# Prevalence and Consequences of Smoking, Alcohol Use, and Illicit Drug Use at Five Worksites

By: Michael T. French, Gary A. Zarkin, Tyler D. Hartwell, Jeremy W. Bray

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## Abstract:

EMPLOYERS ARE BECOMING increasingly concerned about the consequences and costs of substance use in their workplaces. Despite this heightened awareness, little information is available to guide them in setting up worksite-based prevention and assistance programs. Most estimates of the prevalence or consequences of substance use are derived from large national surveys of households or individual persons.

The primary contribution of this research to the public health literature is the empirical results from a unique data set. In particular, this study presents results of a survey administered to more than 1,200 employees at five different worksites. Descriptive statistics for the prevalence of smoking, alcohol and illicit drug use, prescription drug misuse, and workplace consequences, such as reduced performance and absenteeism, are reported, as well as findings from a multivariate analysis of substance use prevalence and consequences.

Compared with national averages, workers at these five sites tended to have substance use profiles similar to or slightly lower than estimates from large national surveys. The study's estimates may help employers identify the extent of a substance abuse problem in their worksites and specific areas to target for possible intervention.

**Keywords:** substance use | worksite-based prevention and assistance programs | cost | workplace

## Article:

*****Note: Full text of article below**

*Michael T. French, PhD*
*Gary A. Zarkin, PhD*
*Tyler D. Hartwell, PhD*
*Jeremy W. Bray, MA*

All the authors are with Research Triangle Institute; Dr. French in Washington, DC, the others in Research Triangle Park, NC. Dr. French, Dr. Zarkin, and Mr. Bray are with the Institute's Center for Economics Research. Dr. Hartwell is with the Center for Medical, Environmental, and Energy Statistics.

*Tearsheet requests to Michael T. French, PhD, Center for Economics Research, Research Triangle Institute, 1615 M St., NW, Suite 740, Washington, DC 20036; tel. 202-728-2052; FAX 202-728-2095.*

# Prevalence and Consequences of Smoking, Alcohol Use, and Illicit Drug Use at Five Worksites

*SYNOPSIS*

**EMPLOYERS ARE BECOMING increasingly concerned about the consequences and costs of substance use in their workplaces. Despite this heightened awareness, little information is available to guide them in setting up worksite-based prevention and assistance programs. Most estimates of the prevalence or consequences of substance use are derived from large national surveys of households or individual persons.**

**The primary contribution of this research to the public health literature is the empirical results from a unique data set. In particular, this study presents results of a survey administered to more than 1,200 employees at five different worksites. Descriptive statistics for the prevalence of smoking, alcohol and illicit drug use, prescription drug misuse, and workplace consequences, such as reduced performance and absenteeism, are reported, as well as findings from a multivariate analysis of substance use prevalence and consequences.**

**Compared with national averages, workers at these five sites tended to have substance use profiles similar to or slightly lower than estimates from large national surveys. The study's estimates may help employers identify the extent of a substance abuse problem in their worksites and specific areas to target for possible intervention.**

Data from the National Household Survey on Drug Abuse indicate that the prevalence of any illicit drug use for the U.S. household population ages 18 or older was 15.80 percent in 1991. Estimated prevalence of past-year smoking was 34.97 percent, and estimated prevalence of past-month heavy alcohol use—defined as drinking five or more drinks per occasion on 5 or more days in the past 30 days—was 7.28 percent (*1*). Although national prevalence estimates provide an overview for the household population, relatively little is known about the extent of substance use and its potential consequences at individual worksites (*2*).

In this paper, we examine the prevalence of smoking, alcohol use, illicit drug use, and prescription drug misuse and describe the corresponding labor market consequences at five worksites, using self-reported data from 1,262 employees. In the following section we describe our research methods, which include the data collection protocol and estimation techniques. The next section contains the descriptive and multivariate statistics for substance use prevalence and adverse workplace consequences. In the final section we summarize our findings and discuss the policy implications.

## Methods

The data for this study were collected from a sample of randomly selected employees at each of five worksites. We administered the questionnaire to employees at the first worksite in late 1991, to the second and third worksites in mid-1992, and to the fourth and fifth worksites in early 1993. The data collection instrument was approximately 30 pages long, and most people took 30 to 45 minutes to answer the questions. (A copy of the full questionnaire is available from the authors.)

Confidentiality protection was an important condition during the administration of our employee questionnaire. We worked closely with staff members from each worksite to develop procedures whereby employees would feel confident that their answers would not be made available to management and that no person could be traced to a particular set of answers. We began by informing the selected employees by letter about the survey and the procedures we were following. We hired a trained survey administrator to conduct sessions at the worksites with no more than 25 employees at any one time. The workers were given a questionnaire and a pencil and instructed not to write their names on any part of the booklet. All completed questionnaires were deposited in a community box after each session and mailed to us the following day. Very few people communicated any concern to us (either in writing or orally) about confidentiality or protection from employers.

Although the survey respondents were assured of anonymity, managers asked us not to release the raw data for external analysis because of the sensitive nature of the questions and the possibility that companies could be identified. Thus, we cannot disclose company names or exact locations, nor can we provide the analysis files to other researchers without the permission of individual worksites. We will refer to them as Worksites 1, 2, 3, 4, and 5. We chose them primarily because each company fully supported our research design and analysis plans and allowed employees time away from work to complete the questionnaire. Most employees at each site completed the survey in person with the assistance of our survey coordinator; those employees who were unavailable for the on-site administration period mailed their responses.

**Table 1. Characteristics of five worksites**

| Worksite number and type | Location | Total employees | Sample size | Percentage response rate |
|---|---|---|---|---|
| 1 Manufacturing-service | South | 6,000 | 444 | 92 |
| 2 Manufacturing | Northeast | 1,600 | 300 | 65 |
| 3 Municipal government | Midwest | 250 | 220 | 88 |
| 4 Financial services | Midwest | 3,000 | 400 | 66 |
| 5 Health care services | Midwest | 3,750 | 300 | 68 |

Table 1 provides an overview of the type of industry, location, size, and response rate at each site. Because we selected the worksites primarily on the basis of their mature employee assistance programs and their support of our research, they are not nationally representative.

Table 2 presents demographic and job characteristics for each worksite. In addition to offering descriptive statistics, we tested for statistically significant differences in variable means across sites. Because some of the continuous variables in table 2 are asymmetrical or have multiple modes, we used a rank-order transformation and tested for differences in their overall distributions using the Kruskal-Wallis test for k independent samples. The Kruskal-Wallis test is an extension of the Wilcoxon-Mann-Whitney rank-order test. For dichotomous variables we used the Pearson chi-square test to explore differences in variable means across sites. Variables with any significant cross-site differences are indicated with a footnote in the table.

**Table 2. Variable means for worker demographics and job characteristics**

| Variable | Site 1 (N=408) | SE | Site 2 (N=195) | SE | Site 3 (N=194) | SE | Site 4 (N=262) | SE | Site 5 (N=203) | SE |
|---|---|---|---|---|---|---|---|---|---|---|
| Age (years)[1] | 42.50 | 0.50 | 40.87 | 0.70 | 39.64 | 0.86 | 38.52 | 0.64 | 39.37 | 0.76 |
| Male[2] | 0.67 | 0.02 | 0.81 | 0.03 | 0.64 | 0.03 | 0.39 | 0.03 | 0.12 | 0.02 |
| White[2] | 0.97 | 0.01 | 0.96 | 0.01 | 0.96 | 0.01 | 0.63 | 0.03 | 0.88 | 0.02 |
| Grade[1] | 14.33 | 0.10 | 14.05 | 0.16 | 14.01 | 0.14 | 14.90 | 0.14 | 14.17 | 0.15 |
| High school diploma, GED | 0.99 | 0.004 | 0.97 | 0.01 | 0.98 | 0.01 | 0.98 | 0.01 | 0.97 | 0.01 |
| Married[2] | 0.79 | 0.02 | 0.83 | 0.03 | 0.67 | 0.03 | 0.61 | 0.03 | 0.76 | 0.03 |
| Full-time[2] | 1.00 | 0.00 | 1.00 | 0.00 | 0.98 | 0.01 | 0.96 | 0.01 | 0.68 | 0.03 |
| Tenure (years)[1] | 17.26 | 0.49 | 11.44 | 0.68 | 6.40 | 0.42 | 12.66 | 0.55 | 8.34 | 0.51 |
| Annual salary[1] | $45,477 | 1,458 | $45,080 | 1,105 | $32,837 | 779 | $44,460 | 1,857 | $26,223 | 1,173 |
| Fair or poor health | 0.06 | 0.01 | 0.03 | 0.01 | 0.05 | 0.02 | 0.07 | 0.02 | 0.07 | 0.02 |
| Days absent past year[1] | 7.22 | 1.47 | 9.20 | 2.13 | 6.29 | 0.90 | 4.55 | 0.50 | 5.28 | 0.94 |
| Dissatisfied with job[2] | 0.05 | 0.01 | 0.12 | 0.02 | 0.13 | 0.02 | 0.14 | 0.02 | 0.14 | 0.02 |

[1]Statistically significant differences in means across sites at the 0.05 level (Kruskal-Wallis rank-order test).

[2]Statistically significant differences in means across sites at the 0.05 level (Pearson chi-square test).

NOTE: SE = standard errors.

**Table 3. Prevalence of smoking, alcohol use, illicit drug use, and prescription drug misuse by worksite**

| Variable | Site 1 (N=408) | SE | Site 2 (N=195) | SE | Site 3 (N=194) | SE | Site 4 (N=262) | SE | Site 5 (N=203) | SE |
|---|---|---|---|---|---|---|---|---|---|---|
| Cigarettes: | | | | | | | | | | |
| Any use in past year | 0.26 | 0.02 | 0.25 | 0.03 | 0.26 | 0.03 | 0.19 | 0.02 | 0.23 | 0.03 |
| Smoked 1 pack or more per day in past year[1] | 0.19 | 0.02 | 0.17 | 0.03 | 0.16 | 0.03 | 0.08 | 0.02 | 0.12 | 0.02 |
| Alcohol: | | | | | | | | | | |
| Abstainer in past year[1] | 0.27 | 0.02 | 0.11 | 0.02 | 0.14 | 0.03 | 0.11 | 0.02 | 0.17 | 0.03 |
| Daily drinker in past year[1,2] | 0.07 | 0.01 | 0.14 | 0.02 | 0.11 | 0.02 | 0.15 | 0.02 | 0.05 | 0.02 |
| Heavy drinker in past year[1,3] | (4) | | 0.07 | 0.02 | 0.08 | 0.02 | 0.05 | 0.01 | 0.02 | 0.01 |
| Total number of drinks in past year[5,6] | 83 | 9.88 | 192 | 29.33 | 158 | 23.36 | 164 | 16.85 | 64 | 9.42 |
| Illicit drugs: | | | | | | | | | | |
| Used any drug in past year[1] | 0.03 | 0.01 | 0.06 | 0.02 | 0.04 | 0.01 | 0.08 | 0.02 | 0.04 | 0.01 |
| Ever used in lifetime[1] | 0.27 | 0.02 | 0.46 | 0.03 | 0.30 | 0.03 | 0.43 | 0.03 | 0.37 | 0.03 |
| Used any drug 6 or more times in lifetime[1] | 0.15 | 0.02 | 0.36 | 0.03 | 0.17 | 0.03 | 0.28 | 0.03 | 0.19 | 0.03 |
| Used any drug 6 or more times in past year | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 | 0.01 | 0.01 |
| Prescription drugs: | | | | | | | | | | |
| Misuse in past 12 months[1] | 0.17 | 0.02 | 0.13 | 0.02 | 0.12 | 0.02 | 0.23 | 0.03 | 0.19 | 0.03 |

[1]Statistically significant differences in means across sites at the 0.05 level (Pearson chi-square test).

[2]Defined as drinking 20 or more days per month, on average.

[3]Defined as drinking five or more drinks per occasion on 5 or more days per month.

[4]Variable not available for Worksite 1.

[5]Defined as the product of the estimated number of days in past year that the respondent drank alcohol and the average number of drinks the respondent drank per occasion.

[6]Statistically significant differences in means across sites at the 0.05 level (Kruskal-Wallis rank-order test).

NOTE: SE = standard error.

The workers in our sample are predominantly white, well educated, and married. Average compensation and tenure is relatively high, but average age is about the same as national averages reported in the 1992 Statistical Abstract of the United States (*3*). Only a small percentage of workers claimed to be in fair or poor health, which is reflected in the fact that the average number of sick days taken during the previous year was less than 10 at all sites.

Self-reported job dissatisfaction varied across worksites ranging from a high of 14 percent dissatisfied at Worksites 4 and 5 to a low of 5 percent dissatisfied at Worksite 1. Part of the reason for the relatively low job dissatisfaction rate at Worksite 1 may be attributed to the importance of this worksite to the community. It is clearly the largest employer in the area, and discussions with employees during the site visits indicated that jobs at this company are generally higher paying and more desirable than other positions in the community.

Our analysis of the prevalence and consequences of substance use involves both a descriptive and a multivariate component. The descriptive component first calculates and compares mean values for the prevalence of substance use for all five worksites. A similar calculation and comparison is performed for the measures of substance use consequences. The multivariate analysis uses single-equation regression techniques to estimate the relationship between worker demographics and consequences of substance use. It is important to note that both the descriptive and multivariate estimates provide information on central tendencies and relationships between variables, but the findings cannot be used to infer causality.

## Results

In our employee survey, respondents were asked to report their use of cigarettes, alcohol, prescription drugs, and illicit drugs during the past year and throughout their lifetime. Our focus is on past-year use of cigarettes, alcohol, and prescription drugs and both past-year and lifetime use of illicit drugs as reported in table 3. Past-year prevalence estimates of cigarette use are very similar across worksites at approximately 24 percent of respondents. The estimates drop below 20 percent when smoking is defined as one pack or more per day in the past year, with a range across worksites from 8 to 19 percent.

Turning to alcohol and other drug use, Worksites 1 and 5 generally had lower prevalence than the other worksites. Twenty-seven percent of respondents from Worksite 1 abstained from consuming alcohol during the past year and 97 percent reported no illicit drug use during this period. At Worksite 5, 17 percent of respondents drank no alcohol during the past year and 96 percent reported no illicit drug

use during the same period. The other three worksites had abstention rates of around 12 percent for alcohol and 94 percent for illicit drugs during the past year. Worksites 1 and 5 are both located in relatively rural communities compared with the other three worksites, which may explain some of the differences in the prevalence of alcohol and illicit drug use.

To gain additional information on the quantity and frequency of alcohol use, we multiplied the reported number of days in the past year that the respondent consumed any alcohol and the typical number of drinks the respondent consumed per occasion to create a measure of the total number of drinks consumed per person during the past year. The mean per-person estimates range from a low of 64 drinks per year at Worksite 5 to a high of 192 drinks per year at Worksite 2. Conditional on drinking some alcohol during the past 12 months, the estimates increase to a low of 77 drinks per year at Worksite 5 and to a high of 216 drinks per year at Worksite 2.

The estimated prevalence of illicit drug use at these worksites appears to be slightly lower than the estimates from the latest National Household Survey on Drug Abuse (*1*). For example, more than 25 percent of all respondents at each worksite reported some amount of illicit drug use in their lifetime, with a high of 46 percent at Worksite 2. This compares with a lifetime prevalence estimate of 46.6 percent for full-time employees older than age 18 in the household population who were sampled in 1991 (*1a*). As expected, much of the reported lifetime use in our sample is casual or experimental, judging from the fact that the estimates drop considerably when we consider only respondents who used any illicit drug six or more times in their lifetime. Similarly, the prevalence rate for any past-year illicit drug use is about 5 percent across worksites, which is significantly lower than the National Household Survey on Drug Abuse estimate of 13.10 percent for full-time employees (*1b*). Our estimates drop to about 1 percent if we include only workers who used any illicit drug six or more times during the past year.

The last item in table 3 reports the prevalence of any prescription drug misuse. This measure includes activities such as using a prescribed medication for nonmedical reasons or using higher doses than prescribed. Our results show that prescription drug misuse varies between 12 and 23 percent among worksites.

In an effort to examine the multivariate relationships between substance use and worker demographics, we estimated logit models of the probability of substance use. In general, we found few significant relationships and therefore present only a brief summary of the results. A full set of results is available from the authors.

We found that older, single, and less educated people are more likely to smoke and that better educated people and white men are most likely to have consumed alcohol daily in the past year. We also found weak evidence that nonwhites are slightly more likely to have reported illicit drug use in the past year than are whites, and women and workers in fair to poor health are slightly more likely to have reported nonmedical use of prescription drugs in the past year than males and people with better health status.

Substance use by itself would not be nearly the social or public health problem it is without the adverse consequences it imposes on users, employers, and other members of society (*4–6*). We were unable to examine the full range of consequences in terms of health, family, and crime attributable to substance use through our employee survey, but table 4 presents information on workers' self-reported impact of substance use on worksite performance and other factors. The six workplace consequences variables were derived from responses to the questions in the box. We organized the workplace consequences into two categories—those associated with alcohol use and those associated with illicit drug use. It should be noted that the estimates in each category are conditional on using alcohol or illicit drugs during the past year.

Looking at the alcohol-related consequences in table 4, we see that approximately 20 percent of the drinkers at each site, except Worksites 1 and 5, reported poor performance because of alcohol use during the past year. Only 9 percent of the drinkers in Worksite 1 and 5 reported poor performance from alcohol use. Although poor performance could be a significant problem, fewer than 10 percent of drinkers at each site indicated that they were tardy, absent, or that they left work early because of alcohol use. In addition, none of the respondents reported being hurt in an accident because of alcohol use, and only about 1 percent or less revealed that they were high at work during the past year. Some people at each site except Worksite 5 admitted that they currently need help for a drinking problem with a range from 1 percent of drinkers at Worksite 2 to 4 percent of drinkers at Worksite 4.

With the exception of Worksite 1, the reporting of workplace consequences from illicit drug use tended to be somewhat lower for most categories than the consequences reported for alcohol use, with more variation across sites. For example, 24 percent of past-year illicit drug users in Worksite 1 reported a performance decline from drug use, but only 6 percent of drug users in Worksite 2 and none in Worksite 5 disclosed a performance decline. About 10 percent of illicit drug users in Worksites 1 and 4 reported having an attendance problem last year because of drug use, but no users in Worksites 2, 3, or 5 reported having this problem. Similarly, between 5 and 10 percent of users in Worksites 1, 3, and 5 reported that they were high at work, but none of the past-year users in Worksites 2 and 4 reported being high at work. Lastly, a fairly large percentage of illicit drug users (that is, between 22 and 42 percent across sites) reported that they had a drug problem in need of immediate help. It is important to note, however, that many of the incidence estimates for illicit drug use consequences involve very small sample sizes for individual worksites.

The data reported in tables 3 and 4 can be used easily to convert the conditional estimates in table 4 to unconditional

**Table 4. Variable means for self-reported workplace consequences due to alcohol and illicit drug use by worksite, conditional on substance use in the past year[1]**

| Variable | Site 1 | SE | Site 2 | SE | Site 3 | SE | Site 4 | SE | Site 5 | SE | Total | SE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alcohol | | | | | | | | | | | | |
| (N[2]) | 286 | ... | 163 | ... | 164 | ... | 229 | ... | 162 | ... | 1,004 | ... |
| Poor performance[3] | 0.09 | 0.02 | 0.18 | 0.03 | 0.20 | 0.03 | 0.20 | 0.03 | 0.09 | 0.02 | 0.14 | 0.01 |
| Tardy or left early[3] | 0.03 | 0.01 | 0.06 | 0.02 | 0.07 | 0.02 | 0.08 | 0.02 | 0.02 | 0.01 | 0.05 | 0.01 |
| Absent[3] | 0.02 | 0.01 | 0.04 | 0.02 | 0.09 | 0.02 | 0.02 | 0.01 | 0.04 | 0.02 | 0.04 | 0.01 |
| Hurt in accident | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| High at work | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.002 |
| Need help now | 0.02 | 0.01 | 0.01 | 0.01 | 0.03 | 0.01 | 0.04 | 0.01 | 0.00 | 0.00 | 0.02 | 0.004 |
| Illicit drugs[4] | | | | | | | | | | | | |
| (N[2]) | 21 | ... | 16 | ... | 10 | ... | 27 | ... | 12 | ... | 86 | ... |
| Poor performance | 0.24 | 0.10 | 0.06 | 0.06 | 0.10 | 0.10 | 0.07 | 0.05 | 0.00 | 0.00 | 0.10 | 0.03 |
| Tardy or left early | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.05 | 0.00 | 0.00 | 0.05 | 0.02 |
| Absent | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.02 | 0.02 |
| Hurt in accident | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| High at work | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.10 | 0.00 | 0.00 | 0.08 | 0.08 | 0.04 | 0.02 |
| Need help now | 0.33 | 0.11 | 0.25 | 0.11 | 0.40 | 0.16 | 0.22 | 0.08 | 0.42 | 0.15 | 0.30 | 0.05 |

[1]These rates are for self-reported consequences of alcohol and illicit drug use in the past year for those respondents who indicated any use in the past year. Because each respondent could report more than one of the behaviors listed, the categories are not mutually exclusive. In addition, some of the conditional estimates for illicit drugs include a relatively small number of people. See box for a list of the questions that were used to derive the variables.

[2]The sample sizes provided are the number of alcohol (illicit drug) users at each site. Because of varying item response rates, each table cell can potentially have a different sample size.

[3]Statistically significant differences in means across sites at the 0.05 level (Pearson chi-square test).

[4]We tested for significant differences across sites in the means of the illicit drugs variables using Fisher's exact test. We found no significant differences.

NOTE: SE = standard errors.

estimates. For example, 86 percent of the workers (that is, the compliment of abstainers or 1−0.14) at Worksite 3 drank alcohol during the past year. Since 20 percent of these drinkers reported poor performance due to alcohol use, then 17 percent (0.86 multiplied by 0.20) of all respondents at this worksite reported poor performance because of alcohol use.

To examine further the relationship between substance use and adverse consequences, we conducted multivariate analyses using logit models. A complete model of substance use would consist of a system of equations that treated both substance use and substance-use-related consequences as endogenous variables. Unfortunately, our data are not rich enough to provide variables that could serve plausibly as identifying instruments in estimating such a model. Because we lacked the necessary instruments to estimate a system of equations, we estimated single-equation models with a sample that is conditional on past-year substance use.

Data limitations further constrained our analysis in two other ways. First, to ensure the asymptotic properties of the logit estimates (that is, consistency and efficiency), we combined the data across all sites. Although we recognize the potential bias this might cause as a result of underlying differences between the sites, we feel that site-specific models would result in sample sizes too small to ensure asymptotic properties of the resulting estimates. Second, even after combining data across sites, the low prevalence rate of any illicit drug use and the low incidence rates of both illicit drug and alcohol use consequences forced us to examine only poor job performance due to alcohol as a dependent variable.

To control for the level of alcohol use in our job performance equations, we included an estimate for the total number of drinks consumed by a person during the past year. When we examined the distribution of the number of drinks per year, we discovered several outliers that skewed the distribution considerably. To examine the role these outliers played in our results, we estimated several models. First, we estimated our model with all observations. Second, we dropped all observations with more than 1,460 drinks per year, or 4 drinks per day. This criterion led to the deletion of seven observations. Third, we dropped all observations with an estimated drinks-per-year value that was more than three standard deviations above the mean, or 925 drinks per year. Applying this cutoff caused us to drop 26 observations. Although the quantitative results varied, the qualitative results were essentially the same for all three models, so we only report estimates from the equations that included all observations. The full set of results is available on request.

Table 5 presents the results from a multivariate analysis of the likelihood of reporting poor job performance due to alcohol use in the past year. We report the coefficient estimates on the number of drinks per year for a linear, quadratic, and cubic model in the top half of table 5. Included in these models but not reported in the table is the full set of standard human capital variables (that is, age, race, education, and so on). A full set of regression results is available from the authors. Each of the job performance models shows that the effect of the number of drinks per year is small but highly significant and positive. The bottom half of Table 5 reports the predicted probability of poor job perfor-

mance at several levels of drinks per year. Small shifts in the number of drinks per year produce relatively small changes in the probability of poor job performance.

Although all three models predict a positive relationship between drinking and poor job performance, they each predict a different shape to this relationship. The linear model predicts a constantly increasing relationship, but the quadratic model predicts an inverse-U relationship with the probability of poor performance declining after a certain point. The cubic model predicts an overall increasing relationship but suggests a "flat spot" in the middle. When our results are applied to the upper tail of the drinking distribution, the various models predict divergent probabilities, and the exact locations of the "turning points" for the quadratic and cubic models are sensitive to the use of the outlier criteria described previously. Because more than 95 percent of our data lie below 1,000 drinks per year, however, we can conclude that all three models provide the same qualitative result—increased drinking leads to an increased probability of reporting poor job performance due to alcohol—within a wide range of data.

## Discussion

Most estimates of the prevalence or consequences, or both, of substance use are derived from large national surveys of households or individual persons (*7,8*). The primary contribution of this research to the public health literature is the empirical results from a unique data set. We collected detailed descriptive data on the use of cigarettes, alcohol, and other drugs by a random sample of employees at five worksites. We also obtained information on self-reported workplace consequences of alcohol and illicit drugs during the past year, including poor performance, absenteeism, and accidents. These data are particularly useful to employers and public health officials as they grapple with the design of prevention and treatment programs to reduce the prevalence of substance abuse in the workplace.

Calculated over the full sample, the most important descriptive findings can be summarized as follows: About 15 percent of these workers are heavy cigarette smokers—one or more packs per day in the past year. The vast majority of workers consumed some alcohol during the past year, but fewer than 11 percent were daily drinkers, and about 6 percent were heavy drinkers. We estimated that the average annual consumption per respondent was 125 drinks per year, which corresponds to about 2.5 drinks per week. More than 35 percent of workers used illicit drugs at least once in their lifetime, but much of this use could be classified as experimental. Past-year illicit drug use was reported by about 5 percent of all respondents. In contrast, about 17 percent of all respondents reported situations that imply prescription drug misuse.

The only workplace consequence reported by more than 10 percent of substance users was poor performance. Eighteen percent of alcohol users and 12 percent of illicit drug users noted that their performance declined due to alcohol or illicit drug use. Absenteeism and accidents due to substance use and working while high were reported by fewer than 10 percent of respondents at each site. Finally, fewer than 3 percent of alcohol users feel that they currently need help for a drinking problem, but more than 30 percent of illicit drug users feel that they have a problem in need of immediate help.

The demographic variables and personal characteristics in our data set did not show a strong multivariate relationship with the substance use variables. Smokers tended to be older and single, daily drinkers tended to be white men and better educated, and illicit drug users tended to be nonwhite; but most of the demographic variables were not statistically different from zero when included in logit models predicting substance use.

Using logit models to predict the probability of reporting a decline in job performance due to alcohol consumption, we found that alcohol consumption had a statistically significant and positive impact on performance declines. In

**Table 5. Estimation results from logit models predicting poor job performance due to alcohol use**

| Variables | Linear model | Quadratic model | Cubic model |
|---|---|---|---|
| Drinks per year | .[1]0.003 | [1]0.008 | [1]0.010 |
| Drinks per year squared | ... | -[1]3.56E-6 | -[1]6.18E-6 |
| Drinks per year cubed | ... | ... | [1]9.25E-10 |
| Chi square | [1]196.62 | [1]260.51 | [1]266.79 |
| Pseudo *R* squared | 0.257 | 0.340 | 0.348 |
| Predicted probabilities: | | | |
| 1 drink per year | 0.004 | 0.005 | 0.003 |
| 25 drinks per year | 0.005 | 0.006 | 0.004 |
| 100 drinks per year | 0.006 | 0.010 | 0.007 |
| 500 drinks per year | 0.018 | 0.095 | 0.079 |
| 1,000 drinks per year | 0.073 | 0.282 | 0.184 |

[1]Statistically significant at the 0.01 level.

NOTE: N = 922; mean of dependent variable = 0.142.

### Questions About Alcohol Use in the Worksite Survey Instrument

(*Requires yes or no answers*)

1. I worked below my normal level of performance due to drinking, a hangover, or an illness caused by drinking.
2. I was late for work or left early because of drinking, a hangover, or an illness caused by drinking.
3. I did not come to work at all because of a hangover, an illness, or a personal accident caused by drinking.
4. I was hurt in an on-the-job accident caused by my drinking.
5. I was drunk or "high" at work because of drinking.
6. I was called in during off hours and reported to work feeling drunk or high from alcohol.
7. I need help now for a problem related to my drinking.

addition, the relationship appears to be nonlinear. Although alcohol consumption displayed a statistically significant and positive relationship with the probability of a performance problem, the size of the differential was relatively small across drinking categories.

When using these findings to formulate recommendations for substance abuse programs and workplace policy, it is important to recognize some data limitations. For example, the samples are not typical of most full-time workers in some demographic categories, the data are self-reported rather than abstracted from reliable records, and it is somewhat risky to generalize from a sample of five worksites. Nevertheless, our results offer some unique information for program planners. Workers in these five sites tended to have substance use profiles similar to or slightly lower than estimates from national surveys on households and individual persons (*1*).

Despite the low reporting of most adverse workplace consequences from substance use, a significant percentage of past-year illicit drugs users felt that they needed help for a substance use problem. Past-year alcohol users were more likely to report a performance decline than drug users, but were much less likely to feel that they have a substance abuse problem. Given these apparent cases of problem denial for some alcohol users and admitted problems for many illicit drug users, employees at these worksites could potentially benefit from alcohol education and substance abuse counseling delivered through an employee assistance program. If these programs are effective in treating addiction and reducing the workplace consequences from substance abuse, they may justify the program cost to employers and return additional benefits to workers and society.

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