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HIV-positive persons who inject drugs experience poor health outcomes and unmet needs for care services

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Abstract

Comparison of social determinants of health and clinical outcomes between HIV-positive persons who inject drugs (PWID) and HIV-positive persons who do not inject drugs is essential to understanding disparities and informing HIV prevention and care efforts; however, nationally representative estimates are lacking. Interview and medical record data were collected for the Medical Monitoring Project during 2015–2018 among U.S. adults with diagnosed HIV. Among HIV-positive PWID ($N=340$) and HIV-positive persons who do not inject drugs ($N=11,475$), we reported weighted percentages and prevalence ratios with predicted marginal means to compare differences between groups ($P<.05$). Associations with clinical outcomes were adjusted for age, race/ethnicity, and gender. HIV-positive PWID were more likely to be homeless (29.1% vs. 8.1%) and incarcerated (18.3% vs. 4.9%). HIV-positive PWID were less likely to be retained in HIV care (aPR: 0.85 [95% CI: 0.77–0.94]), and were more likely to have poor HIV outcomes, have unmet needs for care services (aPR: 1.50 [1.39–1.61]), seek non-routine care, and experience healthcare discrimination (aPR: 1.42 [1.17–1.73]). Strengthening interventions supporting (1) continuity of care given high levels of incarceration and housing instability, (2) early ART initiation and adherence support, and (3) drug treatment and harm reduction programs to limit transmission risk may improve outcomes among HIV-positive PWID.

Keywords

Injection drug use; social determinants of health; transmission risk

Introduction

During 2017, 9% of diagnosed HIV infections in the U.S. were attributed to injection drug use or male-to-male sexual contact and injection drug use (CDC). Persons who inject drugs (PWID) may be at risk for HIV infection through injection equipment sharing (e.g., syringes) and certain sexual behaviors, such as condomless sex. Starting in late 2014, a large outbreak of HIV infection occurred among PWID in Scott County, Indiana, which heralded increases in HIV transmission risk among PWID that have been documented in outbreaks

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in other areas of the U.S. over the last 5 years, including Washington and Massachusetts (Cranston et al., 2019; Golden et al., 2019; Peters et al., 2016).

The “Ending the HIV Epidemic” initiative highlights the need to prevent new HIV transmission and treat people with HIV rapidly and effectively, particularly among vulnerable populations, such as PWID. In the context of the national opioid crisis, meeting these goals among PWID may be particularly challenging. The number of PWID has been increasing over time (Zibbell et al., 2018), and compared with other persons, HIV-positive PWID experience poorer clinical outcomes, such as antiretroviral therapy (ART) initiation and sustained viral suppression, and higher mortality rates (CDC; Crepaz et al., 2016; Lewden et al., 2007; Lucas et al., 2001; Mehta et al., 2010; Palepu et al., 2003; Westergaard et al., 2012). PWID are more likely to experience social determinants of poor health, including high levels of unstable housing, incarceration, and poverty, which may be interrelated and also, in turn, could affect substance use patterns (Nandi et al., 2010; Strathdee et al., 1997). These social determinants of health could also contribute to poorer access to healthcare services (Adler & Newman, 2002; Bradford et al., 2007), and thus, suboptimal clinical outcomes and increased HIV transmission risk for persons with HIV (Bradford et al., 2007; Cohen et al., 2016; Colasanti et al., 2017; Mugavero et al., 2012). In addition, PWID are disproportionately affected by comorbidities, such as hepatitis C, skin abscesses, and endocarditis, which can complicate HIV care management, and thus, lead to adverse HIV clinical outcomes (Altice et al., 2010; Kamarulzaman & Altice, 2015; Zibbell et al., 2018).

People with HIV who inject drugs may experience unique challenges in accessing care and healthcare outcomes compared with HIV-positive persons who do not inject drugs. Comparison of social determinants of health and HIV outcomes between HIV-positive PWID and HIV-positive persons who do not inject drugs is an essential step towards understanding and addressing disparities that HIV-positive PWID experience, and informing HIV prevention and care efforts supporting the “Ending the HIV Epidemic” initiative. In addition, comparison of clinical outcomes that could directly affect HIV outcomes, such as depression, use of non-routine care, and unmet needs for substance use, may provide additional insight into how to address disparities between HIV-positive PWID and HIV-positive persons who do not inject drugs. Although some studies have been conducted to understand differences in experiences related to HIV care engagement and clinical outcomes among HIV-positive PWID and HIV-positive persons who do not inject drugs, these studies are often limited in scope (i.e., focus on a particular geographic area), have limited sample size, or are outdated (Lucas et al., 2001; Mehta et al., 2010; Palepu et al., 2003). Further, examining social determinants of health and clinical outcomes together provides a more complete picture of the challenges that HIV-positive may face related to HIV care engagement, antiretroviral treatment (ART) adherence, and viral suppression. Having up-to-date, representative benchmark estimates of these characteristics may be helpful in informing interventions to improve outcomes among HIV-positive PWID at a national level. We used nationally representative data from the Medical Monitoring Project (MMP) to describe and compare selected characteristics, including social determinants of health and clinical outcomes, among U.S. HIV-positive PWID and HIV-positive persons who do not inject drugs.

Methods

Population

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. During the 2015, 2016, and 2017 MMP cycles, MMP used a two-stage sampling design. First, 16 states and 1 territory were sampled from all states in the U.S., the District of Columbia, and Puerto Rico. Jurisdictions were selected using a probability proportional to size sampling strategy based on AIDS prevalence at the end of 2002, such that areas with higher prevalence had a higher probability of selection. Next, a simple random sample of persons aged 18 years with diagnosed HIV was sampled annually within each selected jurisdiction from the National HIV Surveillance System (NHSS), a census of persons with diagnosed HIV in the U.S. Data on demographic, behavioral, and clinical characteristics were collected through face-to-face or phone interviews conducted by trained interviewers within individual MMP areas. Medical records were abstracted for interviewed participants who received HIV care during the previous two years. MMP is conducted as a part of routine surveillance and is considered non-research. Participating jurisdictions obtained institutional review board approval for data collection as needed and informed consent was obtained from all participants.

All sampled jurisdictions participated in MMP, 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. Data were collected from June to May for the 2015, 2016, and 2017 cycle years; response rates for jurisdictions was 100% and for sampled persons ranged from 40%–46%.

Measures: injection drug use and social determinants of health

Interviewers collected information about self-reported injection drug use; those who injected drugs in the past 12 months were considered to be people who inject drugs. Data on social determinants of health and demographic characteristics, including age, gender, race/ethnicity, household poverty threshold according to the Department of Health and Human Services poverty guidelines (DHHS, 2015; 2016; 2014), healthcare coverage, incarceration, and homelessness were also collected through participant interviews. Healthcare coverage was categorized as any private; public only, excluding Ryan White HIV/AIDS Program (RWHAP) / AIDS Drug Assistance Program (ADAP) only but including Medicare and Medicaid; and RWHAP/ADAP only or no coverage.

Measures: HIV outcomes

The three primary HIV care continuum outcomes included retention care, antiretroviral therapy (ART) adherence, and sustained viral suppression. For this analysis, persons with two or more elements of outpatient HIV care at least 90 days apart during the previous 12 months were considered to be retained in HIV care. Outpatient HIV care included self-reported information or medical record documentation of a visit with a healthcare provider,

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or medical record documentation of a viral load or CD4 test result, HIV drug resistance test, ART prescription, *Pneumocystis jiroveci* (PCP) prophylaxis, or *Mycobacterium avium* complex (MAC) prophylaxis. Persons who reported needing but not receiving at least one care service (e.g., HIV care management, ART adherence support, drug/alcohol treatment) were considered to have an unmet need (CDC, 2019). ART use and dose adherence based on the past 30 days were combined into a single variable with the following categories: not currently taking ART, currently taking ART but not 100% adherent, currently taking ART and 100% adherent.

Viral loads and CD4 cell counts (CD4 counts) were abstracted from medical records. Persons for whom all documented viral load measurements in the past 12 months were undetectable or <200 copies/mL were considered to have sustained viral suppression. The most recent CD4 count was categorized as <200, 200–349, 350–499, and 500 cells/mm³. All information collected was based on the past 12 months unless otherwise indicated.

Measures: clinical outcomes that may affect HIV care continuum

In addition to HIV-related outcomes, we included clinical outcomes that may influence retention in care, ART adherence, and viral suppression – including depression, anxiety, non-routine care visits, unmet needs for care services, and healthcare-related discrimination. Symptoms of depression and generalized anxiety disorder (GAD) during the past 2 weeks were assessed using previously validated scales (Patient Health Questionnaire-8 and Generalized Anxiety Disorder-7, respectively) and categorized based on clinically meaningful cutpoints (Spitzer et al., 1999; Spitzer et al., 2006). Participants were asked about emergency room (ER) visits and hospitalizations during the previous 12 months. Unmet needs for ancillary care services, such as dental care, HIV case management, and patient navigation services, were defined as persons needing, but not receiving, services during the past 12 months (CDC, 2019). Respondents were considered to have experienced healthcare discrimination if they reported that, since testing HIV-positive, anyone in the healthcare system: (1) exhibited hostility or lack of respect towards them, (2) was less attentive towards them than other patients, and/or (3) refused them services. PWID who reported experiencing healthcare discrimination were asked whether they attributed the discrimination to their injection drug use.

Analysis

Data from the 2015, 2016, and 2017 cycles were combined for the analysis. We reported demographic characteristics and social determinants of health among HIV-positive PWID ($N=340$) and HIV-positive persons who do not inject drugs ($N=11,475$) using weighted percentages and 95% confidence intervals (CIs). We reported prevalence ratios (PRs) with predicted marginal means to compare differences in characteristics by injection drug use status, using $\alpha=.05$ as the cutoff for statistical significance.

Next, we assessed associations between injection drug use and clinical outcomes, including (1) those directly related to HIV (e.g., retention in care, ART adherence, viral suppression) and (2) those that may influence HIV outcomes (e.g., depression, anxiety, use of non-routine care visits). Since certain social determinants of health have been found to be associated

with clinical outcomes in the literature, PRs were adjusted for age, race/ethnicity, and gender to control for potential confounding (CDC, 2019, 2020). Because the models with clinical outcomes involved multiple statistical tests, we presented adjusted PRs with corresponding 95% confidence intervals, but highlighted covariates in models that remained statistically significant even after multiple comparisons adjustment using the Bonferroni correction.

Data were weighted based on known probabilities of selection, adjusted for non-response, and post-stratified to NHSS population totals by age, race/ethnicity, and sex at birth. All analyses were conducted using SAS, version 9.4 (SAS Institute, Cary, NC) and SAS-callable SUDAAN, version 11.0.3 (RTI International, NC).

Results

Overall, 2.6% of adults with diagnosed HIV injected drugs in the prior 12 months (Table 1). Compared with persons who do not inject drugs, PWID were more likely to be male (92.1% vs. 75.4%) and non-Hispanic white (57.0% vs. 29.0%). PWID were 3.59 times as likely to be homeless (29.1% vs. 8.1%) and 3.75 times as likely to be incarcerated in the past 12 months (18.3% vs. 4.9%), compared with persons who do not inject drugs. PWID were less likely to have private health insurance than other persons (27.1% vs. 35.6%).

We present associations between injection drug use in the past 12 months and clinical characteristics, controlling for age, gender, and race/ethnicity in Table 2. Compared with persons who do not inject drugs, PWID were less likely to be retained in HIV care (aPR: 0.85; 95% CI: 0.77–0.94) and have sustained viral suppression (aPR: 0.75; 95% CI: 0.66–0.85). PWID were more likely to not take ART (aPR: 2.53; 95% CI: 1.79–3.56) and less likely to be 100% ART adherent (aPR: 0.51; 95% CI: 0.41–0.64).

PWID were more likely to have an unmet need for ancillary care services (aPR: 1.50; 95% CI: 1.39–1.61) and to self-report ER visits (PR: 1.51; 95% CI: 1.35–1.69) and hospitalizations (aPR: 1.78; 95% CI: 1.46–2.17), compared with other persons. PWID had higher levels of moderate or severe GAD (aPR: 2.01; 95% CI: 1.65–2.44) and major or other depression (aPR: 1.76; 95% CI: 1.47–2.10). PWID were more likely to have experienced healthcare discrimination following HIV diagnosis (aPR: 1.42; 95% CI: 1.17–1.73); among HIV-positive PWID who experienced discrimination, nearly 40% attributed the discrimination to injection drug use.

Discussion

This is the first analysis to compare nationally representative estimates of characteristics among U.S. HIV-positive PWID and HIV-positive persons who do not inject drugs. We found that HIV-positive PWID were more likely to be homeless and incarcerated. HIV-positive PWID had poorer outcomes related to HIV, including ART use, ART adherence, and viral suppression, and outcomes not directly related to HIV, such as GAD and depression. HIV-positive PWID were less likely to be engaged in routine HIV care, and were more likely to have unmet needs for ancillary care services, visit the ER, and be hospitalized.

Having a routine source of care and adequate healthcare coverage are key predictors of early ART initiation among HIV-positive PWID, a key facilitator for achieving viral suppression and decreasing HIV transmission risk (Mehta et al., 2010). Routine HIV care for PWID is also critical because PWID can experience a number of comorbidities. Coinfections related to drug use, such as hepatitis C and bacterial endocarditis, are common, could result in complications if untreated, and could accelerate HIV clinical disease progression (Bruce & Altice, 2007; Sulkowski, 2007). Further, depression, which we found to be more prevalent among HIV-positive PWID, is associated with poor HIV outcomes along the continuum of care (Beer et al., 2019; Gokhale R et al., 2019) and drug overdose (Bartoli et al., 2014).

Having unmet needs for ancillary services could lead to poor outcomes across the HIV care continuum, from linkage to care to achieving and maintaining viral suppression. Unmet needs for care could also necessitate emergency care visits for acute medical issues related to drug use, such as overdose or endocarditis (Bruce & Altice, 2007), or because there is simply no other source for routine care. This is particularly important given the recent large increases in opioid-involved overdose deaths, driven primarily by deaths involving illicitly manufactured fentanyl and fentanyl analogs (Wilson et al., 2020). PWID may be less likely to receive routine HIV care because of competing priorities and social stressors related to drug use and poor access to healthcare, which contribute to virologic failure (Bruce & Altice, 2007; Meyer et al., 2013). Incarceration and unstable housing, which are more common among HIV-positive PWID than HIV-positive persons who do not inject drugs, could interrupt healthcare coverage and continuity of HIV care, and impede ART adherence (Milloy et al., 2011). This may especially true for persons with HIV who are caught in a cycle between incarceration and release. Providing referrals for care when released from jail or prison and linking patients to navigation services can help ensure that care and access to ART remain continuous (Cunningham et al., 2018).

HIV-positive PWID often experience stigma and discrimination related to injection drug use and addiction, mental illness, and HIV, which can, in turn, worsen health outcomes (Ahern et al., 2007; Barry et al., 2014). Marginalization of PWID can also be seen in the healthcare setting in the form of healthcare-related discrimination, which be a deterrent to establishing strong connections between providers and patients, and can discourage PWID from engaging with the healthcare system. Establishing strong patient-provider relationships helps ensure that trust is built between providers and patients, and that patients are connected to healthcare services based on their needs (Knowlton et al., 2010). Increased availability of provider trainings focused on decreasing healthcare discrimination among HIV-positive PWID may help strengthen patient-provider relationships and provision of patient-centered care.

We demonstrated that HIV-positive PWID were less likely to use ART, compared with other persons. Although injection drug use has been associated with delayed ART initiation in other settings (Mehta et al., 2010), positive patient-provider relationships have been shown to be associated with earlier ART initiation among HIV-positive PWID (Knowlton et al., 2010). However, a survey conducted in 2012 demonstrated that about a quarter of sampled HIV care providers reported that they would defer ART for HIV-positive PWID because of concerns around adherence and treatment readiness (Westergaard et

al., 2012). A more recent analysis demonstrated that 64% of providers were aware of national guidelines recommending ART initiation regardless of disease stage or history of pre-existing conditions, such as mental illness, substance use, or psychosocial challenges (HHS, 2019; Krakower et al., 2015). However, over three-fourths of providers reported that they would defer treatment if patients were not ready to initiate ART (Krakower et al., 2015). International guidelines on HIV care management also indicate that ART should be initiated at or shortly after HIV diagnosis (WHO, 2017). Patients with a history of homelessness and substance use, who may be more likely to have interruptions in care, should be offered additional support through case management to ensure ART adherence (HHS, 2019). Offering case management through other community members that may have previously injected drugs or experienced homelessness may be helpful in providing more support for HIV-positive PWID who may have experienced similar circumstances. Emphasizing the importance of early or immediate ART initiation and provision of ART adherence support services during provider trainings could improve treatment success among HIV-positive PWID.

Given that HIV-positive PWID experience multiple challenges to accessing medical care and managing health outcomes, expanding availability of co-located ancillary care services, such as for HIV case management, mental health, and substance use disorder treatment, that are available during flexible hours and in easily accessible locations may improve HIV care engagement (Meyer et al., 2013; Smith-Rohrberg et al., 2006). Increasing access to medication-assisted treatment for substance use disorders in a facility with co-located services, such as a syringe services program (SSP), could reduce need for injection, thus decreasing HIV transmission risk, improving ART adherence (Meyer et al., 2013), and closing the gap in health disparities between HIV-positive PWID and persons who do not inject drugs. SSPs not only provide access to clean syringes and other injection equipment, but also offer a forum for provision of comprehensive prevention services and referrals for services not offered on-site (CDC, 2017; Strathdee et al., 1997). Co-locating HIV treatment and support services in SSPs is part of a comprehensive, integrated HIV prevention approach and supports the Ending the HIV Epidemic initiative.

There were some limitations to this analysis. First, not all sampled persons participated in MMP, but results were adjusted for nonresponse and post-stratified to known population totals by age, race/ethnicity, and gender from the National HIV Surveillance System using standard methodology. Because we took simple random samples of adults with diagnosed HIV from selected jurisdictions by data cycle, people had the potential of being selected, and participating, in more than one MMP cycle; however, the proportion of people who participated in multiple data cycles was low (3%). All characteristics ascertained through interview were based on self-report, and thus, subject to information bias. However, we do not suspect that misclassification was differential with respect to history of injection drug use; thus, results may be biased towards the null.

Conclusions

HIV-positive PWID had poorer social determinants of health and clinical outcomes, compared with HIV-positive persons who do not inject drugs. HIV-positive PWID were less

engaged in routine HIV care, and had greater unmet needs for care services and more non-routine care visits. Given the challenges that HIV-positive PWID face, enhancing availability of services to match the needs of this population may be helpful in improving outcomes. Further, interventions supporting (1) continuity of care given high levels of incarceration and housing instability, (2) programs focused on early ART initiation following HIV diagnosis and provision of ART adherence support, and (3) drug treatment and harm reduction programs to limit transmission risk among HIV-positive PWID, are important for supporting the Ending the HIV Epidemic initiative.

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Table 1.
Demographic characteristics and social determinants of health among HIV-positive persons who inject drugs (PWID) ($n=340$) and persons who do not inject drugs ($n=11,475$) – Medical Monitoring Project, 2015–2018.*

Characteristic	HIV-positive PWID		HIV-positive non-PWID		Unadjusted PR	P
	n	Weighted col % (95% CI)	N	Weighted col % (95% CI)		
Total (row %)	340	2.6 (2.1–3.2)	11,475	97.4 (96.8–97.9)	--	--
Age, in years						
18–29	27	10.5 (6.8–14.2)	953	8.9 (8.1–9.8)	1.18 (0.81–1.71)	0.393
30–39	86	26.3 (20.3–32.2)	1840	16.2 (15.4–17.1)	1.62 (1.28–2.04)	<0.001
40–49	85	22.9 (17.4–28.4)	2774	24.7 (23.7–25.7)	0.93 (0.73–1.17)	0.525
50	142	40.3 (33.7–46.9)	5908	50.1 (48.7–51.5)	0.80 (0.69–0.94)	0.003
Gender						
Male	305	92.1 (88.9–95.4)	8308	75.4 (73.9–76.9)	1.22 (1.18–1.27)	<0.001
Female	32	7.9 (4.6–11.1)	2992	24.6 (23.1–26.1)	--	--
Race/ethnicity						
White, non-Hispanic	197	57.0 (49.1–64.8)	3312	29.0 (25.6–32.3)	1.97 (1.72–2.25)	<0.001
Black, non-Hispanic	52	14.3 (8.6–20.1)	4882	41.6 (36.3–47.0)	0.34 (0.24–0.50)	<0.001
Hispanic/Latino	64	20.3 (13.8–26.9)	2513	22.5 (18.0–27.0)	0.91 (0.65–1.26)	0.553
Other	27	8.4 (4.4–12.3)	768	6.9 (6.0–7.9)	1.20 (0.78–1.85)	0.404
Poverty threshold						
Above poverty threshold	159	52.8 (45.6–59.9)	6020	56.8 (54.3–59.4)	--	--
At or below poverty threshold	164	47.2 (40.1–54.4)	4713	43.2 (40.6–45.7)	1.09 (0.93–1.29)	0.287
Health insurance coverage						
Any private	88	27.1 (21.4–32.9)	4007	35.6 (33.7–37.5)	0.76 (0.61–0.95)	0.011
Public only, excluding RWHAP/ADAP only	224	59.8 (52.5–67.1)	6367	54.2 (51.9–56.4)	1.10 (0.97–1.26)	0.161
RWHAP/ADAP only or no coverage	26	13.1 (6.4–19.7)	994	10.2 (8.4–12.0)	1.28 (0.77–2.12)	0.351
Homelessness						
Yes	102	29.1 (22.7–35.6)	952	8.1 (7.4–8.8)	3.59 (2.85–4.52)	<0.001
No	237	70.9 (64.4–77.3)	10,523	91.9 (91.2–92.6)	--	--
Incarceration						
Yes	58	18.3 (13.2–23.4)	539	4.9 (4.3–5.5)	3.75 (2.79–5.04)	<0.001

Characteristic	HIV-positive PWID		HIV-positive non-PWID		Unadjusted PR	P
	n	Weighted col % (95% CI)	N	Weighted col % (95% CI)		
No	282	81.7 (76.6–86.8)	10,931	95.1 (94.5–95.7)	--	--

Notes:

* Injection drug use was based on the past 12 months. All characteristics were based on the past 12 months, unless otherwise indicated.

Abbreviations: PWID, persons who inject drugs; RWHAP: Ryan White HIV/AIDS Program; ADAP: AIDS Drug Assistance Program.

Table 2. HIV care continuum outcomes and other clinical outcomes among HIV-positive persons who inject drugs (PWID) (n=340) and persons who do not inject drugs (n=11,475) – Medical Monitoring Project, 2015–2018.*

Characteristic	HIV-positive PWID			HIV-positive non-PWID			P	Adjusted PR ^a	P
	n	Weighted col % (95% CI)	n	Weighted col % (95% CI)	Unadjusted PR				
Total (row %)									
	340	2.6 (2.1–3.2)	11,475	97.4 (96.8–97.9)	—	—	—	—	—
<i>HIV CONTINUUM OF CARE OUTCOMES</i>									
Retention in HIV care ^b									
Yes	261	65.9 (59.2–72.6)	9589	79.8 (78.4–81.3)	0.83 (0.75–0.91)	<0.001	0.85 (0.77–0.94)	<0.001	
No	74	34.1 (27.4–40.8)	1595	20.2 (18.7–21.6)	—	—	—	—	—
ART use and adherence									
Not currently taking ART ^b	40	20.2 (13.6–26.8)	597	7.9 (7.2–8.7)	2.55 (1.81–3.58)	<0.001	2.53 (1.79–3.56)	<0.001	
Currently taking ART but not adherent	223	59.0 (52.6–65.4)	6095	51.5 (50.2–52.8)	1.15 (1.03–1.28)	0.025	1.15 (1.03–1.29)	0.024	
Currently taking ART and 100% adherent ^b	77	20.8 (16.1–25.5)	4730	40.6 (39.2–41.9)	0.51 (0.41–0.64)	<0.001	0.51 (0.41–0.64)	<0.001	
Sustained viral suppression ^b									
Yes	188	48.1 (41.9–54.4)	7856	64.4 (62.7–66.1)	0.75 (0.66–0.85)	<0.001	0.75 (0.66–0.85)	<0.001	
No	152	51.9 (45.6–58.1)	3619	35.6 (33.9–37.3)	—	—	—	—	—
<i>CLINICAL OUTCOMES THAT MAY AFFECT HIV</i>									
<i>CONTINUUM OF CARE</i>									
Moderate/severe generalized anxiety disorder ^b									
Yes	110	33.7 (27.1–40.4)	1910	17.3 (16.3–18.3)	1.95 (1.59–2.39)	<0.001	2.01 (1.65–2.44)	<0.001	
No	229	66.3 (59.6–72.9)	9512	82.7 (81.7–83.7)	—	—	—	—	—
Major or other depression ^b									
Yes	124	35.9 (29.6–42.2)	2327	21.2 (20.0–22.4)	1.69 (1.40–2.04)	<0.001	1.76 (1.47–2.10)	<0.001	
No	214	64.1 (57.8–70.4)	9062	78.8 (77.6–80.0)	—	—	—	—	—
Had unmet need for 1 service ^b									
Yes	272	79.2 (73.3–85.2)	6024	53.7 (52.4–55.0)	1.48 (1.36–1.59)	<0.001	1.50 (1.39–1.61)	<0.001	
No	68	20.8 (14.8–26.7)	5442	46.3 (45.0–47.6)	—	—	—	—	—
Had 1 emergency room visit ^b									

Characteristic	HIV-positive PWD			HIV-positive non-PWD			P	Adjusted PR ^a	P
	n	Weighted col % (95% CI)	n	Weighted col % (95% CI)	Unadjusted PR				
Yes	188	54.9 (48.9–60.9)	4270	37.3 (35.6–38.9)	1.47 (1.31–1.65)	<0.001	1.51 (1.35–1.69)	<0.001	
No	151	45.1 (39.1–51.1)	7176	62.7 (61.1–64.4)	—	—	—	—	
Had 1 hospitalization ^b									
Yes	108	27.6 (21.7–33.4)	1988	16.9 (15.9–17.9)	1.63 (1.32–2.02)	<0.001	1.78 (1.46–2.17)	<0.001	
No	232	72.4 (66.6–78.3)	9461	83.1 (82.1–84.1)	—	—	—	—	
Experienced healthcare discrimination after HIV diagnosis ^b									
Yes	112	31.5 (25.7–37.3)	2499	22.1 (20.9–23.3)	1.42 (1.18–1.72)	0.001	1.42 (1.17–1.73)	0.001	
No	225	68.5 (62.7–74.3)	8903	77.9 (76.7–79.1)	—	—	—	—	
Discrimination attributed to injection drug use among persons who experienced healthcare discrimination after HIV diagnosis ^b									
Yes	49	39.7 (29.9–49.5)	—	—	—	—	—	—	
No	62	60.3 (50.5–70.1)	—	—	—	—	—	—	

Notes:

^a Injection drug use was based on the past 12 months. All characteristics were based on the past 12 months, unless otherwise indicated.^b Results adjusted for age, race/ethnicity, and gender.^b Association remained significant after Bonferroni correction for multiple comparisons.

Abbreviations: PWD: persons who inject drugs; ART: antiretroviral therapy.