

Comparisons of Drug Use, Workplace Drug Policy, and Utilization of Drug Rehabilitation Services among Construction Workers and their Non-Construction Work Counterparts

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Abstract

Aim: To compare the association between past-year drug use disorder and utilization of drug rehabilitation services between construction trade and extraction workers (CTEW) and other workers as well as examine time trends in past-year drug use disorder and utilization of rehabilitation services among CTEW between 2004 and 2014.

Methods: These analyses used an aggregated sample of the National Survey Drug Use and Health (NSDUH) from 2004 to 2014 (N= 321,145). Past-year drug use disorder was determined by survey questions using DSM-IV criteria. Past-year utilization of drug rehabilitation services was based on self-reported drug or alcohol treatment/counseling received. Logistic regression was used to compare CTEW and non-CTEW with regard to past-year drug use disorder and past-year utilization of drug rehabilitation services utilization among those with past-year drug use disorder. Logistic regression was also used to examine time trends among CTEW focusing on trends in the odds of past-year drug use disorder among CTEW and past-year utilization of drug rehabilitation service utilization among CTEW with a past-year drug use disorder.

Results: Prevalence of drug use disorder was higher among CTEW (4.9%) as compared to other workers (2.7%; OR: 1.83; 95% CI: 1.67, 2.00). Among those with past-year drug use disorder, utilization of drug rehabilitation services was higher among CTEW (18.5%) vs. other workers (15.0%; OR: 1.29; 95% CI: 0.99, 1.68). Findings from a multivariable logistic regression model suggest CTEW have significantly higher odds of past-year drug use disorder (aOR: 1.22; 95% CI: 1.11, 1.36) and among those with a past-year drug use disorder, CTEW were not significantly different than other workers in utilizing drug rehabilitation services in the past year (aOR: 1.14; 95% CI: 0.92, 1.41). While there were slight changes in the odds of drug use disorder among CTEW from 2004 to 2014, there were no discernable overall time trends. Similarly, among CTEW with a past-year drug use disorder, there were no discernable time trends in the odds of drug rehabilitation services utilization from 2004 to 2014.

Conclusion: There is a need to place greater emphasis on the utilization of drug rehabilitation services among CTEW given their elevated odds of drug use disorder.

Background

As of April 2020, there were over six million construction workers in the United States (Bureau of Labor Statistics, 2020). A growing body of literature has found associations between working in the construction trade and/or extraction industries and drug use. Based upon nationally representative data, research findings noted that when compared with other occupational groups, construction trade and extraction workers (CTEW) had significantly higher odds of past year marijuana use and past year cocaine use (Ompad, Gershon, Sandh, Acosta, & Palamar, 2019; Zhang & Snizek, 2003). In the construction industry specifically, the most commonly used drug was marijuana, followed by cocaine, pain killers, tranquilizers, amphetamine/methamphetamine, and opiates (Zhang & Snizek, 2003). This order has been reported consistently across self-report as well as hair and urine tests (Hersch, McPherson, & Cook, 2002). This pattern of drug use is also supported by results of a survey conducted among various construction firms which cite the most commonly used drugs as marijuana followed by cocaine (Olbina, Hinze, & Arduengo, 2011). More recent research indicates that drug use remains an issue among CTEW (Ompad et al., 2019).

Construction workers are one of the most highly injured occupational groups. In 2017, those who worked in construction had a nonfatal injury rate of 3.1 per 100 full-time workers (Bureau of Labor Statistics, 2019). In this same year, construction workers had the highest count of fatal injuries and ranked fourth highest in rate of fatal injuries at 9.5 per 100,000 full-time equivalent (FTE) workers. This is more than double the all-worker fatal injury rate of 3.5 per 100,000 FTE (Bureau of Labor Statistics, 2017). Beyond the risks posed within construction work itself, such as falls, overexertion, musculoskeletal disorders, and exposure to toxic hazards, drug use is an additional factor related to injury (Welch, Hunting, & Anderson, 2000).

Drug use in the construction industry is associated with injuries. Among construction workers, those who reported lifetime use of marijuana or cocaine had a significantly higher number of injuries compared to construction workers who did not (Dong, Wang, & Largay, 2015). The relationship between drug use and injury is recognized by many construction companies. In a survey of 53 different construction companies, all of the firms conducted drug tests immediately after an accident (Olbina et al., 2011). Thus, construction companies are concerned that impairment due to drug use is a factor in workplace injuries among construction workers. This study also reported a significant association between drug use and higher levels of injury (Olbina et al., 2011).

The elevated risk of injury in this employment sector, along with the added risk of injury as a result of drug use, may have broader implications for governmental agencies such as the Social Security Administration (SSA) which provides disability benefits. In 2017, 86.4% of the approximately 10 million individuals receiving SSA disability benefits were disabled workers. On average, a disabled worker earns \$1,327 per month in disability benefits, resulting in a cost of over 10 billion dollars per month (Social Security Administration, 2018). This is particularly concerning as longitudinal analyses of those on SSA disability insurance from 1996 to 2006, found that only 28% of individuals returned to work (Liu & Stapleton, 2011). Given the high costs of disability and that a majority of workers who begin receiving disability benefits never return to the workforce, preventing disability before the workers enter the system is key.

One strategy for maintaining worker health is the use of workplace drug policies. These policies have shown to be a deterrent for drug use and have been associated with decline of injuries

(Schofield, Alexander, Gerberich, & Ryan, 2013). Companies that implemented drug testing policies saw a significant 51% decrease in the incidence of injury within two years of policy implementation. On average, this was a decrease from 8.9 injuries to 4.4 injuries per 200,000 work-hours (Gerber & Yacoubian, 2002). Other studies have found similar results, with reductions in accidents from 10% to 60% (Minchin, Glagola, Guo, & Languell, 2006). Based upon data from the 2000 and 2001 National Household Surveys on Drug Abuse (NHSDA) and the 2002 National Survey on Drug Use and Health (NSDUH), those who had employers that tested for drugs reported a 30% lower past month use of marijuana compared to those who had employers that did not (Carpenter, 2007).

Workplace drug policies extend beyond drug testing and can also include repercussions for having a positive drug test result. These types of policies have also shown to be impactful, as the rates of injury are significantly lower in companies that did not rehire employees with positive drug tests and/or implemented drug-free workplace programs (Olbina et al., 2011; Wickizer, Kopjar, Franklin, & Joesch, 2004). The implementation of such drug policies has additional positive impacts on productivity, quality of work produced, and marketing advantages as the company's public image becomes increasingly positive (Minchin et al., 2006). However, workplace drug policies may work better for some drugs but not others as research has found that marijuana use may be more sensitive to workplace drug policies as compared to cocaine and nonmedical use of prescription opioids (Ompad et al., 2019). Moreover, when asked about barriers to implementing workplace drug testing policies, construction companies cited cost as a major concern (Gerber & Yacoubian, 2002). Beyond direct costs associated with implementing drug testing, the result of these policies may also lead to further economic strain. Strict workplace drug policies that involve termination of employees who test positive for drug use or unable to hire applicants with positive drug tests may leave companies understaffed, unable to fulfill contractual obligations, and overspent on recruitment to fill vacant positions (Gerber & Yacoubian, 2002; Minchin et al., 2006). Furthermore, drug testing policies, while shown to be impactful in decreasing workplace injury, are rapidly changing given legislation regarding medical and recreational marijuana. For instance, cities such as New York City have barred job applicants from being tested for marijuana (The New York City Council, 2019).

Newer research points towards drug rehabilitation (i.e., drug treatment) as a method of ensuring safety, decreasing drug use, and maintaining economic profits. Those who work in construction and remain untreated for drug use disorders have a per capita excess cost to employers of \$6,813 per employee (Goplerud, Hodge, & Benham, 2017). This takes into account the costs related to (1) avoidable health care utilization for companies that self-insure, (2) missed work due to unscheduled leave and sick days, and (3) employee turnover. When workers receive drug treatment, companies save money as these employees tend to have lower health care utilization costs and less absenteeism. In fact, for each employee in recovery, construction companies save \$2,373 (Goplerud et al., 2017). Investing in workers who use drugs by providing access to, or supporting the use of, drug rehabilitation services is not only beneficial for the health of the workers but also spells monetary savings for the company. Furthermore, utilization of drug rehabilitation services has been associated with improvements in work absenteeism, tardiness, and productivity (Arbour et al., 2014; Jordan, Grissom, Alonzo, Dietzen, & Sangsland, 2008; Slaymaker & Owen, 2006).

Beyond understanding this relationship, it is imperative to understand how these trends have changed over time, especially in light of the opioid epidemic as well as medical and recreation

marijuana legalization. The opioid epidemic, as described by the Center for Disease Control and Prevention (CDC), can be categorized as three waves. The first wave began around 1999 and focused on overprescription of opioids. The second wave was concentrated specifically around heroin and began around 2010. The third wave was focused around fentanyl, tramadol, and other synthetic opioids and began around 2013 (Centers for Disease Control and Prevention, 2020).

Given the severity of this issue, opioid use has received an increasing amount of attention and actions have been taken to decrease access to and use of opioids. United States data from 2006 to 2015 indicates the prescription rates of opioids reached a peak in 2010 and have since seen decreases. For instance, the rate of opioid prescription saw an approximate increase of over 8% from 2006 to 2010 and saw a decrease from 2012 to 2015 by just over 13% (Guy et al., 2017).

These reductions in prescription rates for opioids are likely related to added attention given to the topic but also due to state policy changes. One such example of these policies is the implementation of pain clinic laws which subject medical practices that prescribe large quantities of opioid prescriptions to greater state oversight and strict regulations around ownership, operation, locations, and licensures (Centers for Disease Control and Prevention, 2012). From 2010 to 2013 compared to states not implementing pain clinic laws or policies requiring a prescribing clinician to review information from prescription drug management programs, states with such laws saw a 26.9% decrease in opioid prescription (Dowell, Zhang, Noonan, & Hockenberry, 2016).

While there have been tightening of restrictions on prescription opioids, the case for marijuana is the opposite, where marijuana continues to become increasingly socially accepted and legalized. From 2002 to 2013 young adults noted a decrease in their levels of “strong disapproval” of marijuana use from 40.5% to 22.6% (Salas-Wright, Vaughn, Todic, Córdova, & Perron, 2015). This decline in disapproval is a trend that can also be seen among adolescents which is further accompanied by a decrease in perceived risk in overall use of marijuana since the mid-2000s (Johnston et al., 2019). Changing attitudes towards marijuana use are also reflected in legislation as states have continued to legalize the use of medical and/or recreational marijuana and decriminalize possession of small amounts of marijuana where it is not legal. Starting in 1996 with California, medical marijuana has been legalized in 33 states as well as the District of Columbia and territories such as Guam, Puerto Rico, and U.S. Virgin Islands, with 13 states and territories allowing recreational use of marijuana (National Conference of State Legislatures, 2020). Recreational marijuana policies have been shown to significantly increase the prevalence of marijuana use within the past 30-days and past year (Maclean, Ghimire, & Nicholas, 2017). Similarly, there have also been increases in the use of medical marijuana; for instance, the average number of patients with an active medical marijuana registration in Colorado, a state that approved medical marijuana use in 2000 and recreational use in 2012, increased from 94 in 2001 to over 88,000 in 2018 (Colorado Department of Public Health & Environment, n.d.; National Conference of State Legislatures, 2020).

Currently, the United States has been reexamining existing drug policies, including the legalization of marijuana. Any changes to federal or state drug policies will likely result in changes in the associations between drug use, workplace drug policies, and utilization of drug rehabilitation among construction workers. This may be particularly important as state-level medical marijuana legalization (which can be prescribed for pain) has been associated with increases in the prevalence of marijuana use (Cerdá, Wall, Keyes, Galea, & Hasin, 2012). Moreover, patterns in nonmedical prescription opioid use, workplace drug policy, and utilization

of drug rehabilitation services have likely been impacted by the U.S. opioid epidemic (Wilkerson, Kim, Windsor, & Mareiniss, 2016).

While research has noted that CTEW have higher odds of drug use when compared to those in other occupations (Ompad et al., 2019), less is known about the use of rehabilitation services among CTEW compared to other occupations. Therefore, this study will use data from a national sample of adults in the United States (US) to answer the following aims with the following hypotheses:

Aim 1: Examine the relationship between past-year drug use disorder among CTEW and non-CTEW.

- Hypothesis 1: CTEW will have significantly higher odds of past-year drug disorder compared to non-CTEW.

Aim 2: Compare the utilization of drug rehabilitation services in the past year between CTEW and non-CTEW who have a past-year drug use disorder.

- Hypothesis 2: Among those with a past-year drug disorder, CTEW will have higher odds of past year utilization of drug rehabilitation services when compared to non-CTEW.

Aim 3: Identify the time trends in the odds of past-year drug use disorder among CTEW from 2004 to 2014.

- Hypothesis 3: When compared to 2014, the odds of past-year drug use disorder among CTEW will be higher in the preceding years.

Aim 4: Identify the time trends from 2004 to 2014 in the odds of past year utilization of drug rehabilitation services among CTEW with a past-year drug disorder.

- Hypothesis 4: When compared to 2014, the odds of past-year utilization of drug rehabilitation services among CTEW with a past-year drug use disorder will be lower in the preceding years.

Methods

Study Design and Participants

These analyses utilized the publicly available aggregated dataset of the National Survey Drug Use and Health (NSDUH) from 2002 to 2014 (N= 321,145) (Substance Abuse and Mental Health Data Archive, n.d.). NSDUH is an annual cross-sectional survey of non-institutionalized individuals in the 50 US states and the District of Columbia. The focus of this survey is drug use, including tobacco, alcohol, and illicit drugs, as well as mental health and other issues related to health. 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. Upon completion of the full survey interview participants were compensated \$30 (National Survey on Drug Use and Health, n.d.). 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. Data on occupation were only collected from 2004 to 2014, therefore these analyses focused only on those eleven cohorts. Sampling weights accounted for the complex survey design and were used for all analyses. Beyond the restriction on survey year,

the sample was restricted to respondents who were at least 18 years or older and reported being employed (full time or part-time) or unemployed (based upon an imputed variable).

Measures

Demographic variables included age, sex, race/ethnicity, educational attainment, annual family income, marital status, health insurance status, employment status, and occupation. Age was categorized 18-25, 26-34, 35-49, 50-64, or 65 years and older. Sex was dichotomized as male or female. Race/ethnicity was categorized as white, Black, Hispanic, or other. Educational attainment was categorized as less than a high school diploma, high school diploma or equivalent, some college, or college degree or higher. Annual family income was categorized as less than \$20,000, \$20,000-\$49,999, \$50,000-\$74,999, or \$75,000 and more. Marital status was categorized as married, widowed, divorced, or never married. Health insurance status was dichotomized as yes or no.

Occupation was measured using a NSDUH imputed occupational variable which was based on responses to the question “What kind of work do you do? That is, what is your occupation?” Participants selected one of fifteen options which included CTEW. This variable was recoded as a dichotomous variable such that CTEW represented one group and all other occupations were grouped together as non-CTEW. Respondents reporting an occupation were asked a series of yes/no questions about workplace alcohol and drug policies. They were first asked if there is a written policy about employee alcohol or drug use, 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. Respondents were then asked if their workplace ever tested its employees for alcohol or drugs, whether testing was part of the hiring process, and whether there was random testing. Finally, respondents were asked what happened if there was a positive drug test with the following response options: handled on an individual basis, termination, referral to treatment or counseling, and nothing or something else.

With respect to drug use, respondents were asked about current (past-month use) of marijuana, cocaine, and nonmedical prescription opioids (NPO; using a prescription opioid when not prescribed or only for the experience or feeling it caused). Opioids were referred to as prescription pain-killers, and respondents were shown cards with images of over two-dozen opioid products/formulations in reference to NPO. Past-year drug use disorder was categorized dichotomously and determined by proxy (via survey questions, not a diagnostic interview) using DSM-IV criteria for marijuana, inhalants, hallucinogens, cocaine, heroin, and prescription tranquilizers, opioids, sedatives, and stimulants. Respondents were categorized as having a drug use disorder in the past year if they reported one or more of the following four criteria: (1) had serious problems due to the substance use at home, work, or school; (2) used the substance regularly and then engaged in actions that were dangerous; (3) actions caused by the substance use result in trouble with the law; (4) substance use caused problems with family and friends but the substance use continued. Participants who reported use of drugs or alcohol for non-medical reasons in their lifetime were asked if they received treatment or counseling for their alcohol or drug use, not counting cigarettes, in the past 12 months. Past-year utilization of drug rehabilitation services was categorized dichotomously as yes or no.

Analyses

We first conducted bivariate analyses using logistic regression comparing sociodemographic, drug use, and workplace drug policy variables between CTEW and non-CTEW. In answering the first aim of this project we used a multivariable logistic regression. The exposure was occupation (CTEW vs. non-CTEW) and the outcome of interest was past-year drug use disorder (yes or no). In answering the second aim, we restricted the sample to those who had a drug use disorder in the past year and used a multivariable logistic regression to compare utilization of drug rehabilitation services in the past year between CTEW and non-CTEW. The exposure variable was occupation, CTEW vs. non-CTEW, and the outcome of interest was utilization of drug rehabilitation services in the past year.

The third and fourth aims sought to examine time trends in the odds of past-year drug use disorder among CTEW as well as the time trends in the odds of utilizing drug rehabilitation services among CTEW between 2004 and 2014. In answering the third aim, we used a multivariable logistic regression with the exposure being survey year and the outcome of interest being past-year drug use disorder among CTEW. In answering the fourth aim, we used a multivariable logistic regression with the exposure being survey year and the outcome of interest being utilization of drug rehabilitation services within the past year among CTEW who had a past-year drug use disorder. The multivariable logistic regression analyses conducted for the third and fourth aims used the 2014 as the point of comparison for the rest of the years.

All analyses adjusted for key socio-demographic characteristics, age, sex, race, education, income, marital status, and insurance. All models accounted 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. Data were analyzed using Stata 13 SE. This secondary analysis was exempt for review by the New York University Institutional Review Board.

Results

The sociodemographic characteristics for the full sample of 321,145 participants are presented in Table 1 for the total sample and stratified by CTEW status. Compared to non-CTEW, CTEW were more likely to be aged 26-29, male, Hispanic, less educated, of lower socioeconomic status, divorced or never married, and uninsured. Prevalence of drug use disorder was higher among CTEW (4.9%) as compared to other workers (2.7%, $p < 0.001$). The unadjusted relationship in Table 2 indicates significantly increased odds of past year drug use disorder among CTEW as compared to Non-CTEW (OR: 1.83; 95% CI: 1.67, 2.00). The multivariable model, controlling for survey year, age, sex, race, education attainment, family income, marital status, and health insurance, indicated CTEW had significantly greater odds of past year drug abuse/dependence when compared to non-CTEW (aOR: 1.23; 95% CI: 1.11, 1.36).

In comparing those with no past year drug use disorder with those who had a drug use disorder in the past year, there were significant differences in workplace drug policies. Those with a past year drug use disorder were significantly less likely to work at a place that: (1) had a written workplace drug policy (OR: 0.66; 95% CI: 0.62, 0.70); (2) gave drug education within the workplace (OR: 0.54; 95% CI: 0.54, 0.58); (3) provided assistance at the workplace for drug problems (OR: 0.42; 95% CI: 0.40, 0.58); (4) tested for drug use (OR: 0.68; 95% CI: 0.64, 0.73); (5) tested for alcohol use (OR: 0.61; 95% CI: 0.57, 0.66); (6) tested for drug during the hiring process (OR: 0.51; 95% CI: 0.45, 0.57); and (7) tested for drugs randomly (OR: 0.87; 95% CI:

0.79, 0.96). In regard to consequences of testing positive for drugs at the workplace and compared to getting fired as a result of a positive drug test, those with a past year drug use disorder were significantly less likely to work at a place that handles positive drug tests on an individual basis (OR: 0.80; 95% CI: 0.70, 0.91) and to receive a workplace referral for help with drug use (OR: 0.65; 95% CI: 0.56, 0.75) but there were no significant differences in working at a place where the outcome of positive a drug test resulted in no action or another action not specified in the options provided by the survey (OR: 0.95; 95% CI: 0.76, 1.18).

We next examined correlates of past year drug rehabilitation service utilization and sociodemographic variables among those with a past year drug use disorder (n=15,850), presented as crude and adjusted odds ratios in Table 4. Among those with a past-year drug use disorder and compared to those with no past year utilization of drug rehabilitation services, those who utilized drug rehabilitation services were generally more likely to be older, male, white, less educated, have lower income, never married, and insured. Furthermore, those with past year utilization of drug rehabilitation services were more likely to be CTEW (9.34% versus 11.7%; $p < 0.059$). The unadjusted relationship was not significant (OR: 1.29; 95% CI: 0.99, 1.68).

Results from the multivariable model, controlling for survey year, age, sex, race, education attainment, family income, marital status, and health insurance, showed similar results. Among those with past year drug use disorder, those who reported utilization of drug rehabilitation services were not significantly different than those who reported no utilization of drug rehabilitation services with regard to occupation as CTEW (aOR: 1.08; 95% CI: 0.82, 1.43). With regard to age, when compared to those who were aged 18 to 25 those who reported utilizing drug rehabilitation services in the past year were significantly more likely to be aged 26 to 34 (aOR: 1.71; 95% CI: 1.43, 2.04), 35 to 49 (aOR: 2.22; 95% CI: 1.75, 2.81), and 50 to 64 (aOR: 1.73; 95% CI: 1.05, 2.85) but there was no significant difference in those aged 65 years or older (aOR: 0.13, 1.27). There was also no significant difference by sex between those who did and did not utilize drug rehabilitation services within the past year (aOR: 0.86; 95% CI: 0.71, 1.03). Compared to those who were white and reported not utilizing drug rehabilitation services, those reporting utilization of drug rehabilitation services were significantly less likely to identify as Black (aOR: 0.70; 95% CI: 0.57, 0.86), Hispanic (aOR: 0.69; 95% CI: 0.55, 0.85), or other (aOR: 0.64; 95% CI: 0.45, 0.91). In regard to educational attainment and compared to those with a college degree or higher, those who reported utilization of drug rehabilitation services versus those who did not were significantly more likely to have attained education less than high school (aOR: 2.16; 95% CI: 1.52, 3.09), have a high school diploma (aOR: 1.87; 95% CI: 1.28, 2.72), or have some college education (aOR: 1.63, 95% CI: 1.15, 2.32). Annual family income also differed significantly with those who reported utilization of drug rehabilitation services, and compared to those earning between \$20,000 and \$49,999, being significantly more likely to earn less than \$20,000 but being no different than those earning between \$50,000 and \$74,999 and those earning more than \$75,000. Compared to those who are married, individuals who reported utilization of drug rehabilitation services versus those reporting no utilization of drug rehabilitation services were more likely to be never married (aOR: 1.52; 95% CI: 1.18, 1.95) or divorced (aOR: 1.72; 95% CI: 1.28, 2.30) but no difference among those who were widowed (aOR: 0.68; 95% CI: 0.20, 2.32).

Next, we examined the time trends in the odds of drug use disorder among CTEW between 2004 and 2014. The odds of drug use disorder for 2014 were utilized as the point of comparison for the rest of the years. Among the 18,236 construction worker, there was no pervasive trend that

indicates a significant difference from the odds of drug use disorder in 2014 (Figure 1). Among CTEW and as compared to 2014, there was no significant differences in those who had and did not have drug use disorder in 2004 (OR: 1.17; 95% CI: 0.79, 1.75), 2005 (OR: 0.93; 95% CI: 0.67, 1.30), 2006 (OR: 0.87; 95% CI: 0.57, 1.34), 2007 (OR: 0.93; 95% CI: 0.64, 1.35), 2008 (OR: 0.83; 95% CI: 0.58, 1.21), 2009 (OR: 0.85; 95% CI: 0.56, 1.30), 2011 (OR: 0.79; 95% CI: 0.48, 1.30), 2012 (OR: 1.23; 95% CI: 0.73, 2.07). However, there was a significantly lower odds of drug use disorder among CTEW as compared to 2014 for 2010 (OR: 0.53; 95% CI: 0.32, 0.87) and 2013 (OR: 0.62; 95% CI: 0.40, 0.98).

This was followed by an examination of time trends in the odds of utilizing drug rehabilitation services among CTEW between 2004 and 2014. The odds of utilizing drug rehabilitation services among CTEW for 2014 was utilized as the point of comparison for the rest of the years. While there appears to be a visual trend based on Figure 2, especially from 2004 to 2009, there is no discernable statistically significant difference. Among 1,370 CTEW who had a drug use disorder in the past year, and as compared to the odds of utilizing drug rehabilitation services in 2014, there was no significant differences in drug rehabilitation services utilization in 2005 (OR: 0.42; 95% CI: 0.17, 1.06), 2006 (OR: 0.61; 95% CI: 0.25, 1.48), 2007 (OR: 0.95; 95% CI: 0.35, 2.57), 2008 (OR: 1.11; 95% CI: 0.49, 2.52), 2009 (OR: 1.39; 95% CI: 0.58, 3.36), 2010 (OR: 0.62; 95% CI: 0.24, 1.58), 2011 (OR: 1.01; 95% CI: 0.36, 2.83), and 2013 (OR: 0.40; 95% CI: 0.15, 1.08) to 2011 and 2013. However, there was a significantly lower odds of drug rehabilitation services utilization among CTEW with a drug use disorder as compared to 2014 for 2004 (OR: 0.36; 95% CI: 0.14, 0.93) and 2012 (OR: 0.18; 95% CI: 0.06, 0.53).

Discussion

While the results indicate the prevalence of a past-year drug use disorder was significantly higher among CTEW as compared to non-CTEW, the prevalence of utilization of drug rehabilitation services in the past year was not significantly different than non-CTEW among those with a past-year drug use disorder. In examining time trends and when compared to the odds of having a drug use disorder among CTEW in 2014, there were no discernable trends in odds of having a drug use disorder from the preceding years. Similarly, among CTEW who had a past year drug use disorder, there were no discernable trends in the odds of utilizing drug rehabilitation services as compared 2014.

In answering the first aim of examining the relationship between past-year drug use disorder among CTEW and non-CTEW, we hypothesized CTEW that CTEW would have significantly higher odds of past-year drug disorder compared to non-CTEW. This hypothesis is supported as data indicated that CTEW have a significantly higher odds of past-year drug use disorder compared to non-CTEW. This extends previous literature findings that have identified the increased odds of drug use among CTEW when compare to non-CTEW (Ompad et al., 2019; Zhang & Snizek, 2003). Specifically, the current findings highlight that previous findings of elevated drug use risk may be consequential for dependence.

In answering the second aim of comparing the utilization of drug rehabilitation services in the past year between CTEW and non-CTEW who have a past-year drug use disorder, the hypothesis that the odds of drug rehabilitation services utilization would be greater were not supported. Instead, our findings indicated that among those who had a past-year drug use disorder there was no significant difference in the odds of past year utilization of drug rehabilitation services among CTEW compared to non-CTEW. These findings indicate a need to

place greater emphasis on the utilization of drug rehabilitation services among CTEW given their elevated odds of drug use disorder and the relationship between drug use and increased risk of injury while working. For instance, among the 1,382 CTEW with a past year drug use disorder, only 18.5% reported utilization of drug rehabilitation services in the past year. This translates to a large unmet need among this group with 81.5% of CTEW who have a drug use disorder remaining untreated. While this prevalence is slightly higher than non-CTEW (15%), the difference is not statistically significant and given the elevated odds of substance use disorder among CTEW, the ideal trend would be a similarly increased odds of drug rehabilitation services utilization.

An examination of workplace drug policy provides insight as to why CTEW with a past year drug use disorder may not be more likely to utilize drug rehabilitation services. When compared to those with no past year drug use disorder, those with a past year drug use disorder were significantly less likely to work at a place that has a workplace drug policy. This may be especially important given that workplaces that implement policies such as drug testing are shown to decrease odds of drug use and affiliated workplace injuries (Carpenter, 2007; Gerber & Yacoubian, 2002; Minchin et al., 2006; Schofield et al., 2013).

A greater emphasis on meeting this need for increased drug rehabilitation services utilization among CTEW would be associated with numerous positive outcomes (Goplerud et al., 2017). In regard to the workplace, drug treatment has been associated with improvements in absenteeism, tardiness, and productivity (Arbour et al., 2014; Jordan et al., 2008; Slaymaker & Owen, 2006). Through pre- and post-drug treatment measures of workplace absenteeism, tardiness, and productivity, Jordan and colleagues (2008) noted that those who received 30 to 60 days of treatment, saw a decrease in the proportion that reported: (1) work absence, from 58.5% to 26.9%; (2) work lateness, from 37.3% to 20.4%; and (3) lost productivity, from 39.8% to 25.3%. A more recent study by Arbour and colleagues (2014) notes similar positive work related outcomes for employees who utilize drug rehabilitation services. Absenteeism was reduced by 76.12%, tardiness decreased by 90.82%, and there was a 75.68% decrease in unproductivity. Beyond these positive work related outcomes, employee drug treatment also has cost saving benefits to the workplace which can save almost 6,000 Canadian dollars (CAD) per employee in treatment given the excess expenses associated with days absent, tardy, or unproductive without treatment (Arbour et al., 2014). Of greatest interest is that utilization of drug rehabilitation services would decrease substance use (Arbour et al., 2014) therefore decreasing the possibilities of a drug use related work injury, a major concern among CTEW. This in turn would lead to a reduction in the number of construction workers seeking SSA disability benefits as a result of employment-related injuries.

In answering the third aim of identifying the time trends in the odds of past-year drug use disorder among CTEW from 2004 to 2014, the hypothesis that the odds of past-year drug use disorder among CTEW will be higher in the years preceding 2014, the reference year, was not supported. Instead, when compared to the odds of having a past-year drug use disorder among CTEW in 2014, there were no significant difference except for 2010 and 2013. While these years did have a significantly lower odds of drug use disorder, there was no discernable trend as whole through all eleven years.

In answering the fourth aim of identify the time trends from 2004 to 2014 in the odds of past year utilization of drug rehabilitation services among CTEW with a past-year drug use disorder, the hypothesis that the odds of past-year utilization of drug rehabilitation services among CTEW

would be lower in the years preceding 2014, the reference year, was not supported. Instead, when compared to the odds of past-year utilization of drug rehabilitation services among CTEW with a past-year drug use disorder, there were no significant differences except for 2004 and 2012. While these years had a significantly lower odds of past-year utilization of drug rehabilitation services, there was no discernable trend as a whole through all eleven years.

While substance use and misuse is an evolving topic, especially given factors such as drug availability, decriminalization, and legalization, the trends in drug use, drug use disorders, and drug rehabilitation services utilization among CTEW have remained fairly stable compared to the odds of drug use disorder and utilization of drug rehabilitation services reported in 2014. This indicates a relative consistency and chronicity of this issue. This may also indicate a lack of appropriate attention provided towards this topic as concentrated efforts and interventions focusing on these issues would have likely resulted in significant changes to the odds of drug use disorder and utilization of drug use rehabilitation services.

While there may have been no discernable overarching trends in past-year drug use disorder and utilization of drug rehabilitation services among CTEW, it is noteworthy to mention that efforts have been put forth to tackle the issue of drug use and disability by the Social Security Administration (SSA). For instance, the SSA has gone through several revisions regarding Supplemental Security Income (SSI) and the Social Security Disability Insurance program (SSDI) eligibility for those who are substance dependent or continuing to use substances. Namely in 1996, SSI and SSDI terminated benefits for individuals whose primary disability was a substance use disorder (Waid & Barber, 2001). This is particularly relevant in relation to the opioid use epidemic which research has shown has an unfavorable impact on disability benefits. Research indicates that increases in the prescription of opioid medication through the years has been associated with increases in the number of SSDI applicants and enrollments (Cutler, Meara, & Stewart, 2017). Furthermore, the concern among CTEW is not only the presence of a substance use disorder but rather the injury and resulting disability due to drug use at the workplace given the nature of construction work.

Due to the relationship between drug use and increased odds of injury among CTEW, a resulting disability has the possibility to keep CTEW out of the workforce. In recognition of the disadvantages related to losing individuals from the workforce and the negative impact this has on workers' compensation, private disability insurance, and Medicare/Medicaid, the SSA has implemented stay-at-work/return-to-work programs. The goals of these programs is to increase the number of individuals returning to the workforce (Thompkins, Honeycutt, Gill, Mastrianni, & Bailey, 2014). While these programs have decreased the number of workers relying on workers' compensation and private disability insurance, the extent to which this impacts disability benefits in the form of SSDI is limited as most individuals who eventually receive SSDI do not receive workers compensation or private disability insurance (Thompkins et al., 2014).

In further facilitating return to the workforce and incentivizing economic self-sufficiency for SSDI recipients, Ticket to Work (TTW) program, vocational rehabilitation reimbursements, and other work incentives have been implemented by the SSA (Stapleton, Mamun, & Page, 2014). In the case of TTW, this is incentivized by offering vocational rehabilitation to SSDI beneficiaries through employment networks. These employment networks receive reimbursement for SSDI recipients that become economically self-sufficient and hence no longer rely on SSDI. Based

upon program evaluations, these programs have a positive but limited impact on the employment of SSDI recipients (Stapleton et al., 2014).

While these various programs implemented by the SSA play a large role in returning workers who were once on SSDI back to the workforce, there may be room for implementing programs that may impact individuals before they become disabled. For instance, these data have shown that individuals who have drug use disorder are significantly less likely to work at places that have drug policies such as a written drug policy, drug education at work, and help available at work for drug problems. Given the current findings of increased odds of drug use disorder among CTEW and combined with findings from previous literature that workplace policy among CTEW is associated with decreased odds of drug use, there may be potential to work alongside occupational groups such as CTEW that have high prevalence of drug using and injury. One such avenue may be to work within these occupational groups to facilitate uptake of workplace drug policies as well to provide tangible resources such as drug use treatment as prevention of workplace injury and subsequent disability. While providing drug use rehabilitation services to all industries may be unrealistic given the monetary resource limitations, focusing on occupational groups that are particularly vulnerable to substance use and injury such as CTEW may keep numerous individuals within the workforce and out of the SSDI system. Furthermore, drug use rehabilitation services can be used in conjunction with programs as such as TTW to bolster outcomes of returning to work.

This research has several limitations. For instance, NSDUH classifies CTEW as one broad and combined category. However, this category reflects heterogeneity with respect to the type of work performed. The differences in type of work performed may have varying impacts on the role of substance use in injury and disability. The publicly available NSDUH data set does not include a state variable. This is an important limitation given variation in state-level drug policies. The inclusion of a state variable would have allowed for analyses to adjust for state level drug policies such as marijuana legalization. Furthermore, the NSDUH only inquired about occupation until 2014, limiting our ability to examine more recent trends. Furthermore, the cross-sectional nature of the data does not allow for inferences of temporality between drug use and occupation. Understanding of temporality may be important in discerning if drug use patterns among CTEW are motivated by factors such as injury (i.e., for pain management). Drug use is often stigmatized, and while the study design used trained interviewers, participants may still have underreported levels of drug use due to the social desirability bias. Nevertheless, these findings indicate a potentially unmet need for drug use rehabilitation services uptake among CTEW. Avenues of future research should focus on qualitative research understanding the reasons behind forgoing drug use rehabilitation.

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Table 1: Sociodemographic correlates comparing non-CTEW and CTEW among 321,145 National Survey on Drug Use and Health (NSDUH) respondents, United States, 2004 – 2014

	Full Sample (N= 321,145)		Non-CTEW (N= 302,715)		CTEW (N= 18,430)		p- value
	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	
Drug Use Disorder							
No	305,295	97.1 (97.1, 97.2)	288,247	97.3 (97.2, 97.3)	17,048	95.1 (94.7, 95.5)	<0.001
Yes	15,850	2.85 (2.78, 2.93)	14,468	2.73 (2.66, 2.80)	1,382	4.89 (4.49, 5.32)	
Survey Year							
2004	28,888	8.7 (8.51, 8.9)	27,003	8.65 (8.46, 8.85)	1,885	9.55 (8.8, 10.3)	<0.001
2005	29,035	8.84 (8.63, 9.05)	27,031	8.76 (8.54, 8.98)	2,004	10.2 (9.42, 11)	
2006	28,599	8.91 (8.75, 9.08)	26,553	8.81 (8.64, 8.98)	2,046	10.6 (9.89, 11.3)	
2007	29,127	8.95 (8.76, 9.14)	27,152	8.86 (8.66, 9.06)	1,975	10.4 (9.63, 11.3)	
2008	29,094	9.12 (8.9, 9.34)	27,286	9.09 (8.88, 9.31)	1,808	9.58 (8.85, 10.4)	
2009	28,935	9.13 (8.92, 9.35)	27,425	9.16 (8.94, 9.38)	1,510	8.66 (7.95, 9.43)	
2010	29,722	9.18 (8.99, 9.37)	28,294	9.26 (9.07, 9.46)	1,428	7.76 (7.1, 8.47)	
2011	29,362	9.15 (8.95, 9.36)	27,865	9.19 (8.98, 9.42)	1,497	8.43 (7.81, 9.08)	
2012	28,621	9.27 (9.08, 9.47)	27,321	9.35 (9.15, 9.56)	1,300	7.93 (7.22, 8.71)	
2013	28,323	9.31 (9.1, 9.52)	26,964	9.37 (9.15, 9.6)	1,359	8.23 (7.63, 8.87)	
2014	31,439	9.44 (9.26, 9.61)	29,821	9.48 (9.3, 9.67)	1,618	8.68 (8.14, 9.24)	
Age Group, y							
18-25	141,469	16.5 (16.3, 16.7)	134,000	16.6 (16.4, 16.8)	7,469	15.1 (14.6, 15.6)	<0.001
26-34	49,398	19.1 (18.9, 19.4)	46,066	18.9 (18.7, 19.1)	3,332	23.3 (22.3, 24.3)	
35-49	69,163	33.5 (33.2, 33.7)	64,942	33.3 (33, 33.6)	4,221	36.6 (35.5, 37.8)	
50-64	26,906	25.6 (25.2, 26)	25,566	25.8 (25.4, 26.2)	1,340	22.2 (21, 23.4)	
≥65	5,321	5.28 (5.1, 5.46)	5,138	5.42 (5.24, 5.62)	183	2.84 (2.35, 3.43)	
Sex							
Male	160,513	52.9 (52.7, 53.2)	142,599	50.3 (50, 50.5)	17,914	97.2 (96.8, 97.6)	<0.001
Female	160,632	47.1 (46.8, 47.3)	160,116	49.7 (49.5, 50)	516	2.76 (2.39, 3.18)	
Race/Ethnicity							
White	205,629	66.9 (66.5, 67.2)	194,044	67 (66.6, 67.4)	11,585	63.9 (62.8, 65)	<0.001
Black	39,361	11.7 (11.5, 12)	38,239	12 (11.7, 12.3)	1,122	7.17 (6.6, 7.79)	
Hispanic	49,997	14.6 (14.4, 14.9)	45,280	14 (13.7, 14.2)	4,717	26 (25, 27)	

	Full Sample (N= 321,145)		Non-CTEW (N= 302,715)		CTEW (N= 18,430)		p- value
	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	
Other	26,158	6.78 (6.56, 7)	25,152	7.01 (6.79, 7.23)	1,006	2.95 (2.58, 3.37)	
Educational Attainment							
Less than High School	45,623	11.7 (11.5, 11.9)	40,073	10.8 (10.6, 10.9)	5,550	27.9 (26.9, 28.9)	<0.001
High School Diploma	102,693	29.1 (28.7, 29.4)	94,634	28.1 (27.8, 28.5)	8,059	44.2 (43, 45.4)	
Some College	95,937	27.4 (27.1, 27.6)	92,163	27.8 (27.5, 28)	3,774	20.6 (19.6, 21.6)	
College Degree or Higher	76,892	31.9 (31.5, 32.2)	75,845	33.3 (33, 33.7)	1047	7.33 (6.68, 8.03)	
Annual Family Income							
<\$20,000	165,192	33.5 (33.2, 33.8)	157,105	33.5 (33.2, 33.8)	8,087	33.1 (32, 34.2)	<0.001
\$20,000-\$49,999	106,842	39 (38.7, 39.3)	98,959	38.5 (38.2, 38.8)	7,883	46.7 (45.4, 48.1)	
\$50,000-\$74,999	27,242	14 (13.8, 14.2)	25,636	14 (13.8, 14.2)	1,606	13 (12.1, 13.9)	
>\$75,000	21,869	13.5 (13.3, 13.8)	21,015	13.9 (13.7, 14.2)	854	7.2 (6.49, 7.98)	
Marital status							
Married	117,511	54.3 (53.9, 54.7)	110,277	54.3 (53.9, 54.7)	7,234	54.4 (53.3, 55.6)	<0.001
Widowed	3,444	2.21 (2.11, 2.31)	3,342	2.28 (2.18, 2.38)	102	1.03 (.771, 1.37)	
Divorced	29,930	13.8 (13.6, 14)	28,066	13.7 (13.5, 13.9)	1,864	14.9 (14, 15.8)	
Never Married	170,260	29.7 (29.5, 30)	161,030	29.7 (29.5, 30)	9,230	29.7 (28.7, 30.7)	
Health Insurance							
No	69,828	17.4 (17.2, 17.6)	62,622	16.4 (16.1, 16.6)	7,206	34.8 (33.5, 36)	<0.001
Yes	251,317	82.6 (82.4, 82.8)	240,093	83.6 (83.4, 83.9)	11,224	65.2 (64, 66.5)	

Table 2: Correlates of past year drug use disorder among 321,145 National Survey on Drug Use and Health (NSDUH) respondents, United States, 2004 – 2014

	Past Year Drug Use Disorder		Unadjusted OR	Adjusted OR
	No (Weighted %)	Yes (Weighted %)	(95% CI)	(95% CI)
CTEW				
No	288,247 (94.5)	14,468 (90.3)	1.00	1.00
Yes	17,048 (5.6)	1,382 (9.7)	1.83 (1.67, 2.00)	1.22 (1.10, 1.36)
Survey Year				
2004	27,312 (8.7)	1,576 (9.6)	1.09 (0.97, 1.23)	1.04 (0.91, 1.18)
2005	27,529 (8.9)	1,506 (8.6)	0.97 (0.85, 1.10)	0.92 (0.81, 1.06)
2006	27,140 (8.9)	1,459 (9.0)	1.00 (0.89, 1.12)	0.95 (0.84, 1.07)
2007	27,669 (9.0)	1,458 (8.9)	0.99 (0.88, 1.11)	0.95 (0.84, 1.08)
2008	27,565 (9.1)	1,529 (9.4)	1.02 (0.91, 1.15)	1.00 (0.89, 1.13)
2009	27,462 (9.1)	1,473 (9.3)	1.01 (0.89, 1.14)	0.99 (0.86, 1.12)
2010	28,269 (9.2)	1,453 (9.0)	0.97 (0.84, 1.12)	0.93 (0.81, 1.08)
2011	27,967 (9.2)	1,395 (8.0)	0.87 (0.77, 0.98)	0.85 (0.75, 0.97)
2012	27,152 (9.3)	1,469 (9.8)	1.05 (0.92, 1.19)	1.02 (0.90, 1.17)
2013	26,988 (9.3)	1,335 (9.0)	0.96 (0.83, 1.10)	0.93 (0.81, 1.07)
2014	30,242 (9.4)	1,197 (9.5)	1.00	1.00
Age Group, y				
18-25	130,530 (15.7)	10,939 (46.4)	1.00	1.00
26-34	47,531 (18.9)	1,867 (26.4)	0.47 (0.44, 0.51)	0.83 (0.77, 0.90)
35-49	67,898 (33.8)	1,265 (20.7)	0.21 (0.19, 0.22)	0.49 (0.45, 0.54)
50-64	26,712 (26.2)	194 (6.2)	0.08 (0.07, 0.10)	0.21 (0.18, 0.26)
≥65	53,12 (5.4)	9 (0.3)	0.02 (0.01, 0.05)	0.05 (0.02, 0.12)
Sex				
Male	150,407 (52.5)	10,106 (68.1)	1.00	1.00
Female	154,888 (47.5)	5,744 (31.9)	0.52 (0.49, 0.55)	0.52 (0.49, 0.55)
Race/Ethnicity				
White	195,538 (66.9)	10,091 (65.1)	1.00	1.00
Black	37,223 (11.6)	2,138 (15.0)	1.33 (1.22, 1.45)	0.86 (0.78, 0.94)
Hispanic	47,690 (14.6)	2,307 (14.8)	1.04 (0.95, 1.13)	0.58 (0.53, 0.64)
Other	24,844 (6.8)	1,314 (5.1)	0.77 (0.68, 0.88)	0.71 (0.62, 0.82)
Educational Attainment				
Less than High School	41,880 (11.5)	3,743 (20.8)	3.95 (3.60, 4.33)	2.02 (1.81, 2.25)
High School Diploma	96,870 (28.9)	5,823 (34.8)	2.62 (2.43, 2.84)	1.57 (1.43, 1.72)
Some College	91,270 (27.3)	4,667 (29.6)	2.37 (2.15, 2.61)	1.50 (1.36, 1.66)
College Degree or Higher	75,275 (32.4)	1,617 (14.8)	1.00	1.00
Annual Family Income				
<\$20,000	153,468 (32.7)	11,724 (62.1)	2.62 (2.47, 2.77)	1.50 (1.40, 1.61)
\$20,000-\$49,999	103,337 (39.3)	3,505 (28.5)	1.00	1.00
\$50,000-\$74,999	26,858 (14.2)	384 (5.3)	0.52 (0.44, 0.60)	0.76 (0.65, 0.88)
>\$75,000	21,632 (13.8)	237 (4.1)	0.40 (0.33, 0.49)	0.77 (0.62, 0.94)
Marital status				
Married	115,792 (55.3)	1,719 (19.8)	1.00	1.00
Widowed	3,397 (2.3)	47 (0.6)	0.75 (0.49, 1.16)	1.57 (1.04, 2.35)

	Past Year Drug Use Disorder		Unadjusted OR (95% CI)	Adjusted OR (95% CI)
	No (Weighted %)	Yes (Weighted %)		
Divorced	28,981 (13.9)	949 (11.0)	2.22 (1.94, 2.54)	2.12 (1.85, 2.42)
Never Married	157,125 (28.6)	13,135 (68.6)	6.72 (6.18, 7.31)	2.75 (2.51, 3.03)
Health Insurance				
No	64,584 (16.9)	5,244 (33.8)	1.00	1.00
Yes	240,711 (83.1)	10,606 (66.2)	2.50 (2.37, 2.64)	1.27 (1.19, 1.35)

Table 3 Workplace drug policy comparing those with and without past year drug use disorder among National Survey on Drug Use and Health (NSDUH) respondents, United States, 2004 – 2014

	Full Sample		No Past Year Drug Use Disorder		Past Year Drug Use Disorder		OR (95% CI)
	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	
Written Workplace Drug Policy							
No	64,378	23.9 (23.6, 24.1)	60,602	23.7 (23.4, 23.9)	3,776	31.9 (30.6, 33.3)	0.66 (0.62, 0.70)
Yes	213,426	76.1 (75.9, 76.4)	204,805	76.3 (76.1, 76.6)	8,621	68.1 (66.7, 69.4)	
Given Drug Education at Work							
No	180,154	60.8 (60.4, 61.1)	170,761	60.4 (60.1, 60.7)	9,393	73.7 (72.5, 75)	0.54 (0.51, 0.58)
Yes	100,056	39.2 (38.9, 39.6)	96,841	39.6 (39.3, 39.9)	3,215	26.3 (25, 27.5)	
Help Available at Work for Drug Problems							
No	138,194	47.6 (47.2, 47.9)	129,932	47 (46.7, 47.4)	8,262	67.8 (66.3, 69.2)	0.42 (0.40, 0.45)
Yes	114,447	52.4 (52.1, 52.8)	111,349	53 (52.6, 53.3)	3,098	32.2 (30.8, 33.7)	
Workplace Ever Tests for Drug Use							
No	148,477	52.2 (51.8, 52.5)	140,549	51.9 (51.6, 52.2)	7,928	61.3 (59.8, 62.7)	0.68 (0.64, 0.73)
Yes	131,302	47.8 (47.5, 48.2)	126,636	48.1 (47.8, 48.4)	4,666	38.7 (37.3, 40.2)	
Workplace Ever Tests for Alcohol Use							
No	192,384	67.1 (66.9, 67.4)	182,462	66.9 (66.6, 67.2)	9,922	76.7 (75.4, 78)	0.61 (0.57, 0.66)
Yes	83,929	32.9 (32.6, 33.1)	81,331	33.1 (32.8, 33.4)	2,598	23.3 (22, 24.6)	
Workplace Tests for Drug Use During Hiring Process							
No	20,201	12.6 (12.4, 12.9)	19,018	12.4 (12.2, 12.7)	1,183	21.8 (19.9, 23.8)	0.51 (0.45, 0.57)
Yes	111,095	87.4 (87.1, 87.6)	107,558	87.6 (87.3, 87.8)	3,537	78.2 (76.2, 80.1)	
Random Drug Testing at Workplace							
No	48,467	38.3 (37.9, 38.8)	46,497	38.3 (37.8, 38.7)	1,970	41.5 (39.3, 43.8)	0.87 (0.79, 0.96)
Yes	77,418	61.7 (61.2, 62.1)	74,778	61.7 (61.3, 62.2)	2,640	58.5 (56.2, 60.7)	
Outcome if Test Positive for Drug Use at Workplace							
Handle Individually	20,265	18.4 (17.9, 18.8)	19,488	18.4 (18, 18.9)	777	17 (15.2, 18.9)	0.80 (0.70, 0.91)
Fired	65,648	51.3 (50.8, 51.9)	62,981	51.2 (50.6, 51.7)	2,667	59 (56.7, 61.4)	1.00
Referred for Help	24,975	26.8 (26.3, 27.3)	24,292	27 (26.4, 27.5)	683	20.2 (18.1, 22.5)	0.65 (0.56, 0.75)
Other or Nothing	4,291	3.49 (3.32, 3.67)	4,099	3.49 (3.31, 3.67)	192	3.81 (3.12, 4.64)	0.95 (0.76, 1.18)

Table 4: Sociodemographic correlates of construction and extraction workers (CTEW) among 15,850 National Survey on Drug Use and Health (NSDUH) respondents with past drug use disorder, National Survey on Drug Use and Health (NSDUH), United States, 2004 – 2014

	Full Sample (N= 15,850)		Non-Construction Workers (N= 14,468)		Construction Workers (N= 1,382)		p-values
	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	
Past Year Drug Use Disorder							
No	13,463	84.7 (83.6, 85.7)	12,344	85 (83.9, 86.1)	1,119	81.5 (77.6, 84.8)	0.059
Yes	2,335	15.3 (14.3, 16.4)	2,081	15 (13.9, 16.1)	254	18.5 (15.2, 22.4)	
Survey Year							
2004	1576	9.58 (8.79, 10.4)	1382	9.18 (8.44, 9.98)	194	13.2 (10.3, 16.9)	<0.001
2005	1506	8.62 (7.82, 9.49)	1342	8.38 (7.54, 9.31)	164	10.8 (8.81, 13.2)	
2006	1459	8.96 (8.24, 9.73)	1305	8.7 (7.95, 9.52)	154	11.3 (8.48, 14.9)	
2007	1458	8.91 (8.12, 9.77)	1290	8.68 (7.88, 9.54)	168	11.1 (8.55, 14.2)	
2008	1529	9.36 (8.63, 10.1)	1394	9.37 (8.61, 10.2)	135	9.2 (7.34, 11.5)	
2009	1473	9.26 (8.44, 10.2)	1372	9.42 (8.57, 10.3)	101	7.81 (5.81, 10.4)	
2010	1453	8.99 (8.07, 10)	1369	9.45 (8.48, 10.5)	84	4.64 (3.2, 6.69)	
2011	1395	8.02 (7.39, 8.71)	1302	8.13 (7.5, 8.79)	93	7.08 (4.78, 10.4)	
2012	1469	9.79 (8.91, 10.7)	1373	9.81 (8.91, 10.8)	96	9.63 (6.5, 14)	
2013	1335	9.02 (8.05, 10.1)	1247	9.36 (8.33, 10.5)	88	5.82 (4.25, 7.94)	
2014	1197	9.51 (8.81, 10.3)	1092	9.52 (8.81, 10.3)	105	9.43 (7.27, 12.1)	
Age Group, y							
18-25	10939	46.4 (45, 47.8)	10128	47.5 (46.1, 48.9)	811	35.9 (32.2, 39.9)	0.012
26-34	1867	26.4 (25, 27.9)	1675	26.1 (24.7, 27.6)	192	29.3 (25.3, 33.7)	
35-49	1265	20.7 (19.6, 21.8)	1104	20.1 (18.9, 21.3)	161	26.3 (21.9, 31.2)	
50-64	194	6.16 (5.11, 7.41)	170	5.93 (4.87, 7.2)	24	8.47 (5.29, 13.3)	
≥65	9	0.33 (0.14, 0.78)	9	0.36 (0.15, 0.89)	0	-	
Sex							
Male	10,106	68.1 (66.9, 69.2)	8,766	65 (63.7, 66.2)	1,340	96.8 (94.9, 98)	<0.001
Female	5,744	31.9 (30.8, 33.1)	5,702	35 (33.8, 36.3)	42	3.20 (2.0, 5.06)	
Race/Ethnicity							
White	10,091	65.1 (63.5, 66.6)	9,179	65.2 (63.6, 66.8)	912	63.7 (59.2, 67.9)	<0.001
Black	2,138	15 (14, 16.1)	2,029	15.4 (14.4, 16.5)	109	11.1 (8.48, 14.4)	
Hispanic	2,307	14.8 (13.8, 15.8)	2,031	14 (13.1, 14.9)	276	22.4 (18.1, 27.4)	

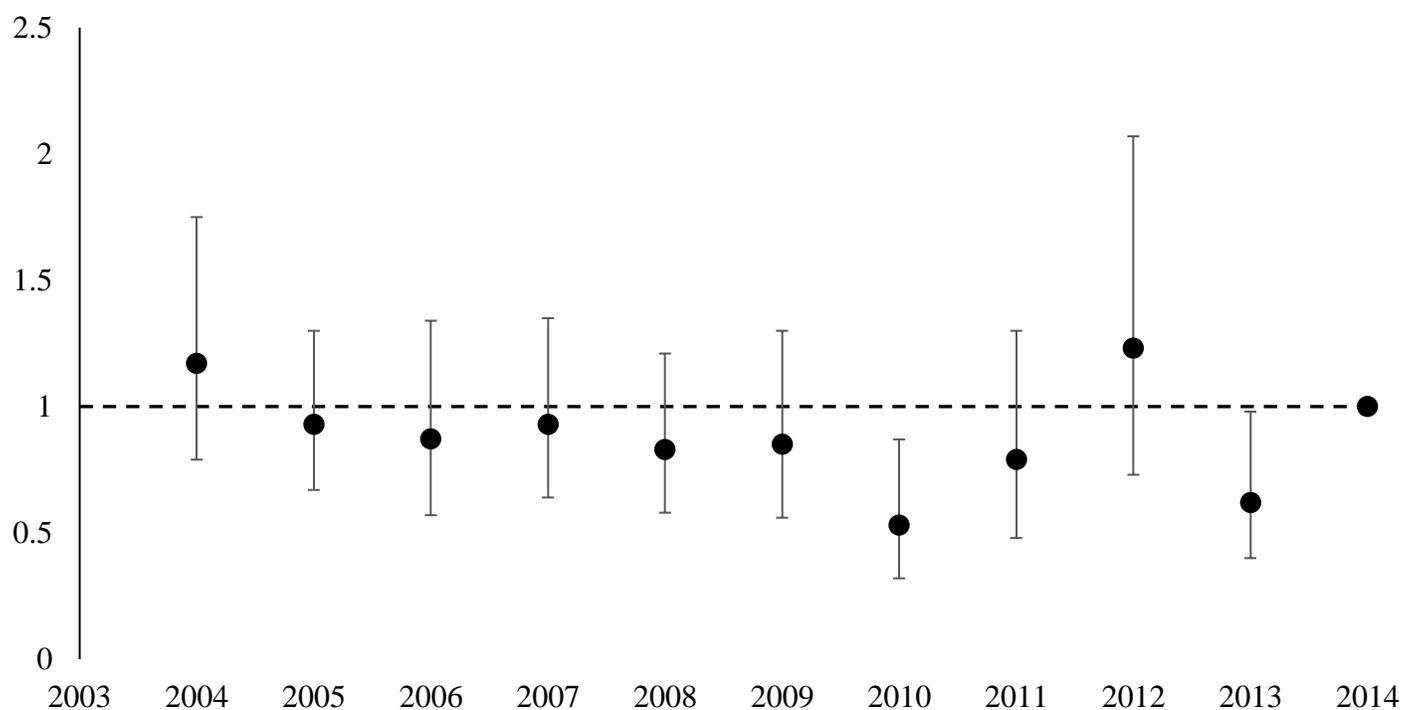
	Full Sample (N= 15,850)		Non-Construction Workers (N= 14,468)		Construction Workers (N= 1,382)		p-values
	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	
Other	1,314	5.12 (4.53, 5.79)	1,229	5.37 (4.74, 6.07)	85	2.8 (1.77, 4.40)	
Educational Attainment							
Less than High School	3,743	20.8 (18.8, 21.8)	3,258	19.9 (18.9, 21.0)	485	29 (25.2, 33.2)	<0.001
High School Diploma	5,823	34.8 (33.5, 36.0)	5,212	33.3 (32, 34.6)	611	48.1 (44.1, 52.2)	
Some College	4,667	29.6 (28.3, 30.9)	4,422	30.7 (29.4, 32.0)	245	19.7 (16.3, 23.7)	
College Degree or Higher	1,617	14.8 (13.9, 15.8)	1,576	16.1 (15.1, 17.2)	41	3.15 (1.98, 4.98)	
Annual Family Income							
<\$20,000	11,724	62.1 (61.0, 63.2)	10,878	62.9 (61.7, 64.1)	846	54.7 (49.9, 59.5)	0.002
\$20,000-\$49,999	3,505	28.5 (27.4, 29.7)	3,026	27.5 (26.4, 28.7)	479	37.6 (33.0, 42.4)	
\$50,000-\$74,999	384	5.33 (4.68, 6.07)	347	5.4 (4.75, 6.12)	37	4.74 (2.74, 8.07)	
>\$75,000	237	4.05 (3.37, 4.86)	217	4.17 (3.42, 5.08)	20	2.93 (1.59, 5.34)	
Marital status							
Married	1,719	19.8 (18.5, 21.1)	1,515	19.5 (18.3, 20.9)	204	21.9 (18.1, 26.1)	<0.001
Widowed	47	0.61 (0.40, 0.92)	44	0.67 (0.44, 1.02)	3	0.05 (0.01, 0.17)	
Divorced	949	11 (10.0, 12.1)	824	10.4 (9.4, 11.4)	125	17.1 (13.9, 20.9)	
Never Married	13,135	68.6 (13.14)	12,085	69.4 (68.1, 70.7)	1,050	61 (56.1, 65.7)	
Health Insurance							
No	10,606	66.2 (65.0, 67.5)	9,889	67.8 (66.5, 68.9)	717	52.2 (48.1, 56.3)	<0.001
Yes	5,244	33.8 (32.5, 35)	4,579	32.2 (31.1, 33.5)	665	47.8 (43.7, 51.9)	

Table 5. Correlates of past year drug rehabilitation services utilization among 15,850 National Survey on Drug Use and Health (NSDUH) respondents with past year drug use disorder, United States, 2004 – 2014

	Past Year Drug Use Disorder		Unadjusted OR (95% CI)	Adjusted OR (95% CI)
	No (Weighted %)	Yes (Weighted %)		
CTEW				
No	12,344 (90.7)	2,081 (88.3)	1.00	1.00
Yes	1,119 (9.34)	254 (11.7)	1.29 (0.99, 1.68)	1.08 (0.82, 1.43)
Survey Year				
2004	1,374 (9.75)	201 (8.83)	0.8 (0.58, 1.1)	0.74 (0.53, 1.02)
2005	1,283 (8.78)	220 (7.79)	0.78 (0.57, 1.07)	0.71 (0.52, 0.97)
2006	1,245 (8.95)	204 (8.95)	0.88 (0.62, 1.26)	0.84 (0.59, 1.21)
2007	1,234 (8.91)	217 (8.7)	0.86 (0.61, 1.22)	0.81 (0.57, 1.15)
2008	1,313 (9.44)	213 (9.02)	0.84 (0.64, 1.11)	0.77 (0.57, 1.03)
2009	1,228 (9.26)	240 (9.04)	0.86 (0.65, 1.14)	0.81 (0.61, 1.07)
2010	1,225 (8.89)	220 (9.53)	0.95 (0.66, 1.37)	0.93 (0.65, 1.33)
2011	1,189 (7.95)	202 (8.44)	0.94 (0.69, 1.28)	0.87 (0.64, 1.18)
2012	1,234 (9.62)	232 (10.9)	1.00 (0.7, 1.44)	0.91 (0.62, 1.35)
2013	1,132 (9.17)	199 (8.25)	0.8 (0.56, 1.13)	0.76 (0.53, 1.08)
2014	1,006 (9.31)	187 (10.5)	1.00	1.00
Age Group, y				
18-25	9,367 (47.3)	1,530 (40.8)	1.00	1.00
26-34	1,563 (26)	325 (28.4)	1.27 (1.06, 1.51)	1.71 (1.43, 2.04)
35-49	1,013 (20)	249 (24.7)	1.44 (1.18, 1.74)	2.22 (1.75, 2.81)
50-64	165 (6.21)	29 (6.08)	1.14 (0.68, 1.91)	1.73 (1.05, 2.85)
≥65	8 (0.39)	1 (0.02)	0.06 (0.01, 0.56)	0.13 (0.01, 1.27)
Sex				
Male	8,531 (67.5)	1,534 (70.7)	1.00	1.00
Female	4,932 (32.5)	801 (29.3)	0.86 (0.72, 1.03)	0.86 (0.71, 1.03)
Race/Ethnicity				
White	8,436 (64.4)	1,627 (69.1)	1.00	1.00
Black	1,886 (15.1)	247 (14.7)	0.91 (0.74, 1.11)	0.70 (0.57, 0.86)
Hispanic	2,019 (15.1)	274 (12.5)	0.77 (0.61, 0.97)	0.69 (0.55, 0.85)
Other	1,122 (5.37)	187 (3.78)	0.66 (0.46, 0.94)	0.64 (0.45, 0.91)
Educational Attainment				
Less than High School	3083 (19.9)	640 (25.2)	2.24 (1.68, 2.97)	2.16 (1.52, 3.09)
High School Diploma	4860 (34.2)	940 (37.6)	1.94 (1.44, 2.6)	1.87 (1.28, 2.72)
Some College	4050 (30)	608 (28.1)	1.65 (1.23, 2.22)	1.63 (1.15, 2.32)
College Degree or Higher	1470 (16)	147 (9.06)	1.00	1.00
Annual Family Income				
<\$20,000	9871 (60.7)	1,813 (69.4)	1.37 (1.15, 1.63)	1.58 (1.30, 1.91)
\$20,000-\$49,999	3050 (29.3)	443 (24.5)	1.00	1.00
\$50,000-\$74,999	330 (5.71)	54 (2.4)	0.71 (0.46, 1.11)	0.73 (0.45, 1.17)
>\$75,000	212 (4.31)	25 (2.73)	0.76 (0.40, 1.43)	0.85 (0.43, 1.71)
Marital status				
Married	1475 (20.4)	236 (15.7)	1.00	1.00
Widowed	40 (0.66)	7 (0.34)	0.77 (0.6, 0.98)	0.68 (0.20, 2.32)

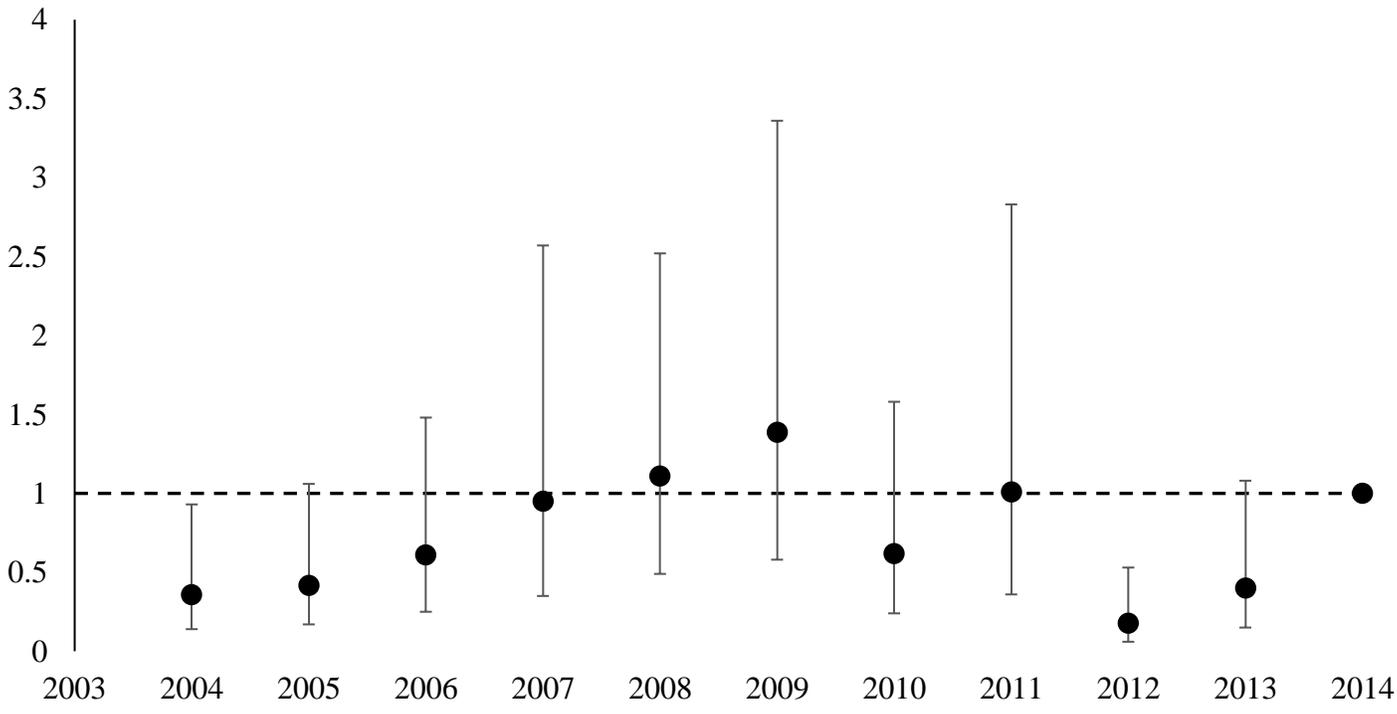
	Past Year Drug Use Disorder		Unadjusted OR (95% CI)	Adjusted OR (95% CI)
	No (Weighted %)	Yes (Weighted %)		
Divorced	726 (10.3)	222 (15.2)	0.51 (0.15, 1.69)	1.72 (1.28, 2.30)
Never Married	11222 (68.6)	1,870 (68.6)	1.47 (1.18, 1.85)	1.52 (1.18, 1.95)
Health Insurance				
No	9,056 (67)	1,527 (63)	1.00	1.00
Yes	4,407 (33)	808 (37)	1.19 (1.01, 1.41)	0.91 (0.76, 1.10)

Figure 1. Odds* of past year drug use disorder among CTEW by year, National Survey on Drug Use and Health (NSDUH), United States, 2004 – 2014, n=18,236



* Adjusted for age, sex, race, education, income, marital status, and insurance

Figure 2: Odds* of past year utilization of drug rehabilitation services among CTEW with a past year drug use disorder by year, National Survey on Drug Use and Health (NSDUH), United States, 2004 - 2014, n = 1,370



* Adjusted for age, sex, race, education, income, marital status, and insurance