Covariates of alcohol consumption among career firefighters

A. K. Piazza-Gardner¹, A. E. Barry¹, E. Chaney², V. Dodd³, R. Weiler⁴ and A. Delisle¹

¹Department of Health Education and Behavior, University of Florida, Gainesville, FL 32611, USA, ²Department of Health Education and Promotion, East Carolina University, Greenville, NC 27858, USA, ³Department of Community Dentistry and Behavioral Science, University of Florida, Gainesville, FL 32610, USA, ⁴Department of Global and Community Health, George Mason University, Fairfax, VA 22042, USA.

Correspondence to: A. K. Piazza-Gardner, Department of Health Education and Behavior, University of Florida, PO Box 118210, Gainesville, FL 32611, USA. Tel: +1 989 798 0240; e-mail: akgardner@ufl.edu

Background
Little is known about rates of alcohol consumption in career firefighters.

Aims
To assess the quantity and frequency of alcohol consumption among career firefighters and the covariates that influence consumption levels.

Methods
A convenience sample of career firefighters completed an online, self-administered, health assessment survey. Hierarchical binary logistic regression assessed the ability of several covariates to predict binge drinking status.

Results
The majority of the sample (n = 160) consumed alcohol (89%), with approximately one-third (34%) having a drinking binge in the past 30 days. The regression model explained 13–18% of the variance in binge drinking status and correctly classified 71% of cases. Race (P < 0.05) and time of service (P < 0.01) were the only covariates that made a statistically significant contribution to the model. After controlling for other factors in the model, white respondents were ~4.5 times more likely to binge drink than non-white respondents (95% CI: 1.15–17.4). For each additional year of service, firefighters were 1.08 times less likely to binge drink (95% CI: 0.87–0.97).

Conclusions
Drinking levels observed in this study exceed those of the general adult population, including college students. Thus, it appears that firefighters represent an at-risk drinking group. Further investigations addressing reasons for alcohol use and abuse among firefighters are warranted. This study and subsequent research will provide information necessary for the development and testing of tailored interventions aimed at reducing firefighter alcohol consumption.

Key words
Alcohol consumption; binge drinking; drinking; firefighter.

Introduction
We currently know little about the drinking habits of firefighters. Two investigations have documented high alcohol consumption frequency and quantities: >80% were current drinkers and 56% reported binge drinking in the past month [1,2]. While this limited literature suggests that firefighters may represent an at-risk drinking group, more investigations are warranted. This study sought to assess the alcohol consumption behaviours and associated covariates of career firefighters in the south-eastern USA.

Methods
After obtaining approval from the Institutional Review Board, we collected data over a 6-week period in summer 2013 from a convenience sample of career firefighters in north central Florida. After giving consent, participants completed a 10–15 min survey (33 items) anonymously assessing various health behaviours. Drinking measures included seven items: the three-item Alcohol Use Disorders Identification Test (AUDIT-C) assessed hazardous drinking [3], three items from the Behavioural Risk Factor Surveillance System assessed drinking quantity and intoxication [4] and a modified item from the National College Health Assessment [5] assessed perception of alcohol consumption among peer firefighters. See Table 1 for a complete list of alcohol-related survey items. ‘Drinking frequency’ was categorized based on responses to Item A. ‘Binge drinking status’ was measured according to Item E. Binge drinking was defined as consuming five or more drinks (males) or four or more drinks (females) in one occasion.
drinks (females) on any occasion over the past 30 days. The AUDIT-C score was calculated according to standard scoring procedures. Values range from 0 to 12 (≥7 in men and ≥5 in women indicate hazardous drinking). Covariates included smoking status, smokeless tobacco use, exercise status, hours of sleep (on- and off-duty), sleep disorder diagnosis, race, sex, time in fire service and work status (active or light duty). Sleep on- and off-duty was categorized as ≤6 and ≥7h. Due to low frequencies for non-white races, race was recoded into white and non-white. Age was not used as a covariate as not all respondents gave their age.

Using Predictive Analytics Software Version 21, descriptive statistics assessed the proportion of current drinkers and rates of hazardous drinking. Hierarchical binary logistic regression assessed the ability of several covariates to predict both binge drinking status and AUDIT-C score. For both regression analyses, Block 1 included personal covariates: race and sex. Block 2 included behavioural covariates: smoking status, smokeless tobacco use, exercise status, hours of sleep and sleep disorder diagnosis. Block 3 included vocational covariates: time in service and work status.

### Results

The final sample included 160 career firefighters (a response rate of 86%) with an average age of 38 (±9), who were primarily white (80%), male (95%) and with 14 (±9) years’ experience. See Table 2 for descriptive statistics. The majority of firefighters (89%) consumed alcohol and ~34% reported binge drinking in the past month. On average, respondents consumed 3.8 (±3.4) drinks per occasion and a maximum of 4.9 (±3.8) drinks per occasion within the past month. AUDIT-C scores averaged 4.1 (±2.5), below the hazardous drinking behaviour cut-off [3]. Respondents estimated peers to have drunk 6 (±4.4) drinks the last time they drank.

Only the full binary logistic regression model was statistically significant, $\chi^2 (10, N = 129) = 18.67, P < 0.05$, explaining between 13% (Cox and Snell $R^2$) and 18% (Nagelkerke $R^2$) of the variance in binge drinking status and correctly classifying 71% of cases. Race ($P < 0.05$) and time of service ($P < 0.01$) made a statistically significant contribution to the model. Overall, white respondents were ~4.5 times more likely to binge drink than non-white respondents (95% CI: 1.15–17.4). Moreover, for each additional year of service, firefighters were 1.08 times less likely to binge drink (95% CI: 0.87–0.97).

The second model did not achieve statistical significance although time of service was a statistically significant predictor of AUDIT-C score ($\beta = −0.244, P < 0.05$). Due to low correlations with AUDIT-C score, work status ($r = 0.018$), smoking status ($r = 0.008$) and exercise status ($r = −0.003$) were omitted. Age was also omitted due to low response and high correlation with time of service ($r = 0.833$).

### Discussion

In this study, average alcohol consumption was similar to that observed by Haddock et al. [2], but binge drinking rates were lower among this sample. White respondents were more likely to binge drink than other races or ethnicities. The longer respondents had served as firefighters the less likely they were to binge drink.

While the use of self-reported data is a limitation, all responses were anonymous and only instruments previously shown to produce valid and reliable data were used. Our convenience sample (primarily white males) limits the extent to which our results can be generalized and the cross-sectional nature of the study precludes detection of changes in alcohol use over time.

The observed drinking levels among this sample are cause for concern considering the potential for overlap with shift work. While research is needed to assess the effects of alcohol consumption on job performance among firefighters, studies have shown decreases in cognitive function and psychomotor performance among other professions (e.g. surgeons) [6]. For instance, active

---

**Table 1. Survey items related to alcohol consumption and binge drinking**

<table>
<thead>
<tr>
<th>AUDIT-C items</th>
<th>BRFSS items</th>
<th>ACHA-NCHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) How often do you have a drink containing alcohol? [never, monthly or less, 2–4 times a month, 2–3 times a week, 4 or more times a week]</td>
<td>D) During the past 30 days, on the days when you drank, about how many drinks did you drink on average? [Indicate number from 0 through 15]</td>
<td>G) How many drinks do you think the typical firefighter at your station had the last time he/she drank? [Indicate number from 0 through 15]</td>
</tr>
<tr>
<td>B) How many drinks do you have on a typical day when you are drinking? [1–2 drinks, 3–4 drinks, 5–6 drinks, 7–9 drinks, 10+ drinks]</td>
<td>E) During the past 30 days, what is the largest number of drinks you had on any occasion? [Indicate number from 0 through 15]</td>
<td></td>
</tr>
<tr>
<td>C) How often do you have six or more drinks on one occasion? [never, less than monthly, monthly, weekly, daily or almost daily]</td>
<td>F) In a typical week, how many days do you get drunk (intoxicated)? [Indicate number from 0 through 7]</td>
<td></td>
</tr>
</tbody>
</table>

BRFSS, Behavioural Risk Factor Surveillance System.
military personnel have demonstrated reduced ‘force readiness’, i.e. one’s level of physical and mental preparedness/alertness [7]. Force readiness also applies to firefighters as the nature of their job demands alertness and attention at a moment’s notice. While this study did not assess alcohol use on duty, excessive consumption can result in lingering effects and reduced force readiness the following day. Therefore, further investigation of alcohol use and abuse and the impact of drinking on job performance are warranted.

Overall, our findings suggest that alcohol consumption represents a health behaviour of concern among this sample of career firefighters. Future research investigating the drinking behaviours, additional covariates (e.g. stress and body mass index) and influencing factors (e.g. identity, norms) is needed.

**Key points**

- Drinking levels observed among firefighters in this study exceeded those of the general adult population, including college students.
- Time of service and race/ethnicity were the only statistically significant covariates of binge drinking, in that whites were more likely to binge drink than non-whites, and length of service was inversely related to binge drinking.
- Further investigations into the reasons for alcohol use in firefighters, as well as development of tailored interventions, are warranted.

**Conflicts of interest**

None declared.

**References**