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Construction trade and extraction workers: A population at high risk for drug use in the United States, 2005-2014

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Abstract

Objective: To estimate prevalence of past-month marijuana, cocaine, and nonmedical prescription opioid (NPO) use and determine employment-related correlates of drug use among construction trade/extraction workers (CTEW).

Methods: We analyzed ten years of data (2005–2014) from 293,492 adults (age≥18) in the National Survey on Drug Use and Health, comparing CTEW and non-CTEW.

Results: CTEW were 5.6% (n=16,610) of the sample. Compared to non-CTEW, CTEW were significantly more likely to report past-month marijuana (12.3% vs. 7.5%), cocaine (1.8% vs. 0.8%), and/or NPO use (3.4% vs. 2.0%; *Ps*<.001). Among CTEW, past-week unemployment and working for ≥3 employers was associated with increased odds of marijuana and NPO use. Missing 1–2 days in the past month because the participant did not want to go into work was associated with increased odds for use of marijuana, cocaine, and NPO use. Missing 3–5 days of work in the past month because sick or injured was associated with double the odds (aOR=2.00 [95% CI: 1.33–3.02]) of using NPO. Having written drug policies was associated with reduced odds for cocaine use, and workplace tests for drug use during hiring and random drug testing were also associated with lower odds of marijuana use.

Conclusions: CTEW are a high-risk population for drug use. Precarious employment is associated with higher prevalence of drug use while some workplace drug policies were associated

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Contributors

D.C. Ompad conceived of the study, designed the analyses and led the writing of the manuscript. J.J. Palamar conducted the analyses and contributed to writing the manuscript. R.R. Gershon and S. Sandh both contributed to writing the manuscript. P. Acosta conducted analyses. All authors reviewed and approved the final manuscript.

Conflict of Interest

No conflict declared.

with lower prevalence. Coupled with reports of high overdose mortality among CTEW, these findings suggest that prevention and harm reduction programming is needed to prevent drug-related morbidity and mortality among CTEW.

Keywords

Construction Workers; Extraction Workers; Drug Use; Marijuana; Cocaine; Nonmedical Prescription Opioid Use

1. Introduction

The construction and mining/extraction industries are among the largest industrial sectors in the US. As of June 2019, there were approximately 7.5 million and 758,000 wage- or self-employed workers, respectively (Bureau of Labor Statistics, 2019). These workers have high injury and fatality rates; in 2017, the nonfatal injury rate among construction trade and extraction workers (CTEW) was 3.1 and 1.5 per 100 full-time workers, respectively (Bureau of Labor Statistics, 2017) and 18.9% of all worker deaths occurred among CTEW (Bureau of Labor Statistics, 2018).

The well-documented hazards to CTEW safety and health include fatal and non-fatal injuries such as slips, trips and falls, electrocution, musculoskeletal disorders from overexertion, being struck by or caught in heavy machinery, and chronic health conditions from exposure to toxic chemicals (Bentley et al., 2006; Bureau of Labor Statistics, 2018; Ringen et al., 1995; Schneider, 2001; Welch et al., 2000). Musculoskeletal disorders in particular can lead to treatment and self-treatment with pain medication, including opioids (Webster et al., 2007). A study of industrial workers in a specialty metals corporation, who like CTEW are at risk of acute occupational and repetitive strain injuries, found that receiving at least one opioid prescription increased from 10.5% in 2003 to 18.7% in 2013 (Pensa et al., 2018). Another study suggested that laborers and related workers are significantly more likely to have long-term opioid treatment for work-related injuries (Berecki-Gisolf et al., 2014).

CTEW are at increased risk for substance use and disorders. Individuals in construction occupations have higher likelihood of binge drinking (Prins et al., 2019; Strickland et al., 2017); heavy alcohol use (Prins et al., 2019); and medical and recreational marijuana use (Rineer et al., 2018) as compared to workers in other industries. Moreover, substance use is an important risk factor for work-related injuries among CTEW, with lifetime cocaine (but not marijuana) use (Dong et al., 2015) and frequent psychotropic drug use for headaches, tiredness, nervousness or anxiety, and/or insomnia (Bhattacherjee et al., 2007) associated with a 15–16% and 70% increased odds of injury, respectively. In an analysis of workers compensation records in Washington state, substance abuse diagnoses have also been found to be associated with a 1.9 increased risk of injury among 25–34 year olds (Pollack et al., 1998).

Between 2016 and 2017, fatal unintentional overdoses due to nonmedical use of drugs or alcohol while at work (all types) increased by 25% (Bureau of Labor Statistics, 2018); recent studies suggest that construction workers may be at particularly high risk. In Massachusetts, CTEW opioid-related overdose death rate was 150.6 per 100,000 – six times higher than the

average (25.1 per 100,000) (Massachusetts Department of Public Health and Occupational Health Surveillance Program, 2018). In Ohio, construction workers were seven times more likely than other workers to die from an opioid overdose between 2010–2016 (Dissell, 2018). In an analysis of the National Occupational Mortality Surveillance (NOMS), proportional mortality ratios (PMR) from drug overdose are significantly above one for construction (PMR = 1.25) and extraction workers (PMR = 1.16), with elevated PMR also observed among different occupational subgroups including supervisors and managers, trade workers, trade helpers, and other construction related workers (Harduar Morano et al., 2018).

Most studies that have examined drug use and its consequences among CTEW have done so among samples of CTEW (cf., Olbina et al., 2011; Pollack et al., 1998; Schofield et al., 2013; Strickland et al., 2017) or workers' compensation claims (Berecki-Gisolf et al., 2014); comparative studies (i.e., by occupation) and studies with population-based samples are rarer (Harduar Morano et al., 2018). The extent and correlates of drug use, and particularly nonmedical prescription opioid (NPO) use, among CTEW are not well characterized in representative population samples or relative to other occupational groups. Using a decade worth of data from nationally representative samples of US adults, we estimated the prevalence of current (past-month) marijuana, cocaine, and NPO use, as these are among the three most common drugs (or drug categories) used in the US (Substance Abuse and Mental Health Services Administration, 2018). We further compared prevalence of drug use between CTEW and non-CTEW and examined workplace and work-related behavioral correlates of drug use among CTEW in order to inform prevention efforts.

2. Methods

2.1. Study Design and Participants

Data were analyzed from adults (ages ≥18) surveyed in the 2005–2014 National Surveys on Drug Use and Health (NSDUH; N=293,492) who reported being employed or unemployed (in the past week). NSDUH is an annual cross-sectional survey of non-institutionalized individuals in the 50 US states and the District of Columbia. The sampling frame each year was obtained in four stages. All participants provided informed consent and were compensated for their participation (Substance Abuse and Mental Health Services Administration, 2013). Surveys were administered via computer-assisted interviewing (which was administered by an interviewer) and audio computer-assisted self-interviewing in which participants were provided with a computer and headphones and asked to complete the survey. Interviewers were trained to not look at the screens in order to maintain privacy and confidentiality and to increase honest reporting. RTI's Institutional Review Board approved all aspects of the study. We focused on the last ten cohorts that were asked about their occupation; this question was excluded from surveys after 2014. Response rates ranged from 71.2%−76.0%. Sampling weights were provided by NSDUH to address unit- and individual-level non-response and additional information on methodology can be found elsewhere (Center for Behavioral Health Statistics and Quality, 2015).

2.2. Measures

2.2.1. Demographic Data.—Participants were asked about their age (18–25, 26–34, 35–49, 50–64, or ≥65 years), sex (male or female), race/ethnicity (white [non-Hispanic], black [non-Hispanic], Hispanic, or other/mixed race), educational attainment (less than high school diploma, high school diploma or its equivalent, some college, or college degree or higher), annual family income (<$20,000, $20,000-$49,999, $50,000-$74,999, or ≥$75,000), marital status (married, widowed, divorced, or never married), and whether they had health insurance.

2.2.2. Employment and Occupation Data.—In terms of employment and occupation, participants were asked whether they were employed in the past week; response options were worked full-time, worked part-time, has a job but did not work in the past week, unemployed or laid off, disabled, keeping house full-time, in school/training, and retired. We utilized an imputation-revised employment variable which allowed us to compare those who are currently employed to those who reported an occupation but are currently employed in a clean manner. Participants were asked, “What kind of work do you do? That is, what is your occupation?” NSDUH provided data on participant occupation classified into 14 categories including CTEW. Those with multiple jobs were asked to describe one job. Respondents then answered multiple follow-up questions about their employment including what type of organization or company they worked for (recoded into private, government, and self-employed) and how many people work at their organization (<10, 10–24, 25–99, 100–499, or ≥500 people). Participants were asked how many hours they worked in the past week (responses coded into 0–20, 21–40, 41–60, and ≥60 hours). They were also asked how many days in the past 30 they missed work because of 1) illness or injury, and 2) because they “just didn’t want to be there” (responses coded into 0, 1–2, 3–5, and ≥6 days).

Respondents indicating an occupation were also asked about workplace alcohol and drug policies. They were first asked if there is a written policy about employee use of alcohol or drugs, whether they have ever been given educational information about alcohol or drug use, and whether they have access to employee assistance programs or counseling for employees with alcohol or drug problems. There were also questions on workplace drug screening and testing. Specifically, they were asked if their workplace ever tested its employees for alcohol or drug use, whether testing was part of the hiring process, whether random testing was administered, and workplace policies regarding positive drug test results. Response options for positive drug testing were: handled on an individual basis, termination, referral to treatment or counseling, and nothing or something else.

2.2.3. Drug Use.—Respondents were asked about past-month use of a variety of drugs, which NSDUH defines as “current” use (Substance Abuse and Mental Health Services Administration, 2018). For this analysis, we focused on self-reported use of marijuana, cocaine, and NPO. NPO use was defined as using a prescription pain-killer (opioid) when not prescribed or only for the experience or feeling it caused. Participants were shown cards with images of over two-dozen opioid products/formulations in reference to NPO. Past-month use of each drug was examined as binary (yes/no) variables in all analyses. The

reliability of these measures has been well-documented (Harrison et al., 2007; Substance Abuse and Mental Health Services Administration, 2010).

2.3 Analyses

We first estimated and compared prevalence of past-month marijuana, cocaine, and NPO use between those reporting an occupation in construction/extraction and those who did not. These comparisons were computed using chi-square. We next examined these associations in a multivariable manner—determining whether construction/extraction work (as a dichotomous indicator variable) was significantly associated with past-month use of each drug. Separate logistic regression models were used to examine each drug outcome. All multivariable models controlled for age, sex, race/ethnicity, educational attainment, and marital status. Survey year was also included in all multivariable models to adjust for any potential cohort effects or secular trends in drug use. We then estimated prevalence of use of each drug according to each occupation, and compared whether CTEW were at differential risk of drug use compared to other occupations (i.e., executive/administrative/managerial/financial occupations), controlling for the covariates previously noted. Finally, among CTEW, using separate logistic regression models (controlling for the aforementioned covariates), we examined whether factors assessed via work-related follow-up questions were related to past-month drug use. All models were adjusted for the complex survey design and used sample weights (provided by NSDUH) to account for oversampling of young participants and non-response to derive nationally representative estimates (Heeringa et al., 2010). Data were analyzed using Stata 13 SE (StataCorp, 2013). This secondary analysis was exempt for review by the New York University Langone Medical Center Institutional Review Board.

3. Results

Table 1 presents sample characteristics. CTEW were generally younger and more likely to be male, Hispanic, have lower educational attainment, and make between $20,000 and $49,999 annually as compared to those who do not work in construction/extraction. CTEW were less likely to have health insurance. All differences between CTEW and non-CTEW were statistically significant (all *Ps*<.001). It should be noted that the proportion of CTEW decreased across years (p for trend < .001).

Compared to non-CTEW, CTEW were significantly more likely to report past-month marijuana (12.3% [95% CI: 11.7–13.0] vs. 7.5% [95% CI: 7.4–7.7]; *P*<.001), cocaine (1.8% [95% CI: 1.5–2.1] vs. 0.8% [95% CI: 0.7–0.8]; *P*<.001), and NPO use (3.4% [95% CI: 3.0–3.7] vs. 2.0% [95% CI: 1.9–2.1]; *P*<.001) (Figure 1). In the multivariable models controlling for demographic characteristics, compared to non-CTEW, CTEW were at higher odds for reporting past-year marijuana (aOR=1.38 [95% CI: 1.28–1.49]; *P*<.001), cocaine (aOR=1.64 [95% CI: 1.33–2.03]; *P*<.001), and NPO use (aOR=1.34 [95% CI: 1.21–1.50]; *P*<.001).

Table 2 compares prevalence estimates between CTEW and the other 13 occupations. CTEW had the second highest estimated prevalence of past-month marijuana use (12.3%) after those in service occupations (12.4%). CTEW had highest estimated prevalence of past-month cocaine use (1.8%) and NPO use (3.4%) as compared to all other occupations.

Compared to those working in executive/administrative/managerial/financial occupations, CTEW had 40% increased odds for current marijuana use (95% CI: 1.28–1.54), 45% increased odds for current cocaine use (95% CI: 1.11–1.91), and 49% increased odds for current NPO use (95% CI: 1.25–1.78).

Associations between past-month drug use among CTEW and work-related characteristics are reported in Table 3. After controlling for age, sex, race/ethnicity, educational attainment, and marital status, being unemployed in the past week and working for three or more employers was associated with increased odds of marijuana and NPO use, and missing 1–2 days in the past 30 because the participant did not want to go into work was associated with increased odds for use of marijuana, cocaine, and NPO use. Missing 3–5 days of work in the past 30 because sick or injured was associated with double the odds (aOR=2.00 [95% CI: 1.33–3.02]) of using NPO.

Associations between drug use and workplace drug policies among CTEW, controlling for age, sex, race/ethnicity, educational attainment, and marital status, are presented in Table 4. Having a written drug policy was associated with reduced odds for cocaine use (aOR=0.57, [95% CI: 0.34–0.97]), and having a workplace that tests for alcohol use was associated with lower odds for marijuana use (aOR=0.66, [95% CI: 0.50–0.87]). Workplace tests for drug use during the hiring process (aOR=0.66, 95% CI: 0.47–0.94]) and random drug testing at the workplace (aOR=0.54, 95% CI: 0.40–0.72]) were both also associated with lower odds of marijuana use. Finally, with regard to how positive drug tests are handled, those reporting they would be fired were at lower odds for marijuana use (aOR=0.69, 95% CI: 0.50–0.96]) and those reporting that nothing or something else (not listed) would happen (aOR=1.92, 95% CI: 1.06–3.46]) were at increased odds for marijuana use.

4. Discussion

We estimate that in 2005–2014, CTEW in the US were significantly more likely to report past-month marijuana, cocaine, and NPO compared to other workers. These findings are consistent with previous literature reporting that the most common drugs used among CTEW are marijuana followed by cocaine (Hersch et al., 2002; Olbina et al., 2011). The reasons for the elevated prevalence of drug use among CTEW cannot be completely elucidated in the NSDUH, as there are no data available on some key risk factors such as injury or stress. CTEW may be more likely to use pain-relieving substances such as opioids and marijuana due to the labor intensive nature of their work as well as high rates of injuries (Bunn et al., 2014; Zhang and Snizek, 2003). Among truck drivers, cocaine use has been associated with managing fatigue and being paid based on productivity (Williamson, 2007). CTEW also deal with fatigue and productivity-based payments as well as other job-related stressors (Ajslev et al., 2015; Loosemore and Waters, 2004; Zhang et al., 2015). Studies have demonstrated that performance-based pay is associated with work stress and injuries (Ganster et al., 2011).

In examining work-related correlates of drug use among CTEW, precarious employment appears to be a potential risk factor for drug use. This is suggested by increased odds of drug use among those who were unemployed and had more employers (e.g., a proxy for being

laid off, fired, or seasonal, part-time, and/or temporary work). Collectively, this suggests CTEW who face precarious employment are at higher risk for drug use. This is also supported by previous literature which illustrates that precarious employment such as temporary employment, job changes, and unemployment are associated with the use of antidepressants (Virtanen et al., 2008), marijuana, alcohol (Kandel and Yamaguchi, 1987), and tobacco (Melchior et al., 2015).

Workplace drug policies were more "protective" against marijuana use than cocaine or NPO. Specifically, workplace alcohol testing, drug testing during the hiring process, random drug testing, and working for an employer that fires employees with a positive drug test, were all associated with lower odds of marijuana use. This is consistent with previous literature demonstrating workplace drug testing by construction companies has been associated with lower levels of marijuana use (Carpenter, 2007). Work policies on drug testing may also have an added health impact as drug use is associated with work injuries (Carpenter, 2007; Olbina et al., 2011). Drug testing is associated with decreases in accidents (Gerber and Yacoubian, 2002; Minchin et al., 2006; Olbina et al., 2011), and consequently results in monetary savings because companies may pay lower premiums for workers compensation insurance (Gerber and Yacoubian, 2002; Minchin et al., 2006; Olbina et al., 2011). Companies that have drug testing policies have also been shown to have increased productivity and quality of the work produced as well as lower employee turnover (Gerber and Yacoubian, 2002).

Marijuana use may be particularly sensitive to workplace drug policies for reasons related to prevalence and detection of drugs. First, marijuana is the most frequently detected drug among CTEW (Hersch et al., 2002; Olbina et al., 2011). Second, smoked marijuana often has a noticeable and distinctive odor (Declues et al., 2018) that can linger on clothing and in hair. Thus, it may be that those who smoke marijuana may be more likely to be tested or approached with educational materials in the workplace. Third, drugs have different detection times in urine tests. Depending on frequency of use, marijuana can be detected for many days or even weeks post-use, compared to ≤3 days for other common drugs such as cocaine and various opioids (Jufer et al., 2006; Oyler et al., 2000; Smith-Kielland et al., 1999). Thus, there is more opportunity to detect marijuana use as compared to cocaine and NPO. Not all studies, however, suggest that drug testing is effective. One study, for example, found slightly lower and nonsignificant levels of injury associated with drug testing programs in small construction agencies (Schofield et al., 2013). It is important to note that drug testing in the workplace has also been contested as it might threaten employees' rights to privacy. Many states have passed medical marijuana legislation (at this writing, 34 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands) (National Conference of State Legislatures, 2019b) and 10 states and the District of Columbia have legalized recreational marijuana for adults (National Conference of State Legislatures, 2019a); thus, CTEW may test positive for medical use of marijuana and/or opioids. Interestingly, NPO use was not associated with any of the workplace drug policies in the NSDUH data. This may be because testing positive for opioids can be attributed to drugs prescribed for pain (Smith, 2014). We also did not have data on whether nonmedical use was related to prescribed opioids. In the high-risk setting of construction/extraction work, where safe handling of potentially hazardous tools and equipment is important in reducing harm for

workers, co-workers, and onlookers, drug testing may have a role in reducing risk. However, strict workplace drug policies also have the potential to harm companies as it may result in understaffing and difficulty fulfilling contractual obligations (Gerber and Yacoubian, 2002).

4.1. Limitations

NSDUH has not asked participants about occupation since the 2014 survey so we did not have access to more current data. Therefore, results should be interpreted with caution as the drug landscape has changed in more recent years. Individuals living in non-institutionalized group quarters (e.g., shelters, dormitories), military bases, hospitals, or jails/prisons and homeless individuals who do not use shelters were not surveyed, which can limit generalizability. Educational attainment is likely underestimated as the NSDUH does not ask about trade or vocational schools. Individuals could have engaged in NPO use for “medical” reasons (e.g., to self-treat pain), whether or not the drug was prescribed, so it should not be assumed that use was to get ‘high’ (Palamar, 2018). The NSDUH does disaggregate by construction trade vs. extraction work or occupation vs. position, so analyses were limited to comparisons between those who do construction trade or extraction work as compared to those who do not. Risk for injuries and drug use vary by occupation or position; for example, construction/extraction managers are at lower risk for injuries. There were no data on injuries or pain levels and therefore two important risk factors for substance use among CTEW could not be examined. Relatedly, data on paid sick leave were also not available. Data on timing of drug use (i.e., use on non-workdays; before, during, and/or after work) were also not available and thus drug use as a risk factor for work-related injuries could also not be assessed. However, we examined “current” (past-month) use so we believe that in most cases use occurred during employment. Data were cross-sectional so temporal associations could not be deduced.

5. Conclusions

We estimate higher prevalence of marijuana, cocaine, and NPO use among CTEW in the US. CTEW who are more precariously employed were more likely to report drug use while those working in companies with drug and alcohol-related policies were less likely to use some of these drugs—particularly marijuana. Coupled with reports of increasing overdose mortality among this occupational group (Dissell, 2018; Harduar Morano et al., 2018; Massachusetts Department of Public Health and Occupational Health Surveillance Program, 2018), these findings suggest that prevention and harm reduction programming is needed to prevent drug-related morbidity and mortality. Moreover, given the limited amount of research in this area, future studies are needed to determine additional risk factors for drug use among CTEW as well as the effectiveness of either workplace or individual-level harm reduction strategies that are implemented in this high risk workgroup.

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Highlights

- We examined marijuana, cocaine, and non-prescription opioid use.
- Drug use prevalence was higher among construction trade/extraction workers (CTEW).
- Precarious employment was associated with increased odds of marijuana and NPO use.
- Absenteeism was associated with increased odds of marijuana, cocaine, and NPO use.
- Written workplace drug policies were associated with reduced odds for cocaine use.
- Workplace drug testing was associated with lower odds of marijuana use.

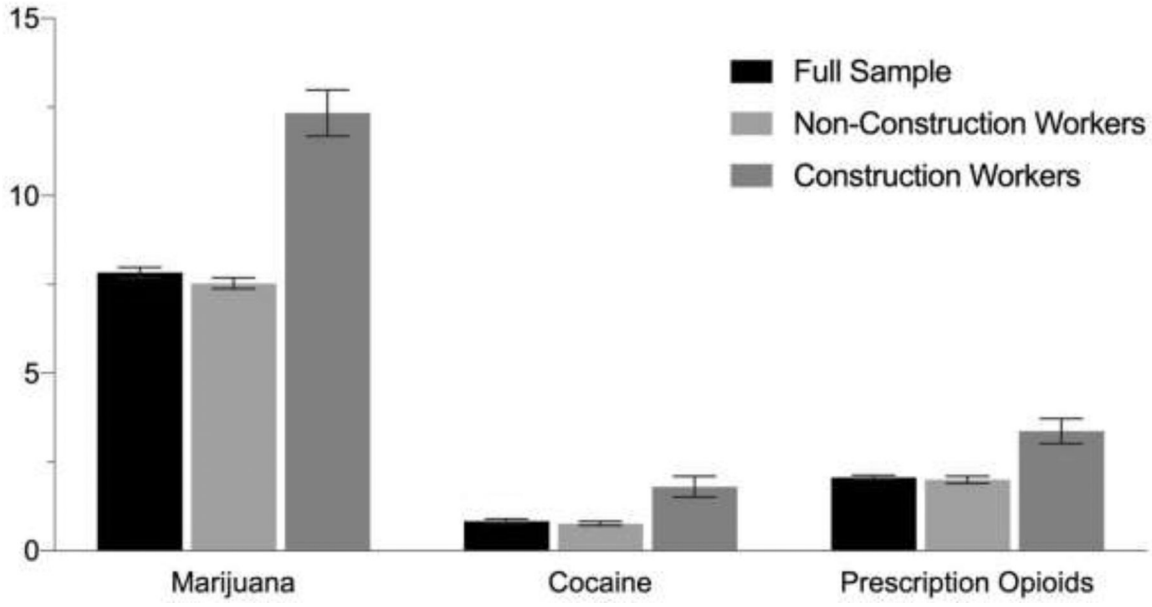

Figure 1.
Prevalence estimates of past-month drug use among 293,492 adults in the US by construction trade/extraction work, 2005–2014.

Table 1.

Demographic characteristics of 293,492 US adults aged ≥ 18 years who worked in the past week stratified by construction trade/extraction work, 2005–2014

	Full Sample (*N*= 293,492)		Non-Construction Workers (*N*= 276,882)		Construction Workers (*N*= 16,610)	
	Unweighted *N*	Weighted % (95% CI)	Unweighted *N*	Weighted % (95% CI)	Unweighted *N*	Weighted % (95% CI)
Survey Year						
2005	29,035	9.7 (9.5–9.9)	27,031	9.6 (9.4–9.8)	2,004	11.2 (10.4–12.1)
2006	28,731	9.8 (9.6–9.9)	26,677	9.7 (9.5–9.8)	2,054	11.7 (10.9–12.5)
2007	29,352	9.8 (9.6–10.0)	27,364	9.7 (9.5–9.9)	1,988	11.5 (10.7–12.5)
2008	29,434	10.0 (9.8–10.2)	27,600	10.0 (9.7–10.2)	1,834	10.6 (9.8–11.5)
2009	29,219	10.0 (9.8–10.2)	27,695	10.0 (9.8–10.3)	1,524	9.6 (8.8–10.4)
2010	29,976	10.0 (9.9–10.3)	28,544	10.1 (9.9–10.3)	1,432	8.6 (7.8–9.3)
2011	29,362	10.0 (9.8–10.3)	27,865	10.1 (9.8–10.3)	1,497	9.3 (8.6–10.0)
2012	28,621	10.2 (10.0–10.4)	27,321	10.2 (10.0–10.5)	1,300	8.8 (8.0–9.6)
2013	28,323	10.2 (10.0–10.4)	29,964	10.3 (10.0–10.5)	1,359	9.1 (8.4–9.8)
2014	31,439	10.3 (10.1–10.5)	29,821	10.4 (10.2–10.6)	1,618	9.6 (9.0–10.2)
Age Group, y						
18–25	142,278	16.5 (16.3–16.7)	134,774	16.6 (16.4–16.8)	7,504	15.1 (14.6–15.6)
26–34	49,507	19.1 (18.9–19.4)	46,162	18.9 (18.7–19.1)	3,345	23.3 (22.3–24.3)
35–49	69,403	33.5 (33.2–33.7)	65,167	33.3 (33.0–33.6)	4,236	36.7 (35.5–37.8)
50–64	26,980	25.6 (25.2–26.0)	25,638	25.8 (25.4–26.2)	1,342	22.1 (21.0–23.4)
≥65	5,324	5.3 (5.1–5.5)	5,141	5.4 (5.2–5.6)	183	2.8 (2.3–3.4)
Sex						
Male	146,680	52.9 (52.6–53.2)	130,526	50.3 (50.0–50.6)	16,154	97.4 (97.0–97.8)
Female	146,812	47.1 (46.8–47.4)	146,356	49.7 (49.4–50.0)	456	2.6 (2.2–3.0)
Race/Ethnicity						
White	187,389	66.6 (66.2–67)	176,976	66.8 (66.4–67.2)	10,413	63.5 (62.3–64.7)
Black	36,031	11.7 (11.5–12.0)	35,032	12.0 (11.7–12.3)	999	7.2 (6.6–7.8)
Hispanic	46,027	14.8 (14.5–15.1)	41,745	14.1 (13.8–14.4)	4,282	26.3 (25.3–27.5)
Other	24,045	6.9 (6.6–7.1)	23,129	7.1 (6.9–7.3)	916	3.0 (2.6–3.4)
Educational Attainment						

	Full Sample (*N*= 293,492)		Non-Construction Workers (*N*= 276,882)		Construction Workers (*N*= 16,610)	
	Unweighted *N*	**Weighted % (95% CI)**	**Unweighted *N***	**Weighted % (95% CI)**	**Unweighted *N***	**Weighted % (95% CI)**
Less than High School	41,244	11.6 (11.4–11.8)	36,262	10.7 (10.5–10.8)	4,982	27.7 (26.7–28.8)
High School Diploma	93,752	29.0 (28.7–29.3)	86,477	28.1 (27.7–28.4)	7,275	44.4 (43.2–45.7)
Some College	87,828	27.4 (27.1–27.7)	84,434	27.8 (27.5–28.1)	3,394	20.5 (19.5–21.5)
College Degree or Higher	70,668	32.0 (31.7–32.4)	69,709	33.5 (33.1–33.9)	959	7.4 (6.7–8.1)
Annual Family Income						
<$20,000	150,453	33.4 (33.1–33.7)	143,287	33.4 (33.1–33.7)	7,166	32.7 (31.5–34.0)
$20,000–$49,999	97,359	38.7 (38.4–39.0)	90,207	38.2 (37.9–38.6)	7,152	46.6 (45.1–48.1)
$50,000–$74,999	25,169	14.0 (13.8–14.2)	23,688	14.1 (13.8–14.3)	1,481	13.2 (12.2–14.2)
>$75,000	20,511	13.9 (13.6–14.2)	19,700	14.3 (14.0–14.6)	811	7.5 (6.7–8.4)
Employed in Past Week						
No	28,948	6.8 (6.7–7.0)	28,531	7.1 (7.0–7.3)	417	1.7 (1.5–2.0)
Yes	264,544	93.2 (93.0–93.3)	28,531	92.9 (92.7–93.0)	16,193	98.3 (98.0–98.5)
Marital status						
Married	106,792	54.1 (53.7–54.5)	100,253	54.1 (53.7–54.5)	6,539	54.5 (53.2–55.7)
Widowed	3,167	2.2 (2.1–2.4)	3,074	2.3 (2.2–2.4)	93	1.1 (0.8–1.4)
Divorced	27,265	13.7 (13.5–14.0)	25,588	13.7 (13.4–13.9)	1,677	14.8 (13.9–15.9)
Never Married	156,268	29.9 (29.6–30.2)	147,967	29.9 (29.6–30.2)	8,301	29.6 (28.6–30.7)
Health Insurance						
No	63,839	17.5 (17.3–17.8)	57,362	16.5 (16.2–16.7)	6,477	35.0 (33.7–36.4)
Yes	229,653	82.5 (82.2–82.7)	219,520	83.5 (83.3–83.8)	10,133	65.0 (63.6–66.3)

Note. All characteristics were significantly different between construction workers and non-construction workers (all *Ps* < .001).

Table 2.

Prevalence and adjusted odds ratios for past-month marijuana, cocaine, and nonmedical prescription opioid use among 293,492 US adults aged ≥ 18 years who worked in the past week by occupation, 2005–2014

	Marijuana Use		Cocaine Use		Nonmedical Prescription Opioid Use	
	Prevalence, Weighted %	**aOR (95% CI)**	**Prevalence, Weighted %**	**aOR (95% CI)**	**Prevalence, Weighted %**	**aOR (95% CI)**
Executive/Administrative/Managerial/Financial	5.6 (5.2–6.0)	1.00	0.6 (0.5–0.8)	1.00	1.4 (1.2–1.6)	1.00
Professional (not Education/ Entertainment/ Media)	4.1 (3.7–4.4)	0.72 (0.64–0.81)[c]	0.4 (0.3–0.5)	0.59 (0.40–0.86)[b]	1.1 (0.9–1.4)	0.87 (0.68–1.11)
Education and Related Occupations	4.2 (3.8–4.7)	0.80 (0.69–0.93)[b]	0.3 (0.2–0.4)	0.46 (0.31–0.69)[c]	0.9 (0.7–1.2)	0.67 (0.51–0.89)[b]
Entertainers, Sports, Media, and Communications	11.4 (10.4–12.6)	1.64 (1.42–1.90)[c]	1.0 (0.7–1.4)	1.08 (0.72–1.63)	1.7 (1.3–2.2)	0.99 (0.73–1.35)
Technicians and Related Support Occupations	5.6 (4.9–6.3)	0.81 (0.69–0.95)[b]	0.3 (0.2–0.5)	0.42 (0.26–0.68)[b]	1.9 (1.6–2.2)	1.09 (0.88–1.36)
Sales Occupations	8.8 (8.3–9.3)	1.14 (1.02–1.27)[a]	0.8 (0.7–1.0)	0.92 (0.68–1.25)	2.1 (1.9–2.4)	1.13 (0.94–1.36)
Office & Administrative Support Workers	6.3 (6.0–6.6)	0.97 (0.88–1.07)	0.5 (0.4–0.6)	0.70 (0.51–0.97)[a]	1.6 (1.4–1.8)	0.95 (0.77–1.17)
Protective Service Occupations	3.4 (2.9–4.1)	0.39 (0.31–0.47)[c]	0.3 (0.2–0.5)	0.32 (0.17–0.62)[b]	1.3 (1.0–1.8)	0.73 (0.52–1.04)
Service Occupations, Except Protective	12.4 (11.9–12.9)	1.50 (1.37–1.65)[c]	1.4 (1.2–1.5)	1.35 (1.04–1.75)[a]	3.1 (2.9–3.3)	1.43 (1.21–1.70)[c]
Farming, Fishing, & Forestry Occupations	6.4 (5.0–8.3)	0.78 (0.60–1.03)	0.8 (0.4–1.5)	0.81 (0.43–1.52)	2.3 (1.5–3.5)	1.15 (0.72–1.82)
Installation, Maintenance & Repair Workers	8.0 (7.2–9.0)	0.92 (0.78–1.08)	0.6 (0.5–0.9)	0.60 (0.41–0.88)[b]	2.1 (1.7–2.7)	1.05 (0.79–1.39)
Construction Trades & Extraction Workers	**12.3 (11.7–13.0)**	**1.40 (1.28–1.54)[c]**	**1.8 (1.5–2.1)**	**1.45 (1.11–1.91)[b]**	**3.4 (3.0–3.7)**	**1.49 (1.25–1.78)[c]**
Production, Machinery Setters/Operators/Tenders	7.0 (6.5–7.6)	0.89 (0.79–1.0)	0.8 (0.6–0.9)	0.79 (0.60–1.05)	2.1 (1.8–2.4)	1.06 (0.86–1.32)
Transportation & Material Moving Workers	7.5 (6.9–8.2)	0.85 (0.74–0.97)[a]	0.8 (0.7–1.1)	0.82 (0.59–1.15)	2.3 (2.0–2.6)	1.13 (0.93–1.37)

Note. aOR: adjusted odds ratio (controlling for year of survey, age, sex, race, marital status, and educational attainment); CI: confidence interval.

[a] p < .05,

[b] p < .01,

[c] p <.001

Table 3.

Work-related characteristics in relation to prevalence of past-month drug use among 16,610 construction trade/extraction workers in the US, 2005–2014

	Marijuana aOR (95% CI)	Cocaine aOR (95% CI)	Prescription Opioids aOR (95% CI)
Unemployed in Past Week			
No	1.00	1.00	1.00
Yes	1.88 (1.10–3.20)[c]	1.67 (0.57–4.90)	2.25 (1.07–4.70)[a]
Number of Hours Worked Last Week			
1–20 hours	1.00	1.00	1.00
21–40 hours	1.06 (0.82–1.37)	1.10 (0.57–2.14)	1.21 (0.81–1.81)
41–60 hours	0.83 (0.63–1.11)	0.60 (0.31–1.16)	1.13 (0.70–1.82)
≥60 hours	0.77 (0.48–1.22)	0.87 (0.34–2.20)	0.74 (0.36–1.51)
Number of Employers in Past Year			
One	1.00	1.00	1.00
Two	1.33 (1.08–1.65)[b]	1.10 (0.77–1.56)	1.31 (0.91–1.88)
Three or More	1.74 (1.40–2.15)[a]	1.50 (0.93–2.43)	1.56 (1.14–2.15)[b]
Organization or Business Type			
Private	1.00	1.00	1.00
Government	0.78 (0.52–1.18)	0.79 (0.29–2.12)	0.63 (0.33–1.22)
Self–Employed	0.94 (0.75–1.18)	1.35 (0.87–2.10)	0.75 (0.51–1.09)
Number of Days Missed because Sick or Injured (in Past 30)			
0	1.00	1.00	1.00
1–2	1.13 (0.90–1.42)	0.87 (0.53–1.41)	1.00 (0.71–1.40)
3–5	1.14 (0.81–1.61)	1.50 (0.73–3.10)	2.02 (1.23–3.32)[b]
≥6	1.09 (0.63–1.87)	1.20 (0.53–2.73)	1.79 (0.82–3.91)
Number of Days Missed because Did Not Want to Go In (in Past 30)			
0	1.00	1.00	1.00
1–2	1.85 (1.36–2.52)[a]	2.21 (1.28–3.81)[b]	2.00 (1.33–3.02)[b]
3–5	1.76 (1.10–2.83)[c]	1.29 (0.57–2.91)	1.14 (0.66–1.96)
≥6	1.09 (0.54–2.21)	2.60 (0.84–8.03)	1.71 (0.60–4.89)

	Marijuana aOR (95% CI)	Cocaine aOR (95% CI)	Prescription Opioids aOR (95% CI)
Number of People Employed by Employer			
<10 people	1.00	1.00	1.00
10–24 people	0.82 (0.66–1.03)	1.52 (0.96–2.41)	1.10 (0.76–1.59)
25–99 people	0.85 (0.66–1.09)	1.52 (0.82–2.81)	0.77 (0.49–1.21)
100–499 people	0.89 (0.57–1.39)	1.16 (0.55–2.45)	0.62 (0.34–1.13)
500 people	0.77 (0.45–1.31)	1.72 (0.44–6.71)	0.78 (0.34–1.79)

Note. aOR: adjusted odds ratio (controlling for year of survey, age, sex, race, marital status, and educational attainment); CI: confidence interval. We added a category for 0 hours worked in the past week to prevent listwise deletion of those currently unemployed (aOR not generated or presented as we include a variable indicating whether the individual is employed).

[a] p < .05,

[b] p < .01,

[c] p <.001

Table 4.

Workplace alcohol and drug policies in relation to prevalence of past-month drug use among 16,610 construction trade/extraction workers in the US, 2005–2014

	Marijuana aOR (95% CI)	Cocaine aOR (95% CI)	Prescription Opioids aOR (95% CI)
Written Workplace Drug Policy			
No	1.00	1.00	1.00
Yes	0.99 (0.81–1.20)	0.57 (0.34–0.97)[a]	0.76 (0.53–1.08)
Given Drug Education at Work			
No	1.00	1.00	1.00
Yes	1.00 (0.79–1.26)	1.26 (0.70–2.29)	0.79 (0.56–1.13)
Help Available at Work for Drug Problems			
No	1.00	1.00	1.00
Yes	0.90 (0.69–1.18)	0.67 (0.28–1.57)	0.95 (0.64–1.40)
Workplace Ever Tests for Drug Use			
No	1.00	1.00	1.00
Yes	0.88 (0.26–3.03)	0.24 (0.03–2.06)	0.78 (0.11–5.82)
Workplace Ever Tests for Alcohol Use			
No	1.00	1.00	1.00
Yes	0.66 (0.50–0.87)[b]	0.42 (0.21–0.82)[a]	0.76 (0.51–1.14)
Workplace Tests for Drug Use During Hiring Process			
No	1.00	1.00	1.00
Yes	0.66 (0.47–0.94)[c]	1.82 (0.74–4.48)	1.52 (0.90–2.57)
Random Drug Testing at Workplace			
No	1.00	1.00	1.00
Yes	0.54 (0.40–0.72)[a]	0.85 (0.52–1.36)	0.89 (0.57–1.40)
Outcome if Test Positive for Drug Use at Workplace			
Handle on Individual Basis	1.00	1.00	1.00
Fired	0.69 (0.50–0.96)[c]	0.81 (0.42–1.54)	0.86 (0.47–1.56)
Referred for Help	0.95 (0.62–1.43)	0.50 (0.18–1.41)	0.75 (0.37–1.53)

	Marijuana aOR (95% CI)	Cocaine aOR (95% CI)	Prescription Opioids aOR (95% CI)
Other or Nothing	1.92 (1.06–3.46)[c]	0.66 (0.09–4.67)	0.76 (0.28–2.08)

Note. aOR: adjusted odds ratio (controlling for year of survey, age, sex, race, marital status, and educational attainment); CI: confidence interval. We included a missing data indicator for the three last workplace drug testing variables to prevent those coded by NSDUH as "legitimate skip" from being listwise deleted (aORs for legitimate skip not presented).

[a] p < .05,

[b] p < .01,

[c] p <.001