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Injection Drug Use, Unknown HIV Positive Status, and Self-reported Current PrEP Use Among Black Men Who Have Sex with Men Attending U.S. Black Pride Events, 2014–2017

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Abstract

Objective: Black gay, bisexual, and other men who have sex with men (BMSM) are at elevated risk for HIV infection in the United States. BMSM who inject drugs may be face even higher HIV risk.

Methods: Random time-location sampling was used to survey BMSM attending Black Pride events in 6 U.S. cities about HIV risk and protective behaviors, including injection drug use, prior HIV testing, and pre-exposure prophylaxis (PrEP). 3,429 individuals who reported a HIV negative/unknown serostatus at enrollment were included in the analysis. HIV status was determined by in-field rapid HIV testing.

Results: 3.6% of BMSM had injected drugs in their lifetime and 58.5% of BMSM who had injected drugs reported sharing syringes in the past six months. BMSM who had injected drugs more commonly reported current PrEP use than BMSM who had never injected (32.5% vs. 8.2%, $p < 0.001$). BMSM who had injected drugs were 3.6-fold (95% CI: 2.4, 5.4) more likely to report currently using PrEP than BMSM who had never injected after adjustment for sociodemographic, substance use, and sexual risk characteristics. Among BMSM who reported ever injecting drugs

Contributors

J.L.M., R.E.G., and K.M.J. conceptualized and conducted the analysis and prepared the manuscript. L.A.E., M.R.F., D.D.M., L.A.B., and R.D.S. conceptualized the parent study and collected the data. All authors read and approved the final manuscript.

Author Disclosures

Conflict of Interest Statement

No conflict declared.

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($n=123$), 31.7% tested HIV positive. HIV prevalence did not differ by self-reported PrEP use among BMSM who had injected drugs ($p=0.59$).

Conclusions: BMSM who inject drugs who reported currently using PrEP were no less likely to test positive for HIV than those who did not use PrEP. Wrap-around services to support consistent PrEP use and long-acting PrEP formulations may improve the effectiveness of PrEP among BMSM who inject drugs.

Graphical abstract

1. INTRODUCTION

People who inject drugs (PWID) are at increased risk for human immunodeficiency virus (HIV) when they share syringes and other injection equipment (Wejnert, 2016; Spiller et al., 2015). According to the U.S. Centers for Disease Control and Prevention (CDC, 2017), 1 in 10 new HIV infections in the U.S. in 2017 were among PWID.⁴ Gay, bisexual, and other men who have sex with men represented 33.9% (1174/3461) of new HIV diagnoses among PWID (*i.e.*, PWID-MSM), and PWID-MSM who are Black accounted for 263/1174 (22.4%) infections among all PWID-MSM.

To reduce HIV incidence among PWID-MSM, it is imperative that this group has access to a combination of harm reduction (*e.g.*, condoms and sterile syringes) and biomedical HIV prevention resources (*i.e.*, pre-exposure prophylaxis [PrEP]) that address both sexual- and injection-related risks in tandem. PrEP is an efficacious once-daily oral antiretroviral medication used to prevent HIV acquisition among HIV-negative individuals. Recent increases in injection drug use and high HIV incidence and prevalence among Black MSM (BMSM) relative to all other demographic groups, underscore the urgency with which new and innovative strategies to increase access to, and adoption of, HIV prevention strategies among BMSM, (del Rio, 2016; Matthews et al., 2016), including BMSM who inject drugs, are needed.

While several prior studies have explored HIV risk broadly among MSM and MSM who inject drugs (Nerlander et al., 2018; Burt & Thiede, 2014) few have characterized injection-related HIV risk among BMSM who inject drugs. The prevalence of injection drug use among BMSM and the prevalence of undiagnosed HIV infection among BMSM who inject drugs remain unknown. However, BMSM face the highest lifetime risk of HIV of any U.S. racial/ethnic group (Hess et al., 2017), and HIV risk among BMSM who inject drugs may be even greater. With current trends, 1 in 2 BMSM could be diagnosed with HIV in their lifetime, by contrast, non-Hispanic white MSM face a 1 in 11 chance.¹⁰ BMSM who inject drugs may face an even higher risk for HIV infection relative to their counterparts who do not inject drugs given “risk multiplexity”¹¹ from their overlapping drug use and sexual risk factors. BMSM who inject drugs may also have additional HIV prevention and other physical, sexual, and mental health needs distinct from BMSM who do not inject drugs, such

as the need for approaches that address sex-, injection-, and overdose-related risks in combination (Felsher & Koku, 2018).

Our study had three primary objectives that we evaluated among a sample of BMSM who attended Black Pride events in six U.S. cities: Atlanta, GA, Detroit, MI, Houston, TX, Memphis, TN, Philadelphia, PA, and Washington, D.C. who reported a HIV negative or unknown status prior to study enrollment. First, we characterized injection drug use and syringe sharing prevalence. Second, we compared self-reported current PrEP use at the time of study participation, HIV testing history, sexual risk behaviors, and results of in-field HIV testing between BMSM who injected drugs and BMSM who had never injected drugs. Finally, we explored whether self-reported current PrEP use was associated with HIV test results during study participation among a sub-sample of BMSM who had injected drugs.

2. METHODS

2.1 Participants and Procedures

Data from the current study were collected by the Promoting Our Worth, Equality, and Resilience (POWER) Study Team. The study included a serial cross-sectional survey assessment conducted at Black Pride events occurring from 2014–2017 in Atlanta, GA, Detroit, MI, Houston, TX, Philadelphia, PA, Memphis, TN, and Washington, D.C. Full study procedures and eligibility criteria are described elsewhere (e.g., Friedman et al., 2019; Eaton et al., 2017). In brief, at each Black Pride, the POWER Study Team identified official events and randomly selected events for recruitment. For each recruitment event, an intercept zone was established. As individuals entered the intercept zone, they were counted, approached, and invited to participate in the study. In total, 13,396 individuals were approached. Individuals were eligible to participate if they (1) were aged 18 years of age or older, (2) identified as male or transgender female, and (3) reported having a male sex partner in their lifetime. Individuals interested in study activities were screened via electronic tablet for eligibility ($N=6,015$), and 97.4% of those who were eligible provided informed consent and completed an audio computer-assisted self-interview (ACASI) survey ($N=5,857$) which took approximately 20 minutes to complete. Participants were then offered in-field confidential HIV testing, counseling and referral by a partnering local community-based organization in private locations (i.e., mobile testing vans). Testing kits varied by agency and included Oraquick (OraSure Technologies, Inc., Bethlehem, PA), Clearview STAT-PAK (Alere Inc., Waltham, MA), and INSTI (bioLythical Laboratories, Richmond, BC) HIV tests. Participants who declined confidential HIV testing could elect to provide an anonymous saliva sample for HIV testing for surveillance purposes only. Participants were compensated \$10 for survey completion and an additional \$10 for HIV testing. All study procedures were approved by the University of Pittsburgh Institutional Review Board.

For the present study, participants who reported living with HIV ($N=1,006$), identified as transgender ($N=152$), did not identify as Black ($N=217$), completed the survey more than once ($N=294$), or had missing data for variables of interest, including those who chose not to take an HIV test ($N=759$), were removed from analyses. The final, analytic sample size included 3,429 participants.

2.2 Measures

2.2.1. Sociodemographic Characteristics.—Participants reported their age and annual income. Annual income was dichotomized as *\$0-\$29,999* and *\$30,000 and above*.

2.2.2. Drug Use Factors.—Participants reported whether they ever used opioids (including heroin or misuse of prescription opiates [e.g., Vicodin, Oxycontin]), methamphetamine, and cocaine in their lifetime (by any mode of use). Participants who reported ever injecting drugs also reported whether they shared syringes in the last six months.

2.2.3. HIV Testing Factors.—Participants reported whether they had been tested for HIV in the six months before study participation. In addition, we summarized HIV test results from in-field testing during study participation. All participants self-reported HIV negative or HIV unknown statuses prior to testing.

2.2.4. Sexual Risk Practices Factors.—Participants reported the number of male and female partners they had in the past 12 months.

2.2.5. PrEP Awareness and Use Factors.—Participants were asked the following about PrEP use: “Have you ever heard of PrEP (pre-exposure prophylaxis)? PrEP is when HIV-negative people take anti-HIV medications (antiretrovirals like Truvada) BEFORE HAVING SEX to prevent HIV infection.” and “Are you currently taking anti-HIV medications (PrEP) to prevent HIV infection?” Participants were categorized into one of the following groups: *unaware of PrEP*, *aware but not currently using PrEP*, and *aware and currently using PrEP*.

2.3 Data Analysis

We summarized the prevalence of ever injecting drugs by study location and examined differences in age, annual income, prevalence of drug use, HIV testing in the past six months, sexual risk behaviors, PrEP awareness and current use, and in-field HIV test results between BMSM who had injected drugs vs. BMSM who had never injected drugs using Chi-squared and Wilcoxon rank sum tests. We estimated the association (prevalence ratio) between lifetime injection drug use status and current PrEP use adjusted for demographic characteristics, lifetime use of opioids, methamphetamine, and cocaine, and sexual risk practices using Poisson generalized estimating equations with robust standard errors Zou et al., 2014). Among BMSM who had injected drugs, we characterized whether self-reported current PrEP use was associated with participants’ in-field HIV test result. IBM SPSS Statistics version 24.0 (SPSS Inc., Chicago, IL) was used for all analyses.

3. RESULTS

Overall, 3.6% ($n=123$) of the sample reported injecting drugs in their lifetime. Of the individuals who reported ever injecting drugs, over half reported sharing syringes in the past six months (Table 1). In addition, one quarter of participants tested positive for HIV in-field.

Relative to BMSM who had never injected drugs, BMSM who had injected drugs were more likely to report using opioids, methamphetamine, and cocaine (Table 1). In addition, BMSM who had injected drugs were older and had lower annual incomes than BMSM who had never injected. BMSM who had injected drugs differed from those who had not injected drugs with respect to median number of male or female sexual partners in the last year.

In bivariate analysis, BMSM who had injected drugs were more likely to self-report current use of PrEP than BMSM who had never injected drugs. Lifetime injection drug use status remained statistically significantly related to current PrEP use when controlling for age, annual income, lifetime use of opioids, methamphetamine, and cocaine, and number of male and female partners in the past year (Table 2). BMSM who had injected drugs in their lifetime were 3.6-fold more likely than those who had never injected drugs to report currently using PrEP.

Among the 123 BMSM who had injected drugs, we found no difference in HIV positivity by those individuals who self-reported current PrEP use. In addition, while one third of PWID-MSM reporting PrEP use tested HIV-positive, three in 10 PWID-MSM not reporting PrEP tested HIV-positive. Furthermore, current use of PrEP was reported in slightly more than one third of PWID-BMSM participants testing positive for HIV.

4. DISCUSSION

The present study described how injection drug use related to HIV infection, PrEP awareness and use, and injection-related HIV risk behaviors among a sample of BMSM recruited at Black Pride events in six US cities, a population at potentially elevated risk for HIV. We observed an alarmingly high level of unknown HIV infection among this sample, with only moderate levels of HIV testing in the past six months and PrEP awareness. PrEP use was more common among BMSM who injected drugs than those who had not. However, the finding that BMSM who injected drugs and used PrEP were just as likely to have an unknown HIV infection as those who had not used PrEP suggests that the particular PrEP use behaviors in these participants may be insufficient to prevent HIV infection. Our findings reflect challenges to HIV status awareness among BMSM and support the need for better, more accessible testing strategies and prevention options, including PrEP for these communities.

While prior research has indicated that BMSM have a *lower* prevalence of injection drug use than MSM of other races/ethnicities, estimating the burden of injecting behaviors among BMSM, along with understanding the HIV prevention needs of BMSM, is important given the current backdrop of the opioid crisis. It is especially noteworthy that recent increases in overdose mortality, particularly from synthetic opioids (i.e., fentanyl), are growing at faster rates among Black versus White racial/ethnic groups, justifying our contemporary evaluation of the HIV prevention needs of BMSM who inject drugs (NIDA, 2017).

The present study found that self-reported current use of PrEP was not associated with a lower likelihood of a positive in-field HIV test result among men with a history of injection drug use and who reported that they were HIV-negative or did not know their HIV-status

before study participation. This finding highlights the possibility of PrEP adherence challenges and underscore the shortcomings of our current infrastructure to support daily regimens of oral PrEP. Future research may consider whether forthcoming long-acting formulations of PrEP (e.g., implant, injectable PrEP; Greene et al., 2017) may be more acceptable to and better suit the needs of individuals who inject drugs. Indeed, recent data suggest that BMSM find injectable PrEP formulations to be as acceptable as oral pills, and injectable PrEP may be more manageable than daily oral PrEP (Greene et al., 2017; Biello et al., 2018). In addition, future examination of where BMSM who inject drugs obtain PrEP may be warranted, as nonmedical sources of PrEP (e.g., friends, romantic and/or sexual partners) may come without counseling about when and how often to take PrEP.

The results of the present study underscore the need and benefits of partnering with Black Pride events to better develop how, when, and where to offer HIV prevention and risk reduction services. Our results suggest that not providing these services at Black Pride events may be a significant missed opportunity for risk reduction and health promotion efforts for BMSM, including BMSM who inject drugs (Nerlander et al., 2017). In addition, syringe services programs and referrals to medication-assisted treatments (MAT) for opioid use disorder may be well-suited to offer alongside existing HIV prevention and care services, including services offered at Black Pride events. Researchers, policymakers, and service providers working for BMSM who inject drugs in these areas should explore the potential benefits of integrated HIV prevention and other services (e.g., housing assistance) for BMSM who inject drugs.

4.1 Limitations

The findings from the current study need to be interpreted considering the following points. BMSM were recruited from Black Pride events in metropolitan areas in the U.S., limiting the generalizability of the results to urban rather than rural BMSM populations, as well as BMSM who would attend such events. In addition, each participant's data were collected from a single time point; therefore, significant relationships were correlative in nature and no temporal associations could be determined. Moreover, while we were able to characterize the proportion of BMSM who had injected drugs during their lifetimes, we were limited in our ability to determine when they last injected drugs. It is not known to what extent social desirability bias may have affected participant responses around injection drug use and current PrEP use, nor whether participants who refused in-field HIV testing differed from participants who completed in-field testing. With regard to the PrEP awareness question, we focused on PrEP use for sexual behavior-related risks, and not for injection drug use-related risks. The questions regarding methamphetamine, cocaine, and opioid use, as well as injection drug use, were for lifetime use. In the future, measuring recent use (e.g., last six months) is warranted.

4.2 Conclusion

We found that 3.6% of BMSM attending Black Pride events in six cities across the U.S. between 2014 and 2017 had injected drugs. We found a high prevalence of unknown HIV infection (25%) among our sample. In addition, BMSM who injected drugs were marginally more likely to test positive for HIV than BMSM who did not inject drugs, despite self-

reporting significantly higher rates of current PrEP use. There was no difference in HIV prevalence based on in-field testing for BMSM who injected drugs by self-reported current PrEP use. Future research regarding PrEP among BMSM who inject drugs is warranted, including an examination of individual and structural barriers to accessing, engaging, and remaining in PrEP care.

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Sources of Funding and Conflicts of Interest

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REFERENCES

- Burt RD, Thiede H., 2014 Evidence for risk reduction among amphetamine-injecting men who have sex with men; Results from National HIV Behavioral Surveillance surveys in the Seattle area 2008–2012. *AIDS and Behavior*. 18, 1998–2008. [PubMed: 24728999]
- Carlos del Rio MD, 2016 HIV infection in hard-to-reach populations. *Topics in Antiviral Medicine*. 24, 86. [PubMed: 27841977]
- CDC, 2017 Diagnoses of HIV infection in the United States and dependent areas, 2017. *HIV Surveillance Report*, 29 <http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>. Published November 2018. Accessed October 2 2019.
- Eaton LA, Matthews DD, Driffin DD, Bukowski L, Wilson PA, Stall RD, POWER Study Team, 2017 A multi-US city assessment of awareness and uptake of pre-exposure prophylaxis (PrEP) for HIV prevention among Black men and transgender women who have sex with men. *Prevention Science*. 18, 505–16. [PubMed: 28101813]
- Felsher M, Koku E, 2018 Explaining HIV Risk Multiplexity: A Social Network Analysis. *AIDS and Behavior*. 22, 3500–3507. [PubMed: 29680933]
- Friedman MR, Bukowski L, Eaton LA, Matthews DD, Dyer TV, Siconolfi D, Stall R, 2019 Psychosocial health disparities among black bisexual men in the US: effects of sexuality nondisclosure and gay community support. *Archives of sexual behavior*. 48, 213–24. [PubMed: 29623533]
- Greene GJ, Swann G, Fought AJ, Carballo-Diéguez A, Hope TJ, Kiser PF, Mustanski B, Biello KB, Hosek S, Drucker MT, Belzer M, Mimiaga MJ, Marrow E, Coffey-Esquivel J, Brothers J, Mayer KH, 2018 Preferences for injectable PrEP among young US cisgender men and transgender women and men who have sex with men. *Archives of Sexual Behavior*. 47, 2101–2107. [PubMed: 28929260]
- Hess KL, Hu X, Lansky A, Mermin J, Hall HI, 2017 Lifetime risk of a diagnosis of HIV infection in the United States. *Annals of Epidemiology*. 27, 238–243. [PubMed: 28325538]
- Matthews DD, Smith JC, Brown AL, Malebranche DJ. Reconciling epidemiology and social justice in the public health discourse around the sexual networks of black men who have sex with men, 2016 *American Journal of Public Health*. 106, 808–814. [PubMed: 26890175]
- Nerlander LM, Hoots BE, Bradley H, Broz D, Thorson A, Paz-Bailey G, NHBS Group, 2018 HIV infection among MSM who inject methamphetamine in 8 US cities. *Drug and Alcohol Dependence*. 190, 216–223. [PubMed: 30055426]

- NIDA, 2019 Overdose death rates. <https://www.drugabuse.gov/related-topics/trendsstatistics/overdose-death-rates>. Richard TD, 2017 Preferences for long-acting pre-exposure prophylaxis (PrEP), daily oral PrEP, or condoms for HIV prevention among US men who have sex with men. *AIDS and Behavior*. 21, 1336–1349. [PubMed: 27770215]
- Spiller MW, Broz D, Wejnert C, Nerlander L, Paz-Bailey G. HIV infection and HIV-associated behaviors among persons who inject drugs—20 cities, United States, 2012 *MMWR*, 2015. *Morbidity and Mortality Weekly Report*. 64, 270.
- Wejnert C. Vital signs: trends in HIV diagnoses, risk behaviors, and prevention among persons who inject drugs—United States, 2016 *MMWR*. *Morbidity and Mortality Weekly Report*. 65.
- Zou G et al., 2014 A Modified Poisson Regression Approach to Prospective Studies with Binary Data. *American Journal of Epidemiology*, 159, 702–706.

Highlights

- 3.6% of BMSM injected drugs in their lifetime.
- 58.5% of BMSM who injected drugs reported sharing syringes in the past 6 months.
- 31.7% of BMSM who injected drugs had an unknown HIV positive status.
- BMSM who injected drugs had higher levels of PrEP use than BMSM who never injected.
- Among BMSM who injected drugs, current PrEP was not associated with HIV status.

Table 1.

Drug use and socio-demographic characteristics among BMSM attending Black Pride events, 2014–2017.

Category	Overall	PWID	Non-PWID	χ^2 Statistic	<i>p-value</i>
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		
Overall	3429 (100)	123 (100)	3306 (100)		-
Lifetime Drug Use					
Opioids	94 (2.7)	43 (35.0)	51 (1.5)	496.7	< 0.001
Methamphetamine	54 (1.6)	32 (26.0)	22 (0.7)	491.7	< 0.001
Cocaine	176 (5.1)	54 (43.9)	122 (3.7)	393.8	< 0.001
Shared Syringes in the Past 6 Months ¹	-	72 (58.5)	-		
Tested for HIV in the Past 6 Months	2119 (61.8)	81 (65.9)	2068 (61.6)	.890	0.346
Experience with HIV PrEP ²				85.5	< 0.001
Unaware of PrEP	1599 (46.6)	57 (46.3)	1542 (46.6)		
Aware but not currently using	1520 (44.3)	26 (21.1)	1494 (45.2)		
Aware and currently using	310 (9.0)	40 (32.5)	270 (8.2)		
HIV-Positive Test Result	887 (25.3)	39 (31.7)	819 (24.8)	3.039	0.081
Annual Income				11.8	0.001
\$0-\$29,999	1625 (47.4)	77 (62.6)	1548 (46.8)		
\$30,000 and above	1804 (52.6)	46 (37.4)	1758 (53.2)		
Age, Med (IQR)	27 (24–34)	31 (25–40)	27 (24–33)	$Z=-4.3^3$	< 0.001 ³
# Male Partners, Med (IQR)	3 (1–5)	5 (3–8)	3 (1–5)	$Z=-4.3^3$	< 0.001 ³
# Female Partners, Med (IQR)	0 (0–1)	2 (0–5)	0 (0–1)	$Z=-4.3^3$	< 0.001 ³

¹ Percentages of syringe sharing were calculated from the sub-sample of persons who had ever injected drugs.

² Participants who had never heard of PrEP were not asked questions about their current use.

Those who were aware of PrEP reported on their current use of PrEP.

³ Wilcoxon rank sum test.

Abbreviations: PWID: person who injects drugs. PrEP: pre-exposure prophylaxis. IQR: interquartile range. Med: median.

Table 2.

Adjusted prevalence ratios of sociodemographic characteristics, substance use history, and sexual behavior with current PrEP use among a sample of BMSM attending Black Pride events, 2014–2017.

Covariate	Adjusted PR	95% CI	<i>p</i>
Lifetime Injection Drug Use	3.57	2.36, 5.41	< 0.001
Age	0.98	0.97, 0.99	0.27
Annual Income	1.61	1.28, 2.03	< 0.001
Lifetime Drug Use			
Opioids	0.82	0.40, 1.65	0.58
Methamphetamine	1.51	0.91, 2.49	0.11
Cocaine	1.49	0.71, 3.16	0.29
# Male Partners	1.02	1.01, 1.03	< 0.001
# Female Partners	1.00	0.98, 1.03	0.57

Abbreviations: *CI* = confidence interval, *PR* = prevalence ratio.