

Fatalities and Binge Drinking Among High School Students: A Critical Issue to Emergency Departments and Trauma Centers

In conjunction with the Morbidity and Mortality Weekly Report published by the Centers for Disease Control and Prevention

Shahram Lotfipour, MD, MPH
Victor Cisneros, BS
Bharath Chakravarthy, MD, MPH

University of California Irvine School of Medicine, Department of Emergency Medicine, Irvine, California

Supervising Section Editor: Mark I. Langdorf, MD, MHPE

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The Centers for Disease Control and Prevention (CDC) has published significant data and trends related to drinking and driving among United States (U.S.) high school students. National data from 1991-2011 shows an overall 54% relative decrease (from 22% to 10.3%) in drinking and driving among U.S. high school students aged ≥ 16 years. In 2011, this still represents approximately 950,000 high school students ages 16-19 years. The decrease in drinking and driving among teens is not fully understood, but is believed to be due to policy developments, enforcement of laws, graduated licenses, and economic impacts. Most significant to emergency physicians is that even with these restrictions, in 2010 approximately 2,700 teens (ages 16-19) were killed in the U.S. and about 282,000 were treated and released from emergency departments for injuries suffered in motor-vehicle accidents. In the same year, 1 in 5 drivers between the ages of 16-19 who were involved in fatal crashes had positive ($>0.00\%$) blood alcohol concentration (BAC). We present findings from the CDC's Morbidity and Mortality Weekly Report with commentary on current recommendations and policies for reducing drinking and driving among adolescents. [West J Emerg Med. 2013;14(3):271-274.]

CDC MORBIDITY & MORTALITY WEEKLY REPORT FINDINGS

In the October 5, 2012, issue of Morbidity and Mortality Weekly Report (MMWR), the Centers for Disease Control and Prevention (CDC) reported data concerning drinking and driving among high school students aged ≥ 16 years. The report clearly illustrated that, even though there has been substantial progress in the last 2 decades to reduce drinking and driving among teens, 1 in 10 adolescents aged ≥ 16 years reported driving after consuming an alcoholic beverage, and most of them also reported binge drinking. According to the National Institute on Alcohol Abuse and Alcoholism (NIAAA) binge drinking is defined as a "pattern of drinking that brings a person's blood alcohol concentration (BAC) to 0.08 grams percent or above. This typically happens when men consume 5 or more drinks, and when women consume 4 or more drinks in about 2 hours."

To describe the trend in prevalence of drinking among United States (U.S.) high school students aged ≥ 16 years, data were gathered from the 1991-2011 national Youth Risk

Behavior Surveys (YRBS), a component of the CDC's Youth Risk Behavior Surveillance System (YRBSS). Prevalence of drinking and driving was defined as driving 1 or more times when they had been drinking alcohol during the 30 days prior to the survey. The 2011 state YRBS data were used to describe drinking and driving prevalence in 41 states. For each national and 41 state surveys, students completed an anonymous and voluntary, self-administered questionnaire that contained identical questions about drinking and driving, current alcohol use, and binge drinking. The overall national response rate was 60% to 71% and overall state response rate was 60% to 84%.

The 1991-2011 national data shows an overall 54% relative linear decrease (from 22% to 10.3%) in the prevalence of drinking and driving among U.S. high school students aged ≥ 16 years. The decline in prevalence of drinking and driving is evident from 1997 – 2011. Prior to 1997, the prevalence in drinking and driving remained stable. The overall prevalence in drinking and driving in 2011 was 10.3%, which extrapolates to approximately 950,000 high school students ages 16-19 in

the U.S. and approximately 2.4 million episodes of drinking and driving during the past 30 days prior to the survey.

Furthermore, the national data illustrated significant differences in drinking and driving among gender, race, age, and patterns of binge drinking. Male students reported to be more likely than female students to drink and drive (11.7% and 8.8% respectively). Hispanics had the highest prevalence of drinking and driving (11.5%) compared to whites (10.6%) and blacks (6.6%). Data showed that drinking and driving increased with age, from 7.2% among 16 year olds, to 11.5% for 17 year olds and 14.5% aged ≥ 18 years. Drinking and driving was more than 3 times higher among students who reported binge drinking (32.1%) compared to those that reported alcohol use, but did not report binge drinking (9.7%). Overall, 26.4% of students reported binge drinking, yet among those reporting drinking and driving, 86.6% also reported binge drinking.

Additional state YRBS results reported in the MMWR showed that among the 41 states with available YRBS in 2011, the prevalence of drinking and driving per state varied threefold, from the lowest in Utah (4.6%) to the highest in North Dakota (14.5%). The prevalence of drinking and driving was higher than the national prevalence in 6 states: Iowa, Louisiana, Montana, North Dakota, Texas, and Wyoming; and lower in 9 states: Alaska, Indiana, Kentucky, Michigan, New York, North Carolina, Rhode Island, Utah, and Virginia. The remaining 26 states were not statistically different.

The CDC listed 6 limitations in their MMWR report. First, the YRBS does not measure whether a student has driven during the 30 days prior to the survey. Second, the YRBS defines binge drinking for teen males and females as ≥ 5 drinks within a couple hours, which is different from the nationally recommended definition. The MMWR report states that binge drinking in teen females would most likely be higher if reported using national definition of 4 drinks or more threshold. Third, data were not available to determine whether binge drinking occurred before driving. Fourth, the amount of over reporting or under reporting of behaviors in the YRBS cannot be determined. Fifth, data only apply to teens who are in school and thus is not representative of all persons in this age group. Finally, state-level prevalence estimates of drinking and driving were not available for 9 states: Washington, Oregon, California, Nevada, Hawaii, Maine, Minnesota, Missouri, and Pennsylvania.

COMMENTARY

“Get dressed. Ashley is in the hospital. We have to go there now.” I hear my wife yelling at me as she hangs up the phone. I was confused and disoriented; I must have been dreaming, was the first thought that ran through my head. It was midnight and our 17-year-old daughter was supposed to be spending the night at a friend’s house after the prom festivities. She had to be okay, she was always

very responsible. “Get up! We have to go now!” My wife repeated again. I could tell my wife was scared by the tone of her voice. Something must be very wrong with Ashley. I suddenly snapped awake and realize it was not a dream. “What happened to her?” I asked. She explained that Dr. Charles Smith, one of my colleagues, called to say that Ashley had been in a motor vehicle collision. She was stable but we needed to get to the hospital. As an emergency physician, many horrible scenarios played in my mind. I dressed quickly, and we raced to the hospital immediately. All I could think of was if she was okay. I recounted the earlier conversation with Ashley. I told her to be safe, not to drink, not to do anything irresponsible. What was she thinking? I parked the car and I rushed into the emergency department (ED) entrance; I could feel my heart beating faster and faster, not knowing what to expect. Over and over in my head, I am praying, “Dear God, please let my baby be OK.” As I am about to walk into the trauma bay, Charles grabs me by the arm and says, “she not in there, we have her in a private room and she is stable but still a bit intoxicated. Ashley was involved in a drinking and driving collision, she was very lucky but unfortunately, the passenger, her friend Megan was not so lucky; she did not survive.” As I walked into the room, Ashley began to cry and pleaded, “Oh, Daddy, I’m so sorry. Please don’t be mad at me,” she continued by promising never to drink again. I stood back for a moment, trying not to cry. I was not sure what to feel first. I was overcome by many emotions of relief, happiness and then anger and sadness. How could she have done this?

As emergency physicians, we deal with this kind of possible situation everyday, yet they never seem real until it hits home. Although Ashley should recover, Megan’s family will never fully recover. The loss of a loved one is always hard, but it is even more difficult when you know that it could have been prevented.

It is striking to see that even though the MMWR reports a decrease in prevalence in drinking and driving since 1997, the leading cause of death among teens aged 16-19 years in the U.S. continues to be motor vehicle crashes¹.

To minimize the prevalence of alcohol-related injuries, the CDC has worked with EDs and trauma centers to implement alcohol screening and brief intervention (SBI) programs. Currently, the American College of Surgeons Committee on Trauma has required that all Level I trauma centers use SBI to screen all incoming patients for alcohol use, in efforts to identify risky drinking behaviors, and provide patients with a brief counseling or intervention session on-site.⁸⁻¹¹ Research on SBI has shown promising results. For each dollar invested in SBI, there was an approximate 4-fold return in reduced overall healthcare costs. In addition to lower healthcare costs, SBI results demonstrate promising effects by significantly decreasing drinks consumed per week and binge drinking episodes, and an overall 50% decrease in readmissions to trauma centers, EDs, and hospitals.¹² Current research demonstrates that alcohol SBI is a feasible and effective

method to detect significant differences in drinking patterns among gender, language, and age. It can be adapted to serve a spectrum of population demographics (such as teens, Latinos, etc.) and administered via modalities such as computerized or web-based delivery.^{8, 13-17}

Despite research showing that a variety of interventions in ED and trauma centers show promise in reducing underage drinking and alcohol-related crash fatalities, the frequency of these behaviors still remains high in teens. The average age of drinking initiation has declined in the U.S.^{3,18} In the MMWR report, the CDC addresses this issue by recommending that health professionals screen teens for the use of alcohol, drugs, and driving after alcohol or drug use. In addition, they recommend educating parents on how to identify at-risk behavior. The ED presents the opportunity for screening and education by initiating a “teachable moment.” This creates a perfect window for intervention regarding alcohol abuse, yet, policies that support such measures have been “poorly followed or not implemented.”¹⁹⁻²² This is why more research, implementation of alcohol SBI, enforcement, and education is needed for adolescents

Many studies and SBI are focusing on patients \geq 18-years-old and are missing younger teens who engage in alcohol use. It is important that future studies of alcohol SBI also address the developmental and demographic differences (ethnicity, race, and age) among populations.^{13,20} For example, studies have shown important differences between black and white youths’ motivation to consume alcohol.^{21, 22} According to Cooper et al²¹, coping motives (to reduce negative emotions) played a bigger role in black youth, and enhancement motives (to augment positive emotional states) were a greater role in white youth. Even though research is greatly lacking within the Latino and non-English speaking populations, some studies indicate significant differences in alcohol use among English- and Spanish-speaking patients.^{8, 13,17}

Local law enforcement has devoted increased resources to address the problem by establishing special enforcement task forces against drinking and driving. There are random checkpoints, media campaigns, zero tolerance laws, graduated licenses and outreach events targeting adolescents. Yet even with all this work the CDC acknowledges that more needs to be done.¹ Furthermore, the National Highway Traffic Safety Administration reported that between 2000 – 2008 more than 23,000 drivers and 14, 000 passengers aged 16-19 years were killed.⁵ Analysis of these motor vehicle collisions adjusting for miles driven showed younger teens with the highest rates, with fatal crash rates per mile driven for 16- and 17-year-olds at 150% and 90% greater, respectively, compared to older teens.⁵ Therefore, as emergency physicians who witness these atrocities daily, we have the responsibility not to treat the aftermath, but also to prevent it. We need to serve as public health advocates, community organizers, and educators. Emergency medicine should encompass more than just diagnosing and treating acutely ill patients; we should act as

leaders of our communities and encourage our colleagues, our residents and medical students to do the same.

In addition to working with local law enforcement agencies to encourage citizens to reduce underage access to alcohol, it is important that we take direct action in our communities. Emergency physicians could promote public health awareness and education by finding ways to help educate adolescents and parents on the facts of fatalities and binge drinking among high school students.

One example of how emergency physicians could promote public health awareness and education is working with medical students in the Emergency Medicine Interest Group (EMIG). EMIG students work closely with residents and faculty to increase involvement with local high schools and community leaders in DUI awareness campaigns such as Mothers Against Drunk Drivers (MADD). Events such as “More Than Just a Drink” are organized by high school students under EMIG and faculty leadership. In front of 800 of their peers, high school students reenact the consequences of a high-speed motor vehicle collision due to drinking and driving. Students watch as emergency services personnel (Fire, Police and ambulance services) approach the scene as if it was a real critical trauma, with real injuries and fatalities. Emergency medicine faculty, nursing and medical students take a major role in illustrating the dangers of drinking and driving by presenting real-life scenarios and photographs of driving under the influence (DUI) victims that have been treated in the ED. The students later broke out into small groups led by medical students where they discussed what they had witnessed and how they felt about it. By engaging high school students to not only witness, but also to participate in a live experience, EMIG hopes to create “a vivid emotional memory” that will deter them from drinking and driving in the future. This is just one of many ways in which we can make a local long-lasting impact on the community.²³

In summary, the prevalence of drinking and driving has declined since the late 1990s, but alcohol-related fatalities and binge drinking among teens still remains high with 1 in 5 teen drivers involved in fatal crashes, and most (81%) with BACs higher than the legal limit for adults.¹ Because many of these alcohol-related injuries are first encountered in EDs and trauma centers, emergency physicians will be at the forefront of implementing appropriate research studies, educational tools and policies to further minimize drinking and driving among teens. Policy implementation and research are important, but it is equally vital to educate healthcare providers in the ED on SBI and prevention methods. Many EDs and trauma centers already have SBI programs in place for adults (\geq 18 years of age), and therefore, transitioning to a younger population would seem to be the next logical step.^{8,11,13} As physicians we are not only healthcare providers and scientists, but also leaders and educators, with an important responsibility to help the Ashley and Megans of this world grow up to fulfill their potential.

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Address for Correspondence: Shahram Lotfipour, MD, MPH, Center for Trauma and Injury Prevention Research, Department of Emergency Medicine, 101 The City Drive, Rte 128-01, Orange, CA 92868. Email: shl@uci.edu.

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REFERENCES

- Centers for Disease Control and Prevention (CDC). Vital Signs: Drinking and Driving Among High School Students Aged ≥ 16 years – United States, 1991 – 2011. *MMWR Morbidity Mortality Weekly Report*. 2012; 61(39):796-800.
- Fell JC, Todd M, Voas RB. A national evaluation of the nighttime and passenger restriction components of graduated driver licensing. *J Safe Res*. 2011;42:283-290.
- Hingson RW, Assailly J-P, Williams AF. Underage drinking: frequencies consequences, and interventions. *Traffic Inj Prev*. 2004;5:228-236.
- Shults RA, Elder RW, Sleet DA, et al. Reviews of evidence regarding interventions to reduce alcohol-impaired driving. *Am J Prev Med*. 2011;21:66-88.
- Masten S, Foss R, Marshall S. Graduated driver licensing and fatal crashes involving 16- to 19-year-old drivers. *JAMA*. 2001;306(10):1098-1103.
- National Center for Injury Prevention and Control (2010). Policy Impact: Teen Driver Safety. Center for Disease Control and Prevention. Available at: <http://www.cdc.gov/MotorVehicleSafety/teenbrief/index.html>.
- Center for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) (2012). National Center for Injury Prevention and Control. Available at: <http://www.cdc.gov/injury/wisqars/>.
- Lotfipour S, Cisneros V, Chakravarthy B, et al. Assessment of readiness to change and relationship to AUDIT score in a trauma population utilizing computerized alcohol screening and brief intervention. *Subst Abuse*. 2012;33(4):378-386.
- American College of Surgeons Committee on Trauma. Chapter 18: Prevention. Resources for Optimal Care of Injured Patient 2006. Chicago, IL: American College of Surgeons Committee on Trauma; 2006.
- London J, Dunn C, Utter G. Alcohol-related brief interventions as a criterion for American College of Surgeons level I trauma center verification: how best to train the interventionists? *J Trauma*. 2011; 70:931-938.
- Ewing T, Barrios C, Lau C, et al. Predictors of hazardous drinking behavior in 1,340 adult trauma patients: a computerized alcohol screening and intervention study. *J Am Coll Surg*. 2012 Oct;215(4):489-495.
- Centers for Disease Control and Prevention. Injury Response. Available at <http://www.cdc.gov/injuryresponse/alcohol-screening/index.html>. Accessed December 2012.
- Lotfipour S, Cisneros V, Anderson C, et al. Assessment of alcohol use patterns among Spanish-speaking patients. *Substance Abuse*. 2012. In press.
- Lotfipour S, Howard J, Roumani S, et al. Increased detection of alcohol consumption and at-risk drinking with computerized alcohol screening. *J Emerg Med*. 2013;44(4):861-866.
- Lotfipour S, Mortazavi R, Chakravarthy B. Commentary: alcohol and motor vehicle-related crashes-driver attitudes need further intervention. *Ann Emerg Med*. 2011;57:406-408.
- Vaca F, Winn D, Anderson C, et al. Six-Month follow-up of computerized alcohol screening, brief intervention, and referral to treatment in the emergency department. *Subst Abuse*. 2011;31:144-152.
- Vaca F, Winn D, Anderson C, et al. Feasibility of emergency department bilingual computerized alcohol screening, brief intervention, and referral to treatment. *Subst Abuse*. 2010;31:264-269.
- Peter F, Maio R, Drongowski R, et al. Alcohol interventions for trauma patients are not just for adults: justification for brief interventions for injured adolescent at pediatric trauma center. *J Trauma*. 2010;69:202-210.
- Noffsinger DL, Cooley J. Screening, brief intervention, and referral to treatment in the adolescent trauma population: examining barriers to implementation. *J Trauma Nurs*. 2012;19(3):148-151.
- Yuma-Guerrero P, Lawson K, Velasquez M, et al. Screening, brief intervention and referral for alcohol use in adolescents: a systematic review. *Pediatrics*. 2012;130(1):115-122.
- Cooper ML, Krull JL, Agocha VB, et al. Motivational pathways to alcohol use and abuse among black and white adolescents. *J Abnormal Psychology*. 2008;117(3):485-501.
- Spirito A, Monti P, Barnett N, et al. A randomized clinical trial of a brief motivational intervention for alcohol-positive adolescents treated in an emergency department. *J Pediatric*. 2004;145:396-402.
- Emergency Student Interest Group. University of California, Irvine School of Medicine. Available at: <http://www.uciemig.com/>. Accessed February 2013.