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Recall bias across seven days in self-reported alcohol consumption prior to injury among emergency department patients

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Abstract

Introduction and Aims—Recall bias is a concern in self-reported alcohol consumption, potentially accounting for varying risk estimates for injury in emergency department (ED) studies. The likelihood of reporting drinking for the same 6-hour period each day of the week for a full week preceding the injury event is analysed among injured ED patients, controlling for day of the week, gender and age.

Design and Methods—Probability samples of patients 18 and older were interviewed in two ED sites in Vancouver and one in Victoria, BC (n=1191). Generalized Estimating Equation modelling was used to predict the likelihood of reporting drinking for the same 6-hour period prior to the injury event for each day of the week, compared to day 7 as the reference recall day, for a full week preceding the event, controlling for day of the week. Recall by frequency of drinking (weekly; < weekly) and frequency of heavy drinking (5+ monthly; 5+ < monthly) was also analysed.

Results—Drinking was less likely to be reported Monday-Thursday. Controlling for day of the week, drinking was significantly more likely to be reported for each of the first 3 days of recall compared to 7-day recall, and highest for 1-day recall (odds ratio 1.55; $P=0.002$). Patients who reported weekly drinking and 5+ drinking < monthly were significantly more likely to report drinking for each of the first 3 days of recall (compared to 7-day recall).

Discussion—Findings suggest that the first 3 days prior to injury may be a less biased multiple-matched control period than longer periods of recall in case-crossover studies.

Conclusion—Length of accurate recall may be important to consider in case-crossover analysis, but also in other study designs which rely on patient self-report such as the Timeline Followback.

Keywords

recall bias; injury; study design; emergency department

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INTRODUCTION

A substantial literature exists documenting the association between alcohol consumption and injury based on emergency department (ED) studies of drinking within a 6-hour period prior to the event. The magnitude of risk for injury in these studies has been found to vary depending on the study design [1,2], and despite the fact that these studies have used standard protocols and instrumentation assuring representative samples of ED patients [3,4]. Many of these studies have used case-crossover designs [5,6] in which injured patients serve as their own controls, which eliminates potentially confounding from stable within-person factors [7,8]. Case crossover studies are also less expensive to conduct, since analysis is conducted only on injured patients, negating the need for recruiting control subjects.

One issue that has been a concern in case-crossover analysis, however, is that of recall bias related to self-reported drinking in the chosen control period, derived from a pre-determined 6-hour time period matched to the 6-hour period prior to the patient's injury [7,9–12]. Typically this pair-matched control period has been based on the same 6-hour period the previous day or the previous week. Findings based on these two control periods have generated mixed results [8,10,13,14]; however, potential bias inherent in longer versus shorter recall periods has received little empirical attention outside of national surveys, which have found self-reported consumption based on yesterday provides higher estimates than that based on a longer period of recall [15–17].

Another related concern with the case-crossover design is that alcohol consumption often varies by day of the week, potentially resulting in decreased likelihood of reporting drinking if the day before injury falls, for example, on a Thursday, compared to likelihood of reporting drinking one week earlier on a Friday, and this must also be taken into account in selection of the best control period [18]. A study of effectiveness of brief intervention in the ED found, controlling for day of the week, that reported consumption decreased by increasing length of the recall period, but the deterioration in recall was only significant for infrequent drinkers (those reporting drinking no more than four days per week) [19]. The design of that study was different than other ED studies on risk of injury from alcohol consumption, however, with total consumption obtained for a 24-hour period, rather than a 6-hour period, and measured by a 7-day retrospective diary.

Another ED study examining recall bias for the day prior to injury compared to the week prior across six countries found no difference between the two control periods (although some cross-country variation did exist, with a greater likelihood of reporting drinking the day before for one country and a diminished likelihood for two of the countries), or difference by patients' usual frequency of drinking [14]. Potential differential recall bias associated with frequency of drinking is important since estimates of risk are based on discordant pairs, with those reporting drinking at both time periods, as well as those reporting not drinking at both time periods, excluded from analysis. Quantity of drinking prior to the event may also be important in recall. One ED study found that risk estimates were larger based on 7-day recall compared to 1-day recall mainly for 1 drink and 2–3 drinks, with less discrepancy in risk between the two recall periods for 4–5 and 6+ drinks, suggesting the recall bias may be inversely related to quantity consumed prior to injury [8].

Another ED study found average consumption per day decreased over an 8-day period based on total daily consumption, while recall of drinking for the same 6-hour period, corresponding to the 6 hours prior to injury, for each of the days demonstrated little recall bias, suggesting that the 6-hour window may have had personal meaning to the injury patients, leading to greater engagement in the interview and enhanced ability to recall drinking [10]. In the 6-country study, above, patients were asked about the context for both of the 6-hour control periods, i.e. where they were and what they were doing (activity) during each time period, and such contextual cueing may be likely to improve patients' recall of drinking, alleviating potential bias [14].

To further examine potential recall bias associated with prior-day compared to prior-week control periods in case-crossover studies, Generalized Estimating Equation (GEE) modelling was used to predict the likelihood of reporting drinking for the same 6-hour period each day of the week for a full week preceding the injury event among injured ED patients, controlling for day of the week. Differential recall by frequency of drinking and frequency of heavy drinking is also analysed. Since the prior-week pair-matched case-crossover design has become the most commonly used approach in ED studies of risk of injury related to alcohol consumption [14], these analyses are important for a better understanding of recall bias related to the use of this control period compared to those temporally closer to the injury event, and whether recall is affected by usual drinking patterns. This is the first study to examine recall bias for the same 6-hour period over the 7 consecutive days preceding the injury event. Findings here may also apply to the accuracy of varying periods of recall using other study designs in other settings, for example, the widely used Timeline Followback [20].

METHODS

Samples

Probability samples of injured patients were selected for the study using a pre-determined sampling fraction which provided a representative sample of all injured patients in each of two hospitals in Vancouver, BC and one hospital in Victoria, BC. Patients aged 18 and older and arriving at the ED within 6 hours of the injury event were selected from computerised admission logs reflecting consecutive arrival to the ED. All three hospitals serve a diverse clientele in the two largest cities in BC, and include inner-city and suburban populations. Data were collected at each site over a period of 16 months (December 2013-March 2015). Sampling occurred from 8:30 pm to 4:30 am one weekend in every month, with the equivalent of one week of round-the-clock sampling at each site three times a year. Given the oversampling of weekend late evening/early morning hours, data were weighted to provide a representative sample of patients for all shifts and days of the week at each of the three EDs. All studies were reviewed by the appropriated Institutional Review Boards and conducted in accordance with the ethical standards laid down by the Declaration of Helsinki.

Data Collection

Interviewers were trained and supervised by research staff from the Centre for Addictions Research of BC. Patients were approached with written informed consent to participate in

the study and, once consent was obtained, were interviewed as soon as possible after registering for treatment. A \$10 gift card was offered to patients as a token of appreciation for their time in completing the interview. Interviews were conducted in a private area of the waiting room or in an adjacent space to ensure confidentiality of responses, and carried out prior to treatment, if time permitted; otherwise the interview was completed after the examination. Patients who were too severely injured to be interviewed at that time, but who were hospitalised, were interviewed after their condition had stabilised.

Instruments

Data were collected using a 25-minute interviewer-administered questionnaire [21], adapted from the World Health Organization Collaborative Study on Alcohol and Injury (http://www.who.int/substance_abuse/activities/injuries/en/injuriesinstrument). The questionnaire obtained data, among other items, on the reason for the ED visit (type of injury), drinking within 6 hours prior to the event that brought the patient to the ED, and during the same 6-hour period for each of the 7 days preceding the injury event, and quantity and frequency of usual drinking over the last year. Contextual data on where the patient was and what the patient was doing at the time were also obtained for the injury event and for the same time the previous day and the previous week.

Frequency of consumption was obtained from a question asking, across all beverage types combined, how often the patient typically drank any kind of alcoholic beverage from “every day” to “no alcohol during the last year”, with responses collapsed to provide a dichotomous measure of weekly; < weekly drinking. Quantity of consumption was measured using the Graduated-Frequency questions [22] which obtain the frequency of 12+ drinks on one occasion, 5–11 drinks on one occasion and 1–4 drinks on one occasion. Responses were collapsed to provide a dichotomous measure of heavy drinking based on 5+ monthly; 5+ < monthly. Quantity and frequency categories used here are intended to reflect, separately frequent drinking vs. less-frequent drinking, and frequent high consumption occasions, both of which might be expected to affect recall in consumption.

Data Analysis

ED patients’ self-reported drinking during the same 6-hour period for each of the 7 previous days was compared, with the number of recall days ranging from 1 (i.e. yesterday) to 7 (i.e. the same day of the last week). Since alcohol is more often consumed on weekends than weekdays, day of week was controlled in all analysis. First the difference in drinking was examined between 1-day recall and 7-day recall by comparing patients for whom recall falls on the same day of the week; e.g. 1-day recall for patients having their injury on a Sunday would fall on Saturday, which is the same day of the week for 7-day recall for patients having their injury on a Saturday (Table 2).

GEE modelling was then used to predict the likelihood of reporting drinking for the same 6-hour period prior to the injury event for each day of the week, compared to day 7 as the reference recall day, for a full week preceding the event, controlling for day of the week (Mon-Sat) for each of the 7 days (with Sunday as the reference day of the week). Day of the week as a potential confounder was controlled since it may be correlated with the recall day

(e.g. when a larger proportion of patients are admitted during weekends than weekdays). Models also included gender (females as the reference category) and age (as a continuous variable) as co-variables (Table 3). GEE models account for the autocorrelation data structure in the estimation procedure given the 7-day drinking assessment is clustered under patients. Similar analysis was then conducted by frequency of any drinking ($\geq$ weekly; $<$ weekly) and frequency of heavy drinking occasions ($5+ \geq$ monthly; $5+ <$ monthly) (Table 4). All analyses were performed applying the sampling weights.

RESULTS

A total of 1567 patients met eligibility criteria for the study and of these 1191 were successfully recruited, reflecting an overall response rate of 76% across the three sites. Non-interviews were primarily due to the patient refusing to participate (17%), and the remainder due to the patient's condition, not being able to locate the patient, or the patient being discharged before the interview could be completed. Table 1 shows demographic and drinking characteristics for the total sample and by day of ED attendance (weekdays vs. weekends). Those arriving on weekends were more likely to report drinking prior to the event than those arriving during the week.

Table 2 compares the prevalence of drinking between 1-day and 7-day recall for the two groups of patients whose recall fell on the same day of the week. Drinking was more prevalent for 1-day recall compared to 7-day recall for all days of the week except Saturday, although the difference was significant only for Sunday.

Table 3 shows the results of the GEE model predicting the likelihood of reporting drinking during the 7 days of recall by the number of recall days, controlling for day of the week. The odds ratios (OR) indicates whether the patients were either more likely ($OR > 1$), or less likely ($OR < 1$) to report drinking for a given recall day compared to the 7th-day (i.e. last week from the event time). The odds of drinking yesterday (1-day recall) were 1.55 times larger than drinking last week, while the odds of drinking on the 2nd and 3rd recall days were 37% greater than the 7-day recall (Table 3). Drinking was significantly more likely to be reported for each of the first 3 days of recall compared with 7-day recall. Day of week predicted drinking as expected, with patients significantly less likely to report drinking from Monday to Thursday, compared to Sunday.

Table 4 shows the GEE models, separately by frequency of any drinking ($\geq$ weekly, $<$ weekly) and frequency of heavy drinking occasions ($5+ \geq$ monthly, $5+ <$ monthly). Patients who reported at least weekly drinking were significantly more likely to report drinking for each of the first 3 days of recall compared with 7-day recall, with the highest odds, again, observed for 1-day recall. Larger ORs were observed for less frequent drinkers ($<$ weekly) compared to more frequent drinkers, but these differences compared to 7-day recall were not significant for the less frequent drinkers.

Patients who reported $5+$ drinking less than monthly were also significantly more likely to report drinking for each of the first 3 days of recall compared with 7-day recall, while no

difference was found for those reporting 5+ drinking at least monthly, suggesting no recall bias among frequent heavy drinkers.

DISCUSSION

Findings suggest that a shorter recall period may provide less biased estimates in alcohol consumption than a lengthier recall period. Controlling for day of the week, drinking was significantly more likely to be reported for each of the first 3 days prior to the injury event compared to 7-day recall, suggesting bias may be operating for longer periods of recall.

Two prior studies reported larger risk estimates for drinking before injury based on drinking during the same 6-hour period the week prior to injury compared to the day prior, both suggesting downward recall bias based on 7-day recall compared to 1-day recall [8, 13]. However, neither of these studies controlled for day of the week. A third study, controlling for day of the week, found no significant difference between the two recall periods across six countries [14].

Drinking was found to vary by day of the week, as expected, and was less likely to be reported Monday-Thursday compared to Sunday, underscoring not only the need to control for day of the week in comparing time periods for accuracy of recall, but also in conducting pair-matched case-crossover studies which do not use the same day of the week. There is also the possibility that, in addition to recall error, patient fatigue may have biased study findings resulting in a decreased likelihood of reporting alcohol consumption for each successive control period, and may also have contributed to findings here.

When examining whether recall bias may vary across individual usual drinking pattern, frequent heavy drinkers (5+ monthly) were the only group for which no recall bias was observed. Patients who reported frequent (weekly) drinking of any amount or infrequent (< monthly) 5+ drinking were significantly more likely to report drinking for each of the first 3 days compared to 7-day recall. For those drinking < weekly, although ORs were not statistically significant, large effect size estimates were observed (e.g. the odds of drinking for 1-day recall were more than doubled the odds for drinking from 7-day recall (OR=2.12 in Table 3). This suggests that recall bias cannot be ruled out for this group of less infrequent drinkers, as the lack of significance may be due to the lower statistical power related to a smaller prevalence of drinking among this group of drinkers.

When examining whether recall bias may vary across individual usual drinking pattern, we found frequent heavy drinkers (5+ monthly) were the only group for which no recall bias was observed. Patients who reported weekly of any drinking and 5+ drinking < monthly were significantly more likely to report drinking for each of the first 3 days compared to 7-day recall. For those drinking < weekly, even though no OR reported was statistically significant, large effect size estimates were observed (e.g. the odds of drinking from 1-day recall were more than doubled the odds of drinking from 7-day recall with OR=2.12). The results suggest that recall bias cannot be ruled out for this group of less infrequent drinkers, as the lack of significance may be due to the lower statistical power related to a smaller prevalence of drinking among this group of drinkers. In the 6-country study no difference

was found in recall across the two time periods by patients' usual frequency of drinking [14]. However, another ED study of brief intervention based on 24-hour recall of total consumption using a 7-day retrospective diary found, controlling for day of the week, that deterioration in recall was significant only for sporadic drinkers but not for regular drinkers [19]. Our findings are somewhat similar to the latter study, although that study sampled only risky drinkers and regular drinkers were defined as drinking 5 or more days a week, while the sporadic drinkers were those drinking less than 4 days a week.

In the present study contextual questions on where the patient was and the activity in which the patient was involved were asked for the time of the injury event, and for the same time on the day before and the week before, but not for the other 5 days of recall. Although little difference was found in the likelihood of reporting drinking in the six-hour control period across the first three days preceding injury, two of which had no contextual cueing, contextual cueing may be an important factor contributing to more accurate recall of drinking, along with proximity of the time when this information is elicited to the target period of drinking.

One limitation to the present study is that analysis did not include the amount of alcohol consumed either prior to injury or during any of the control periods. While data on the number of drinks consumed before injury and for two of the matched control periods (1-day recall and 7-day recall) were obtained, these data were not obtained for the remaining, intervening control periods. As noted earlier, quantity of drinking prior to the event may be important to recall, with risk estimates found to be larger for 7-day recall compared to 1-day recall among those drinking at lower levels prior to injury (less than 4 drinks) compared to those reporting a larger volume during this time [8]. It is also possible that patients may have been drinking more in the 3 days leading to the injury event than in the 4–7 days prior, possibly reflecting a “bender,” and resulting in a greater likelihood of drinking during control periods temporally closer to the event period.

In conclusion, 3-day recall in the case-crossover and other study designs, controlling for day of the week, may be optimal in reducing bias related to recall. Findings here suggest that, controlling for day of the week, the first 3 days prior to injury may be less biased than the 7-day control period in case-crossover studies. The multiple-matched control period also produces more efficient and stable estimates, with smaller confidence intervals in determining risk of injury from drinking. Contextual cueing may be important in providing more accurate recall regarding drinking, as typically used in the Timeline Followback. It would be prudent, in future case-crossover studies, to elicit where the patient was and the activity in which the patient was involved for each of the matched control periods, in addition to the event period. Since, to a great extent, the field of alcohol studies including those on injury rely on self-reported consumption, future research is necessary for further elucidating those factors which enhance recall of consumption and periods which provide optimal recall, including the amount of alcohol consumed during recall periods. Future research is also important on gender differences in recall.

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References

1. Zeisser C, Stockwell TR, Chikritzhs T, Cherpitel CJ, Ye Y, Gardner C. A systematic review and meta-analysis of alcohol consumption and injury risk as a function of study design and recall period. *Alcohol Clin Exp Res*. 2013; 37(Suppl. 1):E1–E8. [PubMed: 22934961]
2. Cherpitel CJ. Focus on: The burden of alcohol use–trauma and emergency outcomes. *Alcohol Res Health*. 2014; 35:150–4.
3. Cherpitel CJ. Alcohol and injuries: a review of international emergency room studies. *Addiction*. 1993; 88:923–37. [PubMed: 8358264]
4. Cherpitel CJ. Alcohol and injuries: a review of international emergency room studies since 1995. *Drug Alcohol Rev*. 2007; 26:201–14. [PubMed: 17364856]
5. Maclure M. The case-crossover design: a method for studying transient effect on the risk of acute events. *Am J Epidemiol*. 1991; 133:144–53. [PubMed: 1985444]
6. Mittleman MA, Maclure M, Tofler GH, Sherwood JB, Goldberg RJ, Muller JE. Triggering of acute myocardial infarction by heavy physical exertion. Protection against triggering by regular exertion. *N Engl J Med*. 1993; 329:1677–83. [PubMed: 8232456]
7. Vinson DC, Mabe N, Leonard LL, et al. Alcohol and injury. A case-crossover study. *Arch Fam Med*. 1995; 4:505–11. [PubMed: 7773425]
8. Borges G, Cherpitel CJ, Mondragón L, Poznyak V, Peden M, Gutiérrez I. Episodic alcohol use and risk of nonfatal injury. *Am J Epidemiol*. 2004; 159:565–71. [PubMed: 15003960]
9. Borges G, Cherpitel CJ, Orozco R, Bond J, Ye Y, Macdonald S, et al. Multicentre study of acute alcohol use and non-fatal injury: data from the WHO collaborative study on alcohol and injuries. *Bull World Health Organ*. 2006; 84:453–60. [PubMed: 16799729]
10. Vinson DC, MacLure M, Reidinger C, Smith GS. A population-based case-crossover and case-control study of alcohol and the risk of injury. *J Stud Alcohol*. 2003; 64:358–66. [PubMed: 12817824]
11. Gmel G, Kuendig H, Rehm J, Schreyer N, Daeppen J-B. Alcohol and cannabis use as risk factors for injury—a case-crossover analysis in a Swiss hospital emergency department. *BMC Public Health*. 2009; 9:40. [PubMed: 19178706]
12. Cherpitel CJ, Ye Y, Watters K, Brubacher JR, Stenstrom R. Risk of injury from alcohol and drug use in the emergency department: a case-crossover study. *Drug Alcohol Rev*. 2012; 31:431–8. [PubMed: 21824208]
13. Gerlich MG, Rehm J. Recall bias in case-crossover designs studying the potential influence of alcohol consumption. *J Stud Alcohol Drugs*. 2010; 71:619. [PubMed: 20557830]
14. Ye Y, Bond J, Cherpitel CJ, Borges G, Monteiro M, Vallance K. Evaluating recall bias in a case-crossover design estimating risk of injury related to alcohol: data from six countries. *Drug Alcohol Rev*. 2013; 32:512–8. [PubMed: 23574580]
15. Stockwell T, Zhao J, Chikritzhs T, Greenfield TK. What did you drink yesterday? Public health relevance of a recent recall method used in the 2004 Australian National Drug Strategy Household Survey. *Addiction*. 2008; 103:919–28. [PubMed: 18482414]
16. Knibbe RA, Bloomfield K. Alcohol consumption estimates in surveys in Europe: comparability and sensitivity for gender differences. *Subst Abus*. 2001; 22:23–38. [PubMed: 12466667]
17. Mäkelä, K. Measuring the Consumption of Alcohol in the 1968–1969 Alcohol Consumption Study, Report No. 2. 1. Helsinki: Social Research Institute of Alcohol Studies; 1971.

18. Gmel, G., Daeppen, J-B. Conceptional issues in emergency room studies and paths forward. In: Cherpitel, C.J.Borges, G.Giesbrecht, N.Hungerford, D.Peden, M.Poznyak, V., et al., editors. Alcohol and Injuries: Emergency department studies in an international perspective. Geneva, Switzerland: World Health Organization; 2009. p. 115-31.
19. Gmel G, Daeppen J-B. Recall bias for seven-day recall measurement of alcohol consumption among emergency department patients: implications for case-crossover designs. *J Stud Alcohol Drugs*. 2007; 68:303–10. [PubMed: 17286350]
20. Sobell, LC., Sobell, MB. Timeline Follow-Back: a technique for assessing self-reported alcohol consumption. In: Litten, RZ., Allen, JP., editors. Measuring Alcohol Consumption: Psychosocial and biological methods. Totowa, NJ: Humana Press; 1992. p. 41-72.
21. Cherpitel CJ, Bond J, Ye Y, Borges G, Macdonald S, Giesbrecht NA. A cross-national meta-analysis of alcohol and injury: data from the Emergency Room Collaborative Alcohol Analysis Project (ERCAAP). *Addiction*. 2003; 98:1277–86. [PubMed: 12930215]
22. Greenfield TK. Ways of measuring drinking patterns and the difference they make: experience with graduated frequencies. *J Subst Abuse*. 2000; 12:33–49. [PubMed: 11288473]

Table 1

Prevalence of demographic and drinking variables for the total emergency department injury patient sample and by day of emergency department arrival (%)

	Total	Arrival Mon–Fri	Arrival Sat or Sun	<i>P</i> values^I
Gender, male	57.5	58.3	55.5	0.557
<i>Age</i>				
18–29	30.4	30.4	30.5	0.634
30–49	36.1	35.2	38.7	
50+	33.2	34.4	30.8	
White	73.4	75.9	66.9	0.034
<i>Education</i>				
< High school grad	7.8	8.0	7.4	0.762
High school grad	17.8	18.6	15.9	
Some college	36.4	36.8	35.4	
College grad	37.9	36.6	41.3	
<i>Personal after-tax Income</i>				
<\$1000	14.9	14.7	15.3	0.548
\$1000–\$2499	26.2	28.0	21.3	
\$2500–\$3999	21.2	20.8	22.2	
\$4000+	26.6	25.6	29.1	
Missing	11.2	10.9	12.1	
<i>Employment status</i>				
Full time	54.9	54.3	56.5	0.603
Part time	11.8	11.6	12.1	
Unemployed	5.8	5.4	7.0	
Retired	16.6	18.1	12.8	
Others	10.9	10.7	11.5	
<i>Marital status</i>				
Married	40.9	43.0	35.2	0.053
Separated/divorced/widowed	15.1	15.9	13.0	
Single	44.1	41.1	51.8	
Drinking before injury	14.7	12.7	20.0	0.010
Alcohol at least once weekly	54.0	52.4	58.1	0.218
5+ at least once monthly	24.3	22.6	29.0	0.106

^I Chi-square test between patients arriving Mon-Friday and Sat-Sun.

Table 2

Prevalence of any drinking within 6 hours prior to injury (%)

Injured patients			
Day of week	1-day recall	7-day recall	Chi ² test (<i>P</i> value)
Sunday	25.3	12.6	0.028
Monday	13.1	10.5	0.622
Tuesday	8.5	3.6	0.101
Wednesday	5.5	4.2	0.729
Thursday	12.6	5.6	0.134
Friday	14.5	10.8	0.443
Saturday	12.7	12.7	0.993
Total	13.1	8.7	0.071

Table 3

Odds ratios predicting any drinking within 6 hours prior to injury

Injured patients		
	OR (95% CI)	P
<i>Recall period</i> (Ref. 7-day)		
1-day recall	1.55 (1.17, 2.07)	0.002
2-day recall	1.37 (1.05, 1.79)	0.020
3-day recall	1.37 (1.05, 1.81)	0.023
4-day recall	1.00 (0.78, 1.28)	0.994
5-day recall	0.97 (0.76, 1.25)	0.835
6-day recall	1.05 (0.79, 1.38)	0.747
<i>Day of week</i> (Ref. Sunday)		
Monday	0.70 (0.51, 0.96)	0.025
Tuesday	0.52 (0.39, 0.69)	<0.001
Wednesday	0.53 (0.39, 0.72)	<0.001
Thursday	0.63 (0.47, 0.85)	0.002
Friday	0.85 (0.64, 1.14)	0.278
Saturday	1.15 (0.88, 1.49)	0.315
Gender, male	1.22 (0.85, 1.78)	0.283
Age	0.99 (0.97, 1.00)	0.018

CI, confidence interval; OR, odds ratio.

Generalized Estimating Equation modelling of odds ratios predicting any drinking within 6 hours prior to injury by frequency and quantity of drinking (n=1191)

Table 4

	Injured patients Alcohol weekly (N=622)		Injured patients Alcohol < weekly (N=546)		Injured patients 5+ Monthly (N=349)		Injured patients 5+ < Monthly (N=842)	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
<i>Recall period (Ref. 7-day)</i>								
1-day recall	1.52 (1.11, 2.08)	0.008	2.12 (0.76, 5.92)	0.152	1.26 (0.83, 1.93)	0.282	1.91 (1.26, 2.90)	0.002
2-day recall	1.37 (1.02, 1.84)	0.037	1.53 (0.56, 4.16)	0.405	0.99 (0.68, 1.43)	0.938	1.85 (1.24, 2.77)	0.003
3-day recall	1.33 (0.99, 1.77)	0.055	2.21 (0.75, 6.55)	0.152	0.87 (0.58, 1.31)	0.508	1.98 (1.33, 2.94)	0.001
4-day recall	0.89 (0.70, 1.14)	0.374	2.06 (0.75, 5.66)	0.159	0.69 (0.48, 0.99)	0.044	1.35 (0.94, 1.96)	0.105
5-day recall	0.95 (0.75, 1.22)	0.694	1.23 (0.37, 4.06)	0.732	0.79 (0.56, 1.11)	0.179	1.20 (0.82, 1.76)	0.339
6-day recall	1.05 (0.78, 1.41)	0.761	1.07 (0.32, 3.51)	0.916	0.95 (0.64, 1.41)	0.792	1.16 (0.77, 1.77)	0.474
<i>Day of week (Ref. Sunday)</i>								
Monday	0.64 (0.46, 0.90)	0.010	0.84 (0.30, 2.39)	0.750	0.67 (0.43, 1.03)	0.065	0.72 (0.47, 1.12)	0.146
Tuesday	0.53 (0.39, 0.72)	<0.001	0.22 (0.06, 0.87)	0.031	0.65 (0.46, 0.92)	0.016	0.45 (0.29, 0.68)	<0.001
Wednesday	0.52 (0.38, 0.73)	<0.001	0.45 (0.16, 1.29)	0.137	0.63 (0.44, 0.90)	0.012	0.48 (0.30, 0.76)	0.002
Thursday	0.58 (0.42, 0.78)	<0.001	0.87 (0.32, 2.37)	0.787	0.82 (0.56, 1.21)	0.315	0.52 (0.33, 0.81)	0.004
Friday	0.82 (0.60, 1.12)	0.205	1.05 (0.40, 2.75)	0.916	1.02 (0.67, 1.55)	0.930	0.76 (0.52, 1.10)	0.145
Saturday	1.15 (0.85, 1.55)	0.354	1.15 (0.49, 2.73)	0.744	1.42 (0.99, 2.04)	0.054	1.01 (0.69, 1.47)	0.978
Gender, male	1.44 (0.96, 2.17)	0.079	0.48 (0.22, 1.03)	0.060	0.92 (0.55, 1.63)	0.786	1.06 (0.65, 1.72)	0.808
Age	1.00 (0.98, 1.01)	0.652	0.97 (0.95, 0.99)	0.007	1.00 (0.98, 1.02)	0.806	0.99 (0.97, 1.00)	0.125

CI, confidence interval; OR, odds ratio.