

Editorial

Adolescent Motor Vehicle Crash Risk: What's Needed to Understand and Reduce the Risk?

Motor vehicle crashes (MVCs) pose the largest threat to adolescent health in the US, yet until recently [1], books on adolescent health risks did not cover MVCs and other unintentional injuries. Despite this seeming lack of attention, research on teen MVCs has seen a robust evolution, with epidemiological data informing successful state and federal policy initiatives over the past decade and individual-level behavioral studies informing interventional efforts more recently. The paper by Dunlop and Romer in this issue of the journal adds an interesting perspective on the individual risk factors that contribute to teen MVCs [2].

In 2006, 5,358 adolescents aged 13–19 years were killed in traffic crashes (nearly 15 every day). Additionally that year, 744,633 other teenagers required emergency department care for their nonfatal motor vehicle injuries (2,040 every day) [3]. These teenage injuries account for a disproportionately high share of the \$230 billion spent in the year 2000 on all people with motor vehicle injuries. And behind these shocking numbers are the huge number of potential years of life lost, the emotional impact on families and friends, and the possibly lifelong physical and psychosocial disabilities that can follow MVCs. Whether the affected teenagers are drivers or occupants, why does this unacceptable loss happen, and what can we do about it?

Epidemiologic data have identified several risk factors for teenage MVCs, and over time, progress has been made in reducing their roles through effective legislation, enforcement, and media campaigns. The establishment of 21 as the minimum legal drinking age (in all states by 1988), and lowered legal blood alcohol limits for young drivers (zero tolerance laws in all states by 1998) have reduced teen alcohol-related crashes. The passage of primary seat belt legislation (officers may stop vehicles solely for seatbelt violations) has increased belt use among teenagers, thereby providing them increased protection in crashes. Teens' increased crash risk due to inexperience, nighttime driving, and driving with passengers is addressed by states' graduated driver licensing (GDL) programs that have an extended learner phase and a restricted intermediate phase required before full licensure. Nearly all states now have

some version of GDL, and evaluations show crash reductions of 20–40% among the youngest drivers [4]. These legislative efforts had positive effects, but MVCs involving teens still remain unacceptably high.

Other efforts to reduce teen crashes adopted an educational or behavioral approach. School-based programs to reduce drunk driving and riding with drinking drivers have had limited success [5]. The effect of driver education on MVCs involving teens has seldom been carefully studied, but there is no convincing evidence that driver education reduces crashes; in fact it may increase crashes through licensing at younger ages [6]. Driver education will, however, remain essential for teaching novice drivers how to manage a vehicle and follow rules of the road. It is necessary, therefore, to improve driver education and to ensure that driver education involves parents, who must supervise their teens' practice driving sessions. Several states now require parent attendance at a driver education session, although the content has not been established or evaluated.

Given the importance of parents' enhancing and monitoring GDL restrictions during teens' early independent driving, several parent-directed interventions have been conducted and evaluated [7]. Both the Checkpoints and Safe Drivers Wanted programs resulted in more parent-teen driving agreements established to set protective limits on early teen driving, and less risky teen driving. The Checkpoints program was delivered through mailed materials and direct contact in licensing offices, while Safe Drivers Wanted was delivered during home visits. In Michigan, Checkpoints was adapted for delivery by health educators in brief group interventions with parents and teens in driver education classes, achieving modest success [8]. While these parent-directed efforts show promise, they would have to be part of a comprehensive and widely adopted approach to reduce the large number of teen MVCs.

Another important approach to understanding the teen MVC problem is to study individual risk factors related to crashes, that is, differences within the population between those drivers who do and do not have crashes. This is the

See Related Article p. 90

approach adopted by Dunlop and Romer, who examined substance use propensity, substance use, and sensation seeking in relation to self-reported crashes with cross-sectional data [2]. They found that propensity to use substances was more directly related to crashes than specific substance use or sensation seeking, but they acknowledged limitations in their data. In our longitudinal study of young drivers, using state records of crashes and offenses, we found that substance use at 15 years of age (cigarettes, marijuana, and alcohol) was an important predictor of subsequent excess risk of serious offenses and serious crashes [9]. Further, high levels and rapid increases in substance use during adolescence also predicted risky driving in young adulthood [10]. Problem Behavior Theory suggests that an awareness of such co-occurring risk factors should guide early intervention [11]. While screening for such risk factors is unlikely in the official licensing process, parents should be alert to teens' behaviors and consider whether they are ready for driver licensure. Clinicians also may know teens and their families well enough to advise parents about teens' driving, although such counseling may be rare [12].

The teen MVC problem seems orphaned, with no federal agency assuming adequate responsibility. The Centers for Disease Control and Prevention's National Center on Injury Prevention and Control and the National Highway Traffic Safety Administration address the issue as best they can with inadequate funding. The Institute of Medicine and the Transportation Research Board held a workshop, resulting in a report [13] and a journal supplement [14]. The Transportation Research Board has a new subcommittee on young drivers (Young Driver Subcommittee) that held a summer 2008 workshop to determine what research is needed to answer the most critical and timely scientific questions about teen drivers [15]. Five priorities emerged: (1) Advance the science base for programs and policies to reduce teenage driving risk; (2) Determine what teenage drivers learn that sharply reduces crashes during the initial months of unsupervised driving; (3) Document the amount and type of teenage driving under various conditions; (4) Determine how parents influence teenage driving; and (5) Determine how passengers influence teenage driving and crash risk. Research in these priority areas will contribute to reducing teens' crash risk.

Teen MVCs are gaining much attention and will gain more with new knowledge about adolescent brain development, as well as a growing awareness of new driving distractions such as cell phones, text messaging, and navigation devices. Although raising the licensing age is tempting, doing so requires providing safe and attractive alternatives for teens' mobility. Leadership is needed for a nationally supported, sustained, coordinated effort involving researchers,

clinicians, public health practitioners, parents, teens, advocates, government, and the auto and insurance industries to forge partnerships and develop programs that will eliminate teen motor vehicle crash fatalities.

Jean Thatcher Shope, M.S.P.H., Ph.D

*University of Michigan Transportation Research Institute
School of Public Health
and Center for Injury Prevention among Youth
Ann Arbor, Michigan*

References

- [1] Sleet DA, Ballesteros M. Unintentional injuries among adolescents. Chapter 14. In: DiClemente RJ, Santelli JAS, Crosby RA, eds. *Adolescent Health: Understanding and Preventing Risk Behaviors*. San Francisco, CA: Jossey-Bass, 2009.
- [2] Dunlop SM, Romer D. Adolescent and young adult crash risk: Sensation seeking, substance use propensity and substance use behaviors. *J Adolesc Health* 2010;46:90–2.
- [3] Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS database) [Online]. Available at: <http://www.cdc.gov/injury/wisqars/index.html>. Accessed October 17, 2009.
- [4] Shope JT. Graduated driver licensing: Review of evaluation results since 2002. *J Safety Res* 2007;38:165–75.
- [5] Elder RW, Nichols JL, Shults RA, et al. Effectiveness of school-based programs for reducing drinking and driving and riding with drinking drivers: A systematic review. *Am J Prev Med* 2005;28:288–304.
- [6] Vernick JS, Li G, Ogaitis S, et al. Effects of high school driver education on motor vehicle crashes, violations, and licensure. *Am J Prev Med* 1999;16(Suppl 1):40–6.
- [7] Simons-Morton BG, Ouimet MC, Catalano RF. Parenting and the young driver problem. *Am J Prev Med* 2008;35:S294–303.
- [8] Zakrajsek JS, Shope JT, Ouimet MC, et al. Efficacy of a brief group parent-teen intervention in driver education to reduce teenage driver injury risk. *Fam Community Health* 2009;32:175–88.
- [9] Shope JT, Waller PF, Raghunathan TE, et al. Adolescent antecedents of high-risk driving behavior into young adulthood: Substance use and parental influences. *Accid Anal Prev* 2001;33:649–58.
- [10] Bingham CR, Shope JT. Adolescent developmental antecedents of risky driving among young adults. *J Stud Alcohol* 2004;65:84–94.
- [11] Shope JT, Bingham CR. Drinking-driving as a component of problem driving and problem behavior in young adults. *J Stud Alcohol* 2002;63:24–33.
- [12] American Academy of Pediatrics Committee on Injury. Violence, and Poison Prevention. The teen driver. *Pediatrics* 2006;118:2570–81.
- [13] National Research Council. Institute of Medicine and Transportation Research Board. *Preventing Teen Motor Crashes: Contributions from the Behavioral and Social Sciences*, Workshop Report. Washington, DC: The National Academies Press, 2007. ISBN No. 978-0-309-10401-2.
- [14] Teen driving and adolescent health: Strategies for prevention. *Am J Prev Med* 2008;(Suppl 3):35.
- [15] National Research Council, Transportation Research Board, Subcommittee on Young Drivers. *Future Directions for Research on Motor Vehicle Crashes and Injuries Involving Teenage Drivers*. Transportation Research E-CIRCULAR [Online]. Available at: <http://claire.hsrc.unc.edu/~foss/2008Mid-yr-rpt.pdf>. Accessed October 19, 2009.