Driving After Binge Drinking

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Background: Although binge drinking is strongly associated with alcohol-impaired driving, little is known about the prevalence of or risk factors for driving after binge drinking.

Purpose: The purpose of this study was to assess the prevalence of, and risk factors for, driving during or shortly after a specific binge drinking episode.

Methods: The data were analyzed in 2007 and 2008 from 14,085 adults from 13 states in 2003 and 14 states in 2004 who reported binge drinking and answered an additional series of questions about binge drinking behaviors as part of the Behavioral Risk Factor Surveillance System survey. Binge drinking was defined as the consumption of five or more drinks during a drinking occasion.

Results: Overall, 11.9% of binge drinkers drove during or within 2 hours of their most recent binge drinking episode. Those drinking in licensed establishments (bars, clubs, and restaurants) accounted for 54.3% of these driving episodes. Significant independent risk factors for driving after binge drinking included male gender (AOR=1.75); being aged 35–54 or ≥55 years compared to 18–34 years (AOR=1.58 and 2.37, respectively); and drinking in bars or clubs compared to drinking in the respondent's home (AOR=7.81). Drivers who drank most of their alcohol in licensed establishments consumed an average of 8.1 drinks, and 25.7% of them consumed ≥10 drinks.

Conclusions: Because binge drinking and subsequent driving were common in establishments licensed to sell alcohol, and because licensing is conditional on responsible beverage service practices (i.e., not selling to intoxicated people), efforts to prevent impaired driving should focus on enforcing responsible beverage service in licensed establishments.

(Am J Prev Med 2009;37(4):314–320) Published by Elsevier Inc. on behalf of American Journal of Preventive Medicine

Introduction

Excessive drinking is the third leading actual cause of death in the U.S.,[1] is responsible for approximately 79,000 deaths annually, and shortens the lives of those who die by approximately 30 years.[2,3] Binge drinking, defined as the consumption of five or more drinks on an occasion, is responsible for more than half of these deaths[3] and contributed to the 13,000 deaths from alcohol-related motor vehicle crashes in 2006.[4] In the U.S., approximately 15% of all adults report one or more episodes of binge drinking in the past month, resulting in 1.5 billion binge drinking episodes annually (or approximately seven episodes per adult per year).[5] Survey research has shown that binge drinking is strongly associated with alcohol-impaired driving. For example, a recently published study found that 88% of self-reported episodes of alcohol-impaired driving involved adults who reported past-month binge drinking.[6] Another study found that 12% of binge drinkers report that they drove after having "perhaps too much to drink" in the past month, although the amount of alcohol consumed was not quantified.[7] In addition, the increase in binge drinking episodes observed among U.S. adults from 1993 to 2001[5] paralleled a similar increase in alcohol-impaired driving episodes during this time period.[7]

However, little is known about the likelihood of, or risk factors for, driving after a specific binge drinking episode. Although most impaired-driving countermeasures focus on reducing driving among individuals who are already impaired, little attention has been focused on the role played by demographic or environmental factors that may be risk factors for this impairment and/or propensity to drive. It was hypothesized that establishments licensed to sell alcohol were the site of a large proportion of binge drinking and subsequent driving episodes, but it was not clear whether that association was mostly accounted for by the characteristics of those consuming alcohol in licensed establishments. Therefore, the purpose of this study was to assess the prevalence of, and risk factors for, driving during or shortly after a specific binge drinking episode.

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0749-3797/09/$–see front matter
doi:10.1016/j.amepre.2009.06.013

Methods

Data for this study came from the CDC's Behavioral Risk Factor Surveillance System (BRFSS) survey, a random-digit telephone survey of U.S. adults aged ≥18 years in all 50 states, the District of Columbia, and the territories of Guam, Puerto Rico, and the U.S. Virgin Islands. The survey includes questions on a variety of health risk behaviors, including alcohol consumption. Details about the BRFSS are available at http://www.cdc.gov/brfss/technical_infodata/index.htm.

A binge drinker was defined as someone who consumed alcohol in the past 30 days and who gave a nonzero response to the following question: *Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks on an occasion?* In 2003 and 2004, the BRFSS survey offered states a new, optional module of six additional questions to be asked of those who reported binge drinking; all questions were about a respondent's most recent binge drinking episode. Driving after binge drinking was assessed by the question: *Did you drive a motor vehicle, such as a car, truck, or motorcycle during or within a couple of hours after this occasion?* A yes answer to this question was the numerator for determining the prevalence of driving after binge drinking. Because each respondent was providing information about a single binge drinking event, prevalence information was combined with the number of binge drinkers in particular strata to determine the number of episodes of driving after binge drinking. Other questions in the module elicited information about the number and type of alcohol-containing beverages (beer, wine, or liquor) consumed during their most recent binge drinking episode and the physical location where most binge drinks were consumed.

Analyses were limited to the 18 states that used this set of binge drinking questions in both 2003 and 2004 (nine states); 2003 only (four states); or 2004 only (five states). States using the module in both years were California, Maine, Michigan, Minnesota, Montana, Nevada, New Hampshire, Wisconsin, and Wyoming; states using it in 2003 only were Nebraska, North Carolina, Pennsylvania, and South Dakota; and states using the module in 2004 only were Delaware, Idaho, New Mexico, North Dakota, and Virginia. The median response rate to the BRFSS survey among these states across both years was 55.0% and included 121,172 respondents, including 16,496 people who reported one or more episodes of binge drinking in the past month. The weighted prevalence of binge drinking among respondents in the states and years included in the study was 16.3%, which is approximately 1% higher than that for the U.S. during 2003–2004. The weighted prevalence of driving after binge drinking was very similar in 2003 (11.9%) and 2004 (11.6%).

The study was restricted to those who reported one or more episodes of binge drinking in the past 30 days. Data were weighted by age, gender, and race or ethnicity to be representative of the adult population for each state and year analyzed; weights were divided by 2 for states with 2 years of data. After excluding binge drinkers with missing or incomplete information from the binge drinking module, data from 14,085 respondents were analyzed, including 1848 respondents who reported driving during or within 2 hours of binge drinking.

All data analyses were conducted using SAS, version 9.0, and SUDAAN, version 9.0. Analyses were conducted for three types of variables: demographics, alcohol-specific measures, and binge drinking location. Demographic characteristics included age group (18–24, 25–34, 35–44, 45–54, ≥55 years), which was collapsed into three groups (18–34, 35–54, and ≥55 years) for regression analysis based on strata size and similarity with respect to driving characteristics; gender; race or ethnicity (white, non-Hispanic; black, non-Hispanic; other, non-Hispanic; and Hispanic), which was collapsed to white non-Hispanic versus other for regression analysis; education level (less than high school, high school graduate, some college, and college graduate), which was collapsed to some college or more versus high school graduate or less for regression analysis; income level (<$25,000, $25,000–$49,999, and ≥$50,000), which was collapsed to ≥$50,000 versus ≤$49,000 for regression analysis; marital status (married, never married, unmarried couple, divorced, or separated), which was collapsed to married versus nonmarried for regression analysis; and employment status (employed, unemployed, student, homemaker, or retired), which was collapsed to employed versus nonemployed for regression analysis. Alcohol stratification variables included the number of binge episodes during the past 30 days (one to two, three to four, and five or more), which was collapsed to one to two versus three or more for regression analysis; and the total number of drinks consumed during the last binge episode (five to six, seven to nine, and ten or more), which was collapsed to five to six versus seven or more for regression analysis. The physical location where most of the drinks were consumed (own home, another person's home, bar or club, restaurant, other public place, or other) was also analyzed.

Results

Overall, 75.1% of binge drinkers were men, 75.1% were aged ≤44 years, 49.7% consumed seven or more drinks during their most recent binge drinking episode, and 58.3% drank in a private residence (their home or someone else's home; Table 1).

After weighting, 11.9% of binge drinkers reported driving during or within 2 hours of their most recent binge drinking episode (Table 1). Men were more likely than women to drive after binge drinking (13.2% vs 8.1%), and men accounted for 82.9% of all recent binge drinking and driving episodes. The prevalence of driving after binge drinking increased slightly with age; 50.6% of binge drinking and driving episodes involved those aged ≥35 years. Among underage adults aged 18–20 years, 10.3% drove after binge drinking and they accounted for 6.3% of driving episodes (data not shown in Table 1). More than 90% of most recent binge drinking and driving episodes were accounted for by high school graduates or those with at least some college education, and 78.6% of driving episodes were reported by binge drinkers who were employed. Although those who reported five or more binge drinking episodes in the past 30 days were more likely to drive after their most recent binge episode than those who reported binge drinking once or twice, approximately half (48.7%) of driving episodes involved those who reported binge drinking only once or twice in the past

Table 1. Number and weighted percentage of binge drinkers, prevalence of driving after binge drinking[a] among binge drinkers, and proportion of driving episodes among those driving after binge drinking, by selected characteristics

Characteristic	No. of binge drinkers (weighted %)[c]	Percentage of binge drinkers who drove after binge drinking[a,b] (n=14085)	Proportion of driving episodes among binge drinkers[a,b] (n=1848)
All	14,085 (100.0)	11.9 (10.9, 13.0)	100.0
Gender			
Male	9,611 (75.1)	13.2 (11.9, 14.5)	82.9 (79.9, 85.6)
Female	4,474 (24.9)	8.1 (6.9, 9.6)	17.1 (14.4, 20.1)
Age (years)			
18–24	2,076 (24.3)	10.9 (8.6, 13.8)	22.2 (17.9, 27.3)
25–34	3,617 (28.5)	11.3 (9.6, 13.3)	27.1 (23.3, 31.4)
35–44	3,653 (22.3)	11.2 (9.6, 13.1)	21.1 (18.0, 24.5)
45–54	2,841 (15.1)	13.9 (11.4, 16.9)	17.7 (14.5, 21.4)
≥55	1,898 (9.7)	14.5 (11.9, 17.6)	11.8 (9.7, 14.4)
Race			
White, non-Hispanic	12,064 (73.2)	12.3 (11.3, 13.3)	75.4 (69.8, 80.2)
Black, non-Hispanic	373 (4.1)	14.3 (9.6, 20.7)	4.9 (3.3, 7.3)
Other, non-Hispanic	701 (5.4)	16.1 (10.2, 24.4)	7.2 (4.5, 11.4)
Hispanic	877 (17.3)	8.6 (5.8, 12.7)	12.5 (8.5, 17.9)
Education			
<High school	903 (9.5)	7.5 (6.4, 13.5)	7.5 (5.2, 10.8)
High school grad	4,455 (31.0)	12.2 (10.4, 14.3)	31.9 (27.7, 36.4)
Some college	4,318 (30.4)	12.2 (10.3, 14.3)	31.2 (26.9, 35.8)
College grad	4,400 (29.0)	12.1 (10.4, 13.9)	29.4 (25.6, 33.5)
Income ($)			
<25K	2,958 (23.7)	10.3 (7.9, 13.3)	20.0 (15.7, 25.1)
25K–50K	4,490 (30.3)	14.2 (12.3, 16.3)	35.2 (30.9, 39.8)
>50K	5,761 (46.0)	11.9 (10.5, 13.4)	44.8 (40.2, 49.5)
Marital status			
Married	6,801 (47.5)	10.3 (9.0, 11.7)	41.1 (36.7, 45.6)
Previously married[d]	2,791 (12.2)	17.0 (14.4, 19.9)	17.3 (14.6, 20.4)
Unmarried couple	795 (7.9)	12.9 (8.2, 19.5)	8.5 (5.4, 13.2)
Never married, single	3,683 (32.5)	12.1 (10.4, 14.1)	33.1 (28.9, 37.6)
Employment			
Employed	11,198 (76.1)	12.3 (11.2, 13.5)	78.6 (73.8, 82.7)
Unemployed[e]	1,027 (9.3)	9.6 (6.8, 13.5)	7.6 (5.3, 10.6)
Homemaker	301 (2.1)	7.2 (3.7, 13.5)	1.2 (0.6, 2.4)
Student	695 (8.2)	11.5 (7.0, 18.4)	7.9 (4.7, 12.8)
Retired	853 (4.3)	13.1 (9.9, 17.1)	4.7 (3.5, 6.3)
No. of binge episodes, past 30 days			
1–2	8,248 (56.5)	10.3 (9.1, 11.6)	48.7 (44.1, 53.4)
3–4	2,632 (18.8)	13.2 (10.7, 16.3)	20.9 (17.0, 25.3)
≥5	3,205 (24.7)	14.6 (12.5, 17.0)	30.4 (26.4, 34.7)
No. of drinks, most recent binge episode			
5–6	7,730 (50.3)	10.8 (9.6, 12.1)	45.7 (41.2, 50.3)
7–9	3,512 (25.8)	12.7 (10.7, 14.9)	27.4 (23.5, 31.7)
≥10	2,843 (23.9)	13.4 (10.9, 16.3)	26.9 (22.4, 31.8)
Location, most recent binge episode			
Home	5,264 (38.3)	4.0 (3.2, 5.0)	12.8 (10.3, 15.9)
Another's home	2,327 (20.0)	13.6 (11.3, 16.3)	22.9 (19.1, 27.1)
Restaurant	1,001 (7.4)	16.3 (12.1, 21.6)	10.1 (7.4, 13.7)
Bar/club	4,090 (25.3)	20.8 (18.3, 23.6)	44.2 (39.6, 48.8)
All other[f]	1,380 (9.0)	13.2 (10.2, 17.0)	10.0 (7.7, 12.9)

[a]Binge drinking was defined as consuming five or more drinks on at least one occasion in the past 30 days. Respondent information pertained to their most recent episode of binge drinking. Driving after binge drinking refers to those who reported driving during or within 2 hours of their most recent binge drinking episode.

[b]Results were weighted to be representative of states and years included in this study; BRFSS data are weighted by gender, age, and race or ethnicity.

[c]The sum of strata for selected variables may not be 14,062 or 100% because of nonresponse to that variable or rounding error, in the case of the weighted percentages. BRFSS data are weighted by gender, age, and race or ethnicity.

[d]Previously married included those who were divorced, separated, or widowed.

[e]Unemployed included those who were unemployed for less than 1 year, more than 1 year, or who reported they were unable to work.

[f]*Other* refers to places such as parks, sporting events, concerts, or other locations.

BRFSS, Behavioral Risk Factor Surveillance System

30 days. Similarly, although those who consumed more drinks per binge (seven or more drinks) were nonsignificantly more likely to report driving after their most recent binge episode, almost half of driving episodes involved those who consumed five to six drinks. The prevalence of driving after binge drinking varied considerably based on drinking location, ranging from 4.0% for those who reported binge drinking at home to 20.8% of those who drank in bars or clubs. Those who reported binge drinking in bars or clubs accounted for 44.2% of driving episodes; licensed establishments (bars, clubs, and restaurants) accounted for more than half (54.3%) of all driving episodes.

Binge drinkers who drank most of their alcohol in licensed establishments (bars, clubs, and restaurants) and who subsequently drove consumed an average of 8.1 (95% CI=7.45, 8.65) drinks; 53.5% consumed seven or more drinks; and 25.7% consumed ten or more drinks. Among binge drinkers who drove, a greater proportion of those drinking in bars or clubs consumed ten or more drinks compared with those drinking in restaurants (28.7% vs 13.6%, data not shown).

In stratified analysis, differences observed in the prevalence of driving based on the location of binge drinking were generally consistent across various demographic characteristics, the frequency of binge drinking, and the number of drinks consumed during the binge drinking episode (Table 2). Specifically, driving after binge drinking at home was reported by ≤6% of all subgroups. In contrast, driving after binge drinking in bars or clubs was reported by more than 20% of those in most subgroups. The prevalence of driving after binge drinking in bars increased significantly with age, ranging from 17.0% among those aged 18–34 years to 36.7% among those aged ≥55 years. However, the prevalence of driving after binge drinking in bars or clubs did not differ substantially when evaluated by

Table 2. Prevalence of driving after binge drinking,[a] by location of binge drinking episode and selected characteristics

	Location of binge drinking episode (% [CIs])				
	Home	**Other's home**	**Restaurant**	**Bar/club**	**Other locations[b]**
Overall	4.0 (3.2, 5.0)	13.6 (11.3, 16.3)	16.3 (12.1, 21.6)	20.8 (18.3, 23.6)	13.2 (10.2, 17.0)
Gender					
Male	4.0 (3.1, 5.1)	15.2 (12.3, 18.7)	19.7 (14.1, 26.8)	24.5 (21.1, 28.2)	15.3 (11.6, 20.0)
Female	4.2 (2.5, 6.8)	8.5 (6.0, 12.1)	7.9 (4.4, 13.7)	12.5 (9.9, 15.7)	6.5 (3.2, 12.7)
Age (years)					
18–34	4.0 (2.6, 5.9)	11.8 (9.0, 15.2)	11.7 (7.5, 17.9)	17.0 (13.7, 20.9)	12.3 (8.1, 18.4)
35–54	3.5 (2.5, 4.7)	17.5 (13.1, 22.9)	—[e]	26.5 (22.9, 30.5)	12.9 (8.7, 18.9)
≥55	6.0 (3.8, 9.5)	13.8 (8.1, 22.6)	—[e]	36.7 (28.2, 46.1)	—[e]
Race					
White, non-Hispanic	4.1 (3.2, 5.2)	14.1 (11.7, 17.0)	16.8 (12.8, 21.6)	20.9 (18.7, 23.4)	12.3 (9.4, 16.1)
Other race or ethnicity	3.9 (2.3, 6.3)	12.1 (7.3, 19.3)	—[e]	—[e]	—[e]
Education					
≤High school	4.0 (3.2, 5.0)	14.8 (11.0, 19.6)	15.7 (9.6, 24.6)	21.5 (16.9, 26.8)	13.9 (9.4, 20.1)
>High school	4.0 (3.0, 5.4)	12.6 (9.9, 16.0)	16.6 (11.3, 23.6)	20.5 (17.6, 23.7)	13.0 (9.2, 18.0)
Income ($)					
≤50K	3.9 (2.9, 5.4)	12.4 (9.2, 16.5)	—[e]	22.6 (18.9, 26.8)	14.7 (10.2, 20.6)
>50K	4.1 (2.8, 5.7)	15.7 (12.0, 20.2)	15.7 (11.0, 21.9)	19.7 (16.5, 23.3)	13.3 (9.0, 19.7)
Marital status					
Married	3.0 (2.2, 4.2)	12.2 (8.9, 16.4)	15.3 (9.9., 22.9)	23.5 (19.7, 27.7)	11.4 (8.0, 16.1)
Not married[c]	5.2 (3.9, 7.1)	14.6 (11.5, 18.3)	17.8 (12.0, 25.7)	19.5 (16.3, 23.1)	15.7 (10.8, 22.3)
Employment					
Employed	4.2 (3.2, 5.5)	14.2 (11.5, 17.4)	16.5 (11.7, 22.7)	21.8 (19.2, 24.5)	12.6 (9.4, 16.6)
Not employed[d]	3.3 (2.2, 5.0)	11.9 (7.7, 17.8)	—[e]	17.8 (12.0, 25.7)	—[e]
No. of binge episodes, past 30 days					
1–2	2.8 (1.9, 4.2)	11.6 (8.7, 15.3)	13.4 (9.6, 18.3)	17.0 (14.4, 20.0)	13.8 (9.7, 19.2)
≥3	5.2 (4.0, 6.8)	16.8 (13.2, 21.0)	—[e]	25.4 (21.1, 30.3)	12.4 (8.6, 17.6)
No. of drinks consumed, binge episode					
5–6	3.3 (2.3, 4.6)	12.4 (9.5, 16.0)	13.8 (9.9, 19.0)	19.9 (16.9, 23.3)	15.1 (10.5, 21.2)
≥7	4.6 (3.1, 6.8)	15.8 (11.0, 22.3)	—[e]	22.2(16.0, 29.9)	12.3 (7.1, 20.4)

[a]Binge drinking was defined as consuming five or more drinks on at least one occasion in the past 30 days. Respondent information pertained to their most recent episode of binge drinking. Driving after binge drinking refers to those who reported driving during or within 2 hours of their most recent binge drinking episode.

[b]Other locations is a combination of two response categories: (1) other public place, which referred to parks, sporting events, or concerts and (2) other location, which was a response option for those who did not answer "don't know/not sure" to drinking location but who did not consume most of their alcohol in their or another person's home, a restaurant, a bar, a club, or a public place.

[c]Not-married people included those who were never married or were single, in an unmarried couple, widowed, divorced, or separated.

[d]Not-employed people included those who were unemployed, were unable to work, or were retired, homemakers, or students.

[e]Point estimates and CIs not reported because of CIs spanning 20% or sample sizes <50.

various strata of education, income, marital status, and employment.

In multivariate logistic regression analysis, significantly increased odds of driving after binge drinking were observed for men compared with women, those aged ≥35 years compared to younger adults, unmarried people compared to married people, those reporting three or more compared to one or two binge drinking episodes in the past 30 days, and those drinking outside of their own home (Table 3). Compared to those binge drinking in their own home, the AOR for driving after binge drinking in bars or clubs was 7.81 and 5.90 for drinking in restaurants. The AOR of driving for people binge drinking in any licensed establishment (bars or clubs and restaurants) was also significantly increased (AOR 3.4, 95% CI=2.7, 4.4) compared with driving after drinking in any private residence (a respondents' home or someone else's home). Race/ethnicity, education, income, and the number of binge drinks consumed were not significantly associated with subsequent driving.

Table 3. Prevalence and AORs[a] for driving after binge drinking[b] among binge drinkers

Characteristic	Percentage who drove after binge drinking[b]	AOR[a] (95% CI)
Gender		
Female	8.1	1.00 (ref)
Male	13.2	1.75 (1.37, 2.33)
Age		
18–34	11.2	1.00 (ref)
35–54	11.9	1.58 (1.25, 2.01)
≥55	14.3	2.37 (1.69, 3.34)
Race or ethnicity		
Other than white, non-Hispanic	10.8	1.00 (ref)
White, non-Hispanic	12.2	0.98 (0.72, 1.34)
Education level		
Greater than high school	12.1	1.00 (ref)
High school or less	11.2	1.01 (0.80, 1.27)
Income level ($)		
≥50K	11.9	1.00 (ref)
<50K	12.2	1.05 (0.84, 1.32)
Marital status		
Married	10.2	1.00 (ref)
Not married[c]	13.2	1.32 (1.04, 1.68)
Employment status		
Not employed[d]	11.1	1.00 (ref)
Employed	12.0	1.25 (0.91, 1.71)
No. of binge episodes, past 30 days		
1–2	10.3	1.00 (ref)
≥3	13.7	1.52 (1.21, 1.89)
No. of drinks consumed, most recent binge episode		
5–6	10.6	1.00 (ref)
≥7	12.9	1.06 (0.84, 1.32)
Drinking location, most recent binge episode		
Own home	4.0	1.00 (ref)
At another person's home	13.6	4.61 (3.25, 6.53)
Restaurant	16.3	5.90 (3.77, 9.22)
Bar or club	20.8	7.81 (5.69, 10.73)
Other location[e]	13.2	4.31 (2.88, 6.45)

[a]AORs for driving after a respondent's most recent binge drinking episode were determined by logistic regression and were adjusted for the covariates listed in this table.
[b]Binge drinking was defined as consuming five or more drinks on at least one occasion in the past 30 days. Respondent information pertained to their most recent episode of binge drinking. Driving after binge drinking refers to those who reported driving during or within 2 hours of their most recent binge drinking episode.
[c]Unmarried people included those who were never married/single, in an unmarried couple, widowed, divorced, or separated.
[d]Not employed people included those who were unemployed, unable to work, retired, homemakers, or students.
[e]Other location refers to places such as parks, sporting events, concerts, or other locations.

Discussion

To our knowledge, this is the first U.S. study to examine the likelihood of driving following a specific binge drinking event, and the first to assess personal and contextual risk factors (e.g., location of alcohol consumption) affecting these associations. Overall, almost one in eight binge drinkers drove during or within 2 hours of their most recent binge drinking episode. Of these people, more than half consumed most of their alcohol in establishments licensed to sell alcohol. Bars and clubs accounted for 43% of binge drinking and driving episodes; 25% of those who drove after binge drinking in any establishment licensed to sell alcohol (bars, clubs, and restaurants) consumed ten or more drinks. These findings emphasize the need to implement effective measures to reduce binge drinking, including the implementation of policies to prevent overservice in licensed establishments where selling alcohol to intoxicated people is generally illegal.[8]

Although a strength of this study was that it established a temporal relationship between binge drinking and subsequent driving, the current findings are consistent with the strong cross-sectional relationship between binge drinking and impaired driving that has been described in previous studies.[6,7] A population-based study of California drinkers observed that driving while intoxicated was influenced by age, gender, individual drinking patterns, increased alcohol outlet density, and drinking in bars and restaurants.[9] The importance of drinking location and subsequent impaired driving was further illustrated by a New Mexico study of 5000 people convicted of driving-while-intoxicated (DWI), in which 45% of those convicted were drinking in bars or lounges prior to their arrest.[10] Another study of 16,000 DWI arrestees in Ventura County CA found that 44% had consumed their last drink in a bar, club, or restaurant and that those drinking in these establishments had significantly higher blood

alcohol concentrations than those drinking in other locations.[11]

Studies from other developed countries (e.g., Canada and Australia) have also found that drinking in bars and night clubs is strongly associated with drinking more than usual and drinking to the point of intoxication.[12–18] Further, a disproportionate number of drinkers who experienced alcohol-related harms or engaged in closely related risk behaviors, including driving while impaired, had been drinking in establishments licensed to sell alcohol.[19,20]

This study reaffirms the predominant role played by men in alcohol-impaired driving,[6] as men were more likely than women to binge drink and were also more likely to drive after doing so. While those in relatively younger age groups accounted for most binge drinking and driving episodes, the AOR of driving after a single binge drinking episode was progressively higher among those in older age groups. This finding may represent a cohort effect, as younger people have grown up in an era of enhanced awareness of, and social stigma associated with, impaired driving. It is also possible that a higher proportion of older binge drinkers were alcohol dependent, but alcohol dependence could not be assessed using this data source. Finally, drinking more drinks was not associated with a higher likelihood of driving. It is possible that a progressive loss of judgment after consuming more drinks was counteracted by a greater awareness of impairment, because the sensation of impairment is generally attained at or above the number of drinks used to define binge drinking.[21] It is also possible that those drinking more drinks were less likely to report subsequent driving.

This study is subject to several limitations. First, data were from self-report, and survey respondents may under-report how much they drink and whether they engage in impaired driving. Therefore, the number of drinks reported by respondents was likely conservative, as was the proportion of those who reported driving after binge drinking. Similarly, the median response rate among states included in this study was 55%, and nonrespondents may be more likely to binge drink and engage in impaired driving, although it is unclear how the proportion of binge drinkers who drive would vary between respondents and nonrespondents. Second, this study assessed the location where most drinks were consumed, and some binge drinkers may have consumed alcohol at more than one location. Third, the study did not include information about all U.S. states, and therefore may not be representative of the U.S. as a whole. And fourth, the BRFSS used a five-drink threshold to define binge drinking among women; the National Institute of Alcohol Abuse and Alcoholism recommends using a four-drink threshold, and BRFSS survey adopted this threshold in 2006. It is unknown what proportion of women drinking exactly four drinks subsequently drove a motor vehicle, but it is likely that the women would have accounted for a somewhat larger proportion of binge drinking and driving episodes had the four-drink threshold been used.

It was not possible to determine whether all people who reported driving during or within 2 hours of a binge drinking episode were legally intoxicated. However, consuming five drinks for men or four drinks for women at a typical rate (i.e., within 2 hours) results in blood alcohol concentrations of 0.08 mg/dL, the legal limit for defining alcohol-impaired driving in all states in the U.S.[22] Further, half of drivers in this study consumed seven or more drinks during their most recent binge episode, suggesting that many of these people may have had blood alcohol concentrations well in excess of 0.08 mg/dL. And finally, it should be noted that the risk of a motor vehicle crash increases at blood alcohol concentrations in excess of 0.03 mg/dL.[23]

Given the frequency with which binge drinkers subsequently drive a motor vehicle, population-based strategies to reduce both binge drinking and impaired driving are required to reduce alcohol-related motor vehicle crashes. Such strategies are the cornerstone of prevention, because there are few targeted interventions available to address the likelihood of excessive drinking or subsequent driving among high-risk demographic groups (e.g., men). Effective population-based strategies to reduce binge drinking include increasing alcohol excise taxes, limiting alcohol outlet density and hours of sale, enhanced enforcement of the age-21 minimum legal drinking age, and limiting days of alcohol sales.[24-26] Effective strategies to prevent alcohol-impaired driving include implementation of the age-21 minimum legal drinking age, 0.08 laws, sobriety checkpoints, lower blood alcohol concentration laws for young and inexperienced drivers, immediate driver's license revocation for those arrested for driving while intoxicated, sobriety checkpoints, server training programs, mass media campaigns intended to reduce impaired driving, ignition interlocks, multi-component impaired-driving interventions with community mobilization, and school-based instructional programs.[27]

Because driving after binge drinking in licensed establishments accounted for more than half of such episodes, implementing and strengthening existing interventions to prevent on-premise binge drinking in retail alcohol outlets are warranted.[28] Effective interventions to improve responsible beverage service include limits on drink discounting, "dram shop" liability laws, mandatory server training programs, and enhanced enforcement of laws prohibiting sales to intoxicated patrons.[27,29,30] However, a number of states lack liability laws or mandatory server training laws for establishments serving alcohol; most states lack adequate numbers of alcoholic beverage control officers; and laws preventing sales to minors or intoxicated people are enforced only sporadically.[31] Further, some states have laws that prevent cities or counties from adopting

more stringent alcohol-control policies than those that exist at the state level. Strengthening these laws and ensuring their enforcement could help reduce alcohol overservice and create an environment that supports responsible beverage service by not placing law-abiding retailers at an economic disadvantage.

The authors wish to acknowledge the contribution of Dr. Ernest Sullivent, who did preliminary analyses related to this manuscript.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC.

No financial disclosures were reported by the authors of this paper.

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