

# Alcohol and Drug Use Disorders Among Adults in Emergency Department Settings in the United States

Li-Tzy Wu, ScD, Marvin S. Swartz, MD, Zunyou Wu, PhD, MD, Paolo Mannelli, MD, Chongming Yang, PhD, Dan G. Blazer, PhD, MD

From the Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC (L.-T. Wu, Swartz, Mannelli, Blazer); the National Center for AIDS/STD Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China (Z. Wu); and the Social Science Research Institute, Duke University, Durham, NC (Yang).

**Study objective:** Improving identification and treatment for substance use disorders is a national priority, but data about various drug use disorders encountered in emergency departments (EDs) are lacking. We examine past-year substance use and substance use disorders (alcohol, 9 drug classes) among adult ED users. Prevalences of substance use and substance use disorders among ED nonusers are calculated for reference purposes.

**Methods:** Using data from the 2007 to 2009 National Surveys on Drug Use and Health, we assessed substance use disorders among noninstitutionalized adults aged 18 years or older who responded to standardized survey questions administered by audio computer-assisted self-interviewing methods.

**Results:** Of all adults (N=113,672), 27.8% used the ED in the past year. ED users had higher prevalences than ED nonusers of coexisting alcohol and drug use (15.2% versus 12.1%), drug use (any drug, 16.9% versus 13.0%; marijuana, 12.1% versus 9.7%; opioids, 6.6% versus 4.1%), and alcohol or drug disorders (11.0% versus 8.5%). Among substance users, the ED group on average spent more days using drugs than the non-ED group; ED users manifested higher conditional rates of substance use disorders than ED nonusers (alcohol or drugs, 15.9% versus 11.7%; marijuana, 16.6% versus 13.2%; cocaine, 33.2% versus 22.3%; opioids, 20.6% versus 10.0%; stimulants, 18.6% versus 9.2%; sedatives, 35.0% versus 4.4%; tranquilizers, 12.4% versus 5.2%). Regardless of ED use status, substance-using young adults, men, and less-educated adults showed increased odds of having a substance use disorder.

**Conclusion:** Drug use is prevalent and combined with high rates of drug use disorders among drug users treated in the ED. [Ann Emerg Med. 2012;60:172-180.]

Please see page 173 for the Editor's Capsule Summary of this article.

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## INTRODUCTION

### Background

The National Drug Control Strategy and the Patient Protection and Affordable Care Act of 2010 emphasize early identification of individuals with a substance use disorder and integration of treatment with medical settings.<sup>1,2</sup> Substance-related accidents often result in admissions to emergency departments (EDs).<sup>3,4</sup> ED settings thus can provide “a window of opportunity” for screening to facilitate the integration of substance use disorder treatment with mainstream medical care. According to the Drug Abuse Warning Network, about 2.1 million ED visits in 2009 involved drug misuse or abuse (1,244,679 visits, prescription drugs; 973,591 visits, illicit drugs; 1,377,342 visits, alcohol or drugs).<sup>5</sup> Substance-using ED patients are likely to constitute a severe subset, and their contact

with medical providers may trigger recognition of a substance problem or motivation to change.<sup>6</sup>

### Importance

Because of competing priorities in the ED, substance use—especially of illicit or nonmedical drugs—is not screened routinely; substance use disorders are reported to be underdetected or undertreated.<sup>3,7,8</sup> A statewide survey in Tennessee estimated that 27% of ED patients needed substance abuse treatment, but only 3.3% of those in need received it.<sup>8</sup> Patients with unmet treatment needs have increased odds for hospital admission during ED visits, thus generating higher costs than those receiving substance use disorder treatment.<sup>9</sup> Although substance use is considered prevalent in the ED, no representative data exist that describe the extent of use or the disorders for various drugs among ED users.

**Editor's Capsule Summary***What is already known on this topic*

Annually, more than 2 million people visit the emergency department (ED) for consequences of substance use. This number is increasing, particularly for the nonmedical use of prescription drugs.

*What question this study addressed*

This national cross-sectional survey evaluated more than 100,000 people to determine population rates of substance use and their association with ED use.

*What this study adds to our knowledge*

People with 3 or more ED visits were more likely to use drugs (21%) than those who did not access the ED (13%). Substance use disorders were associated with being male, younger, less educated, and single.

*How this is relevant to clinical practice*

Although these findings do not directly affect care, they provide guidance about who might be screened for substance abuse.

Furthermore, little is known about whether universal screening for all drugs is a reasonable approach and whether certain demographic groups should receive more attention than others. Because results of hospital cases of substance users do not consider the denominator (at-risk population), they provide inadequate information about the prevalences or burdens of substance use and substance use disorders for diverse drugs and demographic groups.<sup>5</sup> To identify substance classes that warrant research to evaluate screening strategies, substance use prevalences in the population of ED users and comparative likelihood of having a substance use disorder among users of the substance (conditional prevalence of a substance use disorder) must be determined systematically to allow valid comparison across substances.<sup>10</sup>

To date, screening and intervention efforts have focused primarily on alcohol problems despite that illicit or nonmedical drugs are often combined with alcohol and involved in the majority of drug-related ED visits.<sup>11-13</sup> Because of scarcity of data, the US Preventive Services Task Force has not recommended routine screening for drug problems. To achieve the goal of increasing substance abuse treatment under health care reform (eg, routine screening for substance use, early intervention) and respond to an epidemic of nonmedical prescription opioid use in the United States (to which significant increases in drug-related ED admissions may be attributed),<sup>14-17</sup> systematic data on the extent of different substance use disorders and at-risk groups found in the ED are needed to inform research on screening of substance use and assessments of substance use disorders among substance users (the design of clinical trials to evaluate screening foci and resources).<sup>18,19</sup>

The lack of research on routine screening and intervention for drug-related problems to guide the development of screening guidelines partly relates to the fact that such research must consider 9 major illicit or prescription drug classes (marijuana, inhalants, cocaine, hallucinogens, heroin, prescription opioids, stimulants, sedatives, tranquilizers). These drug classes differ in availability and sources (licit, illicit), abuse liability, and user demographic characteristics.<sup>10,20</sup> The prevalence and demographic correlates of drug use have yet to be comprehensively examined in a large representative sample to specify common illicit and nonmedical drugs of use in the ED population and to identify demographic groups of ED users disproportionately affected by drug-related disorders. Such information will be useful to ED clinicians for prioritization of screening foci and identification of at-risk substance users. To this end, complete population-based data about use of all available substances and substance use disorders in a national sample of ED users will need to be compared with that of ED nonusers to establish the reported elevated rate of substance use in the ED. The diversity in substance classes also requires comparative analysis to consider different substance use status (at-risk population) for making valid comparisons when substance use disorders are evaluated across substances for heterogeneous groups of users. This is accomplished by examining conditional rates of substance use disorders for all substances (probability of having a substance use disorder, given use of the substance) to identify subgroups showing increased rates of substance use disorders.

Here, we examined adult data from the 2007 to 2009 National Surveys on Drug Use and Health to elucidate variations in substance use and substance use disorders by ED use and evaluated 10 substance use disorders (alcohol and 9 drugs) among substance users for age, sex, and race/ethnicity. We focused on adults because they presently are the primary population of interest for screening.<sup>11-13</sup> The National Surveys on Drug Use and Health is the largest survey of substance use disorders in the United States. The selected years used designs permitting use of pooled data to examine all substance use disorders assessed by the same instrument by ED use status and to compare conditional probabilities of substance use disorders among substance users. The pooled data also identify the extent of overlooked illicit and prescription drug disorders for understudied demographic groups (Asians, Native Americans, multiple-race adults, and older adults).<sup>4</sup>

To guide the current practice of a staged approach to screening (an initial question about substance use status, followed by questions of substance-related problems) and elucidate the extent of assessments for substance problems for various drugs, we examined the frequency of substance use and conditional probabilities of substance use disorders to characterize use patterns and identify subsets of users showing increased odds of having a substance use disorder. Conditional rates of substance use disorders consider substance-specific variations in use and disorders by restricting the denominator

for each disorder to users of the corresponding substance, thereby allowing comparisons across substances. We also examined comorbid alcohol-drug disorders to fill the gap left by studies that have focused exclusively on alcohol use.

### Goals of This Investigation

Study aims were to (1) determine whether past-year rates of substance use and substance use disorders among ED users were higher than rates among ED nonusers to gauge substance use–related burdens; (2) among ED users, examine conditional rates of substance use disorders by age, sex, and race/ethnicity to specify substances warranting research on targeted assessments for substance use disorders; and (3) determine key demographic correlates of substance use disorders to elucidate health disparities, which have implications for facilitating identification of subsets of ED users with a substance use disorder and informing health policymaking.

## MATERIALS AND METHODS

### Study Design

Data were from the public-use data file of the 2007 to 2009 National Surveys on Drug Use and Health, the only survey designed to provide ongoing national estimates of substance use and substance use disorders in the United States.<sup>20,21</sup> From 2007 to 2009, approximately 67,500 unique persons aged 12 years or older were interviewed annually (weighted interviewing response rates 74% to 76%). Three years' worth of data from adults aged 18 years or older ( $n=37,708$  to  $38,067$ /year) were pooled to allow for the detection of differences in substance use disorders by age or race/ethnicity ( $N=113,672$ ). The use of data for this research was approved by the Duke University Institutional Review Board.

The survey covers residents of households from the 50 states and the District of Columbia (persons living in houses, apartments, condominiums, or noninstitutional group quarters, such as shelters, rooming houses, group homes, and civilians residing on military bases).<sup>22</sup> Participants are selected by multistage area probability methods to ensure that each independent cross-sectional sample is representative of persons aged 12 years or older. The design oversampled people aged 12 to 25 years; because of a large sample size, there was no need to oversample racial/ethnic groups, as was done before 1999.

### Data Collection and Processing

Prospective respondents were assured that their names would not be recorded and their responses would be kept strictly confidential. All study procedures and protections were carefully explained. Demographic questions were administered by interviewers using computer-assisted personal interviewing. Other questions of a sensitive nature (substance use, substance use disorders, treatment use) were administered with audio computer-assisted self-interviewing, which provided respondents with a highly confidential means of responding to questions to increase honest reporting of sensitive behaviors.<sup>20,21</sup>

Respondents read questions on the computer screen or questions were read to them through headphones, and they entered responses directly into a computer provided by the interviewer. Each respondent who completed the interview received \$30 to compensate for his or her time and effort.

Respondents' age, sex, race/ethnicity, education, total family income, marital status, and population density of residence were examined. Population density of residence—a proxy for community location and a potential confounder for influencing the rate of substance use by ED—was included as a control variable.<sup>4</sup>

ED use was defined as having 1 or more hospital ED visits in the previous 12 months. ED use (“During the past 12 months, that is, since [date], how many different times have you been treated in an ED for any reason?”). Research shows that self-reported ED use data are generally accurate; however, because underreporting of the number of ED visits may occur, the analysis focused on a dichotomized ED status.<sup>23,24</sup> Exploratory analyses were conducted to determine whether more frequent ED users ( $\geq 3$  times) had higher prevalences of substance use and substance use disorders than infrequent ED users (1 to 2 times).

The survey asked each respondent about his or her use of alcohol and 9 drug classes (illicit use of marijuana/hashish, cocaine/crack, heroin, or hallucinogens; inhalant use; and nonmedical use of prescription analgesic opioids, stimulants, tranquilizers, sedatives). Nonmedical use was defined as use without a prescription or for the experience or feeling the drug caused; use of over-the-counter drugs and legitimate use of prescription drugs were not included.<sup>20,25</sup> Alcohol and drug classes were assessed by discrete questions in 10 sections. Each included a detailed description of the substance class and a list of substances belonging to the class. For nonmedical use, respondents were provided with pill cards showing color pictures of tablets for analgesic opioids, tranquilizers, stimulants, and sedatives. To determine the extent of co-usage of alcohol and drugs, users of both alcohol and a drug were categorized. Past-year substance use variables were examined because they are better indicators of recent or active use than lifetime measures and are the focus of screening.<sup>26</sup>

Respondents who reported alcohol or drug use in the past year were asked a set of structured, substance-specific questions designed to operationalize *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* criteria for past-year substance use disorders (abuse or dependence) (Table E1, available online at <http://www.annemergmed.com>).<sup>20,27,28</sup> Dependence on a given substance class included users who met greater than or equal to 3 dependence criteria for that class in the past year; abuse applied to users who met greater than or equal to 1 abuse criterion but did not meet criteria for dependence on that substance class.

Lifetime substance abuse treatment use was defined as any use of treatment services specifically related to alcohol or drug use in the previous year (“Have you ever received treatment or

counseling for your use of alcohol or any drug, not counting cigarettes<sup>27</sup>). History of injection drug use was ascertained by assessing whether respondents had ever injected heroin, cocaine, methamphetamine, or any other drug that was not prescribed for the respondents or that the respondents received solely for the experience or feeling it caused. Both were included as control variables.

The National Surveys on Drug Use and Health uses audio computer-assisted self-interviewing to increase privacy and the accuracy of self-reports and includes detailed probes and color pictures of prescription drugs to augment assessments for substance use; these practices have improved the quality of data.<sup>29,30</sup> A reliability study showed substantial (for abuse/dependence questions) to nearly perfect (for alcohol and marijuana use questions) response agreement for the survey's measures.<sup>29</sup> Validity data revealed high agreement (marijuana 89.8%; cocaine 95.5%) between self-reported use and urine drug test results.<sup>31</sup> The National Surveys on Drug Use and Health also incorporates consistency checks, statistical computation, and analysis weights to minimize response inconsistency and adjust for nonresponse bias.<sup>20,32</sup> A previous follow-up study of survey nonrespondents showed no significant nonresponse bias.<sup>33</sup>

### Primary Data Analysis

The distributions of study variables by ED use were determined by  $\chi^2$ . Prevalences of past-year substance use and substance use disorders in the total sample were compared by ED use to determine whether ED users had higher prevalences of substance use and substance use disorders than ED nonusers. Prevalences of substance use disorders among past-year users of the corresponding substance then were calculated to evaluate conditional rates of substance use disorders. To inform identification of substance users and research on screening, we report conditional rates of substance use disorders among ED users by age group, sex, and race/ethnicity. Logistic regression analyses were conducted among alcohol users to estimate associations between sociodemographic variables (age, sex, race/ethnicity, educational level, marital status, family income, and population density of residence) and alcohol use disorders; similar analyses were conducted among drug users for drug use disorders. History of substance abuse treatment, injection drug use, and survey year were adjusted in these analyses to mitigate for their confounding effects on associations. Data were analyzed with SUDAAN (version 9.0.1),<sup>34</sup> the software designed for analyzing data from a complex national survey such as the National Surveys on Drug Use and Health. All results are weighted figures except for sample sizes (unweighted).

## RESULTS

Overall, 27.8% of adults used EDs for a medical reason in the past year. Table 1 presents demographics, substance abuse treatment, and injection drug use variables by ED status. All variables differed significantly by ED status ( $P < .001$ ).

**Table 1.** Characteristics of adults aged 18 years or older by ED status: 2007 to 2009 (N=113,672).

Characteristics	Percentage (SE)	
	ED Users, N=35,604	ED Nonusers, N=78,068
<b>Age, y</b>		
18–25	17.4 (0.24)	13.7 (0.17)
26–34	16.2 (0.31)	15.8 (0.20)
35–49	26.2 (0.54)	29.7 (0.24)
50–64	22.1 (0.49)	25.0 (0.36)
≥65	18.1 (0.60)	15.9 (0.35)
<b>Sex</b>		
Male	44.6 (0.53)	49.7 (0.30)
Female	55.4 (0.53)	50.3 (0.30)
<b>Race/ethnicity*</b>		
White, non-Hispanic	66.4 (0.45)	69.7 (0.35)
Black, non-Hispanic	15.5 (0.38)	10.0 (0.22)
Native American/Alaska Native	0.5 (0.06)	0.4 (0.04)
Asian/Pacific Islander	3.0 (0.23)	5.3 (0.18)
Multiple race	1.3 (0.08)	1.0 (0.05)
Hispanic	13.3 (0.32)	13.6 (0.27)
<b>Education</b>		
<High school	20.3 (0.34)	13.8 (0.26)
High school	33.5 (0.48)	30.1 (0.33)
≥College	46.2 (0.45)	56.2 (0.33)
<b>Family income, \$</b>		
<40,000	48.5 (0.45)	35.8 (0.34)
40,000–74,999	27.3 (0.39)	29.8 (0.27)
≥75,000	24.2 (0.44)	34.4 (0.38)
<b>Marital status</b>		
Married	48.8 (0.53)	57.4 (0.33)
Separate/divorced/widowed	22.8 (0.47)	17.5 (0.25)
Single	28.4 (0.37)	25.1 (0.25)
<b>Population density<sup>†</sup></b>		
Large metropolitan	49.9 (0.55)	52.5 (0.48)
Small metropolitan	43.2 (0.62)	41.5 (0.47)
Nonmetropolitan	7.0 (0.29)	6.1 (0.24)
<b>History of substance abuse treatment</b>		
Yes	8.0 (0.24)	5.6 (0.13)
No	92.0 (0.24)	94.4 (0.13)
<b>History of injection drug use</b>		
Yes	2.4 (0.12)	1.5 (0.07)
No	97.6 (0.12)	98.5 (0.07)

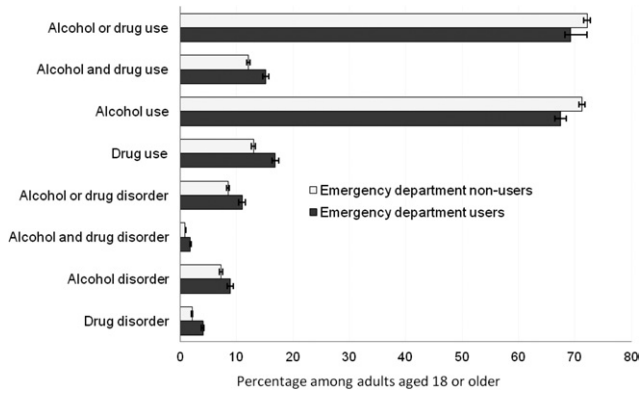
SE, Standard error.

\*Mutually exclusive groups.

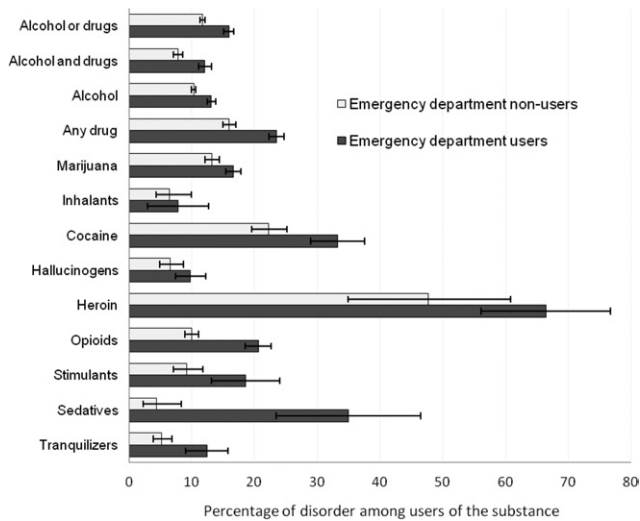
<sup>†</sup>Population density was based on 2000 census data and the June 2003 Core-based Statistical Area (CBSA) classifications and was categorized as large-metro (≥1 million population), small-metro (<1 million population), and nonmetro (not in a CBSA).

Figure 1 shows that ED users had higher prevalences than ED nonusers of coexisting alcohol-drug use, drug use, and substance use disorders (Table E2, available online at <http://www.annemergmed.com>).

Adjusted logistic regression analyses (controlling for the variables in the first column of Table 1) showed that ED users had higher odds than ED nonusers in use of alcohol-drugs (adjusted odds ratio [AOR] 1.19; 95% confidence interval [CI] 1.13 to 1.25), any drug (AOR 1.23; 95% CI 1.16 to 1.29),



**Figure 1.** One-year prevalence of substance use and disorders (abuse or dependence) among adults aged 18 years or older by ED use (N=113,672). Lines extending from bars indicate 95% CIs of the estimates.

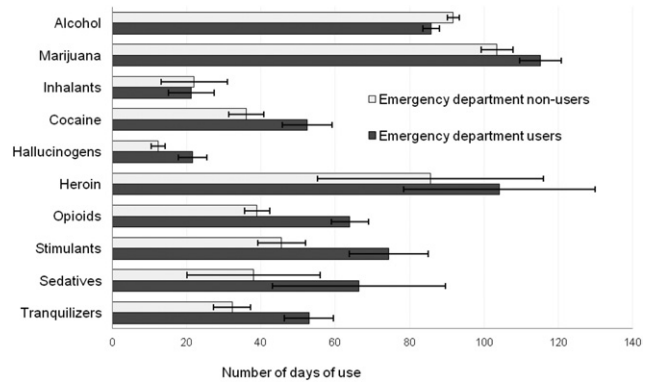


**Figure 2.** One-year conditional prevalence of substance use disorders (abuse or dependence) among adults aged 18 years or older who used the corresponding substance by ED use status (N=86,682). Lines extending from bars indicate 95% CIs of the estimates.

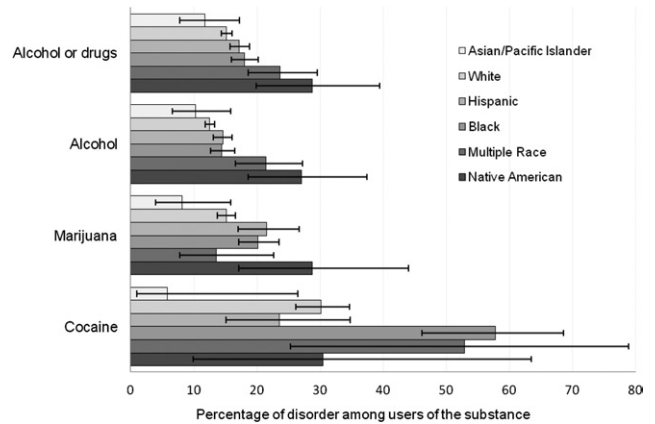
marijuana (AOR 1.14; 95% CI 1.03 to 1.21), inhalants (AOR 1.41; 95% CI 1.10 to 1.80), cocaine (AOR 1.28; 95% CI 1.16 to 1.42), hallucinogens (AOR 1.21; 95% CI 1.09 to 1.36), opioids (AOR 1.48; 95% CI 1.37 to 1.59), stimulants (AOR 1.14; 95% CI 1.01 to 1.29), sedatives (AOR 1.85; 95% CI 1.36 to 2.52), and tranquilizers (AOR 1.32; 95% CI 1.20 to 1.49). Frequent ED users had higher prevalences than infrequent ED users in use of most substances and almost all substance use disorders (Table E3, available online at <http://www.annemergmed.com>).

Figure 2 shows that ED users had higher conditional rates of substance use disorders than ED nonusers in most substances (except for inhalants, hallucinogens, and heroin).

Figure 3 indicates that substance-using ED users on average spent a greater number of days using most drugs (except for



**Figure 3.** Average number of days of substance use among past-year adult users of the corresponding substance by ED use (N=86,682). Lines extending from bars indicate 95% CIs of the estimates.



**Figure 4.** One-year conditional prevalence of substance use disorders (abuse or dependence) among ED patients aged 18 years or older by race/ethnicity group (N=86,682). Lines extending from bars indicate 95% CIs of the estimates.

inhalants, heroin, and sedatives) than substance-using ED nonusers, but ED nonusers had more days of alcohol use than ED users.

Conditional substance use disorders among ED users who used alcohol or drugs in the past year (n=86,682) by key demographics are summarized in Tables E4 through E6 (available online at <http://www.annemergmed.com>). There were age-related decreases in conditional rates of any substance use disorder. Male substance users had higher conditional rates than female substance users of any substance use disorder, alcohol-drug, alcohol, any drug, and marijuana disorders. Figure 4 presents racial/ethnic differences in conditional rates of substance use disorders. Native Americans and multiple-race adults exhibited higher conditional rates of any substance use disorder than whites and Asians/Pacific Islanders.

Finally, adjusted logistic regression analyses of conditional rates of substance use disorders showed that, regardless of ED status, younger age, being male, having less education, being

**Table 2.** Adjusted odds ratio of the conditional prevalence of past-year substance use disorder in past-year substance users among ED patients aged 18 years or older.

Adjusted Logistic Regression Model*	Adjusted Odds Ratio (95% CI) of Alcohol Use Disorder* (N=85,008)		Adjusted Odds Ratio (95% CI) of Drug Use Disorder* (N=26,585)	
	ED Users	ED Nonusers	ED Users	ED Nonusers
<b>Age (vs 18–25 y), y</b>				
26–34	0.76 (0.63–0.91)	0.69 (0.61–0.78)	0.81 (0.65–1.00)	0.86 (0.72–1.03)
35–49	0.53 (0.46–0.62)	0.50 (0.44–0.57)	0.65 (0.49–0.85)	0.65 (0.52–0.79)
50–64	0.35 (0.27–0.47)	0.35 (0.31–0.40)	0.44 (0.26–0.76)	0.38 (0.25–0.57)
≥65	0.12 (0.07–0.19)	0.16 (0.11–0.24)	0.70 (0.21–2.28)	0.85 (0.40–1.84)
<b>Sex (vs female)</b>				
Male	1.99 (1.78–2.22)	1.98 (1.82–2.16)	1.38 (1.17–1.63)	1.38 (1.17–1.63)
<b>Race/ethnicity (vs white)</b>				
Black	0.95 (0.80–1.13)	0.79 (0.66–0.96)	1.13 (0.88–1.44)	1.03 (0.80–1.32)
Native American	1.56 (0.95–2.56)	1.20 (0.81–1.78)	0.91 (0.48–1.72)	0.68 (0.32–1.45)
Asian/Pacific Islander	0.80 (0.48–1.33)	0.55 (0.43–0.71)	0.61 (0.30–1.21)	1.20 (0.66–2.19)
Multiple race	1.47 (1.06–2.03)	0.85 (0.61–1.19)	1.03 (0.55–1.93)	0.97 (0.56–1.66)
Hispanic	0.97 (0.83–1.12)	0.96 (0.86–1.08)	1.04 (0.79–1.36)	1.17 (0.96–1.42)
<b>Education (vs ≥college)</b>				
<High school	1.24 (1.07–1.44)	1.17 (1.01–1.37)	1.44 (1.19–1.74)	2.02 (1.68–2.44)
High school	1.06 (0.92–1.22)	0.98 (0.89–1.08)	1.40 (1.18–1.65)	1.41 (1.62–1.62)
<b>Family income (vs ≥75,000), \$</b>				
<40,000	1.07 (0.89–1.28)	1.04 (0.92–1.18)	1.31 (1.02–1.68)	1.12 (0.94–1.35)
40,000–74,999	1.02 (0.87–1.19)	0.95 (0.85–1.06)	1.23 (0.96–1.58)	1.23 (0.94–1.61)
<b>Marital status (vs married)</b>				
Separated/divorced/widowed	1.68 (1.33–2.12)	1.51 (1.28–1.78)	1.32 (0.96–1.82)	1.33 (0.97–1.82)
Single	1.91 (1.64–2.22)	1.69 (1.50–1.90)	1.52 (1.18–1.95)	1.56 (1.28–1.92)
<b>Population density (vs large metropolitan)</b>				
Small metropolitan	1.06 (0.93–1.21)	1.01 (0.92–1.11)	0.91 (0.78–1.07)	0.96 (0.81–1.13)
Nonmetropolitan	1.11 (0.84–1.48)	0.80 (0.66–0.97)	0.86 (0.66–1.14)	0.79 (0.56–1.13)
<b>History of substance abuse treatment (vs no)</b>				
Yes	4.65 (4.01–5.39)	4.56 (3.99–5.20)	3.24 (2.65–3.96)	2.78 (2.28–3.38)
<b>History of injection drug use (vs no)</b>				
Yes	1.50 (1.13–2.01)	1.40 (1.01–1.91)	2.44 (1.80–3.29)	1.89 (1.38–2.59)
<b>Survey year (vs 2007)</b>				
2008	1.12 (0.96–1.30)	0.94 (0.86–1.04)	1.19 (0.96–1.49)	0.96 (0.81–1.14)
2009	1.06 (0.92–1.22)	0.95 (0.86–1.06)	1.04 (0.84–1.29)	0.93 (0.78–1.10)

\*Each separate model included all independent variables listed in the first column; results were adjusted for the complex survey design of the data (weighting, clustering, and stratification) and model covariates.

single, and history of substance abuse treatment or injection drug use increased odds of having a substance use disorder (Table 2). Findings were similar after each model also was controlled for past-year frequency of alcohol use (for alcohol disorders) and of marijuana use (for drug disorders) (Table E7, available online at <http://www.annemergmed.com>).

## LIMITATIONS

The data source relies on self-reports, which can be influenced by memory error and underreporting. Like other surveys, the National Surveys on Drug Use and Health uses standardized questions designed to operationalize *DSM-IV* criteria for substance use disorders; substance use disorders are self-reported estimates, not clinical diagnoses. The National Surveys on Drug Use and Health–based prevalence of substance use disorders among adults in 2000 (6.7%) resembled that among adults in the National Longitudinal Alcohol Epidemiologic Survey (7.4%).<sup>28</sup> Additionally, substance use

disorder estimates in the ED are expected to be greater than our findings have suggested because nicotine dependence was not based on *DSM-IV* criteria and not included. The National Surveys on Drug Use and Health also does not distinguish between drug-related versus non–drug-related ED visits, and findings do not apply to institutionalized or homeless adults (about 2%) who were not included in the survey. Nonetheless, research shows that the inclusion of institutionalized and homeless individuals in large-scale surveys does not change substantially the overall population estimates of drug dependence because of the very small sample size of these individuals relative to that of the noninstitutionalized population.<sup>35</sup>

## DISCUSSION

This study presents the most recent and comprehensive national estimates of past-year substance use and substance use disorders among adults who used EDs in the past year; findings

have implications for screening, intervention efforts, and designs of clinical trials to evaluate the effectiveness of such efforts. First, ED users had higher prevalences than ED nonusers of past-year drug use (12.1% versus 9.7%), alcohol-drug use (15.2% versus 12.1%), and alcohol (8.9% versus 7.3%) and drug (4.0% versus 2.1%) disorders. Second, among substance users, ED users had higher conditional rates than ED nonusers of alcohol (13.1% versus 10.3%) or drug (23.5% versus 16.0%) disorders, including marijuana (16.6%), cocaine (33.2%), opioid (20.6%), stimulant (18.6%), sedative (35.0%), and tranquilizer (12.4%) disorders. Third, regardless of ED status, substance users who were male, single, younger than 35 years, or less educated demonstrated increased rates of substance use disorder.

Research has shown that alcohol or drug use increases ED use, but community-based rates of illicit/nonmedical drug use and disorders in the population of ED users are lacking.<sup>36,37</sup> The Drug Abuse Warning Network estimates are based on retrospective reviews of medical records of ED visits, focus on drugs identified as the primary causes for ED visits, exclude ED visits involving alcohol only for patients aged 21 years or older, and do not address conditional probabilities or the size of the population at risk for experiencing substance abuse problems.<sup>5,38</sup> Thus, they are inadequate in elucidating comparative probabilities of substance use or demographic profiles to aid in prioritizing substances and population subgroups for screening and better management. Additionally, the Drug Abuse Warning Network's hospital participation rates in nonmetropolitan areas have been low (20% to 30%) and may have identified severe subsets of substance users whose substance use resulted in emergency medical visits; for instance, 73% of drug-related ED visits for substance abuse treatment involved multiple drugs.<sup>39</sup> Thus, these data are incomplete for delineating profiles of less-problematic substance users to inform identification efforts.

Based on the National Surveys on Drug Use and Health's national probability sample, our results suggest that at least two thirds (68%) of adults aged 18 years or older who visited the ED used alcohol; 1 in 6 (17%) were recent or active illicit/nonmedical drug users (mainly marijuana and prescription opioids), and 90% of drug users also used alcohol in the past year. This high rate of past-year drug use supports the need for research to explore the feasibility of routine screening of drug use in the ED with a focus on marijuana and opioids, as well as additional assessments of alcohol problems among drug users. Marijuana and prescription opioids were the most prevalent drug disorders in this national sample of ED users; however, Drug Abuse Warning Network data showed that cocaine and heroin were the most commonly reported drugs among adults.<sup>38,39</sup> The discrepancy might relate to the severe nature of Drug Abuse Warning Network cases identified from ED visits or assessment bias (illicit use or injection of cocaine or heroin are more salient to medical staff than use of marijuana or

prescription drugs). These results nonetheless support increasing concerns about nonmedical marijuana and opioid use and their associated morbidity or mortality.<sup>16,40,41</sup>

Additionally, substance abuse is considered common in the ED because of substance-related injuries. Using a broad definition for substance problems (lifetime substance use disorder/current use, past treatment/current substance use, treatment, current substance use, and current dependence), Rockett et al<sup>8</sup> estimated that 27% of ED users in a sample from a statewide survey needed substance abuse treatment. Our findings demonstrate that about 1 in 10 (11%) adults aged 18 years or older who visit the ED have had a self-reported alcohol (9%) or drug (4%) disorder in the past year. Comparison of our estimates with others is complicated, however, by differences in study samples and criteria for defining substance problems. If our results had included subthreshold substance users (individuals who met some *DSM-IV* dependence criteria but had no disorder),<sup>42,43</sup> the estimate would increase substantially and be closer to that of Rockett et al.<sup>8</sup>

Another clinically relevant finding concerns our inclusive survey-based estimates of conditional substance use disorders to inform clinical strategies for targeted screening. Close to 1 in 4 (24%) past-year drug users in the ED sample had a drug disorder compared with 1 in 8 (13%) past-year alcohol users with an alcohol disorder. Drugs with notable conditional rates of disorders include heroin (66%), sedatives (35%), cocaine (33%), prescription opioids (21%), stimulants (19%), and marijuana (17%). The low use rate of several drugs in the total sample and the high conditional rate of drug disorders suggest that universal screening for drug disorders may not be efficient. The feasibility of a staged approach, however, should be studied to identify strategies that can improve detection of adults with a drug disorder and facilitate integration of substance use disorder treatment with medical care.<sup>17,26</sup>

In conclusion, 28% of adults nationally used ED treatment in the past year. ED users include higher proportions of socioeconomically disadvantaged groups (young, female, black, less-educated adults) than ED nonusers. Among substance users, the ED group used drugs more frequently and had higher conditional rates of substance use disorders than the non-ED group. The ED setting thus provides a window of opportunity for improving detection for substance use problems and linking substance use disorder care with other medical services.<sup>44</sup> Taking into account the number of affected adults and available resources, marijuana and prescription opioids should be the primary focus for screening efforts.

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*Address for correspondence:* Li-Tzy Wu, ScD, E-mail: [litzwu@duke.edu](mailto:litzwu@duke.edu) or [litzwu@yahoo.com](mailto:litzwu@yahoo.com).

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**Table E1.** Items used to operationalize alcohol and drug use disorders (dependence or abuse).

Substance-Specific Dependence*	Substance-Specific Abuse*
Spent a great deal of time during a period of a month obtaining, using, or getting over the effects of THE SUBSTANCE [NAME OF THE SUBSTANCE]	Serious problems at home, work, or school caused by using THE SUBSTANCE [NAME OF THE SUBSTANCE], such as:
Used THE SUBSTANCE more often than intended or was unable to keep set limits on THE SUBSTANCE use	neglecting your children
Needed to use THE SUBSTANCE more than before to get desired effects or noticed that same amount of THE SUBSTANCE use had less effect than before	missing work or school
Inability to cut down or stop using THE SUBSTANCE every time you tried or wanted to	doing a poor job at work or school
Continued to use THE SUBSTANCE even though it was causing problems with emotions, nerves, or mental health, or causing physical problems	losing a job or dropping out of school
THE SUBSTANCE use reduced or eliminated involvement or participation in important activities	Used THE SUBSTANCE regularly and then did something that might have put you in physical danger
Reported experiencing withdrawal symptoms at the same time that lasted longer than a day after THE SUBSTANCE use was cut back or stopped. Symptoms include (i) feeling kind of blue or down, (ii) vomiting or feeling nauseated, (iii) having cramps or muscle aches, (iv) having teary eyes or a runny nose, (v) feeling sweaty, having enlarged eye pupils, or having body hair standing up on skin, (vi) having diarrhea, (vii) yawning, (viii) having a fever, and (ix) having trouble sleeping. <sup>†</sup>	Use of THE SUBSTANCE caused you to do things that repeatedly got you in trouble with the law
	Problems with family or friends that were probably caused by using THE SUBSTANCE and continued to use THE SUBSTANCE even though you thought using THE SUBSTANCE caused these problems

\*All questions refer to use and problems in the past 12 months.

<sup>†</sup>Withdrawal symptoms are substance specific; the list of withdrawal symptoms differs, depending on the substance used. Assessments followed the questions used in the National Comorbidity Survey, and the diagnostic questions were cognitively tested to determine how well they were understood by respondents, evaluated by experts to determine how well the questions captured the *DSM-IV* criteria, and modified for *DSM-IV* criteria (Epstein<sup>28</sup>).

**Table E2.** One-year prevalence of substance use and substance use disorders (abuse or dependence) among adults aged 18 years or older by ED use status (N=113,672).\*

Prevalence	Substance Use, % (95% CI)			Substance Use Disorder, % (95% CI)		
	All Adults, N=113,672	ED Users, N=35,604	ED Nonusers, N=78,068	All Adults, N=113,672	ED Users, N=35,604	ED Nonusers, N=78,068
Alcohol or drug	71.4 (70.89–71.92)	69.3 (68.28–70.24)	72.2 (71.64–72.81)	9.2 (8.90–9.42)	11.0 (10.44–11.58)	8.5 (8.16–8.74)
Alcohol and drug	12.9 (12.64–13.23)	15.2 (14.59–15.72)	12.1 (11.77–12.40)	1.2 (1.11–1.28)	1.8 (1.68–2.01)	0.9 (0.86–1.04)
Alcohol	70.2 (69.69–70.76)	67.5 (66.51–68.51)	71.3 (70.69–71.84)	7.7 (7.49–7.98)	8.9 (8.38–9.37)	7.3 (7.02–7.59)
Any drug <sup>†</sup>	14.1 (13.80–14.43)	16.9 (16.32–17.49)	13.0 (12.69–13.40)	2.6 (2.50–2.73)	4.0 (3.75–4.22)	2.09 (1.97–2.21)
Marijuana	10.3 (10.09–10.60)	12.1 (11.66–12.62)	9.7 (9.37–9.94)	1.5 (1.40–1.57)	2.0 (1.85–2.20)	1.3 (1.17–1.38)
Inhalants	0.5 (0.42–0.53)	0.6 (0.50–0.71)	0.4 (0.35–0.49)	0.03 (0.02–0.05)	0.05 (0.03–0.08)	0.03 (0.02–0.04)
Cocaine	2.4 (2.13–2.36)	3.0 (2.79–3.27)	1.9 (1.82–2.07)	0.6 (0.54–0.65)	1.0 (0.86–1.17)	0.4 (0.37–0.50)
Hallucinogens	1.5 (1.41–1.57)	1.9 (1.78–2.06)	1.3 (1.23–1.42)	0.1 (0.09–0.14)	0.2 (0.15–0.23)	0.1 (0.06–0.12)
Heroin	0.2 (0.17–0.25)	0.3 (0.26–0.45)	0.2 (0.12–0.20)	0.1 (0.10–0.16)	0.3 (0.18–0.35)	0.1 (0.06–0.11)
Opioids <sup>‡</sup>	4.8 (4.60–4.91)	6.6 (6.28–6.83)	4.1 (3.87–4.26)	0.7 (0.62–0.72)	1.4 (1.22–1.48)	0.4 (0.36–0.45)
Stimulants	1.1 (0.99–1.15)	1.4 (1.23–1.49)	1.0 (0.87–1.05)	0.1 (0.11–0.16)	0.3 (0.19–0.34)	0.1 (0.07–0.12)
Sedatives	0.3 (0.25–0.34)	0.5 (0.38–0.61)	0.2 (0.19–0.27)	0.05 (0.04–0.08)	0.17 (0.11–0.25)	0.01 (0.01–0.02)
Tranquilizers	2.2 (2.05–2.28)	2.8 (2.62–3.09)	1.9 (1.77–2.03)	0.2 (0.14–0.21)	0.4 (0.27–0.45)	0.1 (0.07–0.13)

\*A minimal 1.6% of 113,672 adults without ED information were conservatively included in the ED nonuser group. This relatively small size is not expected to inflate our substance use disorder estimates in the ED. Should those with missing ED information have had an increased substance use disorder rate, the finding that ED users showing higher substance use disorder prevalences than ED nonusers would indicate a conservative estimate of substance use disorders in the ED. To be consistent with national estimates, we examined substance use variables used in the National Surveys on Drug Use and Health report. The final, nonresponse-adjusted, and poststratified analysis weights were used in the analysis to compute unbiased substance use estimates. Results were adjusted for the complex survey design of the data (weighting, clustering, and stratification).

<sup>†</sup>Any drug includes any of the following: marijuana, inhalants, cocaine, hallucinogens, heroin, opioids, stimulants, sedatives, and tranquilizers.

<sup>‡</sup>Opioids: analgesic opioids.

**Table E3.** One-year prevalence of substance use and substance use disorders (abuse or dependence) among adults aged 18 years or older by the number of ED visits (N=113,672).

Prevalence	Substance Use, % (95% CI)			Substance Use Disorder, % (95% CI)		
	ED Use 1–2 Times, N=29,933	ED Use ≥3 Times, N=5,671	ED Nonusers, N=78,068	ED Use 1–2 Times, N=29,933	ED Use ≥3 Times, N=5,671	ED Nonusers, N=78,068
Alcohol or drug	70.8 (69.75–71.90)	59.7 (57.14–62.28)	72.2 (71.64–72.81)	10.3 (9.77–10.81)	15.4 (13.75–17.14)	8.5 (8.16–8.74)
Alcohol and drug	14.8 (14.18–15.41)	17.4 (16.02–18.76)	12.1 (11.77–12.40)	1.6 (1.48–1.82)	3.0 (2.49–3.67)	0.9 (0.86–1.04)
Alcohol	69.3 (68.22–70.40)	56.6 (54.04–59.07)	71.3 (70.69–71.84)	8.5 (8.05–8.94)	11.1 (9.62–12.82)	7.3 (7.02–7.59)
Any drug*	16.3 (15.65–16.97)	20.5 (19.20–21.89)	13.0 (12.69–13.40)	3.4 (3.20–3.68)	7.3 (6.47–8.17)	2.1 (1.97–2.21)
Marijuana	11.8 (11.31–12.39)	13.9 (12.87–15.07)	9.7 (9.37–9.94)	1.9 (1.69–2.04)	3.0 (2.53–3.59)	1.3 (1.17–1.38)
Inhalants	0.6 (0.51–0.75)	0.5 (0.35–0.74)	0.4 (0.35–0.49)	0.04 (0.03–0.07)	0.1 (0.02–0.20)	0.03 (0.02–0.04)
Cocaine	2.8 (2.57–3.04)	4.4 (3.70–5.16)	1.9 (1.82–2.07)	0.9 (0.72–1.05)	1.8 (1.43–2.25)	0.4 (0.37–0.50)
Hallucinogens	1.9 (1.72–2.01)	2.2 (1.85–2.68)	1.3 (1.23–1.42)	0.2 (0.14–0.22)	0.3 (0.19–0.40)	0.1 (0.06–0.12)
Heroin	0.3 (0.20–0.36)	0.8 (0.53–1.20)	0.2 (0.12–0.20)	0.2 (0.14–0.29)	0.6 (0.34–0.93)	0.1 (0.06–0.11)
Opioids <sup>†</sup>	6.1 (5.74–6.43)	9.4 (8.44–10.48)	4.1 (3.87–4.26)	1.1 (0.95–1.19)	3.1 (2.57–3.71)	0.4 (0.36–0.45)
Stimulants	1.2 (1.12–1.37)	2.1 (1.53–2.79)	1.0 (0.87–1.05)	0.2 (0.13–0.24)	0.7 (0.43–1.28)	0.1 (0.07–0.12)
Sedatives	0.4 (0.30–0.51)	1.0 (0.67–1.60)	0.2 (0.19–0.27)	0.1 (0.05–0.14)	0.7 (0.40–1.17)	0.01 (0.01–0.02)
Tranquilizers	2.6 (2.36–2.85)	4.4 (3.61–5.26)	1.9 (1.77–2.03)	0.2 (0.18–0.31)	1.1 (0.65–1.68)	0.1 (0.07–0.13)

\*Any drug includes any of the following: marijuana, inhalants, cocaine, hallucinogens, heroin, opioids, stimulants, sedatives, and tranquilizers.

<sup>†</sup>Opioids: analgesic opioids.

**Table E4.** One-year conditional prevalence of substance use disorders (abuse or dependence) among ED patients aged 18 years or older by age group.

Prevalence, Substance Used	Substance Use Disorder Among ED Patients Who Used the Corresponding Substance in the Past Year, % (95% CI), Years				
	18–25	26–34	35–49	50–64*	≥65*
Alcohol or drug	28.6 (27.6–29.7)	20.1 (18.4–22.0)	14.4 (13.1–15.8)	9.3 (7.4–11.6)	2.7 (1.8–4.0)
Alcohol and drug	14.6 (13.4–15.8)	9.9 (7.9–12.3)	11.8 (9.5–14.7)	9.3 (5.5–15.3)	—
Alcohol	23.3 (22.5–24.1)	16.4 (14.7–18.2)	12.2 (10.9–13.5)	8.0 (6.2–10.2)	2.2 (1.5–3.4)
Any drug <sup>†</sup>	26.4 (24.9–27.9)	23.0 (20.4–25.8)	22.1 (19.4–25.1)	18.5 (13.2–25.4)	17.7 (5.5–44.0)
Marijuana	21.5 (20.0–23.0)	14.2 (11.6–17.3)	11.5 (9.2–14.4)	12.8 (7.7–20.5)	—
Inhalants	7.8 (4.2–14.0)	18.1 (7.1–39.1)	5.0 (1.2–18.8)	—	—
Cocaine	23.0 (19.9–26.5)	29.3 (21.4–38.7)	51.3 (42.4–60.2)	30.9 (16.7–49.9)	—
Hallucinogens	10.6 (8.6–12.9)	7.7 (3.5–16.1)	10.5 (2.8–32.5)	—	—
Heroin	60.5 (49.9–70.2)	59.6 (38.0–78.1)	70.8 (43.9–88.3)	74.8 (25.4–96.3)	—
Opioids <sup>†</sup>	19.0 (17.5–20.7)	23.0 (18.5–28.1)	20.8 (16.9–25.3)	21.7 (12.7–34.6)	—
Stimulants	14.3 (11.7–17.4)	19.0 (11.7–29.3)	19.9 (11.3–32.6)	46.1 (14.6–81.1)	—
Sedatives	29.6 (20.8–40.3)	43.2 (22.6–66.4)	24.5 (12.1–43.4)	44.8 (15.6–78.1)	—
Tranquilizers	10.4 (8.3–13.0)	10.7 (6.5–17.2)	12.6 (8.4–18.6)	17.8 (6.6–39.8)	—

\*Dashes indicate that results are not reported because of unstable estimates.

<sup>†</sup>Any drug includes any of the following: marijuana, inhalants, cocaine, hallucinogens, heroin, opioids, stimulants, sedatives, and tranquilizers.

\*Opioids: analgesic opioids.

**Table E5.** One-year conditional prevalence of substance use disorders (abuse or dependence) among ED patients aged 18 years or older by sex.

Prevalence, Substance Used	Substance Use Disorder Among ED Patients Who Used the Corresponding Substance in the Past Year, % (95% CI)	
	Men	Women
Alcohol or drug	20.6 (19.4–21.8)	11.5 (10.8–12.2)
Alcohol and drug	14.6 (13.1–16.3)	9.1 (7.9–10.6)
Alcohol	17.3 (16.2–18.5)	9.2 (8.6–9.9)
Any drug*	27.0 (25.2–29.0)	19.4 (17.8–21.1)
Marijuana	20.1 (18.5–21.9)	12.3 (10.8–13.9)
Inhalants	7.6 (4.0–14.0)	8.3 (3.7–17.8)
Cocaine	35.7 (30.0–41.8)	29.4 (24.5–34.8)
Hallucinogens	10.5 (8.2–13.5)	8.5 (5.9–12.2)
Heroin	63.8 (48.0–77.1)	72.0 (58.0–82.7)
Opioids <sup>†</sup>	21.0 (18.0–24.2)	20.1 (17.2–23.4)
Stimulants	16.7 (11.6–23.4)	20.4 (14.0–28.7)
Sedatives	40.8 (25.2–58.4)	29.5 (18.7–43.2)
Tranquilizers	14.3 (9.9–20.2)	10.7 (7.7–14.7)

\*Any drug includes any of the following: marijuana, inhalants, cocaine, hallucinogens, heroin, opioids, stimulants, sedatives, and tranquilizers.

<sup>†</sup>Opioids: analgesic opioids.

**Table E6.** One-year conditional prevalence of substance use disorders (abuse or dependence) among ED patients aged 18 years or older by race/ethnicity group.

Prevalence, Substance Used	Substance Use Disorder Among ED Patients Who Used the Corresponding Substance in the Past Year, % (95% CI)					
	White	Black*	Native American/Alaska Native*	Asian/Pacific Islander*	Multiple-Race	Hispanic
Alcohol or drug	15.2 (14.4–16.0)	18.0 (15.9–20.2)	28.7 (19.9–39.4)	11.7 (7.8–17.2)	23.6 (18.6–29.5)	17.2 (15.7–18.8)
Alcohol and drug	11.8 (10.7–12.9)	13.7 (11.2–16.6)	18.1 (11.2–28.0)	4.2 (2.0–8.8)	15.6 (8.6–26.5)	12.2 (9.5–15.6)
Alcohol	12.5 (11.8–13.3)	14.4 (12.6–16.5)	27.0 (18.6–37.4)	10.3 (6.6–15.8)	21.4 (16.6–27.2)	14.6 (13.1–16.1)
Any drug <sup>†</sup>	23.3 (21.9–24.7)	25.7 (22.2–29.5)	24.5 (14.6–38.0)	13.6 (7.4–23.7)	22.2 (14.0–33.3)	23.4 (19.5–27.9)
Marijuana	15.1 (13.7–16.6)	20.1 (17.1–23.5)	28.7 (17.1–44.0)	8.1 (3.9–15.8)	13.6 (7.8–22.6)	21.5 (17.0–26.7)
Inhalants	7.1 (4.0–12.5)	—	—	—	0.8 (0.1–7.2)	18.9 (6.5–43.8)
Cocaine	30.1 (26.1–34.6)	57.7 (46.1–68.5)	30.4 (9.9–63.4)	5.8 (1.0–26.5)	52.9 (25.3–78.8)	23.5 (15.1–34.7)
Hallucinogens	7.3 (5.5–9.5)	13.0 (8.9–18.7)	4.2 (0.8–19.3)	14.2 (3.1–45.9)	21.0 (8.3–43.9)	18.7 (10.7–30.6)
Heroin	61.8 (49.8–72.6)	83.0 (38.2–97.5)	15.4 (1.3–71.1)	—	72.5 (30.5–94.0)	74.8 (35.2–94.2)
Opioids <sup>‡</sup>	21.3 (19.1–23.7)	19.2 (13.2–27.0)	15.3 (6.3–32.6)	13.9 (5.3–32.0)	17.1 (8.1–32.6)	19.2 (14.2–25.6)
Stimulants	17.3 (13.1–22.6)	41.1 (13.3–76.3)	34.3 (9.2–72.9)	30.0 (6.1–74.0)	8.7 (2.5–26.0)	15.3 (7.8–27.9)
Sedatives	36.2 (23.2–51.6)	37.1 (15.9–64.8)	21.2 (2.4–74.6)	—	54.7 (8.8–93.8)	28.0 (11.1–54.7)
Tranquilizers	11.3 (8.6–14.7)	25.5 (10.9–48.9)	12.6 (2.7–43.2)	5.8 (1.2–23.5)	28.3 (8.3–63.4)	8.8 (4.1–18.0)

\*Dashes indicate that results are not reported because of unstable estimates.

<sup>†</sup>Any drug includes any of the following: marijuana, inhalants, cocaine, hallucinogens, heroin, opioids, stimulants, sedatives, and tranquilizers.

<sup>‡</sup>Opioids: analgesic opioids.

**Table E7.** Adjusted odds ratio of the conditional prevalence of substance use disorder (abuse or dependence) among past-year substance users aged 18 years or older by ED use status.

Adjusted Logistic Regression Model*	AOR (95% CI) of Alcohol Use Disorder* (N=85,008)		AOR (95% CI) of Drug Use Disorder* (N=26,585)	
	ED Users	ED Nonusers	ED Users	ED Nonusers
<b>Age (vs 18–25 y), y</b>				
26–34	0.73 (0.60–0.88)	0.64 (0.57–0.73)	0.79 (0.64–0.98)	0.83 (0.70–0.98)
35–49	0.51 (0.43–0.61)	0.46 (0.40–0.53)	0.64 (0.48–0.85)	0.61 (0.49–0.75)
50–64	0.33 (0.24–0.45)	0.32 (0.28–0.36)	0.42 (0.24–0.72)	0.37 (0.24–0.56)
≥65	0.10 (0.06–0.15)	0.14 (0.10–0.21)	0.60 (0.19–1.92)	0.65 (0.30–1.42)
<b>Sex (vs female)</b>				
Male	1.57 (1.40–1.76)	1.53 (1.41–1.67)	1.28 (1.08–1.51)	1.32 (1.11–1.56)
<b>Race/ethnicity (vs white)</b>				
Black	0.92 (0.76–1.10)	0.88 (0.72–1.06)	1.07 (0.83–1.38)	0.97 (0.75–1.26)
Native American	1.50 (0.92–2.46)	1.30 (0.84–2.03)	0.87 (0.48–1.57)	0.61 (0.28–1.31)
Asian/Pacific Islander	0.93 (0.55–1.57)	0.73 (0.55–0.97)	0.64 (0.33–1.25)	1.28 (0.70–2.33)
Multiple-race	1.60 (1.06–2.42)	0.95 (0.68–1.32)	1.01 (0.52–1.95)	0.99 (0.59–1.66)
Hispanic	0.98 (0.82–1.16)	1.07 (0.94–1.22)	0.97 (0.74–1.29)	1.18 (0.96–1.46)
<b>Education (vs ≥college)</b>				
<High school	1.33 (1.14–1.56)	1.29 (1.10–1.53)	1.29 (1.06–1.57)	1.77 (1.44–2.17)
High school	1.12 (0.97–1.31)	1.08 (0.97–1.21)	1.30 (1.09–1.55)	1.28 (1.10–1.49)
<b>Family income (vs ≥75,000), \$</b>				
<40,000	1.13 (0.93–1.36)	1.06 (0.92–1.21)	1.27 (0.98–1.65)	1.09 (0.90–1.30)
40,000–74,999	1.07 (0.90–1.27)	0.98 (0.87–1.10)	1.23 (0.94–1.61)	0.89 (0.73–1.08)
<b>Marital status (vs married)</b>				
Separate/divorced/wid.	1.56 (1.21–1.99)	1.46 (1.23–1.72)	1.35 (0.98–1.87)	1.35 (0.97–1.88)
Single	1.77 (1.50–2.08)	1.61 (1.42–1.81)	1.60 (1.25–2.05)	1.64 (1.34–2.00)
<b>Population density (vs large metropolitan)</b>				
Small metropolitan	1.09 (0.95–1.25)	1.06 (0.96–1.17)	0.90 (0.76–1.06)	0.94 (0.79–1.12)
Nonmetropolitan	1.24 (0.90–1.71)	0.90 (0.74–1.10)	0.82 (0.61–1.09)	0.77 (0.54–1.09)
<b>History of substance abuse treatment (vs no)</b>				
Yes	4.40 (3.75–5.15)	4.09 (3.54–4.72)	3.24 (2.64–3.96)	2.74 (2.24–3.35)
<b>History of injection drug use (vs no)</b>				
Yes	1.61 (1.13–2.29)	1.41 (1.00–1.98)	2.44 (1.82–3.28)	1.92 (1.42–2.61)
<b>Days of substance use, past year (vs &lt;12 days)<sup>†</sup></b>				
52 or more	26.80 (18.85–38.10)	27.32 (21.70–34.40)	3.89 (2.96–5.11)	4.69 (3.68–5.98)
12–51	7.39 (4.88–11.19)	7.24 (5.44–9.62)	2.23 (1.58–3.14)	2.90 (2.24–3.75)
<b>Survey year (vs 2007)</b>				
2008	1.11 (0.95–1.29)	0.95 (0.86–1.04)	1.22 (0.97–1.53)	0.94 (0.79–1.12)
2009	1.03 (0.88–1.20)	0.97 (0.87–1.08)	1.07 (0.87–1.33)	0.93 (0.79–1.10)

\*Each model included all independent variables listed in the first column; results were adjusted for the complex survey design of the data (weighting, clustering, and stratification) and model covariates.

<sup>†</sup>For the alcohol disorder model (yes versus no), “days of substance use” referred to alcohol use (3 categories); for the drug disorder model (yes versus no), “days of substance use” referred to marijuana use (3 categories). Marijuana use was selected because “days of substance use” was not available for any drug use, and marijuana was the most prevalent drug used.