

The Young Impaired Driver Problem: Recent Developments and Future Progress

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Young drivers pose particular risks and problems in traffic safety. Until they reach their mid to late twenties, drivers have a higher crash risk, especially when crashes are adjusted for exposure. Impairment by alcohol and drugs exacerbates these risks. Lack of experience in driving coupled with immature judgment make additional impairment by alcohol and drugs particularly dangerous.

In a two-day symposium in June of 2008, the United States National Academy of Sciences Transportation Research Board Committee on Alcohol, Other Drugs and Transportation brought together experts from around the world to discuss issues related to alcohol and drug impairment among young drivers (16-24). The workshop covered the nature of the impaired driving problem among young drivers as well as a range of strategies to reduce the problem. This paper provides a summary and update of the research presented at the workshop – providing an overview of the state of the art regarding young impaired drivers. The full report from the symposium can be seen <http://onlinepubs.trb.org/onlinepubs/circulars/ec132.pdf>.

The Nature of the Problem in the United States

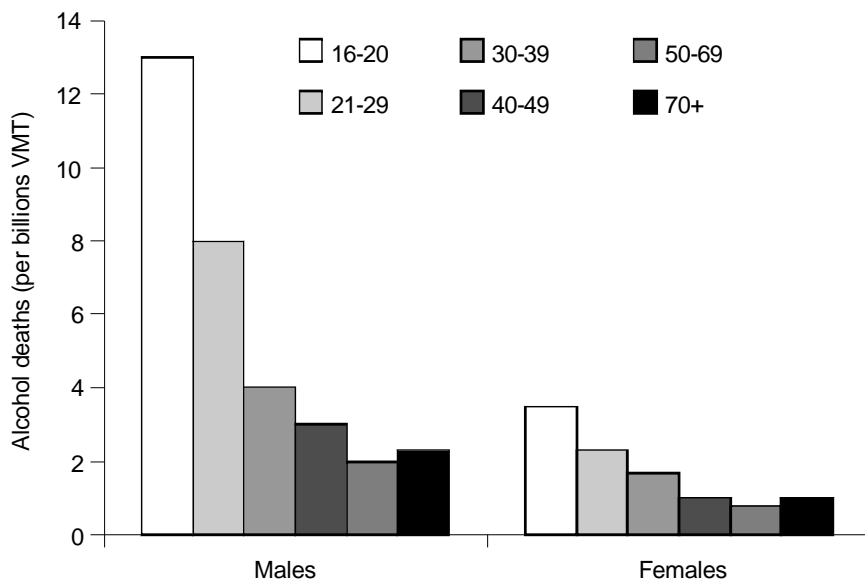
Compared to older drivers, teens drink and drive less often, but when they do drive after drinking, they are at considerably greater risk of being involved in a crash. Drugs also play a role in crashes among young drivers.

Until they reach their mid to late twenties, drivers have a higher crash risk, especially when crashes are adjusted for exposure. (Gonzales et al., 2005; Williams 2003; Zador, Krawchuk, Voas, 2000). After the drinking age was changed to 21 in the U.S. in the 1980s, alcohol related crashes declined dramatically among drivers under 21. Currently, when adjusted for exposure, 21-29 year old drivers in the U.S. are at highest risk for drinking driver fatalities (Elder and Shults 2002). When drivers drink, however, the risk of crashing is much higher for the younger drivers. For example, at a BAC of .07, the relative risk of crashing is nearly 11 for drivers under 21 compared to a relative risk of just over 2 for drivers over 21. That is, for a driver at a BAC of .07 (which is lower than the legal limit of .08) for drivers over 21 in the U.S., drivers under 21

are more than 5 times more likely to be involved in a crash than drivers over 21 (Bingham et al. in press).

Significant impaired driving risk remains for young drivers over 21 and when adjusted for exposure, impaired drivers under 21 are very dangerous. Figure 1 shows that drivers aged 16-20 have the highest risk of crashing per vehicle miles traveled, followed by drivers 21-29. As can be seen in the figure, young male drivers are at dramatically greater risk than young female drivers. The differentials between sexes persist through all ages but become less marked as drivers get older.

Figure 1. Annual death rates based on VMT for drinking drivers in fatal crashes, 1990-1996 (Source: Tippetts and Voas 2002, Fig. 1b)



While alcohol is the most common substance impairing driving, there are indications that marijuana and other drug use may be increasing, and that the rates of driving under the influence of marijuana and other drugs may also be increasing (Albery, Strang, Gossop, Griffiths, 2000).

Predictors of impaired driving

A series of longitudinal studies (Shope, Bingham, and Zakrajsek, in press) have sought to identify significant predictors of adolescent/young adult impaired driving and/or risky driving. Findings show:

- Factors in the *perceived environment system* that predicted impaired driving included more social support for drinking and drink driving, less adolescent parental monitoring, more parental permissiveness, and less perceived risk of drink driving. These factors, as well as less parental nurturing in adolescence, also predicted risky driving outcomes.

- Factors in the *personality system* that predicted impaired driving included more tolerance of deviance, less parent orientation, more susceptibility to peer pressure, more risk-taking propensity, more hostility, more aggression, and poorer marks in school. These factors, as well as less family connectedness, also predicted risky driving outcomes.
- Factors in the *behavior system* that predicted impaired driving included early onset of drinking, more (and an increasing trajectory of) alcohol use, more (and increasing) adolescent alcohol misuse, cigarette and marijuana use (and increasing trajectories of use), and more use of other drugs, as well as more delinquent behavior, and more driving aggression. These factors also predicted other risky driving outcomes.

Characteristics of Crashes Involving Young Drivers

The characteristics of crashes involving young drivers differ from those involving older drivers in some important ways. For example, underage drinkers typically consume larger amounts of alcohol in a single sitting compared to older drinkers (U.S. National Survey on Drug Use and Health, 2003); hence, when they do drink and drive, they are likely to have a higher blood alcohol concentration (BAC) than adults.

Other variables related to driving, alcohol use, or the characteristics of crashes themselves combine to have a greater effect on teen than adult drink/drivers. For example, adult drivers experience either no change in risk or a small safety benefit from having passengers; however, teen passengers greatly increase the crash risk of teen drivers, and that risk increases significantly with each additional passenger (Chen, Baker, Braver, Li, 2000; Masten, 2004; Simons-Morton, Lerner, Singer, 2005; Williams, Ferguson, McCartt, 2007). As a result, crashes involving alcohol, speeding, and carrying of passengers are about 20 times more likely for teens than for middle aged adults. Crashes occurring at night and involving both alcohol and passengers are about 9 times more likely (Bingham et al, in press).

As can be seen in Table 1, overall rates of alcohol related crashes and injuries are higher for young drivers than for middle aged and older adult drivers. For crashes and injuries involving other risk factors, such as passengers and speeding, rates are dramatically higher.

Table 1: Alcohol crash type rate ratios for teen (16-19) and adult (45-65) men

Crash Type	Rate Ratio
Alcohol/Passenger/Speeding	18.16
Alcohol/Nighttime/Passenger	9.08
Alcohol/Nighttime/Weekend	8.03
Alcohol/Speeding/ Weekend	5.44
Alcohol/Passenger/Weekend	5.12
Alcohol/Speeding	5.10
Alcohol/Passenger	4.89
Alcohol/Nighttime/Speeding	4.16
Alcohol/Nighttime	3.71

Alcohol/Weekend	2.40
<u>Alcohol Casualty Crash Types</u>	
Alcohol/Casualty	2.16
Alcohol/Casualty/Speeding	5.07
Alcohol/Casualty/Passenger	4.62
Alcohol/Casualty/Nighttime	3.66
Alcohol/Casualty/Weekend	2.41

1- Rates are based on 100,000 PMD.

(Source: Bingham et al. in press)

The Young Driver Problem in Europe

In Europe, the drinking age is lower than in the U.S., with most countries allowing drinking at 18 or even younger for some beverages and in some circumstances. In addition, little emphasis has traditionally placed on enforcing the drinking age. The legal age of driver licensure tends to be higher (typically 18) than in the U.S.

Uniform statistics from country to country are difficult to find, but it appears that young people are at almost twice the average risk of being killed in a road accident compared to the average member of the respective population across the European Union countries. With the majority of the young people killed being drivers.

As is the case in the U.S., the crash risk for young drinking drivers is greater than for adults who have been drinking. For example, in the Netherlands, with a BAC of 0.5 g/l their crash risk is six times higher than if they had not drunk at all (Mathijssen, 1999). The reason for this is their lack of driving experience in combination with the effect of alcohol. An increasing problem among young (male) drivers is that of drug use (Mathijssen, Koornstra, & Commandeur, 2002).

According to EURO CARE¹ binge drinking is rising all across Europe (Settertobulte, 2001). In France, health authorities report that the number of young people ages 15 to 24 hospitalized in a serious inebriated condition rose 50% from 2004 to 2007. A bill has been introduced in France to raise the drinking age for beer and wine to 18 from 16. Kemp (2004) blamed the increase in binge drinking among young people on "the marketing of new products that don't look like alcohol and don't taste like alcohol. It's the alco-pop culture." She added, "Adults don't drink these things -- it's young people." The issue is still being discussed within the EU; some member states have introduced countermeasures (e.g. server responsibility), others are currently under discussion (Nickel, in press).

The growing problem of heavy drinking among young people led to a police crackdown in England and Wales. Police from 39 different agencies seized alcoholic beverages, including beer, cider, wine, spirits and alcopops from underage drinkers in the February 2009 campaign,

¹ EURO CARE was formed in 1990 as an alliance of voluntary and non-governmental organizations representing a diversity of views and cultural attitudes and concerned with the impact of the European Union on alcohol policy in Member States; the acronym stands for: European Council for Alcohol Research Rehabilitation and Education

which took place during a half-term break. Of the 5,143 youngsters who surrendered alcohol to the police, 25% said they were aged 15 or under, indicating the problem of ever younger drinkers who often obtain alcohol from older friends. The government indicated that these types of crackdowns would continue (Daily Express 2009).

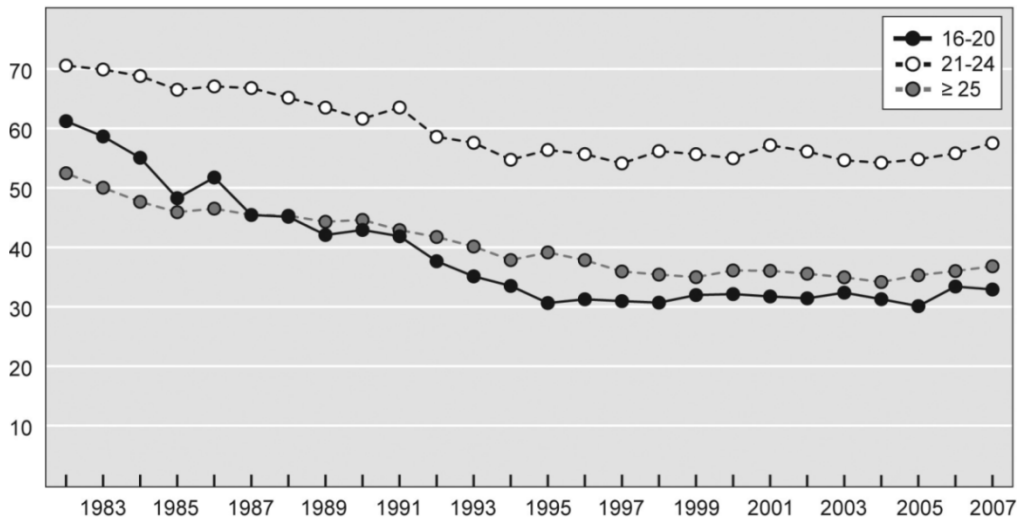
Legal Strategies for Reducing Impaired Driving Among Young Drivers

The dominant strategy for improving the safety of young drivers in many countries around the world has been graduated licensing laws. These laws provide a staged licensing system by which young and novice drivers are restricted in early stages with regard to how and when and under what circumstances they drive and then are allowed increasing independence and flexibility as they gain more experience.

Three elements that contribute most to the effectiveness of graduated licensing are minimum holding periods at each phase of licensure, nighttime restrictions on driving and restrictions on carrying passengers. Also key to these systems are laws prohibiting any use of alcohol during the learning and probationary phases of licensing (zero tolerance) (Sweedler, in press). Graduated licensing and zero tolerance laws have been shown to be highly effective in reducing crashes among young drivers. Studies consistently show a 12-40% reduction in crashes among affected drivers (Shope, 2007). In the U.S., no state has implemented what has been shown by research to be the ideal package of graduated licensing features (Sweedler, in press). The primary ways to improve state systems would be to lengthen learner periods, require more supervised driving time, start nighttime restrictions earlier in the evening, and reduce number of passengers allowed (Williams and Chaudhary, 2008).

Australia has a particularly well structured graduated licensing system. Jurisdictions require the licensing of young drivers at a minimum age of 17 years old and impose a number of specific restrictions not commonly seen in graduated driver licensing approaches in other countries. These provisions include relatively long maximum tenure of learner and provisional licences with the aim of reducing any pressure for novice drivers to progress to later licence stages through licence expiry; requirements for display of a unique identifying plate on the vehicle driven to indicate licence status to other drivers, road users and to police; speed restrictions according to licence category; and a zero alcohol requirement. The minimum purchase age for alcohol in Australia is 18 (Faulks, in press).

In the U.S., as mentioned above, the minimum drinking age of 21 has been a primary legal strategy for reducing impaired driving among young drivers. Dramatic effects of the higher drinking age have been demonstrated repeatedly on drinking and driving and on other alcohol related harms. As shown in Figure 2, while rates of alcohol related fatalities have declined in all age groups over the last 25 years, the rates have declined most dramatically for drivers aged 16 to 20. There do not seem to be any rebound effects of delaying the drinking age until 21. That is, similar patterns of alcohol related crashes are found for 21-24 year olds as for 24-35 year olds (Voas et al. in press).



Source: Fatality Analysis Reporting System (U.S.FARS), 1982-2007 (IIHS, 2008)

FIGURE 2 Percent of U.S. fatally injured passenger vehicle drivers with positive BACs by age, 1982-2007.

A study of the consequences of the 1999 legal change lowering the drinking age in New Zealand from 20 to 18, found that traffic crashes have increased as have other alcohol related injuries and problems among youth. Drinking and associated problems have also trickled down to 15-17 year olds (Kypri, et al, 2006).

Various strategies for strengthening implementation and enforcement have shown promise in further improving traffic safety as well as preventing other alcohol related problems among young people. These include enhanced enforcement, community mobilization, and alcohol regulation that makes alcohol less accessible to youth.

The Role of Enforcement in Reducing Impaired Driving among Youth

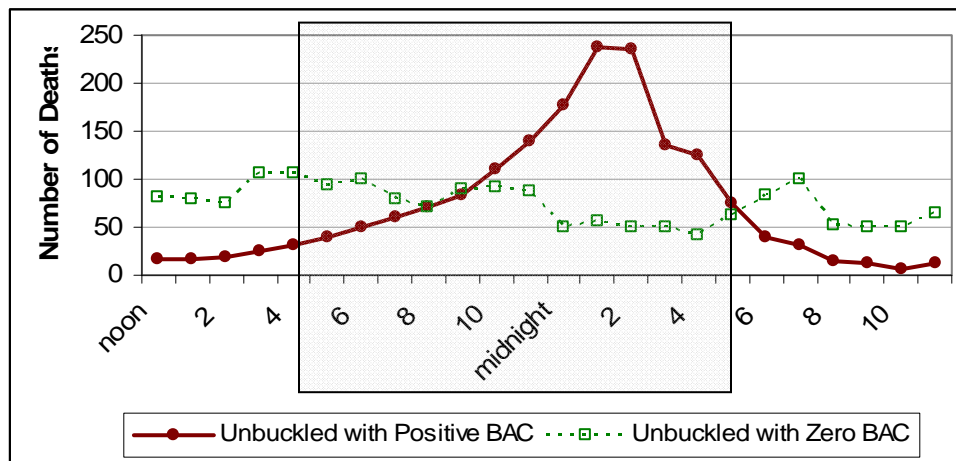
Enforcement plays a key role in reducing impaired driving among all populations – including young drivers. For example, highly publicized random breath tests and sobriety checkpoints have been found to be very effective in reducing impaired driving crashes. The primary effects of enforcement come from its ability to deter illegal behavior rather than to apprehend and punish people who violate the law (Stewart in press).

Recent enforcement campaigns to reduce impaired driving deaths have broadened beyond enforcement of impaired driving laws per se. For example, vigorous enforcement of speed limits in France appears to have reduced crashes among both impaired and sober drivers. When driving speeds are lower, even impaired drivers are more able to avoid crashes and when crashes do occur they are less likely to involve severe injuries (Stewart and Sweedler 2008).

Enforcement of seat belt use laws also has the potential to reduce impaired driving and alcohol related deaths and injuries. As shown in Figure 3, most deaths involving unbelted vehicle occupants occur between midnight and 3 AM – also prime time for impaired driving. Young drivers have lower belt use rates. Thus, nighttime enforcement of seatbelt laws can be effective

in encouraging greater seatbelt use as well as deterring impaired driving, if drivers become concerned about enforcement activities in general (Nichols, Chaudhary and Tison in press).

Figure 3. Number of U.S. Unbuckled Fatalities, by Time of Day, and by Presence or Absence of Alcohol Among Drivers, Ages 16-24
(Source: FARS, 2006 data)



The Potential of Technology to Prevent Impaired Driving among Youth

A great deal of progress has been made in traffic safety through vehicle design and road design as well as through enforcement and education to change driver behavior. It is possible to use recently developed technologies to make further progress. Some of these technologies are particularly relevant to novice drivers, who may lack skills and to young drivers, who may lack judgment. The first 1,000 miles of driving tend to be the most dangerous (McCartt et al. 2003). In addition, as discussed above, teen drivers tend to speed more and use seatbelts less than older drivers – behaviors that might be controlled through the use of technology.

Technology can improve driving performance through three main channels:

- Forcing, that is, designing systems so that dangerous behavior is not permitted. For example, including speed governors on cars of young drivers or preventing driving unless the seat belt is fastened.
- Feedback, that is, alerting the driver to dangerous behavior, for example when following too close.
- Reporting, that is, alerting parents or other authorities when dangerous driving has occurred.

Some systems are currently available that include some of these features. Others are in development. The most sophisticated systems recognize who is driving the car (e.g., the teen or his/her parents) in order to set appropriate limits if the teen is driving. An alcolock may be

included to prevent driving after drinking. Some systems include a data base utilizing GPS technology that indicates the current driving context (e.g., the current speed limit). When the young driver violates the parameters set by parents, the system can report dangerous behavior to an authority (usually the parents). For example, if the young driver exceeds the local speed limit, a warning is sounded. If, after the second warning, the driver does not slow down, the parent is notified via text message or telephone. One feature that could be valuable is the ability to prevent use of cell phones or entertainment systems while the young driver is driving (Brovold et al., 2007).

Conclusions

Young drivers pose a particular danger in traffic due to their inexperience and lack of mature judgment. Their already high risk is exacerbated by impairment with alcohol or other drugs. These risks occur in the U.S. as well as many other countries. Some predictable characteristics are associated with young driver crashes, including excessive speed, carrying passengers, and not wearing seatbelts.

Much progress has been made in reducing crashes and impaired driving among young drivers. Legal structures have been very important in bringing about this progress. In the U.S., raising the drinking age to 21 brought about a dramatic reduction in impaired driving crashes. Zero tolerance laws and graduated licensing systems have also been very effective. These systems gradually introduce young drivers to more difficult driving conditions and place limitations on their driving behavior. These laws can be made even more effective by including some of the features shown to be most important, for example restrictions on night driving or carrying passengers. Enforcement is a necessary adjunct to alcohol access laws and to graduated licensing laws as well as to laws prohibiting impaired driving.

While existing legal structures and enforcement have been very useful, newly developed technologies have the potential to further reduce risky and impaired driving among young drivers.

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