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## Alcohol, Stress-Related Factors, and Short-Term Absenteeism Among Urban Transit Operators

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**ABSTRACT** *Transit operators, relative to workers in many other occupations, experience high levels of work-related stress, as documented through neuroendocrine elevations on the job vis-à-vis resting states (J Occup Health Psychol. 1998;3:122–129). Previous research suggests that self-reported job stress is associated with higher levels of alcohol consumption among transit operators (Alcohol Clin Exp Res. 2000;24:1011–1019) and with absenteeism (Working Environment for Local Public Transport Personnel, Stockholm: Swedish Work Environmental Fund, 1982; Work Stress. 1990;4:83–89). The purpose of this study was to examine the interrelationships between alcohol use, stress-related factors (stressful life events, job stressors, and burnout), and short-term absenteeism among a multiethnic cohort of urban transit operators. Self-reported measures of alcohol, stress-related factors, and short-term absenteeism were obtained from a sample (n = 1,446) of San Francisco municipal transit operators who participated in the 1993–1995 Municipal Railway Health and Safety Study. Multivariate logistic regression analyses showed that absenteeism among drinkers was associated with risk for alcohol dependence [odds ratio (OR) = 2.46, heavy drinking (OR = 1.87), alcohol-related harm (OR = 2.17), increased drinking since becoming a transit operator (OR = 1.74), and having any problem drinking indicator (OR = 1.72). The association between absenteeism and stress-related factors varied by gender and drinking status. Final multivariate models among drinkers indicated that among males, problem drinking (OR = 1.82), stressful life events (OR = 1.62), and job burnout (OR = 1.22) were independently associated with elevated odds of absenteeism. Among female drinkers, only stressful life events (OR = 5.17) was significantly associated with elevated odds of absenteeism. Findings suggest that workplace interventions that address both individual and environmental stressors are most likely to have a positive impact on health-related outcomes, including problem drinking, thereby reducing absenteeism.*

**KEYWORDS** *Absenteeism, Alcohol, Transit operators, Occupational stress.*

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### INTRODUCTION

The purpose of this study was to determine the interrelationships between short-term absenteeism, alcohol use, and stress-related factors (i.e., stressful life events,

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job stressors, and occupational burnout) among a cohort of urban transit operators. Exploring these interrelationships is important for a number of reasons. First, recent research (see *J Occup Health Psychol*, volume 3, 1998) highlights the considerable occupational and environmental stressors (e.g., pollution, congested traffic, ergonomic problems, and competing time demands) that urban transit operators are commonly exposed to. In fact, the work of an urban transit operator may typify a high-strain occupation<sup>1</sup> in which the worker is confronted with high levels of workload demands with little decision latitude with which to cope with those demands.<sup>2</sup> Second, alcohol use among urban transit operators is known to increase with years of tenure,<sup>3</sup> and has been positively correlated with occupational stressors,<sup>4</sup> job burnout,<sup>5</sup> and with time needed to unwind after work.<sup>6</sup> Third, high rates of absenteeism have been found among urban transit operators,<sup>7-9</sup> and from the viewpoint of transit management, absenteeism is an extremely important problem for scheduling.<sup>10</sup> Absenteeism may also result in lowered efficiency, such as service delays if a replacement operator cannot be found on time, or because replacement operators may be unfamiliar with the routes they are covering.<sup>8</sup> Indeed, disciplinary action, including termination, may result from repeated episodes of absenteeism (Transport Workers Union Local 250-A President R. Antonio, personal communication, telephone conversation, July 31, 2001). Although absenteeism among urban transit operators has been associated with self-reported job stress,<sup>11,12</sup> the interrelationships between alcohol use, stress, and absenteeism have not been adequately investigated.

These issues are of particular relevance to urban health. Ragland et al.<sup>9</sup> posit that dynamic reciprocal relationships exist between the larger urban community and the transit agency, and between the transit agency and the transit operators. As such, occupational stress and the health of urban transit operators can affect the transit system, including system performance and work attendance. This can be exacerbated by external economic and political pressures that urban transit systems are often subject to, such as maintaining service in the face of decreased revenue. A vicious cycle of poor working environment, reduced health and well-being of transit operators, and lowered efficiency and increased costs can result.<sup>9</sup> Although the transit system is an integral part of the urban environment, maintaining the health and well-being of transit operators is critical for the proper functioning of the transit system. In turn, maintaining attractive and sustainable transit systems promotes public transit, helping to reduce urban congestion and improve air quality,<sup>13</sup> all of which are beneficial to urban health.

Our interest in analyzing these interrelationships grew out of our ongoing research among urban transit operators at the San Francisco Municipal Railway (MUNI). From 1983 to 1985, the MUNI Health and Safety Study focused on occupational stressors, including the association of the psychosocial and physical work environment with alcohol consumption,<sup>3</sup> hypertension,<sup>14-16</sup> and musculoskeletal injuries.<sup>17</sup> Results from the 1983-1985 survey indicated that mean alcohol consumption was moderately but significantly related to self-reported short-term absence (David Ragland, unpublished data, April 30, 1991). During the course of focus group discussions and ethnographic interviews conducted by project staff, many transit operators described a number of circumstances related to short-term (i.e., one day) absenteeism, including stress and alcohol problems. Questions about short-term absenteeism ("miss outs") were therefore included in our 1993-1995 occupational health and safety survey among MUNI transit operators to determine how these factors are interrelated.

Because short-term absence may serve as a kind of "escape mechanism" for individuals with alcohol problems, especially drinking which results in hangovers,<sup>18</sup>

we hypothesized that alcohol consumption and drinking problems would be positively associated with short-term absenteeism. Short-term absenteeism may also serve as a coping mechanism in response to occupational stress or stressful life events.<sup>19</sup> Theoretically, this view acknowledges the functional role that short-term absence may serve for the worker, as it is a type of coping behavior in response to stressful or noxious stimuli.<sup>20-22</sup> We therefore hypothesized that risk of short-term absenteeism would be higher among transit operators reporting greater levels of stress-related factors compared with workers reporting less stress. Further, we expected the strength of the associations between short-term absenteeism and stress-related factors to vary as a function of drinking status, with a greater magnitude among drinkers than abstainers. Lastly, we explored potential interactions (i.e., gender and alcohol; gender and stress; and alcohol and stress) in relation to short-term absenteeism.

## **METHODS**

### **Study Population**

The sample was drawn from transit operators employed by the San Francisco MUNI. Municipal Railway is the seventh largest public transit agency in the United States, with 700,000 boardings on an average weekday.<sup>23</sup> Vehicles operated by the agency include diesel and electric buses, electric trolleys, light rail, and historic cable cars. Data reported here were collected as part of a cross-sectional study on worksite-related alcohol consumption in urban transit operators. (For a detailed description of the study, see Ragland et al.<sup>4</sup>) Data collection activities were integrated with an ongoing medical clinic that conducts health screening of MUNI operators every 2 years for their commercial driver license renewals. All transit operators who underwent routine medical examination for driver's license renewal between August 30, 1993, and September 29, 1995, were eligible to be in the study (n=1,974). This number represented nearly the entire workforce of transit operators. Following re-licensing examination, operators were asked to complete confidential interviews about work-related stress, alcohol use, and other factors. The sample for this study consists of 1,446 (73.2%) operators for whom we had questionnaire and interview data on alcohol use, occupational factors, and short-term absenteeism. There were no gender differences between operators included in the sample and those for whom we lacked complete data (n=528). Operators who reported having at least one drink in the previous 12 months were classified as current drinkers (n=917; 63.4%); the remaining 529 operators (36.6%) were classified as abstainers. Approximately 17% of the sample is female; over half the sample (53.9%) is African American. For transit vehicles, 45% of the study participants were motor coach and articulated vehicle operators, 33% were trolley operators, 13% were light rail vehicle operators, and 8% were cable car operators.

### **Data Collection**

The first step in the data collection occurred as part of a state-mandated commercial driver's license renewal examination. Operators completed a self-reported health questionnaire, which included assessment of medical history and sociodemographic variables. The health history was reviewed with the medical examiner, and each operator received a complete physical examination. The second step in the data collection was conducted after the license renewal examination. Operators were asked

to complete a self-administered occupational and psychosocial questionnaire. This questionnaire included detailed questions on occupational factors related to job stress, as well as extensive alcohol-related variables. The questionnaires and interviews were administered after the re-licensing examination, when it was less likely that operators would perceive any relationship between our study and their employment. Operators provided informed consent for the interviews, and could choose not to answer any of the questions. The project was approved by the Institutional Review Boards at the University of California, Berkeley, the University of California, San Francisco, and the Western Consortium for Public Health.

## MEASURES

### Short-Term Absenteeism

Short-term absenteeism was operationalized as a dichotomous variable based on those who reported one or more short-term absence in the previous 12 months. As part of the study's self-administered questionnaire, operators were asked, "How many 'miss outs' did you have in the last 12 months? Write the number of miss outs in the space provided." Typically, a miss out is defined as a last-minute failure to report to work as indicated by the schedule and codified by union-management contract, necessitating the use of an immediate replacement driver or operator. The distribution of miss outs was highly skewed, with about 80% of those who had "missed out" reporting three or less occurrences. We therefore dichotomized the dependent variable into zero miss outs (0) and one or more miss outs (1). A similar dichotomized approach was taken by Greiner et al.<sup>2</sup> in a study of sickness absence among transit operators.

### Alcohol Consumption and Drinking Problems

Seven different drinking measures, derived from extensive survey questions on quantity and frequency of alcohol consumption and alcohol-related behavior, were tested in this study, including (1) mean daily ounces of ethanol; (2) heavy drinking. Because moderate drinking is typically defined as consuming not more than two drinks per day,<sup>24</sup> we categorized those drinking 15 or more standard drinks of alcohol per week as being within the lower threshold for heavy drinking; (3) drinks 5+ drinks on most occasions (a measure of heavy episodic or binge drinking); (4) risk for alcohol dependence, on the basis of the standard CAGE screener: *cut down, annoyed, guilty feeling, eye opener*.<sup>25</sup> A CAGE score of 2 or more was coded positively; (5) alcohol-related harm (consequences of alcohol consumption in the past 12 months); (6) increased drinking since becoming a transit operator; and (7) any problem drinking indicator, based on items 2–6. See Cunradi et al.<sup>5</sup> for a detailed description of items 1, 4, and 5.

### Sociodemographic Factors

Variables included gender, age, educational level, marital status, and total household income before taxes. Self-reported race/ethnicity was classified as Asian Americans (including Pacific Islanders and Filipinos), black or African American, Hispanic, white, and other (e.g., American Indian and multiethnic).

### Occupational Factors

Shift usually worked during the past 12 months was categorized as AM (runs beginning between 4 AM and noon), Twilight (runs beginning after 2 PM), Night (runs

beginning after 6 PM), Owl (runs beginning after 10 PM), and Combination. Length of employment (seniority) was categorized as up to 5 years; 5–10 years; 10–15 years; and 15+ years.

### **Stress-Related Factors**

*Past-Year Stressful Life Events* On the basis of Rahe's life-event scale,<sup>26</sup> operators were asked about the occurrence of past-year stressful life events (e.g., trouble with boss; change in health of family member; and death of a spouse or child). Responses were summed and divided into four categories: three or more events, two events, one event, or no events (reference group). For ease of interpretation, this variable was recoded into a dichotomous measure (any past-year stressful life events versus no events) for the interaction model.

*Burnout* Occupational burnout was measured using the emotional exhaustion subscale of the Maslach Burnout Inventory (MBI).<sup>27</sup> Operators were asked to rate the frequency of nine statements (e.g., "I feel emotionally drained from my work"; "I feel used up at the end of the workday"). For a complete list of questions and discussion of the MBI's properties, see Cunradi et al.<sup>5</sup> Responses were assigned numeric values from 0 (never occurs) to 6 (occurs every day), summed, and divided by 10, with each one-point increase in the odds ratio representing a 10-unit change in the burnout score.

*Frequency of Job Stressors* Operators were asked about the frequency of certain job events over the last 12 months (e.g., equipment problems, problems with fares and transfers, and too many passengers). For a complete list of events, see Winkleby et al.<sup>15</sup> Responses were assigned numeric values from zero (never) to four (daily), summed, and divided by 10. Each one-point increase in the odds ratio represents a 10-unit increase in frequency of job stressors.

*Perceived Severity of Job Stressors* Following each item on the frequency of job stressors, operators were asked how much they were bothered by each event. Responses were assigned a numeric value from 0 (not at all) to 3 (extremely), summed, and divided by 10. Each one-point increase in the odds ratio represents a 10-unit increase in perceived severity of job stressors.

### **Data Analysis**

Chi-square tests of independence were employed to analyze the relationship between short-term absenteeism and sample characteristics (Table 1). *t* Tests were conducted to assess mean differences in continuous variables between operators who did and did not report short-term absenteeism (Table 2). Among abstainers, alcohol measures were set at null values for the bivariate analyses. For current drinkers, a logistic regression model was developed to explore whether or not gender interacted with problem drinking in relation to short-term absenteeism. Next, logistic regression models were constructed to analyze the unadjusted and adjusted associations between short-term absenteeism and the six dichotomous alcohol measures (Table 3). The adjusted models controlled for age, gender, race/ethnicity, marital status, income, education, and seniority. Linear and nonlinear logistic regression models of alcohol in relation to short-term absenteeism were run using the continuous variable for mean daily ounces of ethanol. For the nonlinear model, a quadratic term

**TABLE 1. Number (%) reporting short-term absenteeism by sample characteristics, San Francisco Municipal Railway (MUNI) Health and Safety Study, 1993–1995**

Correlate	Sample size	Number (%) reporting absenteeism	$\chi^2$
Gender			
Female	249	65 (26)	3.64
Male	1,197	247 (21)	
Age			
25–34	123	31 (25)	12.81†
35–44	462	118 (26)	
45–54	626	130 (21)	
55+	226	32 (14)	
Marital status			
Married/cohabiting	939	180 (19)	10.31*
Separated/divorced	296	74 (25)	
Widowed	42	12 (29)	
Single, never married	149	42 (28)	
Race/ethnicity			
Black	779	207 (27)	31.84‡
Hispanic	185	36 (19)	
Asian/Filipino	264	28 (11)	
Other	49	10 (20)	
White	169	31 (18)	
Education			
≤High school	500	104 (21)	6.5*
Technical school/some college	758	180 (24)	
College graduate	156	23 (15)	
Income			
<\$40,000	223	73 (33)	29.87‡
\$40,000–49,000	422	100 (24)	
\$50,000–59,000	280	54 (19)	
\$60,000–69,000	147	31 (21)	
\$70,000+	320	44 (14)	
Shift			
AM	684	144 (21)	8.53
Twilight	233	55 (24)	
Night	254	72 (28)	
Owl	22	4 (18)	
Combination	190	34 (18)	
Seniority			
≤5 years	339	67 (20)	9.54*
5–10 years	277	78 (28)	
10–15 years	317	67 (21)	
15+ years	506	97 (19)	
CAGE score			
2+	48	21 (44)	14.37‡
0–1	1,396	291 (21)	
Heavy drinking			
15+ drinks per week	83	32 (39)	14.91‡
<15 drinks per week	1,351	278 (21)	

**TABLE 1. Continued**

Correlate	Sample size	Number (%) reporting absenteeism	$\chi^2$
Alcohol-related harm			
1+ areas	73	26 (36)	8.91 <sup>†</sup>
0 areas	1,371	286 (21)	
Increased drinking			
Yes	112	39 (35)	12.68 <sup>‡</sup>
No	1,332	272 (20)	
Drinks 5+ most occasions			
Yes	30	10 (33)	2.5
No	1,406	300 (21)	
Problem drinking indicators			
1+ indicators	227	76 (33)	22.55 <sup>‡</sup>
0 indicators	1,219	236 (19)	
Stressful life events			
0 events	757	128 (17)	28.47 <sup>‡</sup>
1 event	286	73 (26)	
2 events	157	42 (27)	
3+ events	171	57 (33)	

Shifts: AM, shifts between 4 AM and noon; Twilight, shifts beginning after 2 PM; Night, shifts beginning after 6 PM; Owl, shifts beginning after 10 PM. CAGE: cut down, annoyed, guilty feeling, eye opener.

\* $P < .05$ .

<sup>†</sup> $P < .01$ .

<sup>‡</sup> $P < .001$ .

**TABLE 2. Mean differences in select variables by absenteeism, San Francisco Municipal Railway (MUNI) Health and Safety Study, 1993–1995**

	Absenteeism [mean (SD)]	No absenteeism [mean (SD)]	<i>t</i>
Mean daily ounces of ethanol	0.47 (0.90)	0.26 (0.65)	3.71 <sup>†</sup>
Occupational burnout score	2.14 (1.50)	1.63 (1.40)	5.30 <sup>†</sup>
Frequency of job stressors	2.94 (1.33)	2.75 (1.28)	2.33*
Perceived severity of job stressors	1.91 (1.22)	1.75 (1.15)	2.09*

\* $P < .05$ .

<sup>†</sup> $P < .001$ .

was added to the regression model, represented as  $\log\text{-odds} = a + b_1x + b_2x^2$ , where  $x$  is mean daily ounces of ethanol. To determine whether adding the quadratic term to the model improves the description of the relationship between level of ethanol consumption and the probability of short-term absenteeism, we compared the likelihood values of the models with and without the quadratic term and computed a deviance statistic.

The next set of analyses examined the association between stress-related factors and short-term absenteeism. First, a logistic regression model was developed to test whether or not gender interacts with stress in relation to short-term absenteeism. Logistic regression models were then developed to analyze the association between short-term absenteeism and stress-related factors, with stratification by drinking

**TABLE 3. Logistic regression: unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) for short-term absenteeism and alcohol measures among current drinkers, San Francisco Municipal Railway (MUNI) Health and Safety Study, 1993–1995**

Alcohol measure	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
CAGE score $\geq 2$	2.68 (1.48–4.85) <sup>†</sup>	2.46 (1.28–4.73) <sup>†</sup>
CAGE score 0–1	1.00	1.00
Drinks 5+ drinks most occasions	1.65 (0.76–3.58)	1.32 (0.56–3.15)
Drinks <5 drinks most occasions	1.00	1.00
Drinks 15+ drinks per week	2.21 (1.38–3.54) <sup>†</sup>	1.87 (1.11–3.14)*
Drinks <15 drinks per week	1.00	1.00
1+ areas alcohol-related harm	1.90 (1.15–3.15)*	2.17 (1.26–3.75) <sup>†</sup>
0 areas alcohol-related harm	1.00	1.00
Increased drinking since becoming MUNI	1.94 (1.27–2.96) <sup>†</sup>	1.74 (1.09–2.80)*
Same/less drinking since becoming MUNI	1.00	1.00
1+ problem drinking indicators	1.99 (1.43–2.78) <sup>‡</sup>	1.72 (1.17–2.52) <sup>†</sup>
0 problem drinking indicators	1.00	1.00

Adjusted for age, gender, race/ethnicity, marital status, income, education, and seniority. CAGE: cut down, annoyed, guilty feeling, eye opener.

\* $P < .05$ .

<sup>†</sup> $P < .01$ .

<sup>‡</sup> $P < .001$ .

status and gender, and multivariate adjustment for age, race/ethnicity, marital status, income, education, and seniority (Table 4). To determine whether alcohol mediates the association between stress-related factors and short-term absenteeism among current drinkers, we regressed absenteeism onto stress-related factors using separate models for males and females, and then repeated the equation with problem drinking in the equation to assess the difference between coefficients before and after

**TABLE 4. Logistic regression: adjusted odds ratios (OR) and 95% confidence intervals (CI) for short-term absenteeism and stress-related factors, San Francisco Municipal Railway (MUNI) Health and Safety Study, 1993–1995**

	Abstainers		Drinkers	
	Females OR (95% CI)	Males OR (95% CI)	Females OR (95% CI)	Males OR (95% CI)
Stressful life events				
3+ events	0.67 (0.84–5.34)	2.90 (1.11–7.59)*	6.95 (1.63–29.69) <sup>†</sup>	1.45 (0.78–2.70)
2 events	2.53 (0.11–57.44)	0.34 (0.10–1.12)	5.01 (1.28–19.65)*	1.76 (0.94–3.27)
1 event	0.22 (0.03–1.70)	1.25 (0.53–2.98)	3.03 (0.53–17.26)	1.71 (1.07–2.72)*
0 events	1.00	1.00	1.00	1.00
Burnout score	1.61 (0.69–3.80)	1.37 (1.06–1.76)*	1.37 (0.92–2.04)	1.25 (1.06–1.48) <sup>†</sup>
Frequency of job stressors	0.94 (0.21–4.23)	1.03 (0.72–1.48)	1.35 (0.70–2.64)	0.84 (0.66–1.08)
Perceived severity of job stressors	3.17 (0.66–15.17)	0.88 (0.55–1.40)	0.65 (0.34–1.25)	0.92 (0.70–1.21)

Adjusted for age, race/ethnicity, marital status, income, education, and seniority.

\* $P < .05$ .

<sup>†</sup> $P < .01$ .



**TABLE 5. Logistic regression: adjusted odds ratios (OR) and 95% confidence intervals (CI) for short-term absenteeism, problem drinking, and stress-related factors among current drinkers, San Francisco Municipal Railway (MUNI) Health and Safety Study, 1993–1995**

Covariate	Females OR (95% CI)	Males OR (95% CI)
1+ problem drinking indicators	1.16(0.35–3.91)	1.82(1.20–2.77) <sup>†</sup>
0 problem drinking indicators	1.00	1.00
1+ stressful life events	5.17 (1.63–16.40) <sup>†</sup>	1.62(1.09–2.42)*
0 stressful life events	1.00	1.00
Burnout score	1.39(0.93–2.06)	1.22 (1.04–1.45)*
Frequency of job stressors	1.36(0.69–2.69)	0.85(0.66–1.10)
Perceived severity of job stressors	0.66(0.34–1.27)	0.90(0.68–1.20)

Adjusted for age, race/ethnicity, marital status, income, education, seniority, and all other covariates in the model.

\* $P < .05$ .

adjustment for the mediator. The final set of analyses tested whether stressful life events and problem drinking interact in relation to short-term absenteeism amongst transit operators who are current drinkers. The results of these multivariate models, presented by gender, are shown in Table 5. All statistical analyses used Statistical Package for the Social Sciences (SPSS) for Windows version 11.0.<sup>28</sup> The significance level for bivariate and multivariate analyses was set at  $\alpha = .05$ . As a conservative strategy to increase the power to detect interactions, the level of significance was set at  $\alpha = .20$ , thereby decreasing type II error.<sup>29</sup>

## RESULTS

### Univariate Analysis

Overall, 312 operators (22% of the sample) reported at least one short-term absence in the past year. Rates of short-term absenteeism (Table 1) differed significantly by all sociodemographic categories except gender. As for occupational factors, absenteeism rates differed significantly by seniority, but not by shift. In alcohol, rates of absenteeism were significantly higher among operators with positive CAGE scores, heavy drinkers, those who reported at least one area of alcohol-related harm, those who reported increased drinking since becoming a MUNI operator, and those who had at least one problem drinking indicator. There were significant differences in rates of absenteeism by number of stressful life events, with a positive linear trend observed.

The results in Table 2 indicate that operators who reported short-term absenteeism had significantly higher mean daily ethanol consumption, occupational burnout, frequency of job stressors, and perceived severity of job stressors than operators who did not report short-term absenteeism.

### Logistic Regression Analyses

*Alcohol Measures and Short-term Absenteeism* The results of a logistic regression model that was tested to determine whether or not gender interacted with problem drinking in relation to short-term absenteeism among current drinkers provided no evidence of interaction ( $P = .69$ ). Therefore, the association between alcohol and

absenteeism was modeled among all current drinkers, with multivariate adjustment for gender and other factors. The results (Table 3) indicate that five of the six dichotomous alcohol measures were significantly associated with increased risk of short-term absenteeism. For example, operators with positive CAGE scores were more likely to report absenteeism than those with CAGE scores of one or less [OR=2.46, 95% confidence interval (CI)=1.28–4.73]. Similarly, heavy drinkers were at elevated risk for absenteeism compared with operators who did not report heavy drinking (OR=1.87, 95% CI=1.11–3.14). Operators who reported at least one area of alcohol-related harm were also at elevated risk for absenteeism compared with operators who did not report any alcohol-related harm (OR=2.17, 95% CI=1.26–3.75). Those who had increased their drinking since becoming MUNI operators were at greater risk for absenteeism compared with operators whose drinking had not increased (OR=1.74, 95% CI=1.09–2.80). Lastly, operators who had any problem drinking indicators were significantly more likely to report absenteeism than operators with no problem drinking indicators (OR=1.72, 95% CI=1.17–2.52).

The results of the comparison between likelihood values for the linear and non-linear models of alcohol in relation to short-term absenteeism indicated that adding the quadratic term to the model improved the description of the alcohol-absenteeism relationship (deviance= $Y^2=849.565-840.722=8.843$ ,  $df=1$ ,  $P<.01$ ). The results of this logistic regression interaction model (alcohol  $b_1=.766$ , alcohol $\times$ alcohol  $b_2=-.112$ ) indicate that the change in log-odds or odds ratio for each unit increase in ounces of ethanol is not linear, and differs depending on the level (amount) of ethanol. For example, if a drinker who, on average, consumes about half ounce of ethanol (0.52 oz.) per day is compared to a drinker who consumes, on average, 2 oz. of ethanol per day, the decrease in the log-odds is 0.721 (OR=0.486). For a drinker who, on average, consumes 2 oz. of ethanol per day compared to a drinker who, on average, consumes 4 oz. of ethanol per day, the decrease in log-odds is 0.188 (OR=0.829). But when a drinker who, on average, consumes 4 oz. of ethanol per day is compared to a drinker who, on average, consumes 6 oz. of ethanol per day, the log-odds increase is 0.708 (OR=2.03).

*Stress-Related Factors and Short-Term Absenteeism* The results of the logistic regression model to test whether or not gender interacts with stress in relation to short-term absenteeism indicated a significant interaction ( $P=.09$ ). Therefore, stratified analysis was conducted between male and female drinkers and abstainers to model the associations between short-term absenteeism and stress-related factors (Table 4). Among female abstainers, stress-related factors were not significantly associated with absenteeism. Among male abstainers, those with three or more stressful life events were significantly more likely to report absenteeism than those with no stressful life events (OR=2.90, 95% CI=1.11–7.59), and each 10-point increase in burnout was associated with a 37% increased risk of absenteeism (OR=1.37, 95% CI=1.06–1.76). Among female drinkers, those with two past-year stressful life events were at a five-fold elevated risk for absenteeism compared to those with no stressful life events; female drinkers with three or more stressful life events were at a near seven-fold elevated risk. Among male drinkers, those with one stressful life event were significantly more likely to report absenteeism than those with no stressful life events (OR=1.71, 95% CI=1.07–2.72), and each 10-point increase in burnout score was associated with a 25% increased risk of short-term absenteeism (OR=1.25, 95% CI=1.06–1.48). Frequency and perceived severity of

job stressors were not significantly associated with elevated risk of absenteeism amongst abstainers or drinkers.

*Stress-Related Factors, Problem Drinking and Absenteeism* Our direct test of the mediating role of alcohol on the relationship between stress-related factors and short-term absenteeism through a series of models showed little attenuation in the stress-absenteeism link (data not shown). Because of stress and gender were shown to interact, separate models for males and females were developed to determine whether stressful life events and problem drinking interacted in relation to absenteeism. No interaction was detected for females ( $P=.30$ ) or males ( $P=.75$ ). The results of the final multivariate logistic regression models (Table 5) indicated that among female drinkers, having at least one stressful life event (OR=5.17, 95% CI=1.63–16.40) was independently associated with elevated odds of short-term absenteeism compared to those without stressful life events. Among male current drinkers, having at least one problem drinking indicator (OR=1.82), having at least one stressful life event (OR=1.62), and burnout (OR=1.22) were each independently associated with the likelihood of short-term absenteeism.

## DISCUSSION

The study findings that heavy drinkers, those with alcohol-related problems, and those with greater ethanol consumption were at elevated odds for short-term absenteeism were consistent with the hypothesis that short-term absenteeism may serve as an escape mechanism for workers with heavy alcohol consumption and alcohol problems. It seems plausible that operators who engage in heavy drinking, or whose drinking has resulted in alcohol-related problems, would be more likely to experience hangovers and hangover-related fatigue, which would increase the likelihood of short-term absenteeism.

Although the findings were generally consistent with the hypothesis that short-term absenteeism is a coping mechanism in response to stress-related factors, the association between absenteeism and stress-related factors varied by gender and drinking status. For example, the magnitude of association between stressful life events and absenteeism was strongest among female operators who are current drinkers and weakest among female abstainers. Occupational burnout, however, was significantly associated with absenteeism among male drinkers and abstainers, but not among females. No association was found between frequency of job stressors and absenteeism, or between perceived severity of job stressors and absenteeism, among male and female drinkers and abstainers. Our expectation that the multivariate association between absenteeism and stress-related factors would be stronger for drinkers than abstainers thus yielded inconsistent results. Although the cross-sectional study design precludes temporal ordering of these behaviors, future research should investigate the factors that may underlie the differences in findings, based on gender and drinking status, observed in this study. It may be that gender and drinking moderate the perception of stress.

This study has a number of strengths, including an analysis based on a multiethnic cohort of urban transit operators, with a sizable representation (17%) of women, and inclusion of a broad array of alcohol, occupational, and sociodemographic measures. To our knowledge, this is the first study to analyze the interrelationships between alcohol, stress-related factors, and short-term absenteeism among a multiethnic sample of urban transit operators. While we used self-reported “miss outs” as a

measure of short-term absenteeism—the precise definition of which may vary from one transit agency to the next, depending, for example, on management–union contract language—virtually all urban transit agencies, which encompass hundreds of thousands of workers, must contend with this issue. The findings are thus important for urban transit agencies and researchers seeking to gain understanding of the factors associated with short-term absenteeism and reducing its occurrence. The findings are also generalizable to other occupational groups. For example, workers in blue-collar service industries are often subject to the type of high-demand/low-control job conditions, which characterize work in the urban transit industry. Additionally, the ethnic and gender composition of the workforce in these industries is increasingly non-white and female, respectively. Given similar sociodemographic composition and environmental job conditions known to be associated with high absentee rates,<sup>30–32</sup> our findings are relevant to the study of short-term absenteeism in other blue-collar service industries.

For limitations, our analysis relied on self-report data. This raises the possibility of a spurious correlation between the dependent variable—short-term absenteeism—and stress-related factors and alcohol. Operators may have underreported alcohol consumption in relation to true consumption. If transit operators who consumed higher amounts of alcohol underreported their consumption compared to operators who consumed lesser amounts, however, this would likely result in a reduction of the observed measure of association between the alcohol variables and absenteeism (Type II error). Similarly, we were unable to conduct a test of the reliability of the job-stress variables. Again, even if reliability was low, this would most likely result in an underestimate of the measure of association between the job stress variables and absenteeism. A third limitation of the study is that we were unable to compare the self-reported rate of short-term absenteeism against company records to assess possible underreporting. Absentee records containing personal identifiers are highly confidential, and we were unable to obtain and link official absentee records from MUNI with our survey data. Despite concerns operators may have had about revealing potentially sensitive employment-related information, 22% of the sample acknowledged at least one short-term absence in the past year. When compared with data made publicly available by MUNI, the rate of unscheduled absences among transit operators (including, but not limited to “miss outs”) for Fiscal Year 1999/2000 was 14.4% (MUNI Service Standards report, June 20, 2000). This comparison supports the face validity of the short-term absenteeism rate used in this study despite the known drawbacks of using self-report data. Lastly, conducting analyses stratified by gender and drinking status (Table 4) may have reduced power, thereby limiting the ability to detect associations.

A few points about the contributory role of alcohol should be noted. Our findings indicate that heavy or problem drinkers are at elevated risk for short-term absenteeism compared with operators without alcohol problems. A few operators fall into these categories, and operators who are heavy or problem drinkers do not constitute most short-term absenteeism cases. From a prevention standpoint, workplace health promotion programs that address the benefit of not exceeding moderate levels of alcohol consumption could help reduce overall levels of alcohol consumption among drinkers, who constitute a majority of the workforce, and may make an impact on lowering rates of absenteeism.

In considering alternative explanations to the study findings, it is plausible that other factors besides alcohol and stress-related factors may be associated with short-term absenteeism—that is, childcare problems, errands or home repairs, as

shown in other studies of employee tardiness.<sup>33</sup> Nevertheless, the validity of these factors as potential correlates of short-term absenteeism does not negate or reduce the moderate but significant associations with alcohol and stress-related factors observed in this study. The findings are based on cross-sectional data and do not imply a causal relationship. Future research, based on longitudinal study design, is needed to further elucidate the associations found in this study.

In conclusion, these results are consistent with our previous findings on alcohol, stress-related factors, and adverse health and behavioral outcomes among transit operators.<sup>2,4,5</sup> Moreover, the results have important implications for prevention. As noted by Ragland and colleagues,<sup>9</sup> workplace interventions that address both individual and environmental factors are most likely to have a positive impact on the health outcomes of transit operators. Examples of individual interventions could include alcohol skills training,<sup>34</sup> aimed at lowering overall alcohol consumption levels, and stress management. Involvement of Employee Assistance Program and Union or Peer Assistance Program personnel could be enlisted to help implement these worksite health promotion strategies. Numerous environmental policies have been proposed that could reduce factors that contribute to transit operator stress,<sup>9</sup> such as dedicated transit areas, reduction of non-transit vehicles in downtown areas, transit flow strategies, and ergonomic evaluation and redesign. From the operator's perspective, an increase in flexibility of work schedules is desirable to permit scheduling of absences for personal reasons.<sup>8</sup> A supportive work environment when operators face last-minute unavoidable changes (traffic jams, critical life events) might be crucial. Monitoring systems have been suggested that include the gathering of attendance data in conjunction with organization-wide data to identify warning signs for probable understaffing and high-stress lines.<sup>8</sup> Others suggest financial incentive systems to encourage regular attendance.<sup>35,36</sup> Multilevel interventions that go beyond focusing solely on individuals may be most effective in reducing levels of alcohol consumption and problem drinking, increasing coping ability, optimizing the health and well-being of transit operators, and thereby lowering short-term absenteeism rates.

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