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Concurrent Alcohol and Opioid Use Among Harm Reduction Clients

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Abstract

Background: Harm reduction services infrequently address alcohol use among clients using opioids, despite the evaluated risk of overdose or medical consequences for clients with viral infections. The purpose of this study is to assess concurrent alcohol and opioid use among syringe services and overdose prevention program participants predominately in southern Ohio and northern Kentucky.

Methods: This is a cross-sectional study using self-report data (n = 1,142) pooled across regional overdose prevention programs and a mobile syringe services program. The outcome variable was concurrent use categorized as no concurrent alcohol, prescription opioid or heroin use; alcohol and heroin or prescription opioid use; and alcohol, prescription opioid and heroin use in the past three months.

Results: The sample was predominantly white (95%), 56% were male and the mean age was 33 years old. Forty-seven percent of the clients had no concurrent use of alcohol and opioids; 20.1% reported concurrent use of alcohol and either heroin or prescription opioids; and 33.4% reported concurrent use of alcohol, heroin and prescription opioids in the past 3 months. Lifetime suicidal ideation and non-opioid drug use were associated with concurrent alcohol and opioid use in the multivariable model.

Conclusion: Harm reduction clients with concurrent alcohol and opioid use may warrant enhanced overdose prevention services. Syringe services and overdose prevention program participants may benefit from education or a brief intervention on alcohol consumption.

Keywords

Alcohol; Heroin; Prescription opioids; Overdose

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Conflict of Interest

The authors have no conflicts of interest.

1. Introduction

Globally, the United States (U.S) has the highest rates of drug overdose deaths (Martins, Sampson, Cerda, & Galea, 2015) and in 2017 there were 70,237 overdose deaths (Hedegaard, Minino, & Warner, 2018). Drug overdose deaths have been concentrated in rural areas, particularly in the Midwest/Central Appalachian region of the U.S. (Rossen, Khan, & Warner, 2013). Three of the five states with the highest rates of overdose deaths are located in this area and include West Virginia (57.8 deaths per 100,000), Ohio (46.3) and Kentucky (37.2) (Hedegaard et al., 2018). The hallmark symptom of an opioid overdose is respiratory depression (Boyer, 2012) and the combination of opioids with other central nervous system depressants, like alcohol and benzodiazepines, is particularly problematic (White & Irvine, 1999). While there has recently been attention on the dangerous combination of opioids and benzodiazepines (Martins et al., 2015), there has been less attention on the deleterious effects of combining opioids and alcohol.

Based on the 2017 National Survey of Drug Use and Health (NSDUH), approximately 140.6 million people in the U.S. are current alcohol users; 47.4% of current drinkers were classified as binge alcohol users and 11.9% were classified as heavy alcohol users (SAMSHA, 2018). Significantly fewer people report non-medical use of prescription opioids (11.1 million) or heroin use (886,000) in the past year. Approximately 2.1 million individuals meet the criteria for a prescription pain reliever disorder and 1.7 million for an opioid use disorder (SAMSHA, 2018). Few epidemiological studies have reported community-based rates of concurrent alcohol and opioid use.

Among illicit drug users, polydrug use occurs frequently (Quek et al., 2013) and the specific rates of either concurrent or simultaneous use of opioids and alcohol varies across studies. Concurrent use refers to reported use during the same time period, whereas simultaneous use refers to use at the same time or together (Earleywine & Newcomb, 1997). In the 2000 National Alcohol Survey, concurrent or simultaneous use of alcohol with either heroin or prescription opioids was low (0.0–1.5%) (Midanik, Tam, & Weisner, 2007). An Australian study of heroin and amphetamine users found that 78% of participants reported concurrent use of heroin and alcohol in the past 6 months (Darke & Hall, 1995). Similar findings were observed in a study of young injection drug users in San Francisco, with 76% reporting alcohol consumption (Riley et al., 2016). More recent studies suggest that heavy alcohol consumption occurs frequently among injection drug users (Costenbader, Zule, & Coomes, 2007; Fairbairn et al., 2016). In a study of injection drug users in Baltimore, New York, and Seattle; 37% met criteria for harmful drinking on the Alcohol Use Disorders Identification Test (Campbell et al., 2006). Data from national epidemiological studies in the U.S. suggests that opioid use disorders frequently co-occur with alcohol use disorders (Hughes et al., 2016; Saha et al., 2016). More specifically, one study found that 33.1% of individuals with an opioid use disorder had a co-occurring alcohol use disorder (Kidorf et al., 2004).

While the combined use of opioids and alcohol is known to increase the risk of overdose, there is varying evidence on the extent to which alcohol contributes to opioid overdoses nor is it clear what level of alcohol consumption elevates the risk of an opioid overdose. An Australian study of opioid overdose fatalities found that 40% of cases had alcohol in their

system during the study period; however, alcohol was mentioned as a contributing cause of death in only 14% of cases (Darke & Ross, 1999). Data from the 2010 DAWN study reported that alcohol was involved in 18.5% of opioid-abuse related emergency department visits and 22.1% of opioid related deaths (Jones, Paulozzi, & Mack, 2014). Additionally, alcohol consumption is likely associated with increased risky drug behaviors (Le Marchand, Evans, Page, Davidson, & Hahn, 2013; Stein, Charuvastra, Anderson, Sobota, & Friedman, 2002). Opioid Overdose Education and Naloxone Distribution (OEND), developed by the Veterans Health Administration (VHA), found that 25.0% of veterans receiving naloxone had alcohol use disorder (Oliva et al., 2017). Research suggests that problem alcohol consumption, as defined by the CAGE, was independently associated with overdose risk (Uuskula et al., 2015). There have been mixed findings in respect to whether alcohol consumption among injection drug users is associated with all-cause mortality (Hayden et al., 2014; Johnson et al., 2015).

While there are a limited number of studies that assess concurrent use of alcohol and opioids; the available findings suggest that concurrent use is common and likely contributes to opioid-overdose mortality (Edwards, Vowles, & Witkiewitz, 2017; Witkiewitz & Vowles, 2018). A recent study of opioid overdose deaths in San Francisco found that 20% of opioid overdose deaths involved alcohol (Visconti, Santos, Lemos, Burke, & Coffin, 2015), which is similar to a study conducted in the United Kingdom which found that 23% of the heroin overdose deaths involved alcohol (Oliver & Keen, 2003). A study of overdose deaths in New Mexico between 1994–2003 found that 32.6% involved alcohol co-intoxication, with a lower proportion of alcohol co-intoxication in deaths caused by prescription drugs versus illicit drugs (Shah, Lathrop, Reichard, & Landen, 2008).

The purpose of this study is to assess concurrent opioid and alcohol use among individuals receiving services to reduce the harm associated with opioid use disorders. While harm reduction programs may address alcohol consumption, it remains unknown whether it is sufficient to reduce the risk of overdose and potential medical consequences for those with HIV or Hepatitis C. The results may inform the need to address alcohol use during opioid overdose prevention educational interventions or as part of syringe services programs.

2. Materials & Methods

2.1. Study population

Data were pooled across harm reduction programs including: 1) an overdose prevention program at a residential addiction treatment (n = 250), 2) community-based overdose prevention programs (n = 1,165), and 3) a mobile syringe services program (n = 803). These programs served clients residing primarily in southern Ohio and northern Kentucky. Each program had a baseline self-report intake instrument that was completed by clients upon program entry and/or as part of participation in an overdose prevention training session. The 21 intake items, that were identical across the three programs, were combined into a single database that included data from May 2013 to April 2016. The data was collected as part of routine programming and not specifically for research purposes. Data was restricted to only clients that reported using heroin or prescription opioids in the past three months.

The combined dataset (n = 1,142) included age; sex; employment (no/yes including part-time and full time work); city, county, state of client residence; treatment in an emergency department in the past 3 months for alcohol or drug use; serious thoughts of suicide in the past 30 days (no/yes); serious thoughts of suicide during lifetime (no/yes); attempted suicide in the past 30 days (no/yes); attempted suicide during lifetime (no/yes); living with someone who has an alcohol or drug problem (no/yes); ever injected drugs (no/yes); age first used drugs intravenously; ever overdosed (no/yes); number of times overdosed; age of first overdose; ever witnessed someone overdose (no/yes) and number of witnessed overdoses. Serious thoughts of suicide and attempted suicide were recoded (never/ever). County was classified as either Appalachian or non-Appalachian using the scheme from the Appalachian Regional Commission; counties were also classified into rural, suburban or urban using the National Center for Health Statistics categories (Appalachian Regional Commission (ARC), 2017; Ingram & Franco, 2014).

2.2. Study design

This was a cross-sectional study which utilized self-report data pooled from three programs predominately serving individuals in southern Ohio and northern Kentucky. Data was collected via a self-report instrument that included eight items on the frequency of substance use in the past three months (never, once or twice, monthly, weekly and daily or almost daily) and it included: alcohol, heroin, prescription opioids, sedatives, marijuana, cocaine, methamphetamine, prescription stimulants and other drugs. The primary outcome variable was concurrent alcohol and opioid use which was categorized as no concurrent alcohol, prescription opioid or heroin use; alcohol and heroin or prescription opioid use; and alcohol, prescription opioid and heroin use in the past three months. Data used in this study was deidentified and West Virginia University's Review Board (IRB) determined that this was not human subject research.

2.3. Statistical analysis

The statistical analysis was conducted using Stata/MP Version 15.1 (StataCorp, 2017). Chi-square and ANOVA were used to test for statistical significance, defined as a p-value of < 0.05, between the three categories of concurrent alcohol and opioid use. Tukey HSD was used to determine which specific comparisons of means were statistically significant. Multinomial logistic regression was used to generate relative risk ratios (RRR) for the bivariable models and multivariable model, where no concurrent alcohol or opioid use was specified as the base category. The multivariable model included all of the variables that were statistically significant in the bivariable models and the model controlled for study site. A mean Variance Inflation Factor (VIF) was used to assess for multicollinearity in the final model.

3. Results

The majority of clients were White (95.3%) and unemployed (60.5%); a little more than half of the clients were male (55.6%) (see Table 1). The mean age was 33.3 years old (range: 18–70 years old). Nearly a third (39.4%) of clients reported living with someone who had an alcohol and/or drug problem. Thirty-nine percent of clients reported having thoughts of

suicide during their lifetime and 19.9% reported having attempted suicide during their lifetime. The vast majority of clients reported heroin use (91.6%), 61.3% reported using prescription opioids and a little more than half reported alcohol use (53.5%) in the past 3 months. Almost half reported having ever overdosed (46.3%) and the mean age of first overdose was 27.3 years old (SD = 8.3).

Concurrent alcohol and opioid use was reported by 53.5% (n = 611) of participants. Nearly a fifth (20.1%) reported concurrent use of alcohol and either heroin or a prescription opioid and 33.4% reported concurrent alcohol, heroin and prescription opioid use in the past 3 months. Among clients with concurrent alcohol use (n = 611), 13.1% reported daily or almost daily alcohol consumption. Among clients with concurrent sedative use (n = 496), 19% reported daily or almost daily use of sedatives. Clients reporting concurrent alcohol and opioid use were more likely to be male and unemployed compared to clients who did not report concurrent use (see Table 1). Clients with concurrent alcohol and opioid use had overall higher rates of clinical severity and poly drug use; for example, 41.3% of those with no concurrent alcohol use reported having ever overdosed compared to 54.7% of those with concurrent alcohol, heroin and prescription opioid use. Similarly, 16.7% of those with no concurrent alcohol use reported having attempted suicide compared to 48.5% of those with concurrent alcohol, heroin and prescription opioid use.

In the unadjusted models, concurrent alcohol and opioid users were less likely to reside in Appalachian counties (see Table 2). Concurrent alcohol, heroin and prescription opioid users were more likely to have had serious thoughts of suicide during their lifetime, had attempted suicide, had overdosed and were concurrently using other illicit drugs. Clients reporting alcohol, heroin or prescription opioid use were significantly less likely to have reported using drugs intravenously. Age, county urbanicity and living with someone with an alcohol or drug use problems were not associated with concurrent alcohol and opioid use. In the final multivariable model (VIF = 1.29); only sex, serious thoughts of suicide and cannabis use were associated with both groups of concurrent alcohol and opioid use. Clients who reported ever injecting drugs and clients residing in Appalachian counties were less likely to have concurrent alcohol and heroin or prescription opioid use. Cocaine, methamphetamine, prescription stimulant or sedative use were associated with concurrent alcohol, heroin and prescription opioid use (see Table 2).

4. Discussion

Among clients participating in a syringe services program or overdose prevention programs, 53.5% reported concurrent alcohol and opioid use in the past 3 months. The prevalence of concurrent alcohol and opioid use is much higher than has been observed in community-based samples (Midanik et al., 2007), while it is lower than 6-month prevalence rates among opioid-treatment seeking populations (Darke & Hall, 1995). While it is difficult to directly compare prevalence estimates across studies due to methodological differences, research among injection drugs users have found higher rates of alcohol use (76%) (Riley et al., 2016) and daily alcohol consumption (23.6% in Hayden et al., 2014 versus 7% in the present study). It is interesting to note that 33.4% of clients reported using alcohol, heroin and prescription opioids. It is assumed that in the U.S. many people who used prescription

opioids non-medically have transitioned to using heroin (Banerjee et al., 2016; Cerda, Santaella, Marshall, et al., 2015); which is cheaper and perhaps easier to get in areas that have been successful in implementing strict regulatory policies on the dispensing of prescription opioids for pain. However, our study suggests that people may continue to use prescription opioids even after “transitioning” to heroin. It may be that availability of prescription opioids and heroin is a more important factor driving use, than individual drug preference.

Clients reporting concurrent alcohol and opioid use were more likely to have had suicidal thoughts during their lifetime. This finding is consistent with previous research demonstrating that alcohol consumption was higher among intentional overdose decedents (Pfab, Eyer, Jetzinger, & Zilker, 2006). Additional research is needed to confirm whether higher frequency of concurrent alcohol and opioid use is prospectively associated with intentional overdoses or suicide attempts. Notably, 37.8% of clients with concurrent alcohol, opioid and sedative (e.g., benzodiazepines) use reported using sedatives at least weekly. These clients may also be at extremely high risk of an opioid overdose (Jones et al. 2010; Hernandez, He, Brooks, & Zhang, 2018) and may warrant enhanced overdose prevention services. Overall, there were high rates of concurrent alcohol, opioid and other illicit drug use.

There are several limitations associated with this study. First, the data captured concurrent alcohol and opioid use and therefore it is unknown whether these substances were used simultaneously. Second, the program data did not specify whether the prescription medications were prescribed and/or whether there was non-medical use. Clients using alcohol and only heroin versus alcohol and only prescription opioids may represent different groups and combining them into a single category may have impacted the relative risk ratios in the models. Third, the data reported is part of routine programing and not specifically for research purposes, hence missing alcohol and drug use data may further limit the generalizability of the results. Finally, the alcohol and drug use data was self-reported and hence subject to recall bias; the cross-sectional survey design prohibits understanding of how concurrent alcohol and opioid consumption patterns may change over time.

5. Conclusions

In conclusion, the majority of clients at a syringe services program and participants in overdose prevention programs reported concurrent alcohol and opioid use. The combination of alcohol and opioids increases the risk of an overdose, which is exacerbated by the high rate of injection drug use in this population. It may be beneficial for clients reporting daily concurrent use of alcohol or sedatives to receive enhanced overdose prevention services. Future research is needed to determine whether brief interventions to reduce alcohol consumption are warranted in this population, particularly in the context of syringe services programs.

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References

Appalachian Regional Commission (ARC). The Appalachian region. (2017). https://www.arc.gov/appalachian_region/TheAppalachianRegion.asp (Accessed October 8, 2017).

Banerjee G, Edelman JE, Barry DT, Becker WC, Cerda M, Crystal S, ... Marshall BDL (2016). Non-medical use of prescription opioids is associated with heroin initiation among US veterans: A prospective cohort study. Addiction, 111(11), 2021–2031. [PubMed: 27552496]

Boyer EW (2012). Management of opioid analgesic overdose. New England Journal of Medicine, 367, 146–155. [PubMed: 22784117]

Campbell JV, Hagan H, Latka MH, Garfein RS, Golub ET, Coady MH, ... Project TS (2006). High prevalence of alcohol use among hepatitis C virus antibody positive injection drug users in three US cities. Drug and Alcohol Dependence, 81(3), 259–265. [PubMed: 16129567]

Cerda M, Santaella J, Marshall BDL, et al. (2015). Nonmedical prescription opioid use in childhood and early adolescence predicts transitions to heroin use in young adulthood: A national study. The Journal of Pediatrics, 167(3), 605–612. [PubMed: 26054942]

Costenbader EC, Zule WA, & Coomes CM (2007). The impact of illicit drug use and harmful drinking on quality of life among injection drug users at high risk for hepatitis C infection. Drug and Alcohol Dependence, 89(2–3), 251–258. [PubMed: 17320314]

Darke S, & Hall W (1995). Levels and correlates of polydrug use among heroin users and regular amphetamine users. Drug and Alcohol Dependence, 39, 231–235. [PubMed: 8556972]

Darke S, & Ross J (1999). Heroin-related deaths in South Western Sydney, Australia, 1992–96. Drug and Alcohol Review, 18(1), 39–45.

Earleywine M, & Newcomb MD (1997). Concurrent versus simultaneous polydrug use: Prevalence, correlated, discriminant validity, and prospective effects on health outcomes. Experimental and Clinical Psychopharmacology, 5(4), 353–364. [PubMed: 9386962]

Edwards KA, Vowles KE, & Witkiewitz K (2017). Co-use of alcohol and opioids. Current Addiction Reports, 4(2), 194–199.

Fairbairn N, Hayashi K, Milloy MJ, Nolan S, Nguyen P, Wood E, & Kerr T (2016). Hazardous alcohol use associated with increased sexual risk behaviors among people who inject drugs. Alcoholism, Clinical and Experimental Research, 40(11), 2394–2400.

Hayden A, Hayashi K, Dong H, Milloy M, Kerr T, Montaner JSG, & Wood E (2014) The impact of drug use patterns on mortality among polysubstance users in a Canadian setting: A prospective cohort study. BMC Public Health, 14, 1153. [PubMed: 25377274]

Hedegaard H, Minino AM, & Warner M (2018). Drug overdose deaths in the United States, 1999–2017. NCHS Data Brief, Feb. 329, 1–8.

Hernandez I, He M, Brooks MM, & Zhang Y (2018). Exposure-response between concurrent opioid and benzodiazepine use and risk of opioid-related overdose in Medicare Part D beneficiaries. JAMA Network Open, 1(2), e180919.

Hughes A, Williams MR, Lipari RN, Bose J, Copello EAP, & Kroutil LA (2016). Prescription drug use and misuse in the United States: Results from the 2015 National Survey on drug use and health. Washington, DC: Substance Abuse and Mental Health Services Administration.

Ingram DD, & Franco SJ (2014). 2013 NCHS urban-rural classification scheme for counties. Vital health stat 2 [internet]. Apr. 166, 1–73. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/24776070.

Johnson C, Dong H, Ahamad K, Hayashi K, Milloy MJ, Kerr T, & Wood E(2014) Impact of binge alcohol on mortality among people who inject drugs. Addictive Behaviors Reports, 2, 28–32.

Jones CM, Paulozzi LJ, & Mack KA (2014). Alcohol involvement in opioid pain reliever and benzodiazepine drug abuse-related emergency department visits and drug-related deaths — United States, 2010. Morbidity and Mortality Weekly, (40), 881–885 October 10, 63.

Kidorf M, Disney ER, King VL, Neufeld K, Beilenson PL, & Brooner RK (2004). Prevalence of psychiatric and substance use disorders in opioid abusers in a community syringe exchange program. Drug and Alcohol Dependence, 74, 115–122. [PubMed: 15099655]

Le Marchand C, Evans J, Page K, Davidson PJ, & Hahn JA (2013). Hazardous alcohol consumption among young adult IDU and its association with high risk behaviors. Drug and Alcohol Dependence, 127(1–3), 143–149. [PubMed: 22819868]

Martins SS, Sampson L, Cerda M, & Galea S (2015). Worldwide prevalence and trends in unintentional drug overdose: A systematic review of the literature. American Journal of Public Health, 105(11), e29–e49.

Midanik LT, Tam TW, & Weisner C (2007). Concurrent and simultaneous drug and alcohol use: Results of the 2000 National Alcohol Survey. Drug and Alcohol Dependence, 90, 72–80. [PubMed: 17446013]

Oliva EM, Christopher ML, Wells D, Bounthavong M, Harvey M, Himstreet J, ... Trafton JA (2017). Opioid overdose education and naloxone distribution: Development of the Veterans Health administration's national program. Journal of the American Pharmacists Association, 57(2), S168–S179. [PubMed: 28292502]

Oliver P, & Keen J (2003). Concomitant drugs of misuse and drug using behaviours associated with fatal opiate-related poisonings in Sheffield, UK, 1997–2000. Addiction, 98, 191–197. [PubMed: 12534424]

Pfab R, Eyer F, Jetzinger E, & Zilker T (2006). Cause and motivation in cases of nonfatal drug overdoses in opiate addicts. Clinical Toxicology, 44, 255–259. [PubMed: 16749542]

Quek L, Chan GCK, White A, Connor JP, Baker PJ, Saunders JB, & Kelly AB (2013). Concurrent and simultaneous polydrug use: Latent class analysis of an Australian nationally representative sample of young adults. Frontiers in Public Health, 1, 61. [PubMed: 24350230]

Riley ED, Evans JL, Hahn JA, Briceno A, Davidson PJ, Lum PJ, & Page K(2014) A longitudinal study of multiple drug use and overdose among young people who inject drugs. American Journal of Public Health, 106, 915–917.

Rossen LM, Khan D, & Warner M (2013). Trends and geographic patterns in drug- poisoning death rates in the U.S., 1999–2009. American Journal of Preventive Medicine, 45(6), e19–e25. [PubMed: 24237925]

Saha TD, Kerridge BT, Goldstein RB, Chou SP, Zhang H, Jung J, ... Grant BF (2016). Nonmedical prescription opioid use and DSM-5 nonmedical prescription opioid use disorder in the United States. Journal of Clinical Psychiatry, 77, 772–780. [PubMed: 27337416]

Shah NG, Lathrop SL, Reichard RR, & Landen MG (2008). Unintentional drug overdose death trends in New Mexico, USA, 1990–2005: Combinations of heroin, cocaine, prescription opioids and alcohol. Addiction, 103, 126–136. [PubMed: 18028518]

StataCorp (2017). Stata statistical software: Release 15. College Station, TX: StataCorp LLC.

Stein MD, Charuvastra A, Anderson B, Sobota M, & Friedman PD (2002). Alcohol and HIV risk taking among intravenous drug users. Addictive Behaviors, 27, 727–736. [PubMed: 12201380]

Substance Abuse and Mental Health Services Administration (2018). Key substance use and mental health indicators in the United States: Results from the 2017 national survey on Drug Use and Health (HHS Publication No. SMA 18–5068, NSDUH Series H-53). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration https://www.samhsa.gov/data/.

Uuskula A, Raag M, Vorobjov S, Ruutel K, Lyubimova A, Levina OS, & Heimer R(2015). Non-fatal overdoses and related risk factors among people who inject drugs in St. Petersburg, Russia and Kohtla-Jarve, Estonia. BMC Public Health, 15(1), 1255. [PubMed: 26684815]

Visconti AJ, Santos GM, Lemos NP, Burke C, & Coffin PO (2015). Opioid overdose deaths in the city and county of San Francisco: Prevalence, distribution, and disparities. Journal of Urban Health, 92(4), 758–772. [PubMed: 26077643]

White JM, & Irvine RJ (1999). Mechanism of fatal opioid overdose. Addiction, 94(7), 961–972. [PubMed: 10707430]

Witkiewitz K, & Vowles KE (2018). Alcohol and opioid use, co-use, and chronic pain in the context of the opioid epidemic: A critical review. Alcoholism: Clinical and Experimental Research, 42(3), 478–488.

HIGHLIGHTS

- More than half of clients reported concurrent opioid and alcohol use.
- Concurrent alcohol and opioid use was associated with overdose and suicide attempts.
- Clients with concurrent alcohol and opioid use may warrant enhanced services.

Table 1

Descriptive characteristics of clients with concurrent alcohol and opioid use.

	Overall (*n* = 1,142)	**Heroin or Rx Opioid (*n* = 531)**	**Alcohol + Heroin or Rx Opioid (*n* = 230)**	**Alcohol, Heroin & Rx Opioid (*n* = 381)**	**p-value**
Male	55.6%	51.7%	60.5%	57.8%	0.05
Mean Age	33.3	33.4	33.7	32.9	0.61
Race					0.08
White	95.3%	96.4%	93.9%	94.7%	
Black	2.5%	1.7%	4.8%	2.1%	
Other	2.2%	1.9%	1.3%	3.2%	
Employed (Yes)	39.5%	41.1%	46.3%	33.3%	< 0.00
Reside in County in Appalachia	16.7%	20.1%	12.5%	14.4%	0.02
County Classification					0.32
Rural	1.5%	1.4%	2.3%	1.1%	
Suburban	1.11%	0.8%	0.5%	2.0%	
Urban	97.4%	97.9%	97.2%	96.9%	
Live with Someone AOD Problem (Yes)	39.4%	41.1%	34.6%	39.9%	0.25
Serious Thoughts of Suicide in Lifetime	38.9%	31.4%	40.1%	48.5%	< 0.00
Ever Attempted Suicide in Lifetime	19.9%	16.7%	19.7%	24.5%	0.02
Injection Drug Use (Lifetime)	90.8%	91.1%	84.2%	94.2%	< 0.00
Injected drugs in the past month	84.7%	82.5%	84.4%	87.7%	0.13
Mean age first injected drugs	25.3	26.1[b]	25.3	24.3[b]	0.01
Ever Overdosed in Lifetime (Yes)	46.3%	41.3%	43.8%	54.7%	< 0.00
Mean number of times overdosed	2.9	2.7	2.6	3.3	0.04
Mean age of first overdose	27.3	28.2	27.6	26.3	0.08
Ever Witnessed Overdose in Lifetime (Yes)	73.6%	75.0%	65.5%	76.5%	0.01
Mean number of times witnessed an overdose	5.0	5.2	4.5	4.5	0.56
Mean number times treated in Emergency Dept. in past 3 months	0.5	0.3[b]	0.6	0.7[b]	0.01
Past 3 month drug use[a]					
Heroin	91.6%	90.6%	80.0%	100.0%	< 0.00
Prescription opioids	61.3%	51.4%	20.0%	100.0%	< 0.00

	Overall (*n* = 1,142)	Heroin or Rx Opioid (*n* = 531)	Alcohol + Heroin or Rx Opioid (*n* = 230)	Alcohol, Heroin & Rx Opioid (*n* = 381)	p-value
Cannabis	57.2%	45.5%	59.7%	72.2%	< 0.00
Prescription sedatives	44.4%	31.3%	38.3%	66.7%	< 0.00
Prescription stimulants	18.2%	10.5%	10.6%	66.5%	< 0.00
Cocaine	40.8%	27.7%	36.6%	61.5%	< 0.00
Methamphetamine	13.6%	8.7%	8.0%	24.2%	< 0.00

[a]Category ‘Other’ is not reported because of few counts.

[b]Tukey HSD statistically significant between reference group (no concurrent alcohol & opioid use) versus comparison group.

Table 2

Relative risk ratios for concurrent alcohol and opioid use (N = 1,142).

	Unadjusted Models						Adjusted Model[a]					
	Concurrent Alcohol + Heroin or Rx Opioid			Concurrent Alcohol, Heroin & Rx Opioids			Concurrent Alcohol + Heroin or Rx Opioid			Concurrent Alcohol, Heroin & Rx Opioids		
	RRR	*P* value	95% CI	RRR	P value	95% CI	RRR	P value	95% CI	RRR	P value	95% CI
Female	0.70	0.03	0.51–0.96	0.78	0.07	0.60, 1.02	0.66	0.04	0.45,0.97	0.68	0.03	0.47,0.97
Mean Age	1.00	0.78	0.99–1.02	0.99	0.43	0.98, 1.00						
Race												
White	Ref											
Black	2.88	0.02	1.18, 7.04	1.26	0.64	0.48, 3.29	2.45	0.14	0.75, 7.97	1.27	0.76	0.28, 5.63
Other	0.71	0.60	1.19, 2.59	1.70	0.22	0.72, 3.97	0.85	0.81	0.21, 3.34	1.95	0.21	0.69, 5.48
Employed (yes)	1.24	0.18	0.91, 1.69	0.72	0.02	0.55, 0.94	1.12	0.56	0.76,1.65	0.93	0.69	0.64,1.34
Reside in Appalachian County	0.57	0.02	0.36,0.90	0.67	0.03	0.46,0.96	0.38	< 0.00	0.20,0.71	1.25	0.41	0.74,2.09
County Classification												
Rural	Ref											
Suburban	0.35	0.41	0.03,4.15	3.06	0.21	0.54,17.4						
Urban	0.59	0.37	0.18,1.87	1.19	0.78	0.35,4.11						
Live with Someone AOD Problem (Yes)	0.76	0.10	0.54, 1.05	0.95	0.72	0.72, 1.25						
Serious Thoughts of Suicide in Lifetime	1.46	0.02	1.06, 2.02	2.06	< 0.00	1.56, 2.71	1.66	0.03	1.04,2.65	1.67	0.02	1.09,2.56
Ever Attempted Suicide in Lifetime	1.23	0.31	0.83, 1.83	1.62	0.00	1.17, 2.25	0.88	0.66	0.50,1.56	0.75	0.30	0.44,1.28
IDU, Lifetime	0.52	0.01	0.33, 0.83	1.57	0.09	0.93, 2.66	0.47	0.04	0.23,0.96	2.05	0.10	0.89,4.80
Overdosed, Lifetime (Yes)	1.11	0.52	0.81, 1.52	1.71	< 0.00	1.31, 2.24	1.13	0.57	0.75,1.70	1.08	0.70	0.74,1.56
Witnessed Overdose, Lifetime (Yes)	0.63	0.01	0.45, 0.88	1.08	0.62	0.79, 1.47	0.78	0.27	0.50,1.21	0.87	0.54	0.57,1.34
Number of times treated for AOD problems in ED past 3 months	1.14	0.03	1.01,1.29	1.17	< 0.00	1.05,1.31	0.96	0.64	0.82,1.13	1.05	0.49	0.92,1.19
Cannabis use past 3 months	1.78	< 0.00	1.29,2.43	3.12	< 0.00	2.35,4.14	1.83	< 0.00	1.23,2.71	1.97	< 0.00	1.36,2.84

	Unadjusted Models						Adjusted Model[a]					
	Concurrent Alcohol + Heroin or Rx Opioid			Concurrent Alcohol, Heroin & Rx Opioids			Concurrent Alcohol + Heroin or Rx Opioid			Concurrent Alcohol, Heroin & Rx Opioids		
	RRR	*P* value	95% CI	RRR	P value	95% CI	RRR	P value	95% CI	RRR	P value	95% CI
Cocaine use past 3 months	1.51	0.02	1.08,2.10	4.18	< 0.00	5.15,5.55	1.39	0.11	0.92,2.11	2.75	< 0.00	1.91,3.95
Rx stimulant use past 3 months	1.01	0.98	0.61,1.67	4.30	< 0.00	3.02,6.11	0.63	0.17	0.33,1.22	1.65	0.04	1.02,2.67
Methamphetamine use past 3 months	0.90	0.73	0.51,1.60	3.35	< 0.00	2.27,4.92	1.19	0.62	0.59,2.43	1.92	0.02	1.11,3.32
Rx sedative use past 3 months	1.36	0.06	0.99,1.89	4.40	< 0.00	3.30,5.84	1.21	0.38	0.79,1.86	2.46	< 0.00	1.69,3.59

[a]The adjusted model controlled for study site.

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