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RISK OF PAST YEAR INJURY RELATED TO HOURS OF EXPOSURE TO AN ELEVATED BAC AND AVERAGE MONTHLY ALCOHOL VOLUME: DATA FROM FOUR NATIONAL ALCOHOL SURVEYS (2000–2015)

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Abstract

Background—While a strong association exists between alcohol and injury in emergency department (ED) studies, these studies are not representative of the general population.

Objective—The association of injury with the number of hours of exposure to a BAC ≥ 0.05 and average monthly volume in drinks, both based on self-report of quantity and frequency of drinking in the last year, in a merged sample of respondents ($n=29,571$) from four U.S. National Alcohol Surveys (2000–2015) is analyzed.

Methods—Risk curves based on categorical step-function and fractional polynomial modeling were analyzed separately by gender, and by age and race/ethnicity for males.

Results—Risk of injury increased at one hour of a BAC exposure of ≥ 0.05 and at an average monthly volume of one drink. Risk of injury for spirits increased to an average daily volume of one drink, but no association was found for injury risk and average volume for either wine or beer. Risk of injury increased with both exposure hours and monthly volume among males, but little association was found for either consumption measure with risk of injury for females. Among males increased risk of injury was greater for whites than for blacks or Hispanics for BAC exposure; Hispanics showed a continued elevated risk up to 8 hours of exposure. After peaking at a monthly volume of one drink, injury risk decreased substantially for blacks, but was more gradual for whites, while risk increased very slightly for Hispanics to about 4 drinks per day. Males aged 18–29 showed the largest increase in risk associated with the number of hours of exposure to a BAC of ≥ 0.05 , with risk doubling at one hour of exposure, but subsequently falling.

Conclusions—While findings here are weaker than those from ED studies and likely due to the context of drinking, risk of injury appears to increase at relatively low levels of consumption, suggesting the importance of preventive efforts to reduce injury not only for heavier drinkers but also for more moderate drinkers.

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INTRODUCTION

The risk of negative consequences of drinking from alcohol consumption has been found to be associated with usual patterns of drinking, including both frequency of drinking and quantity consumed per occasion (Corrao et al., 2004). One such alcohol-related negative consequence of interest is non-fatal injury, which has received considerable attention in studies conducted in hospital emergency departments (EDs) (Cherpitel, 2007; Cherpitel et al., 2012; Romelsjö, 1995), but is less well-researched in studies of the general population.

While studies in the ED have focused largely on drinking prior to the injury event (Cherpitel et al., 2015), some have also analyzed drinking patterns. One such study across seven countries, including 10 EDs in the U.S., found injury risk increased with increasing usual alcohol consumption, although a threshold effect was achieved at relatively low levels of mean daily consumption and higher consumption times (Cherpitel et al., 2006). Case-control studies in the ED, adjusting for the effect of acute alcohol intake prior to injury, have found regular drinkers, even at high daily levels, were at lower risk of injury than abstainers (Watt et al., 2004) or lighter drinkers (Cherpitel et al., 2004). A Swiss ED study found that when drinking in the 24 hours preceding injury was controlled, high volume drinkers were at a lower risk of injury than low volume drinkers (Gmel et al., 2006).

One caveat in studies of ED patients is that they have been found more likely to be frequent heavy drinkers than those in the general population from which they come (Cherpitel, 1992), potentially biasing findings of the association of injury and drinking patterns coming from these studies. Respondents in the U.S. National Alcohol Survey who reported an injury for which they obtained treatment in an ED were found to be heavier drinkers (Cherpitel, 1994) and at greater risk for injury than respondents seeking other kinds of treatment or no treatment for their injury (Cherpitel and Ye, 2014). Studies in the U.S. general population have found risk of injury followed a “j-shaped” curve, with lower risk for those averaging from 1/2 to 3/4 drinks per day compared to those averaging less (Cherpitel et al., 1995). In these studies, risk of injury increased at relatively low levels of consumption (as little as one drink per day) (Cherpitel and Ye, 2009) and with the frequency of heavy drinking (5+ drinks) days to a hazard ratio of 2.14 for daily heavy drinkers (Kerr et al., 2015).

Analyses in these general population studies have not included the association of beverage-specific consumption and risk of injury. A differential association of injury risk by beverage type has been found in ED studies (Andreuccetti et al., 2014; Watt et al., 2004), as well as in other studies, with spirits drinkers having higher rates of violence-related injury than wine or beer drinkers (Gustafson, 1999; Smart, 1996; Stickley and Razvodovsky, 2012), while beer drinkers are more likely to sustain drinking-driving injuries than spirits or wine drinkers (Jensen et al., 2002; Smart, 1996). Differential findings of the association of injury related to beverage type in these studies may be related to both volume of consumption and ethanol content of the beverage consumed.

Risk of injury from drinking might also be expected to differ by race/ethnicity, but this has not been well studied (Keyes et al., 2012). An ED study found that black patients were less likely to report heavy drinking or drunkenness in the past year than white or Hispanic

patients (Cherpitel, 1998), although black men (as well as Hispanic) compared to white men have been found to continue heavy drinking at older ages (Caetano and Kaskutas, 1995), with a greater risk for alcohol problems (Galvan and Caetano, 2003; Mulia et al., 2009). National survey data from the U.S. general population found risk of injury related to drinking prior to the event was significantly elevated for blacks and Hispanics but not for whites (Cherpitel and Ye, 2014); however, this study did not examine usual drinking patterns. A prior analysis of risk of a serious lifetime injury in the U.S. general population found risk of injury increased with the number of heavy drinking days for whites, while injury risk increased for frequent heavy drinkers among blacks and for infrequent heavy drinkers among Hispanics (Kerr et al., 2015).

While these studies have examined the association of volume of consumption and risk of injury, no studies have analyzed the association of the length of exposure to a given level of alcohol and injury risk. Exposure to an elevated level of alcohol, during which an individual might be assumed to be physically and/or cognitively impaired, may be a better predictor of injury risk than average volume or frequency of high consumption times (5+ on an occasion), both of which have been typically used in past studies in the ED (Cherpitel et al., 2006; Cherpitel et al., 2012; Gmel et al., 2006) and in the general population (Cherpitel et al., 1995; Cherpitel and Ye, 2009; Kerr et al., 2015) but do not take intensity of exposure into account.

In addressing these gaps in the literature in the association of drinking patterns and risk of injury, reported here are analyses in the U.S. general population, using both categorical step function and fractional polynomial modeling, which examine the association of average volume of consumption by beverage type, and hours of exposure to a blood alcohol concentration (BAC) of ≥ 0.05 . Average volume of consumption and hours of exposure are examined separately for males and females, and by race/ethnicity and age for males. Findings here are important for a better understanding of the role that pattern of alcohol consumption plays in the risk of injury and disparities in this association across gender and race/ethnicity in the U.S. for informing appropriate intervention and prevention efforts to reduce alcohol-related injury.

METHODS

Data collection

Data analyzed are from a merged sample of the Alcohol Research Group's 2000, 2005, 2010 and 2015 National Alcohol Surveys (NASs). Fieldwork for the 2000 surveys was sub-contracted to the Institute for Survey Research at Temple University, the 2005 survey was sub-contracted to DataStat, Inc, and the 2010 and 2015 surveys were conducted by ICF Macro, Inc. Data from all surveys were collected on those aged 18 and older, using Random Digit Dial (RDD) Computer Assisted Telephone Interviews (CATI) of the 50 states and the District, with an over-sampling of blacks and Hispanics. Completed interviews were obtained on 7,612 respondents in the 2000 survey (58% cooperation rate), 6,919 respondents in the 2005 survey (56% cooperation rate), 7,969 respondents in the 2010 survey (52% cooperation rate), and 7,071 respondents in the 2015 survey (47% cooperation rate). Non-response was due to refusals, incapacitation, language barriers and failure to establish

contact. African Americans and Hispanics were oversampled in all surveys, using telephone exchanges with at least a certain percentage of the target groups, and only those from the target groups were recruited. Hispanic respondents were given a choice of being interviewed in English or in Spanish, with bilingual interviewers.

Instruments

After establishing contact with the respondent and obtaining informed consent, trained interviewers administered a structured instrument of about 45 minutes in length. Respondents were asked whether they had had an injury during the last year for which they thought about getting treatment (regardless of whether they actually obtained treatment).

Hours of Exposure to a BAC 0.05 in the last year—Hours of exposure to a BAC 0.05 was obtained from self-reported alcohol consumption and respondents' weight. Estimated BAC was based on the Widmark formula (Brick, 2006), defined as

$$\text{BAC} = 0.01882816 * \text{pure_ethanol_oz} / (\text{weight_kg} * \text{gender_factor}) * 100 - 0.017 * \text{hours}$$

The first constant 0.01882816 was derived for the concentration of alcohol in blood per one ounce of pure ethanol. The gender factor is the percentage of body weight as water (0.58 for men and 0.49 for women). The constant 0.017 accounts for the average rate of alcohol processed by the liver per hour (see <http://www.cs.duke.edu/courses/fall05/cps001/labs/lab4.html> for a detailed explanation of the Widmark formula and (Bond et al., 2010; Taylor et al., 2010) for application). For example, a man weighing 160 pounds and consuming 5 standard drinks (assuming 0.6 ounces of pure ethanol per drink) will reach a peak BAC of 0.134, and his BAC will drop under 0.05 after about 5 hours. The key measure of alcohol consumption at varied levels in the Widmark formula was based on the Graduated Frequency (GF) of usual drinking series (Greenfield, 2000). Respondents were asked the frequency of consuming 12 or more, 8–11, 5–7, 3–4 and 1–2 drinks during the last year, coded as 14, 9.5, 6, 3.5 and 1.5 drinks, respectively. These volume levels and their associated frequency of use in the last year, together with respondents' self-reported weights, were used to calculate the total number of hours exposed to BAC 0.05 based on the Widmark formula.

Beverage-specific volume of consumption (drinks per month)—Beverage-specific volume of consumption was obtained from questions regarding the frequency of consuming wine, beer and spirits, separately, with response categories ranging from never in the past year to every day. For NAS 2000 to 2010, frequency was split into the proportion of drinking days in which the respondents had 5 or more drinks, 3 or 4 drinks and 1 or 2 drinks of each beverage type, with response categories including nearly every time, more than half the time, less than half the time, once in a while, and never (Room, 1990). For the 2015 NAS, usual consumption of wine, beer and spirits was asked. These frequency and quantity measures were combined to derive the beverage-specific total volume during the last year, which was then divided by 12 for average drinks per month, for each beverage-type and for all beverages combined. Beverage-specific BAC exposure could not be calculated with any meaningful degree of accuracy since the measurement of beverage-specific volume lacked

the specific higher volume categories that were obtained for all beverage types combined (5–7, 8–11, 12+) with the Graduated Frequency approach.

Data Analysis

Categorical step-function and fractional polynomial regression were used to model the relationship between hours of exposure to a BAC ≥ 0.05 in the last year and beverage-specific volume of consumption in drinks per month, controlling for gender, age, race/ethnicity, education, family income, marital status and employment status (as categorized in Table 1).

Logistic regressions predicting any injury during the last year were fitted with the alcohol exposure variables treated either as categorical or continuous. For the categorical step-function approach, hours of BAC ≥ 0.05 and average drinks per month were coded into 10–12 categories and entered as dummy variables in the regressions, for which zero hours of BAC ≥ 0.05 or no drinking last year were used as the reference category. These categories were chosen taking into account both substantive interpretation and sample distributions. The fractional polynomial approach models the continuous exposure measure assuming some functional form (described below). While the fractional polynomial estimates are smoother and thus better fitted for cross-group comparisons and prediction purposes, they may have validity problems due to overfitting the data. We thus show the results of the categorical approach as a validity check.

Fraction polynomials (Royston and Altman, 1994; Royston et al., 1999) estimate the probability of an injury using logistic regression via the model: $\text{logit}(\text{injury}) = b_0 + b_1 x^p + b_2 x^q$ (or $b_0 + b_1 x^p + b_2 x^p(\ln x)$ if $p = q$). X is the hours of exposure to a BAC ≥ 0.05 or beverage-specific volume in standard drinks, and p and q values are to be chosen from $-2, -1, -0.5, 0, 0.5, 1, 2$ and 3 ($x^0 = \ln x$), reflecting different function form of risk curves. The 2-degree model was chosen as it provides for both flexibility and stability by choosing from 36 possible models (produced from all possible combinations of p and q shown above), which has been found to sufficiently represent a large range of commonly observed epidemiologic relationships while maintaining model parsimony and reducing overfitting (Sauerbrei and Royston, 1999). The best fit model is determined by selecting p and q producing the largest maximized likelihood function. All models were fitted using the STATA version 13 (StataCorp., 2013) *fracpoly* command.

The predicted probabilities of injury across hours of exposure to a BAC ≥ 0.05 , total volume of consumption, and beverage-specific volume, based on both the categorical step function and fractional polynomial models, are shown as risk curves for the total sample (Figure 1). Risk curves for hours of exposure and total volume of consumption are shown separately for males and females (Figure 2), and for males by race/ethnicity (Figure 3) and age group (18–29, 30–49, 50+) (Figure 4). Note that for the risk curves, both BAC hours and volume of consumption, are shown to increase multiplicatively on the X-axis rather than linearly. This is because drinking was more concentrated at lower levels, thus a linear scale would focus on extreme heavy drinkers with a very low prevalence.

All analyses were weighted by sampling weights constructed for each survey adjusting for the probability of selection (number of households, multiple phone lines and adult residents in households), and non-response. Post-stratification weights were also used to map sample respondents with the U.S. adult (18+) population proportions of ethnicity by region by age by gender groups, and within Hispanics by country of birth for the specific survey year. Given the varying sample size across the four surveys, for both the total sample and racial/ethnic subgroups, the sampling weights for individual surveys were normalized to make all surveys equally represented in the combined data. Only those identified as white, black or Hispanic were retained for analysis. Those with missing data on drinking and injury variables were also excluded, resulting in a final N of 29,571.

RESULTS

Table 1 shows demographic and drinking characteristics (hours of exposure to a BAC 0.05 in the last year and average number of drinks in the last month). In the total sample, 17% (n=5,062) reported an injury for which treatment was either considered or obtained in the last year. Respondents reporting an injury were significantly more likely to report a greater number of hours of exposure to a BAC 0.05 and a greater number of drinks per month, on average, than non-injured respondents (Table 1). Pearson's correlation coefficient between the continuous hours of exposure to a BAC 0.05 and the average number of drinks per month was 0.698 (not shown).

Figure 1 shows both the categorical and polynomial curves for risk of injury with the number of hours of exposure to a BAC 0.05 in the last year, average monthly volume and average monthly volume by beverage type for the total sample, bearing in mind that the outcome of an injury event was not necessarily measured at the same time as alcohol exposure. Risk curves for BAC and total volume increased sharply to one hour of BAC exposure and one drink, respectively. Risk continued to increase to four hours of BAC exposure and then leveled off and declined. Risk appeared similar for wine and beer volume, falling after one drink, but was higher for spirits volume and continued to increase to a monthly average volume of 30 drinks.

Figure 2 shows the risk of injury by gender. Risk for males was similar to that for the total sample, however no increase in risk was found for females for hours of BAC exposure, and only a small increase in risk was found at less than one drink per month which then leveled off. Given that little association was found between BAC exposure hours or average monthly volume for females, subsequent analyses were conducted on males only.

Figure 3 shows risk of injury by race/ethnicity for males. Increase in risk was greater for whites than for blacks or Hispanics for BAC exposure hours, peaking at one hour. No increase in risk was found for blacks for BAC exposure, while for Hispanics, a smaller increase than that for whites was found, which peaked at eight hours of exposure. Risk of injury for monthly volume increased more for blacks than whites or Hispanics, peaking at one drink and then declining. Risk for whites also peaked at one drink, but the decline in risk was more gradual than for blacks, while risk for Hispanics increased very slightly to about 120 drinks per month.

Figure 4 shows risk of injury by age group for males. Increase in risk for BAC exposure hours was most pronounced for those 18–29 where risk doubled at one hour of exposure, while little increase in risk was found for those older. Risk was similar across the three age groups for average monthly volume.

DISCUSSION

Both categorical step-function and fractional polynomial regression were used to analyze the risk of injury from hours of exposure to a BAC ≥ 0.05 and average monthly volume of consumption in the last year in a large general population sample in the U.S., again bearing in mind that injury and alcohol exposure did not necessarily occur at the same time. To our knowledge the association of hours of an elevated BAC and risk of injury has not previously been analyzed. Hours with elevated BAC is more specific than 5+ frequency in measuring the intoxication exposure levels. First, it accounts for intoxication from drinking less than 5 drinks, particularly among women with lower weights, and second, higher amounts per day are associated with longer exposures rather than a single event.

Risk of injury increased at one hour of a BAC exposure of ≥ 0.05 and an average monthly volume of one drink, which is similar to other studies conducted in the U.S. general population (Cherpitel and Ye, 2009). Also similar to other general population studies, as well as studies of drinking patterns among injured ED patients, a dose-response relationship between quantity/frequency of usual drinking and risk of injury was not found. Risk of injury increasing at one hour of exposure to an elevated BAC and then declining is supported by other studies showing a threshold effect, and may be related to tolerance. In those studies a threshold effect was found at relatively low levels of consumption and high consumption times (Cherpitel et al., 2006) with risk greatest for heavy episodic drinkers (Gmel et al., 2006), and lowest for frequent heavy and dependent drinkers (Borges et al., 2006).

Risk of injury for spirits drinking increased to an average daily volume of one drink, but no association was found for injury risk and average volume for either wine or beer. Other research has found a differential association of injury risk with beverage type, with spirits drinkers having higher rates of injury related to violence than either wine or beer drinkers (Gustafson, 1999; Smart, 1996; Stickley and Razvodovsky, 2012), while no association has been found between wine drinking and alcohol-related injury (Smart, 1996; Watt et al., 2004). An ED study across eight countries in Latin America found that those reporting drinking prior to injury were more likely to report drinking spirits than either wine or beer, although beer was the most commonly consumed beverage in those countries (Andreuccetti et al., 2014).

While risk of injury increased with both BAC exposure hours and monthly volume among males, little association was found for either consumption measure with risk of injury for females. Risk of injury was also found to be lower for females compared to males at all hours of exposure and volumes of consumption. This finding is not supported by a prior study in the ED across 18 countries which found that risk of injury from drinking prior to the event was similar for males and females up to about three drinks, at which point risk rose significantly more rapidly for females than for males (Cherpitel et al., 2015). It is possible

that a larger association with BAC exposure hours or average monthly volume of consumption may have been found for females for specific causes of injury, for example, injury related to intimate partner violence; however, type or cause of injury was not available in two of the four data sets analyzed.

Among males increased risk of injury was greater for whites than for blacks or Hispanics for BAC exposure, but Hispanics showed a continued elevated risk up to eight hours of exposure. After peaking at a monthly volume of one drink, injury risk decreased substantially for blacks, but was more gradual for whites, while risk increased very slightly for Hispanics to about four drinks per day. Strength of drinks has been found to vary by race/ethnicity (Kerr et al., 2009), with black males more likely to consume beverages with a higher mean alcohol content than either Hispanics or whites (Kerr et al., 2009). This may have resulted in an underreporting of consumption reflected in these risk curves for blacks, however, we were not able to adjust drink size alcohol content in the national alcohol survey data analyzed here.

Males aged 18–29 showed the largest increase in risk associated with the number of hours of exposure to a BAC of 0.05, with risk doubling at one hour of exposure, but subsequently falling, suggesting heavy episodic drinkers may be most at risk for injury.

Findings here based on either hours of exposure to an elevated BAC or drinks per month were not strong, unlike those based on studies of ED patients drinking prior to the injury event, which show both a larger association of injury with alcohol than that found here and a dose-response relationship (Cherpitel et al., 2015). Studies of those in the general population who reported an injury for which treatment was obtained in the ED have also found similar strong associations a dose-response relationship (Cherpitel and Ye, 2009). This lack of a strong relationship between risk of injury and alcohol consumption found here in the general population may be due to the context in which alcohol was used, with some contexts being more risky for injury than others. For example, the ED study across eight countries noted above found those who reported drinking prior to injury more likely to have been drinking in a public place compared to other venues (Andreuccetti et al., 2014). On the other hand, an ED study of injured compared to non-injured patients found usual heavy drinking patterns (drinking at least 3 times a week with 5 or more on at least one occasion in the in last year) predictive of injury (Cherpitel, 1998), suggesting that usual drinking pattern is predictive of injury in ED populations, regardless of context of drinking.

Some limitations of this study should be noted. As noted the injury event and exposure to alcohol did not necessarily occur at the same time. While an elevated BAC of 0.05 was used here, as this level is frequently the cut point to determine drinking driving offenses, a BAC of 0.08 was also use as a validity check, with no differences found in associations with risk of injury. However, it is possible that hours of exposure to substantially higher BACs may have resulted in a stronger association with risk of injury. Data to calculated beverage-specific BAC were not available in the surveys analyzed, so beverage-specific average monthly volume in drinks was relied on and may have been a less accurate indicator of beverage-specific risk of injury than beverage-specific high intensity drinking. Cause of injury was not taken into account and alcohol has been found to have a stronger association

with some types of injury than with others (Cherpitel et al., 2015; Taylor et al., 2010). Other potential risk factors for injury other than alcohol were also not taken into account, such as risk-taking disposition or occupational-related hazards, and these factors are also likely to vary by gender, race/ethnicity, and age, possibly affecting findings here.

Despite these study limitations, findings here showed gender, and race/ethnic and age differences among males, in risk of injury from both hours of exposure to an elevated BAC and average monthly volume consumed. Risk increased at one hour of exposure to a BAC 0.05 and subsequently declined at a greater number of exposure hours, suggesting that heavy episodic drinkers may be at greatest risk for injury, a notion which is supported in ED studies (Gmel et al., 2006). While findings here were not strong, hours of exposure to an elevated BAC appears to capture nuances in the association of risk of injury and alcohol consumption which average volume of consumption does not reflect, especially evident in the increased risk of injury among males aged 18–29.

It is difficult to determine which of the two measures, hours of exposure to an elevated BAC or average monthly volume, is better suited to analyze the risk of injury from alcohol consumption. Elevated BAC hours has the advantage of directly measuring length of exposure. Earlier ED and roadside traffic studies on the acute drinking effect, however, found increased injury risk started at very low levels of volume or BAC. Average volume captures any drinking above zero, and, based on last year drinking, is a standard exposure measure that has been used in many other studies to examine the effect of drinking on both acute and chronic disease outcomes. Results here show that both measures generated similar risk curves demonstrating the robustness of these findings.

Conclusion

Although findings are weaker than those from ED studies and likely due to the context of drinking, the data suggest that risk of injury increases at relatively low levels of consumption, underscoring the importance of preventive efforts to reduce injury not only for heavier drinkers but also for more moderate drinkers who may only rarely achieve elevated BAC levels but who may be especially at risk on those occasions. Findings here suggest that future research should include the effect of beverage-specific BAC exposure and should also focus on type and cause of injury, separately for males and females.

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Figure 1.
Risk curves of injury associated with hours of exposure to a BAC $\geq 0.05\%$ and average volume of alcohol for the total sample

Figure 2.

Risk curves of injury associated with hours of exposure to a BAC $\geq 0.05\%$ and average volume of alcohol by gender

Figure 3.
Risk curves of injury associated with hours of exposure to a BAC $\geq 0.05\%$ and average volume of alcohol by race/ethnicity for males

Figure 4.

Risk curves of injury associated with hours of exposure to a BAC $\geq 0.05\%$ and average volume of alcohol by age for males

Table 1

Demographic and drinking characteristics by injury status (N10-N13 combined)

	Total (N=29,571)	No Injury (N=22,581)	Injury (N=5,062)	P
Gender male	48.2	46.7	53.2	<0.001
Age				0.001
18–29	21.2	21.3	22.9	
30–49	38.6	38.3	40.7	
50+	40.2	40.4	36.5	
Race/ethnicity				<0.001
White	69.3	68.8	73.6	
Black	11.5	11.7	10.1	
Hispanic	12.7	13.2	9.6	
Others	6.5	6.3	6.7	
Education				<0.001
Less than high school	13.1	13.2	10.7	
High school grad	29.0	29.5	26.4	
Some college	28.7	27.7	32.2	
College grad	29.3	29.6	30.7	
Family income (in 2005 \$)				<0.001
\$20,000	22.7	22.6	22.0	
\$20,001–\$40,000	21.7	22.0	21.2	
\$40,001–\$70,000	21.8	21.7	23.6	
>\$70,000	20.5	20.2	22.3	
Missing	13.3	13.5	11.0	
Marital Status				0.006
Married	62.9	63.3	61.9	
Separate/Divorced	10.7	10.2	11.4	
Widowed	6.4	6.6	5.3	
Never married	20.1	19.9	21.4	
Employment status				<0.001
Full time	49.3	49.0	52.0	
Part time	12.3	12.5	11.4	
Unemployed	6.0	5.9	5.6	
Retired	16.2	16.9	12.6	
Disabled	5.1	4.2	7.5	
Others	11.2	11.5	11.0	
Hours of exposure to a BAC 0.05%				<0.001
Zero	54.1	54.8	50.1	
>0 hours, 10 hours	13.7	13.7	15.0	
>10 hours, 100 hours	15.6	15.2	17.6	
>100 hours	16.7	16.4	17.4	
Average volume per month				<0.001

	Total (N=29,571)	No Injury (N=22,581)	Injury (N=5,062)	P
Zero	39.1	40.2	35.1	
>0 drinks, 5 drinks	22.8	22.4	24.5	
>5 drinks, 30 drinks	21.8	21.4	24.1	
>30 drinks	16.2	16.0	16.4	

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