf/ReducingTeenCrashes.pdf> [accessed May 23, 2011].

⁴¹⁶ Governors Highway Safety Association. 2010 *Graduated Driver Licensing Laws*. Available at: http://www.ghsa.org/html/stateinfo/laws/license_laws.html [accessed March 11, 2010].

⁴¹⁷ Ibid.

⁴¹⁸ AAA Foundation. 2007. *Nationwide Review of Graduated Driver Licensing*.

of the seven elements are in place.^{419,420,421,422,423} GDL shows promise in particular for reducing nighttime crashes and crashes of vehicles with multiple teen passengers.⁴²⁴

Projected Impact

Based on 2008 data on driver fatalities among 16-year-old drivers and a conservative estimate of an average 20 percent reduction in fatal crashes associated with GDL programs, 321 lives could be saved annually among 16-year-old drivers.⁴²⁵ More stringent nighttime restrictions are associated with larger reductions, as are laws limiting teenage passengers to zero or one.⁴²⁶

Economic Factors

Young people ages 15 to 24 account for 30 percent of the total costs of motor vehicle injuries for men and 28 percent of the total costs of motor vehicle injuries for women, while they represent only 14 percent of the U.S. population.⁴²⁷ This suggests that even small reductions in young driver risk would produce significant benefits in health care costs alone.

Conclusion

Younger drivers represent 6.4 percent of drivers; yet they account for 23 percent of traffic fatalities. GDL can significantly reduce crash risk and fatalities. The main barriers to effectiveness of GDL laws are compliance and enforcement.

⁴¹⁹ Centers for Disease Control and Prevention. Injury Prevention & Control: Motor Vehicle Safety. *Teen Drivers: Fact Sheet*. Available at: http://www.cdc.gov/motorvehiclesafety/teen_drivers/teendrivers_factsheet.html [accessed May 23, 2011].

⁴²⁰ Nebraska Department of Motor Vehicles. 2010. *Graduated Licensing Law Statistics By Age In Fatal and Injury Crashes..* Available at: <http://www.dmv.ne.gov/highwaysafety/pdf/tn20-AllInjGDL.pdf> [accessed June 18, 2011].

⁴²¹ Insurance Institute for Highway Safety. *Q&As: Teenagers – Graduated Driver Licensing*. Available at: <http://www.iihs.org/research/qanda/gdl.html> [accessed May 23, 2011].

⁴²² Williams, A.F. and Shults, R.A. 2010. Graduated Driver Licensing Research, 2007-Present: A Review and Commentary. *Journal of Safety Research*, 41: 77-84.

⁴²³ Chen, L., Baker, S.P. and Li, G. 2006. Graduated Driver Licensing Programs and Fatal Crashes of 16-year-old Drivers: A National Evaluation. *Pediatrics*. American Academy of Pediatrics. 118 (1): 56-62.

⁴²⁴ Masten, S.V. and Hagge R.A. 2004. Evaluation of California's Driver Licensing Program. *Journal of Safety Research*, 35: 523-35.

⁴²⁵ Chen, L., Baker, S.P. and Li, G. 2006. Graduated Driver Licensing Programs and Fatal Crashes of 16-year-old Drivers: A National Evaluation. *Pediatrics*. American Academy of Pediatrics. 118 (1): 56-62.

⁴²⁶ McCart, A.T., Teoh, E.R., Fields, M., Braitman, K.A. and Hellinga, L.A. 2010. Graduated Licensing Laws and Fatal Crashes of Teenage Drivers: A National Study. *Traffic Injury Prevention*, 11 (3): 240-248.

⁴²⁷ Centers for Disease Control and Prevention. Injury Prevention & Control: Motor Vehicle Safety. *Teen Drivers: Fact Sheet*. Available at: http://www.cdc.gov/motorvehiclesafety/teen_drivers/teendrivers_factsheet.html [accessed May 23, 2011].

3.3.3 Conclusions: Decrease Incidence of Younger Drivers Driving Beyond Their Skills

Younger drivers experience disproportionately high proportions of fatalities and traffic crash risks. GDL laws reduce these risks. Ensuring compliance and strengthening testing and restrictions can reduce them even more.

3.4 Reduce the Incidence of Older Drivers Driving Beyond Their Cognitive and Physical Abilities

3.4.1 Background: Reduce the Incidence of Older Drivers Driving Beyond Their Cognitive and Physical Abilities

Prevalence of Older Drivers Driving Beyond Their Cognitive and Physical Abilities

In 2008, drivers age 65 and older comprised 13 percent of all licensed drivers.⁴²⁸⁻⁴²⁹ While there has been a significant increase in the number of these older drivers—rising 23 percent from 1999 to 2009—there is little knowledge of how many of those drivers are at risk due to driving beyond their cognitive and physical abilities.⁴³⁰

Impact on Risk

Older drivers tend to limit their driving to times when conditions are safest and drive fewer miles than younger drivers. They have lower incidences of impaired driving.⁴³¹⁻⁴³² However, people age 70 and older are retaining their driver's licenses longer and driving more miles than in the past.⁴³³ Additionally, drivers age 70 and older have an elevated risk per capita and per mile traveled of being at fault for fatal crashes.⁴³⁴⁻⁴³⁵

⁴²⁸ U.S. Department of Transportation Federal Highway Administration. 2008. *Highway Statistics 2008. Distribution of Licensed Drivers – 2008 by Sex and Percentage in Each Age Group and Relation to Population*. Table DL-20 Available at: <http://www.fhwa.dot.gov/policyinformation/statistics/2008/dl20.cfm#foot1> [accessed May 23, 2011].

⁴²⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. Traffic Safety Facts. *Older Population*. DOT HS 811 161. Available at: <http://www.nrd.nhtsa.dot.gov/Pubs/811161.PDF> [accessed May 23, 2011].

⁴³⁰ Centers for Disease Control and Prevention. *Injury Prevention and Control: Motor Vehicle Safety. Older Adult Drivers: Get the Facts*. Available at: http://www.cdc.gov/Motorvehiclesafety/Older_Adult_Drivers/adult-drivers_factsheet.html [accessed April 7, 2011].

⁴³¹ Ibid.

⁴³² U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. Traffic Safety Facts. *Older Population*. DOT HS 811 161.

⁴³³ Insurance Institute for Highway Safety. 2010. *Fatality Facts 2009, Older People*. Available at: http://www.iihs.org/research/fatality_facts_2009/olderpeople.html [accessed April 7, 2011].

⁴³⁴ Stutts, J., Martell, C. and Staplin, L. 2009. *Identifying Behaviors and Situations Associated With Increased Crash Risk for Older Drivers*. National Highway Traffic Safety Administration. Available at: <http://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/811093.pdf> [accessed June 18, 2011].

Impact on Fatality/Injury

In 2008, adults age 65 and older made up 15 percent of all traffic fatalities.⁴³⁶ Traffic fatalities by age tend to increase starting at age 70, and they increase notably after age 80. Adults age 65 and above have an increased susceptibility to injury and medical complications when involved in a crash.⁴³⁷ In 2008, 183,000 adults age 65 and older were injured in traffic crashes.⁴³⁸

Potential for Lives/Injury Saved

If the older driver crash rate per mile driven could be reduced to the level of the crash rate for the overall driving population, a large number of fatalities and injuries could be prevented, especially among drivers age 70 and older when fragility tends to increase.⁴³⁹

Policy for Reducing the Incidence of Older Drivers Driving Beyond Their Cognitive Abilities and Physical Skills

Policy 1: Encourage license evaluation programs

3.4.2 Impact of Policy: Reduce Incidence of Older Drivers Driving Beyond Their Cognitive and Physical Abilities

Policy 1—Encourage license evaluation programs

Definition

License evaluation programs focus on identifying older drivers who have experienced declines in physical and cognitive functions. There is no uniform set of standards for assessment, but the process often includes a vision test, cognitive skill test, and driving test.⁴⁴⁰ License restrictions based on assessments can include daylight-only motor vehicle operation.

⁴³⁵ Insurance Institute for Highway Safety. 2010. *Fatality Facts 2009, Older People*. Available at: http://www.iihs.org/research/fatality_facts_2009/olderpeople.html [accessed April 7, 2011].

⁴³⁶ Ibid.

⁴³⁷ Centers for Disease Control and Prevention. Injury Prevention & Control: Motor Vehicle Safety. *Older Adult Drivers: Fact Sheet*. Available at: http://www.cdc.gov/MotorVehicleSafety/Older_Adult_Drivers/adult-drivers_factsheet.html [accessed May 23, 2011].

⁴³⁸ U.S. Department of Transportation National Highway Traffic Safety Administration. Traffic Safety Facts. 2008 Data *Older Population*. DOT HS 811 161.

⁴³⁹ Insurance Institute for Highway Safety. 2010. *Fatality Facts 2009, Older People*. Available at: http://www.iihs.org/research/fatality_facts_2009/olderpeople.html [accessed April 7, 2011].

⁴⁴⁰ Governors Highway Safety Association. 2011. *Mature Driver Laws*. Available at: http://www.ghsa.org/html/stateinfo/laws/olderdriver_laws.html [accessed May 19, 2011].

History of Deployment

As of 2010, 28 states and the District of Columbia have special provisions for older drivers; these include increased frequency of license renewal, vision and road tests, in-person license renewals, and doctors' notes proving competency.⁴⁴¹

Effectiveness Studies

Requiring in-person license renewal was associated with a significantly lower fatality rates.⁴⁴² Placing some kind of restrictions on licenses lowered crash risk among drivers age 66 years and older and may reduce the number of fatal crashes. These restrictions were most often a prohibition against night-time driving and restrictions on the maximum speed.⁴⁴³

Projected Impact

License evaluation programs appear to reduce fatalities and crashes among older drivers, but more work is needed to evaluate programs and identify which elements contribute to the gains.

Economic Factors

Costs include developing valid tests, as well as screening methods, in addition to the cost of administering tests and enforcing restrictions.⁴⁴⁴

Conclusion

Restricting licensing and requiring in-person renewals led to reduced crash and fatality risks. Further research is needed to develop screening and testing methods that will identify drivers at risk with the required accuracy.

3.4.3 Conclusions: Reduce Incidence of Older Drivers Driving Beyond Their Cognitive and Physical Abilities

Older drivers experience disproportionately high fatality, injury, and crash risks. While limited research has been conducted about implementing driver assessment programs for older drivers, findings suggest that programs would result in reduced crash and fatality risks.

⁴⁴¹ Ibid.

⁴⁴² Ibid.

⁴⁴³ Nasvadi, G.C. and Wister, A. 2009. Do Restricted Driver's Licenses Lower Crash Risk Among Older Drivers? A Survival Analysis of Insurance Data From British Columbia. *The Gerontologist* 49.4: 474-84.

⁴⁴⁴ U.S. Department of Transportation National Highway Traffic Safety Administration. 2003. *Model Driver Screening and Evaluation Program: Final Technical Report*. DOT HS 809 583.

3.5 Reduce Speeding

3.5.1 Background: Reduce Speeding

Prevalence

In a nationwide survey, about 75 percent of drivers reported driving over the speed limit in the month preceding the survey, and more than 25 percent reported speeding on the day it took place.⁴⁴⁵

Impact on Crash Risk

Speeding contributes to crash risk because it makes the driving task more difficult by reducing the driver's ability to maneuver safely, increases the stopping distance of the vehicle, and extends the distance the vehicle travels while the driver reacts. The impact of speeding on crash risk is greater under poor weather conditions such as snow, slush, and ice.⁴⁴⁶

Impact on Fatality and Injury

In 2008 speeding was a factor in 31 percent of fatal crashes, with 11,674 lives lost.⁴⁴⁷ Speeding increases the severity of crashes in general and especially in crashes between vehicles and pedestrians or bicyclists.⁴⁴⁸ Speeding-related fatalities are disproportionately more common among younger drivers, male drivers, and alcohol-impaired drivers.⁴⁴⁹

Potential for Lives/Injury Saved

Given that excessive speed is a contributing factor in 31 percent of fatal crashes, any efforts that reduce speeding will result in a significant number of lives saved and injuries prevented.

Policies for Reducing Speeding

Two policies are considered that have shown substantial potential for reducing speed and therefore speed-related fatalities and injuries.

Policy 1: Encourage use of automated speed enforcement (ASE) (where appropriate and as an adjunct to traditional enforcement methods and engineering approaches)

⁴⁴⁵ Royal, D. 2003. *National Survey of Speeding and Unsafe Driving Attitudes and Behavior: 2002, Volume II*, (DOT HS 809 688), NHTSA, Washington, D.C.

⁴⁴⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. Traffic Safety Facts. *Speeding*. DOT HS-811-166.

⁴⁴⁷ Ibid.

⁴⁴⁸ Rosen, E., Stigson, H., Sander, U. 2009. Pedestrian Fatality Risk as a Function of Car Impact Speed. *Acc Anal Prev*. 41: 536-542.

⁴⁴⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2008. Traffic Safety Facts. *Speeding*. DOT HS-811-166.

Policy 2: Use traffic calming (and other engineering techniques) to reduce speeds

3.5.2 Impact of Policies: Reduce Speeding

Policy 1—Encourage use of automated speed enforcement (ASE)

Definition

Automated speed enforcement (ASE) detects a speeding vehicle (usually with a camera) as it passes a location and photographs the license plate, while creating a record of the date, time, location, and speed. A ticket is mailed to the car's registered owner.⁴⁵⁰

History of Deployment

States began to adopt ASE in the early 1970s, but by the early 1990s, many had abandoned the practice due to public complaints related to privacy, fairness, and reliability.⁴⁵¹ As of 2010, 12 states plus the District of Columbia permit ASE statewide, while another seven permit it under certain circumstances.⁴⁵² ASE is used in at least 16 other countries.⁴⁵³

Effectiveness Studies

ASE is associated with substantial reductions in speeding and crashes,⁴⁵⁴⁻⁴⁵⁵⁻⁴⁵⁶⁻⁴⁵⁷ in some instances by several orders of magnitude (e.g. from 300 crashes per year on one highway to

⁴⁵⁰ Retting, R.A. and Farmer, C.M. 2003. Evaluation of Speed Camera Enforcement in the District of Columbia. *Transportation Research Record: Journal of the Transportation Research Board* 830: 34-37.

⁴⁵¹ Rodier, C.J., Shaheen, S.A. and Cavanagh, E. 2007. *Automated Speed Enforcement for California: A Review of Legal and Institutional Issues*. Institute of Transportation Studies. California PATH Research Report: UCB-ITS-PRR-2007-14.

⁴⁵² Insurance Institute for Highway Safety. Highway Loss Data Institute. *Q&A: Speed – Law Enforcement*. Available at: http://www.iihs.org/research/qanda/speed_lawenf.aspx [accessed July 22, 2010].

⁴⁵³ Thomas, L.J., Srinivasan, R., Decina, L.E. and Staplin, L. 2008. Safety Effects of Automated Speed Enforcement Programs: Critical Review of International Literature. *Transportation Research Record: Journal of the Transportation Research Board*, 2078: 117-126.

⁴⁵⁴ Pilkington, P. and Kinra, S. 2005. Effectiveness of Speed Cameras in Preventing Road Traffic Collisions and Related Casualties: Systematic Review. *British Medical Journal*, 330: 331-34.

⁴⁵⁵ Rodier, C.J.; Shaheen, S.A. and Cavanagh, E. 2007. *Automated Speed Enforcement in the U.S.: A Review of the Literature on Benefits and Barriers to Implementation*. Transportation Research Board Annual Meeting, July 2007.

⁴⁵⁶ Washington, S., Shin, K. and van Schalkwyk, I. 2007. *Evaluation of the City of Scottsdale Loop 101 Photo Enforcement Demonstration Program*. Final Report AZ-684. Arizona Department of Transportation.

⁴⁵⁷ Harsha, B. and Hedlund, J. 2007. *Changing America's Culture of Speed on the Roads*. AAA Foundation. Available at: <http://www.aaafoundation.org/pdf/HarshaHedlund.pdf> [accessed June 20, 2010].

30).⁴⁵⁸⁻⁴⁵⁹ In other cases, there were drops of 20 to 25 percent for overall crashes and as much as 71 percent for fatal crashes.^{460,461}

Projected Impact

ASE can have a very strong impact on speeding, as long as it is designed as a safety-enhancing program and implemented in the context of a general deterrence approach.

Economic Factors

Some ASE programs generate net revenue, but most are revenue neutral or require subsidies.⁴⁶² Comprehensive cost-benefit studies indicate positive cost-benefits.⁴⁶³

Conclusion

ASE is potentially a highly effective tool in reducing vehicle speeds and subsequent crashes and injuries. Barriers remain, however, due to bureaucratic and legal complications, privacy concerns, constitutional challenges, and perceptions that ASE is merely a method for generating revenue rather than reducing the incidence of speeding.

Policy 2—Use traffic calming to reduce speeds

Definition

Traffic calming uses infrastructure such as street closures, medians, forced turn islands, speed bumps, roundabouts, curb extensions, and raised intersections and crosswalks to slow motorized traffic to make conditions safer and more comfortable for pedestrians, bicyclists, and other non-motorized road users, without increasing volumes and traffic speeds on other parts of the road network.⁴⁶⁴

⁴⁵⁸ Ibid.

⁴⁵⁹ Transportation Research Board. 1998. *Special Report 254; Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits*. Washington, D.C. National Academy of Sciences.

⁴⁶⁰ Mountain, L.J., Hirst, W.M. and Maher, M.J. 2004. Costing Lives or Saving Lives? A Detailed Evaluation of the Impact of Speed Cameras on Safety. *Traffic Engineering and Control* 45: 280-87.

⁴⁶¹ Pilkington, P. and Kinra, S. 2005. Effectiveness of Speed Cameras in Preventing Road Traffic Collisions and Related Casualties: Systematic Review. *British Medical Journal*, 330: 331-34.

⁴⁶² Blackburn, R. and Gilbert, D. 1995. *Enforcement of Traffic Laws: Synthesis of Highway Practice 219*. Washington, D.C. National Academy Press.

⁴⁶³ Greg Chen, G., Warburton, R. 2006. Do Speed Cameras Produce Net Benefits? Evidence from British Columbia, Canada. *Journal of Policy Analysis and Management*, 25 (3): 661–678.

⁴⁶⁴ Kirschbaum, J.B., Axelson, P.W., Longmuir, P.E., Mispagel, K.M., Stein, J.A. and Yamada, D.A. 2001. *Designing Sidewalks and Trails for Access: Part II of II, Best Practices Design Guide*. Chapter 9. U.S. Department of Transportation Federal Highway Administration. Available at: <http://www.fhwa.dot.gov/environment/sidewalk2/index.htm>[accessed May 23, 2011].

History of Deployment

The first traffic calming program was developed in Delft, Holland in the 1960s. In the U.S., the first places to use it were Berkeley, California, and Seattle, Washington, in the early 1970s. Since traffic calming is most feasible for local streets, it has largely been the concern of city governments. A more recent variant on traffic calming is “Complete Streets,” which is an evolving concept expressed in federal and some state transportation policies, guiding street designs and improvements to take into account the needs of all users.⁴⁶⁵

Effectiveness Studies

The number and variety of traffic calming measures makes it difficult to provide an overall estimate of effectiveness.⁴⁶⁶ The installation of roundabouts is associated with crash reductions.^{467,468} Curb extensions reduce vehicle speed;⁴⁶⁹ speed bumps tend to reduce the fastest speeds on local streets⁴⁷⁰ and are also associated with lowering child pedestrians’ traffic injury risk;⁴⁷¹ and raised crosswalks can reduce pedestrian fatalities and injuries.⁴⁷²

Projected Impact

While there is no comprehensive evaluation of the entire suite of traffic calming devices,⁴⁷³ in general, traffic calming reduces speeds and creates a more pedestrian- and bicycle-friendly street environment.⁴⁷⁴

Economic Factors

Cost-benefit calculations of traffic calming measures are highly situational and location-based.^{475,476}

⁴⁶⁵ Smith, R., Reed, S. and Baker, S. 2010. Street Design: Part 1—Complete Streets. *Public Roads*, 74 (1).

⁴⁶⁶ Retting, R.A., Ferguson, S.A., McCartt, A.T. 2003. A Review of Evidence-Based Traffic Engineering Measures Designed to Reduce Pedestrian-Motor Vehicle Crashes. *American Journal of Public Health*, 93 :1456–63.

⁴⁶⁷ Flannery, A. and Datta, T.K. 1996. Modern Roundabouts and Traffic Crash Experience in United States. *Transportation Research Record: Journal of the Transportation Research Board*, 1553: 103-109.

⁴⁶⁸ Retting, R.A., Ferguson, S.A., McCartt, A.T. 2003. A Review of Evidence-Based Traffic Engineering Measures Designed to Reduce Pedestrian-Motor Vehicle Crashes. *American Journal of Public Health*, 93 :1456–63.

⁴⁶⁹ McCourt, R.S. 1998. *Survey of Neighborhood Traffic Management Performance and Results*. Institute of Transportation Engineers. Available at: <http://www.ite.org/traffic/documents/CCA98A01.pdf> [accessed June 13, 2010].

⁴⁷⁰ Ewing, R. 2001. *Impacts of Traffic Calming*. TRB Circular E-C019: Urban Street Symposium.

⁴⁷¹ Tester, J.M., Rutherford, G.W., Wald, Z. and Rutherford, M.W. 2004. A Matched Case-Control Study Evaluating the Effectiveness of Speed Humps in Reducing Child Pedestrian Injuries. *American Journal of Public Health*, 94 (4): 646-650.

⁴⁷² Bahar, G., Masliah, M., Wolff, R. and Park, P. 2007. *Desktop Reference for Crash Reduction Factors*. Federal Highway Administration. FHWA-SA-07-015. Available at: http://safety.fhwa.dot.gov/speedmgmt/ref_mats/fhwas09028/resources/CRF%20Desktop%20Reference.pdf [accessed July 28, 2010].

⁴⁷³ Retting, R.A., Ferguson, S.A., McCartt, A.T. 2003. A Review of Evidence-Based Traffic Engineering Measures Designed to Reduce Pedestrian-Motor Vehicle Crashes. *American Journal of Public Health*, 93:1456–63.

⁴⁷⁴ Mao, J. and Koorey, G. 2010. *Investigating and Modelling the Effects of Traffic Calming Devices*. IPENZ Transportation Group Conference 2010. Christchurch, New Zealand. Available at: <http://ir.canterbury.ac.nz/handle/10092/3897> [accessed July 28, 2010].

Conclusion

Traffic calming can be effective in reducing vehicular speeds and traffic volumes, although the potential for “migration” of volume to other locations should be considered. Additional research is needed to understand the cost-benefits of traffic calming over a wider area and to identify suitable locations.

3.5.3 Conclusions: Reduce Speeding

Speeding is very common and is a major contributor to crashes and injuries. Automated speed enforcement is very effective in reducing speeding and crashes, but it faces barriers related to public perception. Traffic calming measures can be effective on the local level.

3.6 Increase Seat Belt Use

3.6.1 Background: Increase Seat Belt Use

Prevalence of Seat Belt Use

In 2010, U.S. seat belt use rose to 85 percent as measured by the National Highway Traffic Safety Administration’s (NHTSA’s) National Occupant Protection Use Survey (NOPUS).⁴⁷⁷ Seat belt use varies among different demographic groups and is lower among males, 16- to 24-year-olds, pickup truck occupants, African-Americans, and solo drivers.^{478,479}

Impact on Fatality

Seat belts reduce the risk of fatal injury to front-seat passengers by 45 percent and the risk of moderate to critical injury by 50 percent.⁴⁸⁰

⁴⁷⁵ Litman, T.A. 1999. *Traffic Calming Benefits, Costs and Equity Impacts*. Victoria Transport Policy Institute. Available at: <http://www.vtpi.org/calming.pdf> [accessed June 14, 2010].

⁴⁷⁶ Elvik, R., Vaa, T., Høy, A. (eds). 2009. *The Handbook of Road Safety Measures*. Emerald Group Publishing Limited.

⁴⁷⁷ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Seat Belt Use in 2010—Overall Results*. DOT HS 911 378.

⁴⁷⁸ U.S. Department of Transportation National Highway Traffic Safety Administration: *Occupant Restraint Use in 2009—Results from the National Occupant Protection Use Survey Controlled Intersection Study*. Available at: <http://www-nrd.nhtsa.dot.gov/Pubs/811414.pdf> [accessed January 2011].

⁴⁷⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Seat Belt Use in 2008—Demographic Results*. DOT HS 811 183.

⁴⁸⁰ U.S. Department of Transportation National Highway Traffic Safety Administration. 2000. *Fatality Reduction by Safety Belts for Front Seat Occupants of Cars and Light Trucks: Updated and Expanded Estimates Based on 1986-99 FARS Data*. DOT HS 809 199.

Potential for Lives Saved

A 2009 U.S. Department of Transportation study estimated that 1,652 additional lives could be saved and 22,372 serious injuries prevented annually in the U.S. if seat belt use rates rose to 90 percent.⁴⁸¹ Slightly more than half of the savings would come from the 20 states that do not have primary seat belt laws.⁴⁸² NHTSA estimates that each 1 percent increase in seat belt use could save 270 lives annually.⁴⁸³

Policies for Increasing Seat Belt Use

Policies over the past several decades have led to increased seat belt use. However, a substantial percent of fatalities and injuries still occur to unrestrained occupants.

Policy 1: Expand primary seat belt laws to all 50 states

Policy 2: Increase funding for enhanced enforcement

3.6.2 Impact of Policies: Increase Seat Belt Use

Policy 1—Expand primary seat belt laws to all 50 states

Definition

Primary seat belt laws allow a police officer to stop a vehicle and issue a ticket to the driver solely because of a seat belt violation.

History of Deployment

New York passed the first primary seat belt law in 1984. Currently, 31 states and the District of Columbia have primary seat belt laws.⁴⁸⁴

Effectiveness and Impact

States with primary seat belt laws have higher use rates⁴⁸⁵ and lower fatality rates.

⁴⁸¹ U.S. Department of Transportation National Highway Traffic Safety Administration. Traffic Safety Facts: 2009. *The Increase in Lives Saved, Injuries Prevented, and Cost Savings if Seat Belt Use Rose to at Least 90 Percent in All States*. DOT HS 811 140.

⁴⁸² Ibid.

⁴⁸³ U.S. Department of Transportation National Highway Traffic Safety Administration. 2006. *FY2006 Budget Request Statement*. Dr. Jeff W. Runge, NHTSA Administrator. Available at: www.nhtsa.dot.gov/nhtsa/whatis/BB/2006/pages/AdminStmnt.htm. [accessed May 11, 2011].

⁴⁸⁴ Insurance Institute for Highway Safety. *Safety Belt Use Laws*. Available at: <http://www.iihs.org/laws/SafetyBeltUse.aspx> [accessed May 22, 2011].

⁴⁸⁵ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. Traffic Safety Facts. *Seat Belt Use in 2010—Overall Results*. DOT HS 811 378.

Projected Impact

Occupant fatalities were 9 percent higher per vehicle-mile traveled and 15 percent higher per capita in 2005 and 2006 in states without primary seat belt laws.⁴⁸⁶

Economic Factors

Costs for implementing and enforcing primary seat belt laws are distributed among numerous enforcement agencies, and there is no breakdown of costs. Savings in medical and other costs if all states were to adopt primary seat belt laws would average \$138 million per state annually.⁴⁸⁷

Conclusion

Universal adoption of primary seat belt laws would prevent hundreds of fatalities and thousands of injuries per year, resulting in billions of dollars in annual savings.

Policy 2—Increase funding for enhanced enforcement

Definition

Enhanced seat belt enforcement programs include defined periods of media coverage, intensive enforcement, paid advertisement, and program evaluations using observation surveys and surveys of public perception.⁴⁸⁸

History of Deployment

The largest enhanced enforcement campaign is the Click it or Ticket (CIOT) program, which utilizes advertising and funding provided by NHTSA. The first CIOT campaign took place in 1993. By 2004, most states and territories were participating in the program.⁴⁸⁹

Effectiveness Studies

Enhanced enforcement programs led to a median increase in observed seat belt use of 16 percentage points.⁴⁹⁰

⁴⁸⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2006 Data. Traffic Safety Facts. *States With Primary Enforcement Laws Have Lower Fatality Rates*. DOT HS 810 557.

⁴⁸⁷ National Cooperative Highway Research Program. 2008. *The Impact of Legislation, Enforcement, and Sanctions on Safety Belt Use*. Report No. 601.

⁴⁸⁸ The Community Guide to Preventive Services. *Use of Safety Belts: Enhanced Enforcement Program*. Available at: <http://www.thecommunityguide.org/mvoi/safetybelts/enforcementprograms.html> [accessed May 22, 2011].

⁴⁸⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. *Campaign History Fact Sheet*. Available at: <http://www.nhtsa.gov/staticfiles/communications/pdf/ciot-history.pdf>, [accessed June 5, 2010].

⁴⁹⁰ The Community Guide to Preventive Services. *Use of Safety Belts: Enhanced Enforcement Program*. Available at: <http://www.thecommunityguide.org/mvoi/safetybelts/enforcementprograms.html> [accessed May 22, 2011].

Projected Impact

For each 1 percent increase in seat belt use, approximately 270 lives are saved annually.⁴⁹¹

Economic Factors

Costs are moderate and vary by state.⁴⁹² Federal funding supports the CIOT campaign.⁴⁹³

Conclusion

Enhanced seat belt enforcement programs have proven very effective in increasing seat belt use, preventing thousands of traffic fatalities and hundreds of thousands of injuries. Maintaining and expanding federal funding for such programs will increase these benefits.⁴⁹⁴

3.6.3 Conclusions: Increase Seat Belt Use

Efforts have dramatically increased seat belt use from about 10 percent in 1982 to about 85 percent in 2010. However, there is a large potential for further gains by expanding federal incentive programs to encourage states without primary seat belt laws to establish and enforce such laws, and increasing federal funding for enhanced enforcement programs.

3.7 Increase Use of Age- and Size-Appropriate Child Safety Seats and Booster Seats

3.7.1 Background: Increase Use of Age- and Size-Appropriate Child Safety and Booster Seats

Prevalence of Use of Age- and Size-Appropriate Child Safety and Booster Seats

While there is evidence that more children are restrained in appropriate seats, especially among the youngest children, there is a strong tendency for children to be prematurely graduated out of rear-facing safety seats, out of front-facing safety seats, and into seat belts. Among the oldest and tallest children, only 15 percent were restrained in appropriate safety seats; by contrast, 89 percent of the shortest and youngest children were properly restrained.⁴⁹⁵

⁴⁹¹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Analyzing the First Years of the Ticket or Click It Mobilizations*. DOT HS 811 232.

⁴⁹² Solomon, M.G., Ulmer, R.G., Presser, D.F. 2002. *Evaluation of Click It or Ticket Model Programs*. National Highway Traffic Safety Administration, DOT 809 498.

⁴⁹³ U.S. Department of Transportation National Highway Traffic Safety Administration. *Click It or Ticket: Campaign History Fact Sheet*. Available at: <http://www.nhtsa.gov/CIOT> [accessed April 13, 2011].

⁴⁹⁴ Ibid.

⁴⁹⁵ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Child Restraint Use in 2008 – Use of Correct Restraint Types*. DOT HS 811 132.

Impact on Fatality

Child safety seats reduce fatalities 71 percent for infants (less than a year) and 54 percent for toddlers (1 to 4 years).⁴⁹⁶

Potential for Lives Saved

In the United States, 1,314 children age 14 and under died in traffic crashes in 2009—at least 23 percent of those were unrestrained (not all children’s restraint use was recorded). NHTSA estimates that 309 children age 5 and under were saved by restraint use in 2009. If child restraints had been used by all children age 5 and under involved in fatal crashes, an additional 63 lives could have been saved.⁴⁹⁷ Adjusting the use of child restraints to ensure they are age- and size-appropriate would save at least a similar number of lives.⁴⁹⁸

Policies for Increasing Use of Age- and Size-Appropriate Child Safety and Booster Seats

The current rate of non-use or misuse of child restraint systems is surprisingly high. Two policies are described for increasing the use of appropriate child restraints.

Policy 1: Encourage states to adopt and enforce uniform standards

Policy 2: Increase funding for education and enforcement

3.7.2 Impact of Policies: Increase Use of Age-Appropriate Child Safety and Booster Seats

Policy 1— Encourage states to adopt and enforce uniform standards

Definition

From infancy to pre-teen years there are four types of appropriate restraints: (1) rear-facing child safety seats, (2) forward-facing child safety seats, (3) booster seats, and (4) adult seat belts. NHTSA publishes detailed guidelines for appropriate use based on age and weight of the child.⁴⁹⁹

⁴⁹⁶ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Occupant Protection*. DOT HS 811 160.

⁴⁹⁷ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Children*. DOT HS 811 387.

⁴⁹⁸ U.S. Department of Transportation National Highway Traffic Safety Administration. 1999. *Final Economic Assessment, FMVSS No.213 and 225, Child Restraint Systems, Child Restraint Anchorage Systems*, Office of Regulatory Analysis. Available at: <http://www.nhtsa.gov/cars/rules/rulings/ucra-omb-j08/econ/regeval.213.225.html> [accessed May 21, 2011].

⁴⁹⁹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2011. *Child Safety: Which Car Seat is the Right One for Your Child?* Available at: <http://www.nhtsa.gov/Safety/CPS> [accessed May 21, 2011].

History of Deployment

NHTSA, in particular, has developed guidelines and recommendations for child restraint devices.⁵⁰⁰⁻⁵⁰¹ Federal rules in this area were strengthened in 2002 with the adoption of LATCH (Lower Anchors and Tethers for Children), a system mandated for nearly all passenger vehicles and all child safety seats in an effort to standardize and simplify the installation of child restraint systems. While all 50 states and the District of Columbia currently have child restraint laws in effect, requirements differ, with many falling short of offering the best protection—and three states have no booster seat use requirement.

In March of 2011, NHTSA released new guidelines based on age to help parents choose the appropriate restraints for their children.⁵⁰² However, many parents still prematurely “graduate” their children to older-child restraints.^{503,504}

Effectiveness Studies

Education and training programs increase child restraint device use.⁵⁰⁵ Research is needed on the potential impact of setting and enforcing uniform standards.

Projected Impact

There has been little study on the impact of standardized regulations of child protection systems on parents’ ability to use them more appropriately. Research on parents’ perceptions, as well as the implications such standards would have for simplifying and improving enforcement, would contribute to an understanding of the effectiveness of this policy.

Economic Factors

There is little information on the cost of adopting and enforcing uniform standards on a national basis. Given the high impact that any improvement in use rates would have, any steps to make compliance easier for parents are likely to lead to significant safety gains and cost savings. NHTSA has been giving states incentive grants to improve compliance and enforcement.⁵⁰⁶

⁵⁰⁰ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Child Restraint Use in 2008 Use of Correct Restraint Types*. DOT HS 811 132.

⁵⁰¹ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Child Safety*.

⁵⁰² U.S. Department of Transportation National Highway Traffic Safety Administration. 2011. *Child Safety: Which Car Seat is the Right One for Your Child?* Available at: <http://www.nhtsa.gov/Safety/CPS> [accessed May 21, 2011].

⁵⁰³ Rivara, F.P., Bennett, E., Crispin, B., Kruger, K., Ebel, B. and Sarewitz, A. 2001. Booster seats for child passengers: lessons for increasing their use. *Injury Prevention*, 7: 210-213.

⁵⁰⁴ Ramsey, A., Simpson, E. and Rivara, FP. 2000. Booster Seat Use and Reasons for Nonuse. *Pediatrics*. American Academy of Pediatrics. 106 (2): e20.

⁵⁰⁵ Tessier, Karen 2010. Effectiveness of Hands-On Education for Correct Child Restraint Use by Parents. *Accident Analysis and Prevention*, 1041-1047.

⁵⁰⁶ Federal Grants Wire. *Child Safety and Child Booster Seats Incentive Grants (20.613)*. Available at: <http://www.federalgrantswire.com/child-safety-and-child-booster-seats-incentive-grants.html> [accessed May 23, 2011].

Conclusion

Encouraging states to adopt national standards through incentive programs is likely to reduce traffic deaths and injuries among child passengers.

Policy 2—Increase funding for education and enforcement

Definition

Education and enforcement programs combine high-visibility media campaigns with well-publicized enforcement efforts to raise awareness.

History of Deployment

In the 1990s, NHTSA led the development of a standardized curriculum for child passenger safety education, which includes a process for training and certifying persons in how to correctly install child safety devices. In addition, NHTSA and its many partners each year conduct Child Passenger Safety Week and National Seat Check Saturday, during which parents and caregivers are offered free inspections of their child safety seats and are provided education on correct installation and use.^{507,508}

Effectiveness Studies

Education and enforcement increase child protection device use by a median 23 percent.⁵⁰⁹ Education programs that incorporate incentives or rewards are the most effective.⁵¹⁰ Checkpoints increase child seat effectiveness by 21 percent.^{511,512}

Projected Impact

There is little information on the impact of education and enforcement programs, though they have been shown to work. Additional study of the effectiveness of different approaches would aid the design of more effective policies.

⁵⁰⁷ U.S. Department of Transportation National Highway Traffic Safety Administration. 2009. Traffic Safety Facts. *Child Restraint Use in 2008—Use of Correct Restraint Types*. DOT HS 811 132.

⁵⁰⁸ U.S. Department of Transportation National Highway Traffic Safety Administration. 2010. *Child Safety Seat Inspection Station Locator*.

⁵⁰⁹ The Community Guide to Preventive Services. 2010. *Use of Child Safety Seats: Distribution and Education Programs*. Available at: <http://www.thecommunityguide.org/mvoi/childsafetyseats/distribution.html> [accessed September 17, 2010].

⁵¹⁰ Zaza, S., Sleet, D.A., Thompson, R.S., Sosin, D.M., Bolen, J.C. and Task force on Community Preventive Services. 2001. Reviews of Evidence Regarding Interventions to Increase the Use of Child Safety Seats. *American Journal of Preventive Medicine*, 21 (4S): 31-47.

⁵¹¹ Decina, L.E., Hall, W.L. and Lococo, K.H. 2010. *Booster Seat Law Enforcement: Examples from Delaware, New Jersey, Pennsylvania and Washington*. National Highway Traffic Safety Administration. DOT HS 811 247.

⁵¹² Miller, T. R., Zaloshnja, E. and Sheppard, M.A. 2002. *Child Safety Distribution & Misuse Reduction Programs Sound Investments?* Paper presented at the 130th Annual Meeting of the American Public Health Association, Philadelphia, PA.

Economic Factors

Given the relatively low expense, child safety seat programs for education or enforcement are highly cost-effective.⁵¹³ NHTSA has provided consistent although limited funding for such programs for some time.⁵¹⁴

Conclusion

Even when parents select the appropriate child safety seat, improper installation or misuse is common.⁵¹⁵ Increased funding for parent and community education, as well as increased enforcement, are likely to increase the age- and size-appropriate use of child restraint systems.⁵¹⁶

3.7.3 Conclusions: Increase Use of Age-Appropriate Child Safety Seats and Booster Seats

There is considerable room for improvement in the rate of use of child restraints that provide the most protection for children based on their size and age. Giving incentives for states to adopt uniform child restraint laws and increasing funding for education and enforcement are very likely to increase appropriate child restraint use and prevent child passenger fatalities and injuries.

3.8 Conclusions for Chapter 3

Motor vehicle crashes are the leading cause of fatality and injury for Americans age 1 to 34. In 2009, traffic-related crashes resulted in 33,808 deaths and over 2 million injuries.

DUI crash fatalities decreased from 53 percent all traffic fatalities in 1982 to 32 percent in 2009 largely due to governmental policies. Significant additional savings in lives and dollars could be achieved through expanding interlock programs, increasing the use of sobriety checkpoint programs, maintaining the minimum drinking age law at 21 and expanding enforcement, and strengthening the implementation and enforcement of zero-tolerance laws for underage drivers.

Distracted driving increases crash risk—in the case of cell phone use, to rates approximating those for DUI. Three policies at the federal level have potential for reducing this risk: incentive grants to states to pass rigorous and effective bans on cell phone use, grants to support high-visibility enforcement of cell phone bans, and support for distracted driving education programs in conjunction with enforcement.

⁵¹³ Ibid.

⁵¹⁴ United States Department of Transportation. 1998. *TEA-21: A Summary – Improving Safety*. Available at: <http://www.fhwa.dot.gov/Tea21/sumsafe.htm> [accessed September 17, 2010].

⁵¹⁵ Decina, L.E., Lococo, K.H. and Block, A.W. 2005. *Misuse of Child Restraints: Results of a Workshop to Review Field Data Results*. Traffic Safety Facts, Research Note. National Highway Traffic Safety Administration. DOT HS 809 851.

⁵¹⁶ Pierce, S.E., Mundt, M.P., Peterson, N.M. and Katcher, M.L. 2005. Improving Awareness and Use of Booster Seats in Head Start Families. *Wisconsin Medical Journal* 104 (1): 46-51.

Both younger (age 21 and under) and older (age 65 and over) drivers experience disproportionately high rates of fatalities and traffic crash risks. Graduated driver licensing (GDL) laws benefit younger drivers, while ensuring compliance and strengthening testing and restriction can further reduce youth fatalities. Although limited research has been conducted regarding implementation of driver assessment programs for older drivers, findings suggest that they reduce crash and fatality risks.

Speeding is a very common behavior and a major contributor to traffic crashes. Automated speed enforcement (ASE) is very effective at cutting speeds and fatalities, but it faces public resistance unless it is deployed as a revenue-neutral safety measure designed around the principals of general deterrence. Traffic calming can be effective on the local level, especially for pedestrian and bicycle safety.

Seat belt use has increased from about 10 percent in 1982 to about 85 percent in 2010, due to efforts over the past several decades, preventing thousands of fatal and non-fatal injuries. However, there is great potential for further gains if the national rate were to be raised to 90 percent overall. Expanding federal incentive programs to encourage states to adopt and enforce primary seat belt laws and maintaining and increasing federal funding for enhanced enforcement and education programs would result in additional savings of thousands of lives and injuries and billions in associated yearly costs.

While more children are being properly restrained, misuse is still a major problem, especially among children age 1 and above. Giving states incentives to adopt uniform child restraint laws and usage standards, while increasing funding for education and enforcement is likely to increase appropriate child restraint usage and reduce traffic fatalities and injuries among child passengers.