Injection and Non-Injection Drug Use Among Adults with Diagnosed HIV in the United States, 2015–2018

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Abstract

Understanding behavioral characteristics and health outcomes of people with HIV (PWH) who inject drugs and PWH who use drugs, but do not inject, can help inform public health interventions and improve HIV clinical outcomes. However, recent, nationally representative estimates are lacking. We used 2015–2018 Medical Monitoring Project data to examine health outcome differences among adults with diagnosed HIV who injected drugs or who only used non-injection drugs in the past year. Data were obtained from participant interviews and medical record abstraction. We reported weighted percentages and prevalence ratios with predicted marginal means to assess differences between groups ($P < 0.05$). PWH who injected drugs were more likely to engage in high-risk sex; experience depression and anxiety symptoms, homelessness, and incarceration; and have lower levels of care retention, antiretroviral therapy adherence, and viral suppression. Tailored, comprehensive interventions are critical for improving outcomes among PWH who use drugs, particularly among those who inject drugs.

Keywords

HIV; People who use drugs; People who inject drugs; Social and structural factors; HIV care continuum outcomes

Introduction

People with HIV (PWH) who use drugs are more likely to experience comorbidities and suboptimal HIV care continuum outcomes, including lower levels of antiretroviral therapy (ART) adherence and viral suppression [1–3]. PWH who use drugs are also more likely

to experience mental health issues, including anxiety and depression [4, 5], in addition to experiencing higher levels of stigma [6, 7], homelessness [8], and incarceration [9].

Among PWH who use drugs, those who inject drugs face even greater barriers to health [10]. They are more likely to experience drug injection complications, including soft tissue infections and endocarditis [11–13], and are at increased risk of overdosing [14] or contracting other viral infections, such as hepatitis C [15, 16]. They also often delay engagement in medical care [17] and have poorer ART adherence [2, 18, 19].

Both PWH who inject drugs and those who use drugs but do not inject (i.e., those who only use non-injection drugs) are also more likely to engage in behaviors that increase the risk of HIV transmission, including having condomless vaginal or anal sex [16, 20, 21]. Among people who inject drugs (PWID), these behaviors also include the direct sharing of injection equipment or drug solutions [22, 23]. One study found that 18% of PWH who inject drugs reported sharing syringes with people with HIV-negative or unknown status [24], which in the context of the worsening opioid crisis, has been associated with multiple HIV outbreaks across the United States [25–29].

While assessments of HIV risk among people who use drugs, and health outcomes among selected populations of PWH who use drugs are well known, less is known about the behavioral characteristics and health outcomes comparing PWH who inject drugs and PWH who only use non-injection drugs; recent estimates based on nationally representative data are lacking. Understanding differences between these two groups could help inform public health interventions, improve HIV clinical outcomes, and reduce barriers to care engagement among PWH who use drugs. This analysis also supports both the federal HIV National Strategic Plan and End the HIV Epidemic initiative, which prioritize prevention and treatment of vulnerable populations of PWH, including those who use and inject drugs [30, 31]. We analyzed nationally representative data to compare selected characteristics —including drugs used and frequency, clinical characteristics, and social and structural-related factors—between U.S.-based PWH who injected drugs and PWH who only used non-injection drugs.

Methods

Design and Procedures

The Medical Monitoring Project (MMP) is an annual, cross-sectional survey designed to produce nationally representative estimates of behavioral and clinical characteristics among adults with diagnosed HIV in the United States [32]. Briefly, MMP uses a two-stage sampling method. In the first stage, 16 states and Puerto Rico were sampled from all 50 states, the District of Columbia, and Puerto Rico. In the second stage, simple random samples of people with diagnosed HIV aged 18 years and older were drawn for each participating jurisdiction from the National HIV Surveillance System (NHSS), a census of people with diagnosed HIV in the United States. For each of the 2015, 2016, 2017, and 2018 MMP data cycles, data were collected from June of each cycle year to May of the following year via in-person or telephone interviews. Medical record abstractions were also completed at the participants' self-reported most frequent source of HIV medical care.

All selected jurisdictions participated in the project, including California (including the separately funded jurisdictions of Los Angeles County and San Francisco), Delaware, Florida, Georgia, Illinois (including Chicago), Indiana, Michigan, Mississippi, New Jersey, New York (including New York City), North Carolina, Oregon, Pennsylvania (including Philadelphia), Puerto Rico, Texas (including Houston), Virginia, and Washington. Adjusted for eligibility, the participant response rate by cycle year ranged from 40–46%.

MMP data collection is part of routine public health surveillance and thus determined to be nonresearch [33]. Participating jurisdictions obtained local institutional review board approval to collect data when required. Informed consent was obtained from all participants.

Measures

MMP staff in participating jurisdictions interviewed participants and abstracted their medical records to obtain information on drug use, social and structural-related factors that affect health, as well as behavioral and clinical characteristics. All characteristics were based on the 12 months prior to the interview, unless otherwise indicated.

Drug Use

Participants were asked about their use of drugs for nonmedical purposes in the past 12 months. Participants who reported using drugs were then asked (1) if they had used any drugs that they did not inject (i.e., non-injection drugs) and (2) if they had shot up or injected any drugs. For each confirmed route of administration, participants were also asked to report specific types or categories of drugs that they had used (e.g., cocaine, methamphetamines) for that particular route of administration; participants could report use of > 1 drug. Due to state differences in legal recognition of marijuana, inconclusive results on the effect of marijuana use on HIV health outcomes, and a high prevalence of marijuana use among both groups of participants, participants who reported only using marijuana (N = 2380) were excluded from the analysis [34, 35]. Frequency of drug use in the past 12 months was categorized as daily, weekly, monthly, and less than monthly based on the most frequently used drug per participant. Binge drinking in the past 30 days was defined as consuming 5 alcoholic beverages in a sitting for males and 4 alcoholic beverages in a sitting for females.

Demographic Characteristics and Social/Structural Factors that Affect Health

Data collected on demographic characteristics included age, gender, and race/ethnicity. Social and structural factors that affect health (e.g., education, healthcare coverage, poverty level, and recent homelessness or incarceration), were also included. Sexual behavior was based on sexual activity during the past 12 months, or if the participant was not sexually active or data were not available, was based on self-reported sexual orientation. Sexual behavior was categorized as: men who have sex with men, men who only have sex with women, and women who have sex with men. Race and ethnicity were collapsed into the following categories: non-Hispanic White, non-Hispanic Black/African American, Hispanic or Latino, and other/multiracial. Education was categorized as having less than a high school education, a high school diploma or equivalent, and higher than a high school education. Healthcare coverage was categorized as having any private insurance, public insurance only,

or Ryan White HIV/AIDS Program (RWHAP) coverage only/uninsured. Household poverty level was defined based on the Department of Health and Human Services guidelines [36].

Clinical Characteristics

Participants were also asked about certain clinical characteristics related to HIV, including ART use and adherence; symptoms of depression and anxiety in the 2 weeks before the interview; healthcare discrimination (defined as discriminatory healthcare experiences and reports of whether healthcare providers had been hostile or disrespectful with the participant, provided inferior care, or refused the participant service [37, 38]); and receipt of healthcare services. Data on healthcare discrimination were only collected during the 2015–2017 cycles.

Generalized anxiety disorder and depression symptoms were categorized based on clinically meaningful cut points from the Generalized Anxiety Disorder 7-item scale [39] and the Patient Health Questionnaire 8-item scale [40]. Participants were also asked whether they received mental health services and drug or alcohol counseling or treatment. Among those who did not receive services, need for services was ascertained. Receipt of each service was categorized as needing but not receiving, receiving, and not needing and not receiving services.

ART use and adherence were combined into a single variable categorized as no ART use in the past 12 months, ART use but < 100% dose adherent, and ART use and 100% dose adherent. Retention in care was measured through medical record abstraction and defined as having 2 or more elements of outpatient HIV care (e.g., an encounter with an HIV provider, CD4 test result, or viral load test result) at least 90 days apart in the past 12 months. Sustained viral suppression was also captured through medical record abstraction and defined as having all HIV viral load measurements documented as undetectable or < 200 copies/mL in the past 12 months.

Factors Associated with Elevated HIV Transmission Risk

Factors that influence risk of HIV transmission, including high-risk sex, drug use before or during sex, and lack of receipt of HIV or sexually transmitted disease (STD) prevention counseling, were assessed. High-risk sex was defined as not having sustained viral suppression and having condomless sex with 1 HIV-negative or HIV-unknown partner not known to be on pre-exposure prophylaxis (PrEP). Data on drug use before or during sex were only collected during the 2015–2017 cycles.

Analytic Methods

For this analysis, we combined data from the 2015, 2016, 2017, and 2018 data cycles. Among people who used drugs for non-medical purposes in the past 12 months (N = 2562), we compared types and frequency of drugs used, demographics, social and structural-related factors, clinical characteristics, engagement in high-risk sex, and receipt of HIV or STD prevention counseling among PWH who reported injecting drugs (n = 449) and those who reported using only non-injection drugs (n = 2113).

We reported weighted percents and 95% confidence intervals (CIs) for all characteristics. We reported prevalence ratios with predicted marginal means to assess differences in characteristics between PWH who injected drugs and those who only used non-injection drugs ($P < 0.05$). Data were weighted based on known probabilities of selection at state or territory and person levels. In addition, data were weighted to adjust for nonresponse and poststratified to known population totals by age, race/ethnicity, and sex from NHSS [32]. All weighted analyses accounted for the complex sample design using the survey procedures in SAS version 9.4 (SAS Institute Inc. SAS version 9.4. Cary, NC: SAS Institute; 2011).

Results

Overall, 15.6% (95% CI 14.4–16.8%) of adults with diagnosed HIV used drugs for nonmedical purposes in the past 12 months; 2.6% (95% CI 2.2–3.1%) reported injecting drugs and 13.0% (95% CI 12.1–13.9%) only used non-injection drugs (*data not shown in tables*). Among PWH who injected drugs, the most commonly injected drugs were methamphetamines (81.8%), heroin (26.9%), and cocaine (14.6%), and the most commonly used drugs that were not injected were methamphetamines (73.4%), marijuana (61.0%), poppers or amyl nitrate (38.0%), and cocaine/crack (34.6%) (Table 1). Among people who only used non-injection drugs, the most commonly reported drugs were marijuana (75.0%), cocaine/crack (45.8%), poppers or amyl nitrate (39.7%), and methamphetamines (28.2%).

PWH who injected drugs had 2.60 times the prevalence of methamphetamine use (95% CI 2.32–2.91; T = 15.0, P < 0.001) and 1.69 times the prevalence of club drug use (95% CI 1.38–2.08; T = 4.9; P < 0.001) as those who only used non-injection drugs. On the other hand, PWH who injected drugs had a lower prevalence of marijuana use (prevalence ratio (PR): 0.81; 95% CI 0.75–0.89; T = −5.4; P < 0.001) and cocaine/crack use (PR: 0.75; 95% CI 0.64–0.89; T = − 3.6; P < 0.001). A higher percentage of PWH who injected drugs also had reported daily (43.1% vs. 32.0%; T = 3.4; P = 0.001) and weekly (25.3% vs. 23.2%; T = 0.8; P=0.441) drug use. Conversely, a lower percentage of PWH who injected drugs reported binge drinking compared with those who only used non-injection drugs (18.8% vs. 34.4%; T = − 5.1; P < 0.001).

A higher percentage of PWH who injected drugs were non-Hispanic White (58.4% vs. 38.9%; T = 6.2; P < 0.001), had household incomes at or below the poverty threshold (48.6% vs. 40.2%; T = 2.4; P = 0.017), and experienced homelessness (30.0% vs. 15.6%; T = 5.3; P < 0.001) or incarceration (16.5% vs. 7.4%; T = 4.8; P < 0.001) in the past year (Table 2). Conversely, a lower percentage of PWH who injected drugs had private health insurance compared with those who only used non-injection drugs (26.5% vs. 37.8%; T = − 3.5; P=0.001).

PWH who injected drugs had a higher prevalence of depression (PR: 1.41; 95% CI 1.18–1.68; T = 3.6; P < 0.001) and anxiety (PR: 1.49; 95% CI 1.26–1.76; T = 4.4; P < 0.001) compared with those who only used non-injection drugs (Table 3). However, a higher percentage of PWH who injected drugs also reported receiving mental health services (54.9% vs. 40.1%; T = 4.9; P < 0.001) and drug or alcohol counseling or treatment (37.6% vs. 15.4%; T = 9.6; P < 0.001) compared with those who only used non-injection drugs.

Still, the prevalence of unmet needs for drug or alcohol counseling or treatment remained higher among PWH who injected drugs than among people who only used non-injection drugs (PR: 2.19; 95% CI 1.63–2.95; T = 5.0; P < 0.001). Forty-five percent of PWH who injected drugs and 76.7% of those who only used non-injection drugs reported not needing and not receiving drug or alcohol counseling or treatment.

In regards to HIV care outcomes, PWH who injected drugs had a lower prevalence of being retained in care (PR: 0.88; 95% CI 0.80–0.97; T = − 2.8; P = 0.005), being 100% ART adherent to HIV medications (PR: 0.73; 95% CI 0.60–0.88; T = − 3.5; P < 0.001), and having sustained viral suppression (PR: 0.83; 95% CI 0.74–0.93; T = − 3.4; P < 0.001) than people who only used non-injection drugs.

Furthermore, a higher percentage of PWH who injected drugs engaged in high-risk sex (22.7% vs. 12.4%; T = 4.6; P < 0.001) and used drugs before or during sex (72.5% vs. 65.1%; T = 2.1; P = 0.034) compared with people who only used non-injection drugs (Table 4). There were no significant differences between groups in the proportion of people who received HIV or STD prevention counseling; roughly one-third received counseling from an outreach worker, counselor, or prevention program worker and 57.1% received counseling from a healthcare provider.

Discussion

Our analysis provides the first nationally representative estimates of selected characteristics and outcomes comparing PWH who injected drugs with PWH who only used non-injection drugs in the United States. Overall, these findings demonstrated that regardless of mode of drug administration, PWH who used drugs in the past 12 months were more likely to (1) experience life events that adversely affect health, including homelessness and incarceration; (2) have worse clinical outcomes; and (3) engage in high HIV-acquisition risk behaviors, including high-risk sex, compared with all adults with diagnosed HIV [41].

We demonstrated that methamphetamine use was commonly reported, particularly among PWH who injected drugs, where 4 in 5 reported injecting methamphetamines. Previous studies have reported significant associations between methamphetamine use and high-risk behaviors, including having condomless sex, participating in exchange sex, and using multiple drugs during the same episode [42, 43]. Additionally, among PWH, methamphetamine use has been found to increase T-cell proliferation and exhaustion of the immune system, which can worsen HIV outcomes, even among those on ART [44]. Cocaine has also been found to have similarly deleterious effects by promoting virus replication and accelerating HIV-associated neurocognitive disorders, resulting in increased mortality rates among this group [45, 46]. In our study, 1 in 3 PWH who injected drugs and almost half of those who used non-injection drugs reported using cocaine or crack. Behavioral interventions, including cognitive-behavioral therapy and contingency management, have been shown to be effective for addressing substance use issues related to both methamphetamine and cocaine use [47, 48].

Of PWH who used drugs, those who injected drugs also reported more daily drug use than those who only used non-injection drugs. Frequent injection of drugs can result in harmful health effects, including increased risk for soft tissue and cardiovascular infections [11–13], as well as increased risk of overdose. Access to clean injection equipment, including sterile syringes, is critical in preventing the spread of HIV and other infectious diseases, including hepatitis C [15, 16, 49]. Those who inject more frequently may need access to greater numbers of sterile syringes to inject safely, making syringe service programs (SSPs), which provide a range of services from free syringes to substance use treatment, a critical component to preventing disease transmission and even overdose-related deaths [50]. SSPs have also been shown to reduce injection-related behaviors associated with HIV transmission by providing safe injection education, in addition to access to substance use treatment services [51, 52]. A key component of the federal HIV National Strategic Plan and End the HIV Epidemic initiative, SSPs that co-locate HIV prevention and care with harm reduction programs for PWH who inject drugs can also improve retention in care, ART adherence, and other HIV outcomes [27, 30, 31].

Our research also found that unmet needs for drug and alcohol counseling or treatment were substantial among PWH who used drugs. PWH who injected drugs were twice as likely to report needing, but not receiving, drug or alcohol counseling or treatment compared with those who only used non-injection drugs; most PWH who injected drugs (i.e., nearly 7 in 10) reported using drugs on a daily or weekly basis, further highlighting the importance of, and need for drug treatment. On the other hand, 1 in 3 PWH who used non-injection drugs reported binge drinking during the past 30 days, but only 15% reported having received drug or alcohol counseling or treatment. Likewise, nearly one-half of those who injected drugs and 3 out of 4 who only used non-injection drugs reported not needing and not receiving drug or alcohol counseling or treatment. However, as mentioned previously, 4 in 5 of those who injected drugs reported injecting methamphetamines and nearly half of those who only used non-injection drugs reported having used cocaine/crack. When available, drug and alcohol treatment programs, such as those providing medication-assisted treatment for opioid use disorders and those using the Matrix Model to treat methamphetamine and cocaine abuse, have been found to be effective in preventing HIV transmission [53] and improving HIV outcomes [54]. However, based on our findings, these programs may not be accessible to all persons who need these services, particularly among PWH who inject drugs. Likewise, additional education about substance abuse is needed, as some individuals do not appear to perceive their drug use as a health concern, thus precluding them from seeking out treatment.

We also found that symptoms of depression and anxiety were more prevalent among PWH who used drugs than reported estimates among all adults with diagnosed HIV [41]. Nearly 1 in 6 PWH who used drugs reported unmet needs for mental health services. Depression and anxiety were also higher among PWH than the general population [5, 55], and the need for services may be elevated among people who use drugs. Those suffering from drug addiction are twice as likely to suffer from mood and anxiety disorders; likewise, those with mood or anxiety disorders are twice as likely to suffer from drug addiction [56]. Chronic use of certain drugs can also temporarily or permanently alter the brain, resulting in mental health issues, including depression and anxiety [56]. Because depression and anxiety have

been shown to be associated with poor clinical outcomes among PWH [5, 57], ensuring access to mental health services for all PWH who use drugs will be beneficial for improving health and maintaining viral suppression. Integrating these services with other services in order to comprehensively address health issues (e.g., substance use disorders, HIV care) and barriers to care (e.g., housing), could further improve health outcomes, particularly if they are available in a single setting.

We found that homelessness was more prevalent among PWH who used drugs when compared with reported estimates among all adults with diagnosed HIV [41]. Experiences with homelessness were also substantially higher among those who injected drugs, supporting other studies that have found that PWH who injected drugs were more likely to experience homelessness compared with those who did not inject drugs [58, 59]. Homelessness among PWH is associated with living below the poverty level [58], suboptimal clinical outcomes [8, 60, 61], increased morbidity and mortality, and high-risk sexual behavior, including exchange sex [62]. Programs that focus on providing stable housing with supportive services for PWH, such as Housing Opportunities for People with AIDS, or HOPWA [63], and the "Housing First" models [64], can improve HIV outcomes for PWH, including those who use drugs and particularly among PWH who inject drugs. Previous studies have shown that with stable housing, PWH who injected drugs had double the odds of later ART use compared with those who were already in care but were unstably housed [65].

HIV clinical outcomes associated with PWH experiencing homelessness are further exacerbated when the person has been involved in the criminal justice system [66–68]. In our study, PWH who injected drugs were more likely to have been recently incarcerated compared with people who only used non-injection drugs. Although PWH who are incarcerated may have improved HIV outcomes [69], release from prison or jail may result in a higher risk of overdose [70], poor re-engagement in care [71, 72], and decreased ART adherence [69]. Re-entry efforts that focus on PWH and people who use drugs have been effective in reducing recidivism and drug relapses [73, 74].

In terms of sustained viral suppression, we found that PWH who injected drugs had a lower prevalence compared with those who only used non-injection drugs; however, both groups had suboptimal levels of viral suppression. Prioritizing interventions that improve sustained viral suppression and reduce HIV transmission risk among PWH who use drugs directly supports the federal HIV National Strategic Plan and End the HIV Epidemic initiative [30, 31]. Strengths-based case management is one such intervention [75] that has been shown to improve ART adherence among people who use drugs [76].

Finally, our analysis demonstrated that the prevalence of sexual behaviors associated with HIV transmission—including high-risk sex and drug use before or during sex—was high among PWH who used drugs. Prevalence of these behaviors was higher among PWH who used drugs than reported estimates among all adults with diagnosed HIV [41], which may result in elevated HIV transmission risk. Prevalence of sexual behaviors was also higher among PWH who injected drugs; nearly 1 in 4 engaged in high-risk sex and nearly 3 in 4 used drugs before or during sex, supporting similar studies that have found sexual risk

behavior to be higher among PWID than people who use non-injecting drugs [20]. However, despite a higher prevalence of sexual behaviors associated with HIV transmission among PWH who injected drugs, the prevalence of HIV and STD prevention counseling services reported by both groups were similarly low, indicating a potential missed opportunity to educate patients and prevent further HIV and STD transmission.

Limitations

This analysis is not without limitations. First, most of the measures described in this analysis, including drug use, were self-reported and may be subject to information biases, including social desirability and recall bias. However, we do not suspect that misclassification was differential with respect to mode of drug administration, and thus, may have resulted in bias towards the null. Additionally, not all sampled people participated in MMP, but results were adjusted for nonresponse and poststratified to known population totals by age, race/ethnicity, and sex from NHSS using standard methodology. Despite suboptimal response rates, results obtained from unbiased sampling methodologies, such as the methodology used in this analysis, have substantial value [77]. Lastly, the authors recognize that associations do not account for potential confounding by factors, such as age or race; future studies should incorporate multivariable analyses to further support these findings and to help inform public health action.

Conclusion

Overall, we found that PWH who used drugs were more heavily impacted by social and structural factors that adversely affect health, such as homelessness and incarceration; more likely to suffer from anxiety or depression; have suboptimal clinical outcomes; and engage in high HIV-acquisition risk behaviors, such as high-risk sex, when compared with all adults with diagnosed HIV. Among PWH who used drugs, those who injected drugs experienced a higher prevalence of homelessness, incarceration, and suboptimal clinical outcomes than those who only used non-injection drugs. Both groups reported using drugs, such as methamphetamines and cocaine, that can cause deleterious health effects, including the worsening of HIV outcomes.

Integrating HIV treatment services with other services and programs that can comprehensively address health issues (e.g., substance use, mental health disorders) and barriers to care (e.g., housing, recent incarceration) could greatly improve health outcomes for PWH who use drugs, particularly those who inject drugs. Tailored interventions are not only essential to improving the quality of life for PWH who use drugs, but they are also essential to ending the HIV epidemic [10, 65, 78, 79].

Acknowledgements

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Data Availability

MMP data are not available to be shared publicly because they are collected under a federal Assurance of Confidentiality that restricts access. Access to data may be granted under limited circumstances after security and confidentiality requirements are met.

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Table 1

Frequency of drug and alcohol use among adults with diagnosed HIV who injected drugs or only used non-injection drugs in the past 12 months—United States, 2015–2018 (N = 2562)

	People who injected drugs		People who only used non-injection drugs[a]		Prevalence ratio (95% CI)	Test statistic[b]	P[b]
	n[c]	Col % (95% CI)[d]	n[c]	Col % (95% CI)[d]			
Total (row %)	449	16.9 (14.6–19.1)	2113	83.1 (80.9–85.4)			
Drugs that were injected[e]							
Heroin and cocaine (i.e., speedballs)	42	7.9 (4.6–11.1)	–	–	–		
Heroin	128	26.9 (21.8–32.1)	–	–	–		
Cocaine	71	14.6 (10.6–18.6)	–	–	–		
Methamphetamines (i.e., crystal meth, tina, crank, ice)	359	81.8 (77.0–86.7)	–	–	–		
Amphetamines (e.g., speed)	63	11.8 (8.4–15.2)	–	–	–		
Prescription painkillers (e.g., Oxycontin, Vicodin, Percocet)	21	5.4 (2.4–8.5)	–	–	–		
Drugs that were not injected[e]							
Marijuana	264	61.0 (55.7–66.4)	1588	75.0 (72.7–77.3)	0.81 (0.75–0.89)	– 5.4	< 0.001
Cocaine, Crack	150	34.6 (28.4–40.8)	966	45.8 (42.0–49.6)	0.75 (0.64–0.89)	– 3.6	< 0.001
Methamphetamines (i.e., crystal meth, tina, crank, ice) or amphetamines (e.g., speed, bennies, uppers)	314	73.4 (68.6–78.3)	588	28.2 (25.0–31.5)	2.60 (2.32–2.91)	15.0	< 0.001
Club drugs (e.g., Ecstasy or X, ketamine, special K, gamma hydroxybutyrate, or liquid ecstasy)	141	31.7 (26.9–36.5)	402	18.7 (16.5–20.9)	1.69 (1.38–2.08)	4.9	< 0.001
Poppers (i.e., amyl nitrate)	162	38.0 (32.8–43.1)	884	39.7 (36.4–43.0)	0.96 (0.81–1.12)	– 0.6	0.581
Prescription tranquilizers (e.g., Valium, Ativan, or Xanax)	75	19.2 (14.5–23.8)	288	13.8 (11.6–16.0)	1.39 (1.03–1.87)	2.1	0.033
Prescription painkillers (e.g., Oxycontin, Vicodin, Percocet)	92	21.8 (16.9–26.6)	395	19.0 (16.9–21.0)	1.15 (0.90–1.46)	1.1	0.275
Frequency of drug use[f]							
Daily	180	43.1 (37.0–49.2)	675	32.0 (29.5–34.4)	1.35 (1.15–1.59)	3.4	0.001
Weekly	127	25.3 (20.2–30.5)	505	23.2 (21.2–25.3)	1.09 (0.88–1.36)	0.8	0.441
Monthly	67	15.5 (11.4–19.6)	405	19.4 (17.1–21.8)	0.80 (0.60–1.06)	– 1.6	0.116
Less than monthly	75	16.0 (12.3–19.8)	528	25.4 (23.1–27.7)	0.63 (0.50–0.81)	– 3.9	< 0.001
Binge drinking (during past 30 days)[g]							

	People who injected drugs		People who only used non-injection drugs[a]		Prevalence ratio (95% CI)	Test statistic[b]	P[b]
	n[c]	Col % (95% CI)[d]	n[c]	Col % (95% CI)[d]			
Yes	81	18.8 (14.4–23.3)	720	34.4 (31.8–37.1)	0.55 (0.43–0.70)	− 5.1	< 0.001
No	367	81.2 (76.7–85.6)	1377	65.6 (62.9–68.2)	–		

CI confidence interval; all variables were self-reported and measured over the past 12 months, except where otherwise indicated

[a] Excludes people who only used marijuana

[b] *P*-values are associated with the prevalence ratios; all test statistics were calculated based on t-tests associated with prevalence ratios, with 1 degree of freedom

[c] Numbers are unweighted

[d] Percentages and corresponding CIs are weighted percentages

[e] Participants could report > 1 drug; thus, these are not mutually exclusive categories

[f] Based on the most frequently used drug

[g] 5 alcoholic beverages in a single sitting (4 for women) during the 30 days before the interview

Table 2

Selected characteristics, including social and structural-related factors, among adults with diagnosed HIV who injected drugs or only used non-injection drugs in the past 12 months—United States, 2015–2018 (N = 2562)

Characteristics	People who injected drugs		People who only used non-injection drugs[a]		Prevalence ratio (95% CI)	Test statistic[b]	P[b]
	n[c]	Col % (95% CI)[d]	n[c]	Col % (95% CI)[d]			
Total (row %)	449	16.9 (14.6–19.1)	2113	83.1 (80.9–85.4)			
Age at the time of interview (years)							
18–29	35	10.2 (7.1–13.4)	268	13.7 (11.7–15.7)	0.74 (0.53–1.05)	− 1.7	0.090
30–39	108	25.4 (20.6–30.3)	476	22.8 (20.3–25.4)	1.11 (0.89–1.40)	0.9	0.360
40–49	124	26.5 (21.7–31.3)	512	24.1 (21.9–26.4)	1.10 (0.91–1.33)	1.0	0.337
50	182	37.8 (32.6–43.1)	857	39.3 (36.9–41.7)	0.96 (0.83–1.12)	− 0.5	0.615
Gender							
Male	401	91.2 (88.1–94.4)	1835	88.9 (87.1–90.7)	1.03 (0.99–1.07)	1.3	0.191
Female	42	8.8 (5.6–11.9)	243	11.1 (9.3–12.9)	–		
Race and ethnicity							
Non-Hispanic White	261	58.4 (52.1–64.7)	827	38.9 (34.8–43.0)	1.50 (1.33–1.69)	6.2	< 0.001
Non-Hispanic Black/African American	62	13.4 (8.5–18.2)	657	30.3 (25.3–35.3)	0.44 (0.32–0.61)	− 5.4	< 0.001
Hispanic or Latino[e]	86	19.3 (13.9–24.6)	429	21.2 (17.2–25.2)	0.91 (0.69–1.21)	− 0.7	0.511
Other/Multiracial[f]	40	9.0 (5.8–12.1)	200	9.6 (8.1–11.1)	0.94 (0.65–1.35)	− 0.4	0.726
Sexual behavior							
Sex with men (among men)	310	72.4 (67.5–77.3)	1509	73.0 (69.9–76.1)	0.99 (0.92–1.07)	− 0.2	0.826
Sex with women only (among men)	86	19.5 (15.0–24.0)	308	15.9 (13.7–18.1)	1.23 (0.95–1.60)	1.5	0.125
Sex with men (among women)	38	8.1 (5.1–11.2)	237	11.1 (9.3–12.9)	0.73 (0.50–1.07)	− 1.6	0.104
Education							
< High school	62	11.0 (7.7–14.4)	281	13.5 (11.5–15.5)	0.82 (0.59–1.13)	−1.2	0.215
High school diploma or equivalent	111	27.3 (21.8–32.8)	440	21.9 (19.7–24.1)	1.25 (1.00–1.55)	1.9	0.052
> High school	276	61.7 (56.3–67.0)	1392	64.6 (61.7–67.5)	0.95 (0.87–1.05)	− 1.0	0.302
Healthcare coverage							
Any private insurance	114	26.5 (21.5–31.4)	826	37.8 (34.6–41.0)	0.70 (0.57–0.86)	− 3.5	0.001
Public insurance only	298	61.8 (55.8–67.9)	1114	52.0 (48.9–55.1)	1.19 (1.05–1.34)	2.6	0.009

Characteristics	People who injected drugs		People who only used non-injection drugs [a]		Prevalence ratio (95% CI)	Test statistic [b]	P [b]
	n [c]	Col % (95% CI) [d]	n [c]	Col % (95% CI) [d]			
RWHAP coverage only or uninsured	34	11.7 (6.5–16.9)	158	10.2 (7.9–12.5)	1.15 (0.73–1.82)	0.6	0.553
Poverty level [g]							
Above poverty level	206	51.4 (45.6–57.2)	1225	59.8 (56.0–63.6)	–		
At or below poverty level	223	48.6 (42.8–54.4)	778	40.2 (36.4–44.0)	1.21 (1.04–1.41)	2.4	0.017
Homeless at any time, past 12 months [h]							
Yes	138	30.0 (24.1–35.9)	343	15.6 (13.6–17.6)	1.93 (1.53–2.42)	5.3	< 0.001
No	310	70.0 (64.1–75.9)	1770	84.4 (82.4–86.4)	–		
Incarcerated > 24 hours, past 12 months							
Yes	69	16.5 (12.3–20.6)	155	7.4 (6.0–8.8)	2.22 (1.61–3.06)	4.8	< 0.001
No	380	83.5 (79.4–87.7)	1956	92.6 (91.2–94.0)	–		

CI confidence interval, *RWHAP* Ryan White HIV/AIDS Program; all variables were self-reported and measured over the past 12 months

[a] Excludes people who only used marijuana

[b] *P*-values are associated with the prevalence ratios; all test statistics were calculated based on t-tests associated with prevalence ratios, with 1 degree of freedom

[c] Numbers are unweighted

[d] Percentages and corresponding CIs are weighted percentages

[e] Hispanics or Latinos can be of any race. Participants were classified in only 1 race/ethnicity category

[f] Includes American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and those identifying as multiple races

[g] Poverty guidelines as defined by the HHS; participants were asked about their household income for the year prior to the year they were interviewed. More information regarding the HHS poverty guidelines can be found at http://aspe.hhs.gov/frequently-asked-questions-related-poverty-guidelines-and-poverty

[h] Living on the street, in a shelter, in a single-room–occupancy hotel, or in a car

Table 3

Clinical outcomes and co-morbidities among adults with diagnosed HIV who injected drugs or only used non-injection drugs in the past 12 months—United States, 2015–2018 (N = 2562)

Characteristics	People who injected drugs		People who only used non-injection drugs[a]		Prevalence ratio (95% CI)	Test statistic[b]	P[b]
	n[c]	Col % (95% CI)[d]	n[c]	Col % (95% CI)[d]			
Total (row %)	449	16.9 (14.6–19.1)	2113	83.1 (80.9–85.4)			
Major or other depression, past 2 weeks[e]							
Yes	167	38.7 (33.0–44.4)	542	27.5 (25.1–29.8)	1.41 (1.18–1.68)	3.6	< 0.001
No	280	61.3 (55.6–67.0)	1555	72.5 (70.2–74.9)	–		
Moderate to severe generalized anxiety disorder, past 2 weeks[f]							
Yes	151	36.5 (31.0–42.0)	486	24.6 (22.3–26.8)	1.49 (1.26–1.76)	4.4	< 0.001
No	295	63.5 (58.0–69.0)	1618	75.4 (73.2–77.7)	–		
Received drug or alcohol counseling or treatment							
Needed, but did not receive[g]	74	17.4 (13.3–21.5)	160	7.9 (6.7–9.2)	2.19 (1.63–2.95)	5.0	< 0.001
Received	178	37.6 (32.4–42.7)	333	15.4 (13.6–17.1)	2.44 (2.07–2.89)	9.6	< 0.001
Did not need and did not receive	196	45.0 (40.0–50.1)	1615	76.7 (74.8–78.6)	0.59 (0.52–0.66)	– 12.1	< 0.001
Received mental health services							
Needed, but did not receive[g]	74	17.4 (13.1–21.8)	319	16.7 (14.8–18.6)	1.05 (0.79–1.38)	0.3	0.754
Received	250	54.9 (49.2–60.5)	894	40.1 (37.3–42.9)	1.37 (1.22–1.54)	4.9	< 0.001
Did not need and did not receive	123	27.7 (23.2–32.2)	888	43.2 (40.6–45.8)	0.64 (0.54–0.76)	– 5.4	< 0.001
Retained in care							
Yes	343	67.1 (61.2–73.0)	1688	75.9 (72.9–79.0)	0.88 (0.80–0.97)	– 2.8	0.005
No	94	32.9 (27.0–38.8)	353	24.1 (21.0–27.1)	–		
Current ART use and adherence in past 30 days							
No ART use	46	18.3 (12.9–23.8)	160	11.6 (9.6–13.6)	1.58 (1.13–2.20)	2.6	0.008
ART use but < 100% dose adherent	266	55.0 (49.8–60.2)	1119	51.7 (49.4–54.0)	1.06 (0.96–1.18)	1.2	0.251
ART use and 100% dose adherent	137	26.7 (22.0–31.4)	828	36.7 (34.4–38.9)	0.73 (0.60–0.88)	– 3.5	< 0.001
Sustained viral suppression[h]							
Yes	246	47.7 (42.1–53.2)	1325	57.5 (54.3–60.6)	0.83 (0.74–0.93)	– 3.4	< 0.001

Characteristics	People who injected drugs		People who only used non-injection drugs [a]		Prevalence ratio (95% CI)	Test statistic [b]	P [b]
	n [c]	Col % (95% CI) [d]	n [c]	Col % (95% CI) [d]			
No	203	52.3 (46.8–57.9)	788	42.5 (39.4–45.7)	–		
Healthcare discrimination [i]							0.253
Any discrimination	109	31.5 (25.7–37.3)	417	27.7 (24.5–30.9)	1.14 (0.92–1.41)	1.1	
No discrimination	219	68.5 (62.7–74.3)	1114	72.3 (69.1–75.5)	–		

CI confidence interval, *ART* antiretroviral therapy, *PHQ-8* Patient Health Questionnaire [footnotes only], *DSM-IV* Diagnostic and Statistical Manual of Mental Disorders, 4th edition [footnotes only]; all variables were self-reported and measured over the past 12 months, except where otherwise indicated

[a] Excludes people who only used marijuana

[b] *P*-values are associated with the prevalence ratios; all test statistics were calculated based on t-tests associated with prevalence ratios, with 1 degree of freedom

[c] Numbers are unweighted

[d] Percentages and corresponding CIs are weighted percentages

[e] Responses to the items on the PHQ-8 were used to define "major depression" and "other depression," according to criteria from the DSM-IV. "Major depression" was defined as having ≥ 5 symptoms of depression; "other depression" was defined as having 2–4 symptoms of depression

[f] Responses to the GAD-7 were used to define "mild anxiety," "moderate anxiety," and "severe anxiety," according to criteria from the DSM-IV. "Severe anxiety" was defined as having a score of ≥ 15; "moderate anxiety" was defined as having a score of 10–14; and "mild anxiety" was defined as having a score of 5–9

[g] Determined to be an unmet need

[h] Assessed by medical record abstraction. All HIV viral load measurements documented undetectable or < 200 copies/mL

[i] Only reported for 2015–2017 data

Table 4

High-risk sexual behaviors and receipt of prevention counseling for HIV and sexually transmitted diseases (STDs) among adults with diagnosed HIV who injected drugs or only used non-injection drugs in the past 12 months—United States, 2015–2018 (N = 2562)

Characteristics	People who injected drugs		People who only used non-injection drugs[a]		Prevalence ratio (95% CI)	Test statistic[b]	p[b]
	n[c]	Col % (95% CI)[d]	n[c]	Col % (95% CI)[d]			
Total (row %)	449	16.9 (14.6–19.1)	2113	83.1 (80.9–85.4)			
High-risk sex[e]							
Yes	85	22.7 (17.4–28.0)	229	12.4 (10.5–14.2)	1.84 (1.43–2.36)	4.6	< 0.001
No	357	77.3 (72.0–82.6)	1856	87.6 (85.8–89.5)	–		
Any drug use before or during sex[f]							
Yes	232	72.5 (66.5–78.5)	1013	65.1 (61.7–68.5)	1.11 (1.02–1.22)	2.1	0.034
No	98	27.5 (21.5–33.5)	521	34.9 (31.5–38.3)	–		
Received HIV or STD prevention counseling by an outreach worker, counselor, or prevention program worker							
Yes	191	38.8 (33.0–44.6)	745	33.6 (30.7–36.6)	1.15 (0.99–1.34)	1.8	0.077
No	258	61.2 (55.4–67.0)	1365	66.4 (63.4–69.3)	–		
Received HIV or STD prevention counseling by a healthcare provider							
Yes	264	57.1 (51.1–63.1)	1220	57.1 (54.6–59.7)	1.00 (0.90–1.12)	0	0.994
No	184	42.9 (36.9–48.9)	888	42.9 (40.3–45.4)	–		

CI confidence interval, *PrEP* pre-exposure prophylaxis [footnotes only]; all variables were self-reported and measured over the past 12 months

[a] Excludes people who only used marijuana

[b] *P*-values are associated with the prevalence ratios; all test statistics were calculated based on t-tests associated with prevalence ratios, with 1 degree of freedom

[c] Numbers are unweighted

[d] Percentages and corresponding CIs are weighted percentages

[e] High-risk sex was defined as not having sustained viral suppression and having condomless sex with 1 HIV-negative or HIV-unknown partner not known to be on PrEP

[f] Only reported for 2015–2017 data