



Jiaqi Liang graduated in 2009 from the Harry S Truman School of Public Affairs at the University of Missouri with a Master's degree in Public Affairs with specialization in Public Policy. She also earned a Master of Laws in Dispute Resolution degree from MU in 2007. She earned a Bachelor in Laws in 2006 at Guangdong University of Business Studies in Guangzhou, China. She is currently pursuing her Doctoral degree in Political Science at American University in Washington D.C.

## Drinking-Driving and Other Risk Behaviors Among Missouri High School Students, 1997-2005

Jiaqi Liang

### Introduction

Underage drinking remains a critical public health issue nationwide; it also brings about tremendous burden on the Missouri taxpayers. Survey data from the Missouri Youth Risk Behavior Surveillance System (YRBSS) from 1997 to 2005 revealed that despite some encouraging changes in driving after drinking and other risk behaviors among Missouri high school students over recent years, underage drinking, problem drinking and drinking-driving remain significant issues for 9th to 12th graders. Specifically, the problem of drinking-driving was strongly associated with decreased seat belt use, increased alcohol use, and an earlier age of initiation for alcohol use.

Using the 1997, 1999, 2001, 2003 and 2005 Missouri YRBSS individual-level surveys, this report analyzes the trends in risk behaviors related to alcohol use among high school students in Missouri and explores the associations between these risk behaviors using statistical methods. Finally, this report will discuss the policy implications of the analysis and present recommendations.

### Problem statement

Underage drinking continues to be a significant public problem in the United States in spite of the 21-year-old legal drinking age established by the National Minimum Legal Age Act of 1984.

The Youth Risk Behavior Surveillance System (YRBSS) state surveys are jointly administered on a biennial basis by U.S. Centers for Disease Control and Prevention (CDC) and state education and health agencies. The individual-level surveys mainly monitor and report six categories of priority high-risk behaviors among youth and young adults (9th-12th graders), including behaviors contributing to unintentional injury and violence, tobacco/alcohol/other drug use, sexual behaviors and related diseases, unhealthy dietary behaviors and physical activity.

--- YRBSS (2008)

In 2005, it was documented by the U.S. Department of Justice that minors aged 12 to 20 drank 11 percent of all alcohol consumed nationwide. Further, ninety percent of the alcohol consumed by juveniles was in the form of binge drinking (OJJDP, 2005). In addition to physical harm, underage drinking led to a wide array of social and behavioral problems among minors. Risky traffic activities, especially driving after drinking, were prominent issues. The 2007 National YRBSS reported that during the 30 days prior to the survey, 45 percent of high school students had consumed some amount of alcohol, 26 percent binge drank, 11 percent drove after drinking and 29 percent became passengers of vehicles with drinking-drivers (CDC, 2008).

Other national surveys, such as the National Survey on Drug Use and Health and the Monitoring the Future Survey, reported similar findings.

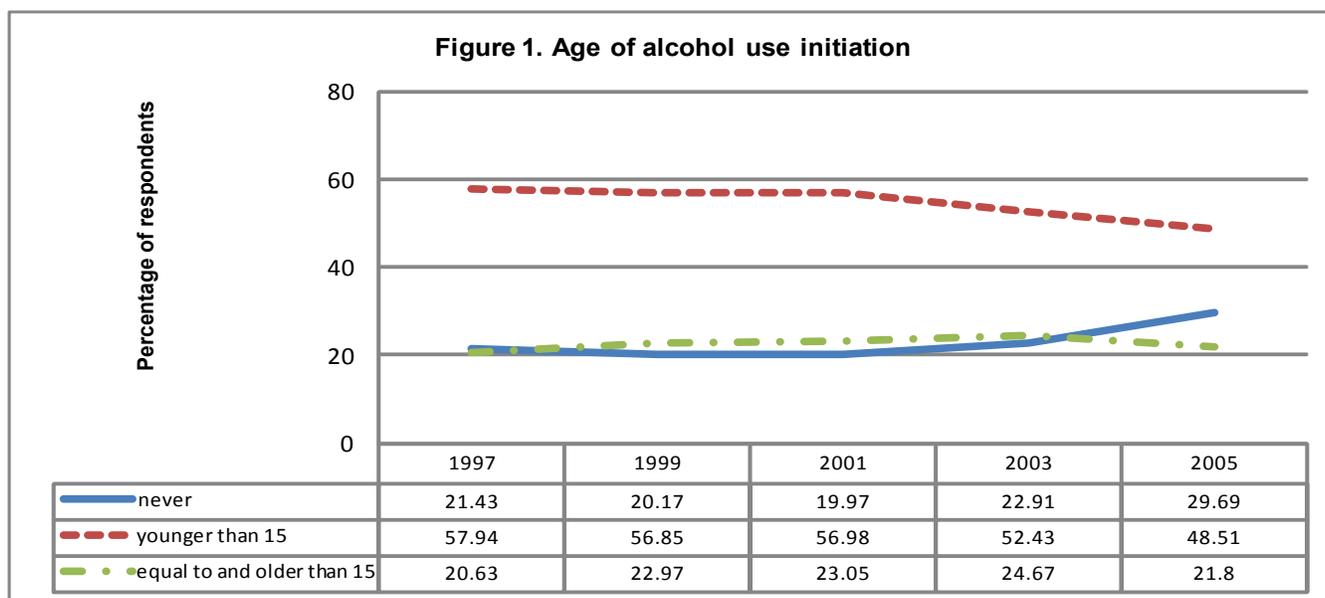
Underage drinking has also imposed a considerable burden on the state of Missouri. According to the Missouri Division of Alcohol and Drug Abuse, the costs to Missouri taxpayers of underage drinking were estimated to be \$1.3 billion (i.e., pain & suffering costs of \$864 million, medical costs of \$111 million and work loss costs of \$322 million) in 2005. These costs placed Missouri the 19th highest among all states in terms of cost (\$2,244) per youth of underage drinking. Of these costs, those accrued by youth violence and traffic crashes accounted for the largest portion. Additionally, 6 percent of all treatment admissions for alcohol abuse in Missouri were for minors aged 12 to 20 (Missouri-DADA, 2006).

### Trends in drinking-driving and other risk behaviors among Missouri high school students

The statistical analysis of the Missouri YRBSS showed that in general between 1997 and 2005, the percentage of high school students involved in alcohol use had decreased; more students behaved in a much safer manner in light of traffic safety. In terms of alcohol consumption, more students self-reported to never have had alcohol during their life (Figure 1). The amount of students engaged in binge drinking during the past 30 days had dropped by 16.6 percentage points from 1997 to 2005 (Figure 2).

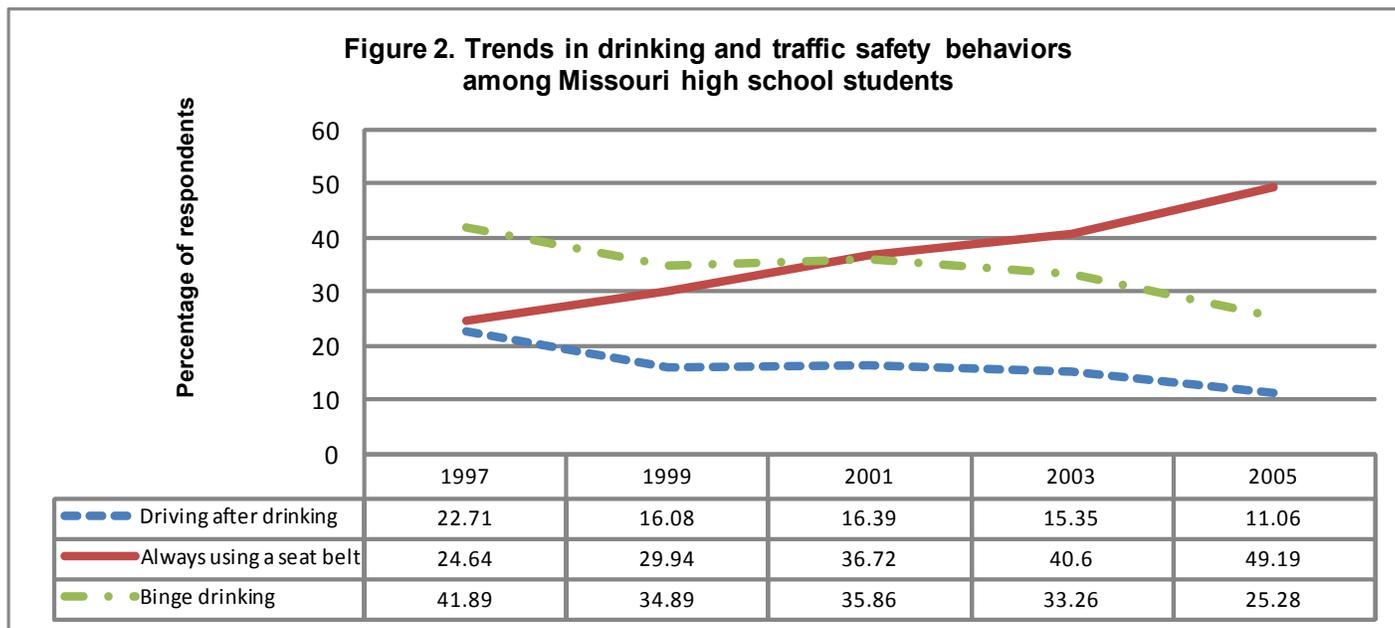
The percentage of students driving after drinking had declined to 12.9 in 2005 from a high of 22.7 in 1997. Similarly, the number of students reporting that they always wear a seat belt had experienced a dramatic increase of approximately 24.7 percentage points over the research period (i.e., 24.5% v. 49.2%) (Figure 2). While it showed improvement, the percentage of students who buckled up was substantially lower than those of both national and Missouri overall usage of safety belts. According to reports from Missouri Coalition for Roadway Safety, in 2005, the overall seat belt usage (i.e., drivers & front seat outboard passengers) in Missouri and the U.S. was 77 percent and 82 percent respectively (MCRS, 2009).

Positive changes in trends, however, do not necessarily imply the eradication of alcohol use problems among high school students. A striking percent (i.e. 57.9% in 1997 and 48.5% in 2005) of students initiated their alcohol consumption at an age younger than 15 (Figure 1). The improvement of this situation was less than 10 percentage points. Nevertheless, the number of individuals who never had alcohol capped at 31 percent despite an overall upward trend. In an absolute sense, when it comes to driving after drinking and binge drinking, the percent of students involved in these risky and problem behaviors was still very high (Figure 2).



**Age of alcohol use initiation:** How old were you when you had your first drink of alcohol other than a few sips?  
 A, Never; B. 8 years old or younger; C. 9 or 10 years old; D. 11 or 12 years old; E. 13 or 14 years old; F. 15 or 16 years old; G. 17 years old or older





**Drinking after driving:** During the past 30 days, did you ever drive in a car or other vehicle when you had been drinking alcohol?

**Always using a seat belt:** Do you always wear a seat belt when riding a car driven by someone else?

**Binge Drinking:** During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

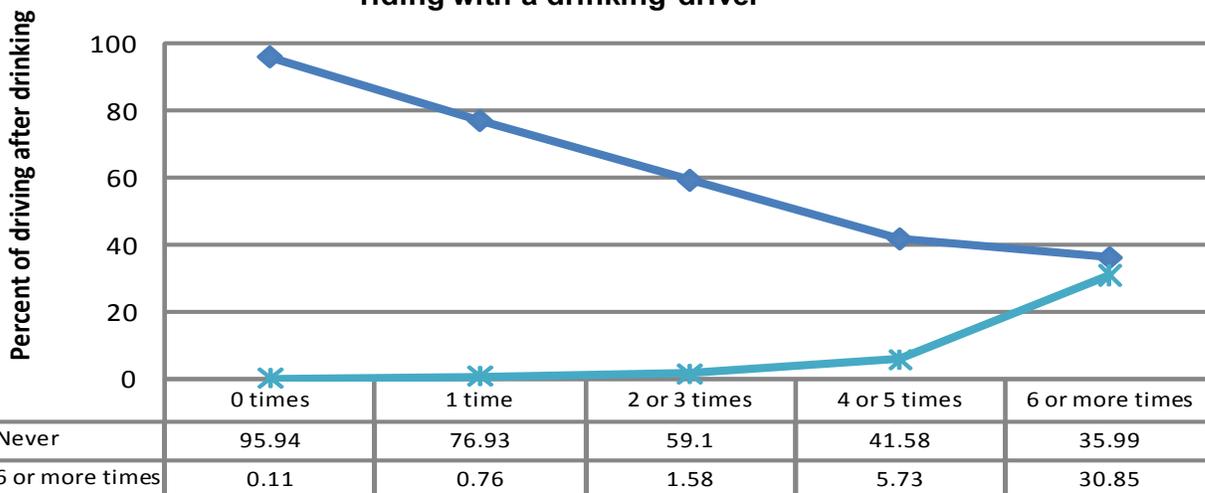
### Associations between the risky behaviors

The Problem Behavior Theory suggests that risk-taking and health behaviors are related to the intoxicated driving practices among youth (Klepp et al, 1991; Johnson et al, 1989; Shope et al, 2002; O’Malley et al, 2007). The Problem Behavior Theory “views problem behavior as purposeful, psychologically meaningful and a component of individual development”, and it has been widely applied to the research on adolescent drinking behaviors (Shope et al, 2002, p.25). The self-reported result from Dellinger et al (1999) showed that the percent of drinking-drivers being passengers of drinking-drivers was substantially larger than that of their non-drinking counterparts (i.e., 44 v. 4 percent). Also, only one half of drinking drivers said they would use their safety belt always (Dellinger et al, 1999). Young adults who were most frequently involved in drinking-driving were found to be more likely to have problem drinking behaviors (Donovan, 1993).

The statistical analyses conducted in this report showed compatible results with the findings of the aforementioned literature. It was found that driving after drinking was associated with the following behaviors: lower frequency of seat belt use, increased frequency of riding with a drinking driver, binge drinking, drinking frequency, as well as a lower age of initiation for alcohol use. All these associations were statistically significant at the 1% probability level.

In the category of traffic safety behavior, individuals who were more likely to ride in a vehicle driven by someone who had been drinking alcohol were also prone to drive a car after consuming alcohol. The percentage of never drinking-driving decreased as the times of being a passenger of a drinking driver increased. For example, 95.5 percent of students reported they neither had driven after drinking nor ridden with a drinking driver; whereas if the students had six or more times of riding with a drinking-driver, only 36 percent of them said they never drove after drinking (Figure 3). As opposed to riding with a drinking driver, driving after drinking was negatively associated with seat belt use. It implies that the more often students wore a seat belt, the less likely they were to drink and drive (Figure 4). At the point of always wearing a seat belt, the percentage of respondents reported to never practice drinking-driving reached the highest (i.e., 92.8%). To the contrary, the same group of people had the lowest percent of driving after drinking with six or more times (i.e., 0.54%).

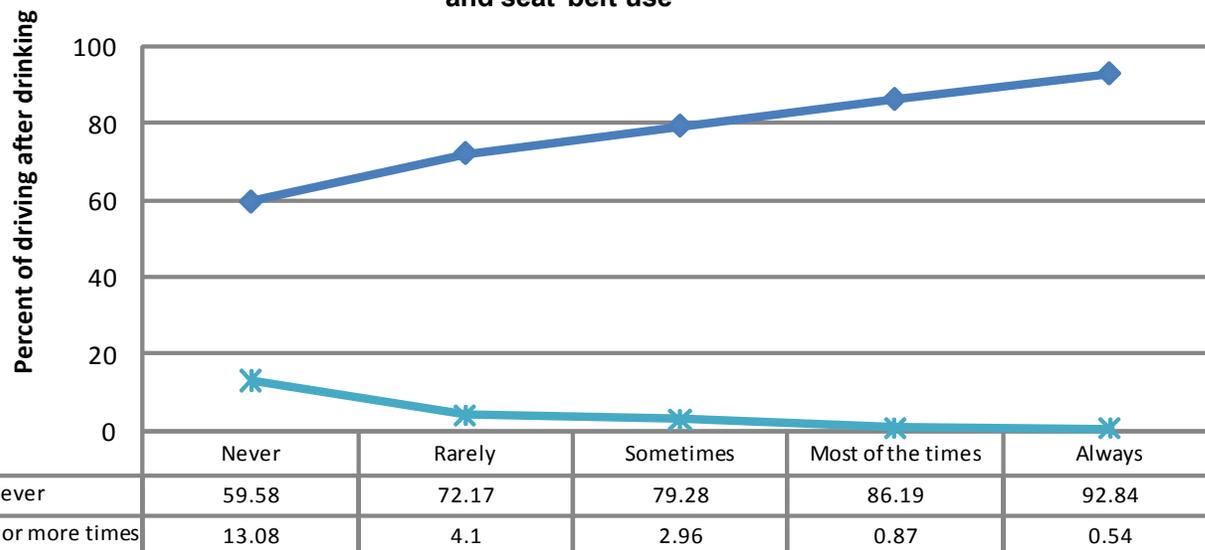
**Figure 3. Association between driving after drinking and riding with a drinking driver**



**Riding with a drinking driver:** During the past 30 days, how many times did you ride in a car or other vehicle driven by someone who had been drinking alcohol?

A, Never; B. 1 time; C. 2 or 3 times; D. 4 or 5 times; E. 6 or more times

**Figure 4. Association between driving after drinking and seat belt use**

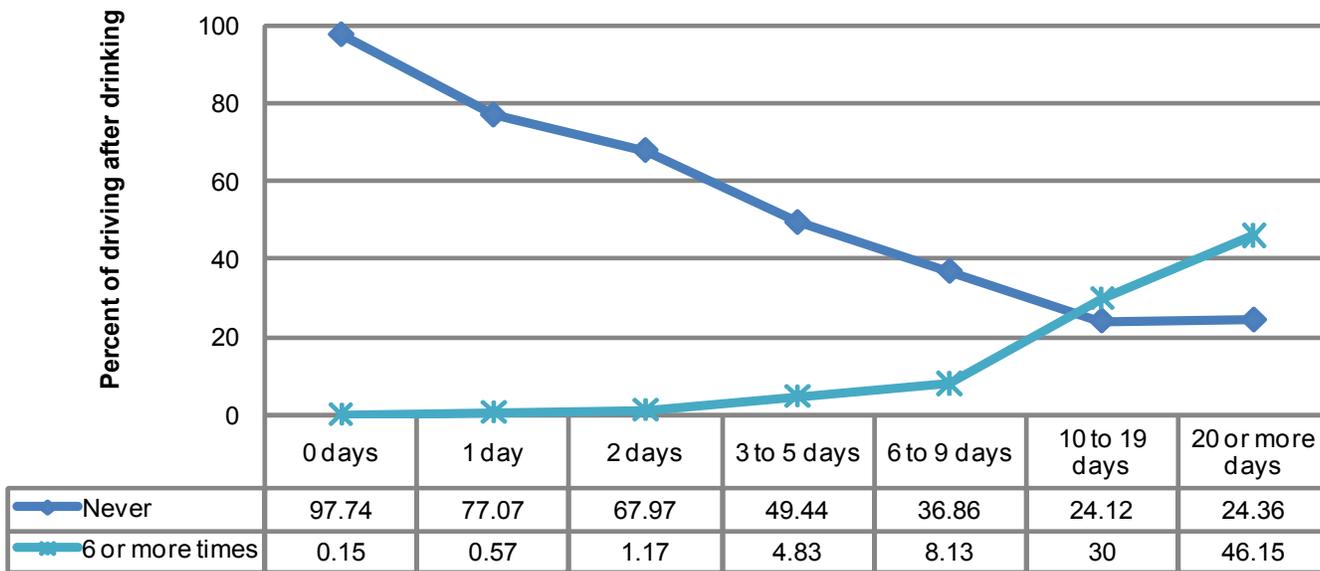


**Seat belt use:** How often do you wear a seat belt when riding in a car driven by someone else?

A. Never; B. Rarely; C. Sometimes; D. Most of the times; E. Always

Other problem drinking behaviors accompany the alcohol-related risky driving activities. The relationships between both binge drinking and drinking frequency were fairly consistent. People who binge drank as well as consumed alcohol frequently had a behavioral pattern of driving less soberly and more often in intoxicated situations (Figure 5 and 6).

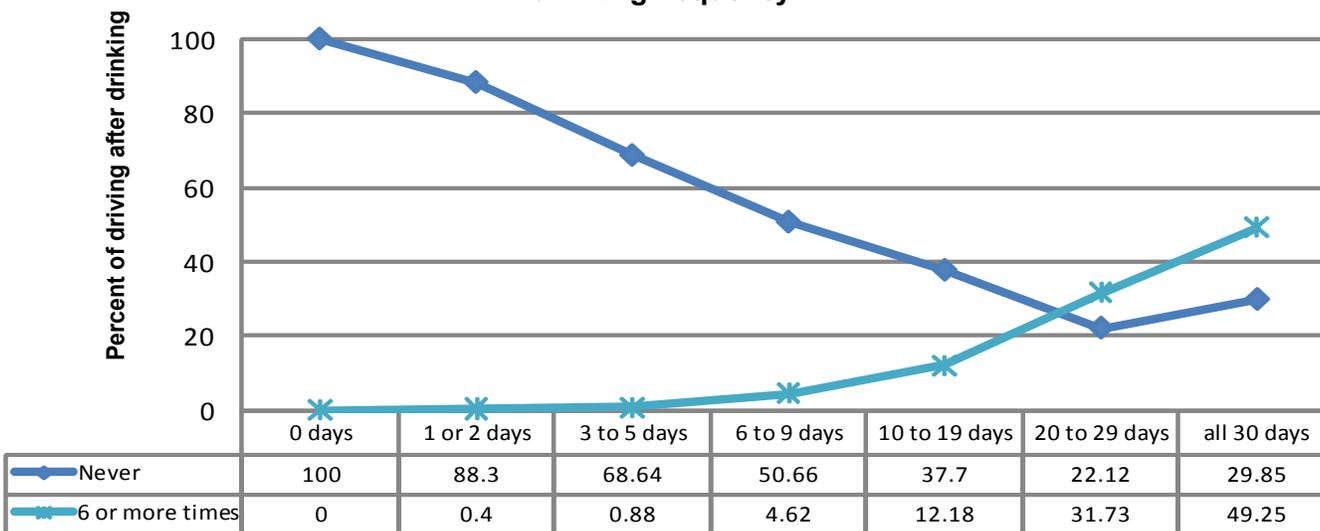
**Figure 5. Association between driving after drinking and binge drinking**



**Binge drinking:** During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

- A. 0 days; B. 1 or 2 days; C. 3 to 5 days; D. 6 to 9 days; E. 10 to 19 days; F. 20 to 29 days; G. all 30 days

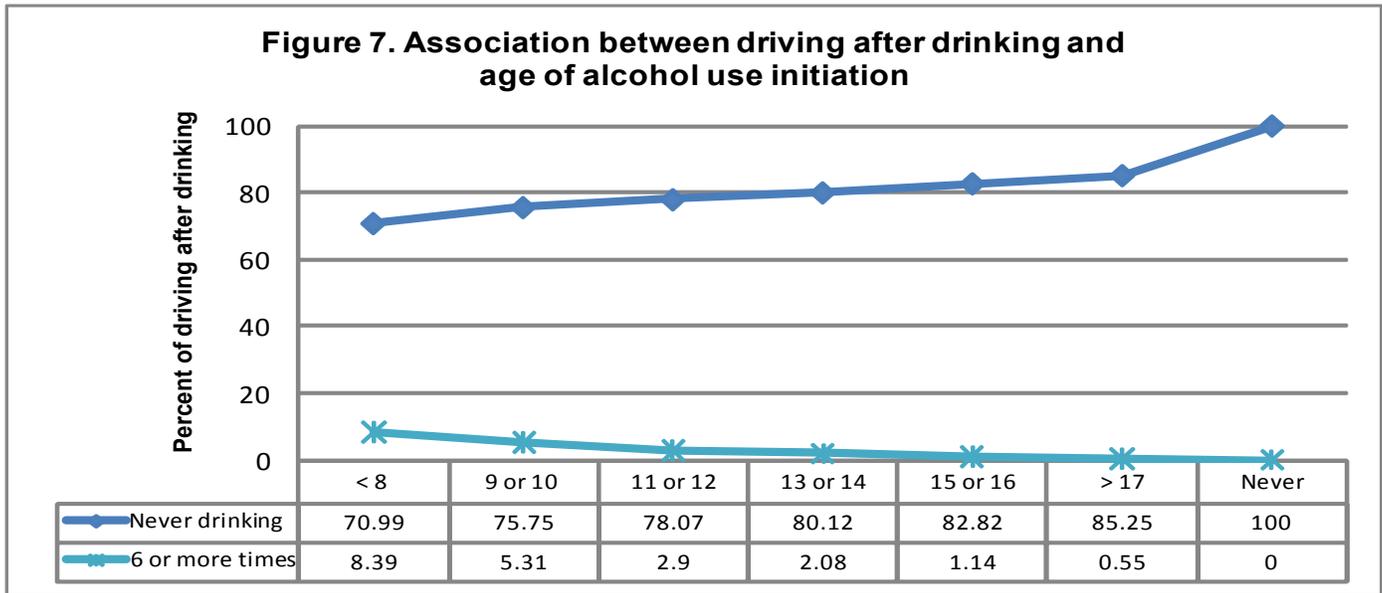
**Figure 6. Association between driving after drinking and drinking frequency**



**Drinking frequency:** During the past 30 days, on how many days did you have at least one drink of alcohol?

- A. 0 days; B. 1 day; C. 2 days; D. 3 to 5 days; E. 6 to 9 days; F. 10 to 19 days; G. 20 or more days

The surveys also indicated that students who initiated their alcohol use at an earlier age were more apt to engage in driving after drinking. For instance, the percent of students with six or more times of drinking-driving was the highest (i.e., 8.4%) if they had their first alcohol use at age of eight or younger (Figure 7).



**Drinking after driving:** During the past 30 days, did you ever drive in a car or other vehicle when you had been drinking alcohol?  
**Age of alcohol use initiation:** How old were you when you had your first drink of alcohol other than a few sips?

**Policy implications**

**(1) Reinforcing current law and policy efforts**

The alcohol-related problems among high school students remain prominent, and a large proportion of students initiated alcohol or drug use at an early age in Missouri. The state government should maintain or strengthen its policy efforts to combat these risky practices. Particularly, it is important to raise students’ awareness of traffic safety and alcohol risks (Klepp et al, 1991). Limiting minors’ access to alcohol is an effective approach to diminishing underage drinking and corresponding drinking-driving. Therefore, Missouri should continue the high-visibility enforcement of the zero tolerance law and the use/lose law (Figure 8).

As for Missouri’s zero tolerance law and use/lose law, currently a BAC 0.02 is set as the illegal per se threshold in the minors’ drinking-driving cases, and the licensing agencies may have the minors’ driving privileges suspended or revoked if minors (i.e., aged 15 to 20) “purchase or attempt to purchase any intoxicating liquor or possess any intoxicating liquor” (RSMo, 311.325, 577.500).

**Figure 8. Key anti-underage drinking and driving after drinking policies**

Zero tolerance law:  
 It is illegal for drivers under age 21 to operate a motor vehicle even with a low blood alcohol concentration. Such policies establish a very low legal BAC limit of 0.02 or less for drivers under the legal drinking age of 21 (APIS, 2009). By July 1998, all 50 states and D.C. had such laws in place. If states failed to comply with the zero tolerance law mandated by the National Highway Systems Designation Act of 1995 by October 1995, they would lose federal highway construction funds (Shults et al, 2001).

Use/lose law:  
 Authorizes the enacting state to suspend or revoke the young drivers’ driving privileges upon the purchase, possession or consumption of alcoholic beverages (i.e., violation of the minimum legal drinking age law). As of January 2008, only 11 states did not have use/lose policies (APIS, 2008-c).

Open container law:  
 Bans possession of alcohol in all passenger areas of a motor vehicle. (NHTSA, 2004)

These provisions enable Missouri to combat underage drinking and driving after drinking in a consistent manner with the federal government and other states (Figure 8).

In addition, Missouri should seriously consider the enactment of the statewide and federally compliant open container law to ban both drivers and passengers from consuming alcohol. At present, Missouri's laws merely apply to drivers but not passengers (Roberts, 2005). In this field, Missouri has lagged far behind the majority of its counterparts. As of January 2008, forty states have the open container laws that meet the federal standard (APIS, 2008-a).

### (2) Targeting the behavioral syndromes

In addition, as the analyses showed, drinking-driving was not insulated from but was highly related to other risky activities. Intervention or prevention of driving after drinking must be devised by taking into account typically associated behavioral syndromes, such as risky driving and problem drinking (Shope et al, 2002). Also, minimizing the drinking-driving problem needs collaborative rather than simply individual efforts. In this sense, the government should invest in education programs that instill knowledge and skills into minors to diagnose and avoid the impaired or risky driving practices of their families and friends (Klepp et al, 1991).

The Missouri Division of Alcohol and Drug Abuse has identified the substance-related problem behaviors and provided a wide array of treatment and prevention programs across the state, including the Substance Abuse Traffic Offenders Program (SATOP), Community Coalitions, Regional Support Centers, and Direct Prevention Services. Moreover, Missouri created a student-oriented program, School-based Prevention Intervention Framework State Incentive Grant (SPF SIG) in Missouri. It substantially improves substance abuse prevention by encouraging more community participation (Missouri-DADA, 2009). Missouri needs to strengthen the existing programs and consider investing more in human resources.

### (3) Including broader social and environmental factors

The government should make use of broader environmental or societal factors to promote the movement against alcohol-related driving by "altering the environment of social and structural context of alcohol use" (Hingson et al, 2002, p. 234).

Holder et al (2000) revealed that comprehensive community-mobilized intervention efforts in California from 1992 to 1996, which combined responsible beverage service, limiting minors' access to alcohol by using zoning and high-lighted local drinking-driving law enforcement, successfully lowered the self-reported amount of alcohol consumed per drinking occasion and times of driving when "over the legal limit". Additionally, the traffic safety records in the intervention communities suggested the nighttime injury crashes declined by 10 percent and crashes involving a drinker driver declined by 6 percent.

Responsible beverage service training is identified as one of the common strategies to reduce minors' access to alcohol alongside the regular law enforcement. States establish either requirements ("mandatory participation") or incentives ("voluntary participation") in the retail alcohol outlet oriented programs, pertaining to preventing the alcohol establishments from selling or serving the minors or intoxicated adults as well as training the licensees, managers and sellers/servers to implement the state anti-underage drinking and drinking-driving policies (APIS, 2008-b). As of 2008, 22 states had mandatory systems and 17 states had voluntary systems, with 5 states (i.e., Michigan, New Hampshire, Oregon, Rhode Island and Tennessee) having both systems. Missouri is one of 16 states yet to devise a responsible server training system (APIS, 2008-b). Currently, one community-based free of charge online education course, State of Missouri Alcohol Responsibility Training (SMART) is available for owners and employees of the establishments licensed to sell alcohol in Missouri. The SMART program is endorsed by Missouri Department of Transportation, supported by the Missouri Division of Alcohol and Tobacco Control and coordinated by the Wellness Resources Center at the University of Missouri (SMART, 2009).

Regulating alcohol advertising that may pose an adverse impact on teenagers is a third tool to lessen the minors' exposure to alcohol. Missouri has established explicit jurisdiction over the in-state electronic media. It is rated as a "best practice" by the Center on Alcohol Marketing and Youth (CAMY, 2003). Also Missouri has certain law provisions governing the false or misleading alcohol advertisements; however, it performs poorly with respect to targeting minors, portraying children, athletic achievement, intoxication, outdoor advertisements near children/ schools/ playgrounds/ churches, retail windows or outside areas, college campuses, sponsoring civic events and promoting giveaways (CAMY, 2003, p.10; Figure 9). As a result, Missouri needs to advance its alcohol advertisement laws and adopt model policies from its peers (Figure 9).

### Figure 9. Critical state alcohol advertising provisions

1. Prohibit false or misleading alcohol advertising;
2. Prohibit alcohol advertising that targets minors;
3. Prohibit images of children in alcohol advertisements;
4. Prohibit images or statements that associate alcohol with athletic achievement;
5. Prohibit images or statements that portray or encourage intoxication;
6. Establish explicit jurisdiction over in-state electronic media;
7. Restrict outdoor alcohol advertising in locations where children are likely to be present;
8. Prohibit outdoor advertising near schools, playgrounds and churches;
9. Restrict alcohol advertising on alcohol retail outlet windows or outside areas;
10. Prohibit alcohol advertising on college campuses;
11. Restrict sponsorship of civic events;
12. Limit giveaways (i.e., contest, raffles, etc.)

Source: Center on Alcohol Marketing and Youth (2003). *State alcohol advertising laws: current status and model policies*

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Institute of Public Policy  
137 Middlebush  
University of Missouri  
Columbia, MO 65211  
<http://www.truman.missouri.edu/ipp>