



Published in final edited form as:

Subst Use Misuse. 2020 ; 55(4): 525–533. doi:10.1080/10826084.2019.1673419.

HIV Pre-exposure Prophylaxis for People Who Inject Drugs: The Context of Co-occurring Injection- and Sexual-Related HIV Risk in the U.S. Northeast

Alberto Edeza^{a,b}, Angela Bazzi^c, Peter Salhaney^{a,b}, Dea Biancarelli^{d,e}, Ellen Childs^d, Matthew J. Mimiaga^{a,b,f,g,h}, Mari-Lynn Drainoni^{d,e,i,j}, Katie Biello^{a,b,f,h}

^aDepartment of Behavioral & Social Health Sciences, Brown University School of Public Health, Providence, Rhode Island, USA

^bCenter for Health Equity Research, Brown University, Providence, Rhode Island, USA

^cDepartment of Community Health Sciences, Boston University School of Public Health, Boston, Massachusetts, USA

^dDepartment of Health Law, Policy & Management, Boston University School of Public Health, Boston, Massachusetts, USA

^eEvans Center for Implementation and Improvement Sciences, Boston University School of Medicine, Boston, Massachusetts, USA

^fDepartment of Epidemiology, Brown University School of Public Health, Providence, Rhode Island, USA

^gDepartment of Psychiatry & Human Behavior, Brown University Alpert Medical School, Providence, Rhode Island, USA

^hThe Fenway Institute, Fenway Health, Boston, Massachusetts, USA

ⁱSection of Infectious Diseases, Department of Medicine, Boston University School of Medicine, Boston, Massachusetts, USA

^jCenter for Healthcare Organization and Implementation Research, ENRM VA Hospita, Bedford, Massachusetts, USA

Abstract

Background: People who inject drugs (PWID) are at increased risk for HIV infection through sharing contaminated needles and injection equipment, and engaging in condomless sex.

Objectives: To qualitatively examine the overlapping nature of these behaviors among PWID in the US Northeast.

Methods: We recruited HIV-uninfected PWID and key informants through community-based organizations. Qualitative interviews explored sexual partnerships as they related to sharing

contaminated needles and injection equipment, engaging in condomless sex, and associated indications for PrEP among PWID.

Results: Among 33 PWID, 66% engaged in condomless vaginal or anal sex in the past 3 months, and 27% had three or more sexual partners in this same time period. Over half engaged in any past month distributive or receptive syringe sharing (64%). We identified three contexts through which overlapping sexual and injection-related HIV risks emerged, including (1) multiple concurrent sexual partnerships; (2) using and injecting drugs with sexual partners (including increase injecting of crystal methamphetamine); and (3) exchanging sex for money or drugs (including among male PWID). Condom use was inconsistent across these contexts. Limited interactions with healthcare providers often resulted in sexual risks being overlooked in light of competing health concerns.

Conclusions: Sexual risk for HIV acquisition is complex and multifaceted among PWID yet may be overlooked by prevention and healthcare providers. Comprehensive HIV prevention efforts must acknowledge the distinct contexts in which overlapping injection and sexual risk behaviors occur. Increased sexual health screening and risk reduction services including PrEP for PWID may help curtail transmission in this population.

Keywords

Sexual Behavior; Injection Drug Use; HIV; Condoms; Sexual Partners

Introduction

People who inject drugs (PWID) are an at-risk group for HIV infection in the United States. While PWID comprise less than 2.6% of the country's population, they account for 7–10% of new HIV infections annually (Lansky et al., 2014; Spiller, Broz, Wejnert, Nerlander, & Paz-Bailey, 2015) and 22% of all persons living with HIV (Lansky et al., 2014). Syringe service programs (SSPs) help reduce HIV incidence among PWID by providing access to sterile injection equipment and other harm reduction supplies (Baker, 2016; Bramson et al., 2015; Des Jarlais et al., 2015). However, SSPs remain unavailable in many jurisdictions (Canary et al., 2017; Des Jarlais et al., 2015) and existing programs may be underutilized or inaccessible for some PWID due to stigma or fear of legal consequences (Baker, 2016; Beletsky, Grau, White, Bowman, & Heimer, 2011). Additionally, some research, though limited, suggest a high prevalence of sexual HIV-risk behaviors among PWID, including vaginal sex without condoms, condomless anal sex with men and women, multiple opposite-sex partners, and transactional sex (Bogart et al., 2005; Brook et al., 2000; Bull, Piper, & Rietmeijer, 2002; Somlai, Kelly, McAuliffe, Ksobiech, & Hackl, 2003; Spiller et al., 2015). Sexual risk has been identified as an important driver of HIV infections among PWID in previous studies (Chapin-Bardales et al., 2019). As such, syringe exchange will not protect PWID who are also engaging in HIV sexual risk behavior (Bramson et al., 2015). Moreover, while many SSPs provide condoms to PWID, addressing HIV sexual risk through condom distribution alone may be insufficient (Somlai, Kelly, McAuliffe, Ksobiech, & Hackl, 2003; Spiller et al., 2015) as condom use is often inconsistent or impossible, particularly in the context of drug use or sexual violence (Medina-Perucha, Family, Scott, Chapman, & Dack, 2019; Steffanie A. Strathdee & Sherman, 2003).

A potential supplement to current prevention efforts is oral antiretroviral pre-exposure prophylaxis (PrEP), a once-daily pill which has been shown to reduce HIV incidence among PWID (Choopanya et al., 2013). Although there has been some controversy surrounding the use of PrEP in this population (Escudero, Lurie, Kerr, Howe, & Marshall, 2014; Guise, Albers, & Strathdee, 2017) and uptake remains low, PrEP is currently recommended by the Centers for Disease Control for HIV prevention in PWID who have an HIV-positive injection partner, share injection equipment, or otherwise present ‘substantial risk of acquiring HIV infection’ (Centers for Disease Control and Prevention, & US Public Health Service, 2018). In light of the current U.S. opioid epidemic and increasing concerns about HIV transmission among this group (Conrad et al., 2015; MDPH, 2017; Nelson, Juurlink, & Perrone, 2015), further research is needed to identify PWID at highest risk of HIV acquisition who could most benefit from PrEP and establish how to supplement current prevention efforts to deliver PrEP to these individuals. In particular, little in-depth research has elucidated the specific contexts in which the previously identified HIV risks occur or may interact with one another. In fact, a recent field report from the HIV outbreak in Lawrence and Lowell, Massachusetts suggest that HIV transmission, while clustered among PWID, occurred within the context of both injection and sexual risk (Cranston et al., 2019). Notably, other HIV outbreaks have occurred among PWID and their sexual partners in recent years across throughout the US, including in Seattle (Golden et al., 2019), Philadelphia, West Virginia (Nash, 2019), Kentucky and Ohio (NKHD, 2018), and Indiana (Gonsalves & Crawford, 2018).

In order to address this large gap in the literature on HIV risk among PWID in the era of the current opioid epidemic and inform PrEP implementation for PWID, we conducted qualitative interviews with a high-risk sample of PWID to examine knowledge, interest, and potential barriers to PrEP uptake in two large cities in the U.S. Northeast. The current analysis explored overlapping sexual and injection drug use-related risks for HIV infection that emerged as an important concern beyond the pre-specified themes explored in the interviews. In this paper, we describe the sexual risk behaviors that overlap with injection-related risk among PWID, the potential role of PrEP in the context of co-occurring risk behaviors, and related gaps in training among health and social service providers who work with PWID.

Materials and methods

Study design and sample

We drew from a previously-described qualitative study (Bazzi et al., 2018) focused on PrEP interest and barriers to utilization among PWID in two large cities in the Northeastern United States, a region where opioid and heroin injection are widespread (Cicero, Ellis, & Harney, 2015) and have been linked to recent HIV and HCV transmission (Liang & Ward, 2018). In brief, we partnered with community-based organizations (CBOs) serving PWID including SSPs and drop-in HIV/HCV testing centers to recruit high-risk PWID. Eligible PWID (hereafter, “participants”) were 18 years of age and HIV-uninfected (self-report), and reported injecting any drugs in the past-month. Purposive sampling was used to ensure a demographically diverse, high-risk sample (i.e. oversampling women and racial/ethnic

minorities and those reporting recent receptive syringe sharing and condomless sex). To understand perspectives of other stakeholders, we also recruited key informants who were individuals 18 years of age with professional experience providing PrEP or other health or harm reduction services to PWID. All participants and key informants provided verbal informed consent. The institutional review board of Boston University Medical Center approved all study protocols.

Data collection

From October 2016–October 2017, trained qualitative interviewers conducted confidential interviews with participants and key informants in private spaces within CBOs and professional offices, respectively. All CBOs included in this study either offered HIV and STI testing to clients as a regular part of service, or provided referrals to nearby testing centers. Interviewers administered brief demographic questionnaires and then used semi-structured interview guides to explore drug use, sexual partnerships, and related HIV risk behaviors; HIV prevention and health service utilization; and PrEP acceptability and perceptions regarding various aspects of uptake and adherence. Interviews with participants were structured to last ~45 min to address concerns about feasibility posed by key stakeholders during development of the interview guide. Interviews with key informants lasted ~30 min. All interviews were audio-recorded and professionally transcribed for text analysis. We continued recruiting and interviewing until determining through regular team discussions that we had reached thematic saturation (i.e. redundancy) in topics of interest. Interviews were completed prior to the identification of an HIV-outbreak among PWID in Massachusetts in late 2017 (MDPH, 2017).

Data analysis

We reviewed transcripts for quality and to identify emergent themes. We followed a collaborative codebook development process (Corbin, Strauss, & Strauss, 2014) in which six research team members independently read selected transcript excerpts to generate potential codes and definitions based on interview guide domains and emergent topics. We discussed and compiled potential codes into a preliminary codebook that team members then independently applied to a different set of full transcripts. We compared code application, discussed and resolved discrepancies, and modified the codebook for application to another set of transcripts. We refined the codes and definitions until reaching consensus on a final codebook through two additional rounds of this process. Codebook development was considered complete when team members reached consensus on all code definitions, and were independently coding transcripts with little discrepancy between members. Three analysts then used NVivo (v11) to apply final codes to all transcripts anew. More in-depth thematic analysis then involved synthesizing coded data to identify and clarify key emergent themes regarding predominant types of overlapping sexual and injection-related HIV risks. Findings are illustrated below using representative quotes.

Results

Participant characteristics

Among 33 PWID participants (Table 1), median age was 36 years (interquartile range: 31.5–48), and two-thirds identified as White (67%). Over half identified as male (55%), and most participants identified as straight (64%). In the past three months, 66% reported having condomless vaginal or anal sex, and 27% had three or more sex partners. While nearly all participants injected heroin in the past 3 months (90%), substantial proportions also injected cocaine (70%), crack (39%), and/or methamphetamine (33%). Almost all (90%) had received an HIV test in the past year, and 73% had past-year STI testing, with 67% of these being diagnosed with an STI. Among 12 key informants (Table 2) half worked at CBOs serving PWID, while the rest worked in clinical settings. On average, key informants had over 12 years working with PWID and almost 11 years working in HIV prevention and/or treatment.

From qualitative interviews with participants and key informants, we identified the following three predominant contexts through which overlapping sexual and injection HIV-risk behaviors could occur: (1) multiple concurrent sexual partnerships; (2) using and injecting drugs with sexual partners (including an increase in injection of crystal methamphetamine); and (3) exchanging sex for money or drugs (including among male PWID). As described in the sections below, these types of overlapping risks were not mutually exclusive, and many individuals described experiencing one or more types of overlapping risk at various points in time, which could alter their HIV risk profiles and related prevention needs (e.g. PrEP). Finally, we explored (4) key informant perspectives on HIV risk of PWID and PrEP as a prevention tool.

Multiple concurrent sexual partnerships

Participants reported a wide variety of sexual partnerships, including long-term relationships and more casual or fluid forms of sexual partnerships that were less clearly defined. Participants who described being in “steady” relationships did not always characterize their relationships as monogamous, and several participants explained that they or their steady partners had multiple steady or casual sex partners.

B07: It’s a casual environment, but we’re steady ... we’ll go hang out, be buddies, you know ... do this, that, and the other ... go get a motel, whatever, and then seems like we’re just friends for another month or so. (43-year-old cisgender man)

Some sexual partners included sex work clientele or transactional sex partners, as well as PWID who did not engage in sex work themselves reporting having steady partners who were sex workers. One 29-year-old cisgender man stated about his former girlfriend and injection partner:

P05: “I don’t give a fuck if she’s gonna suck dick to make money, like I’m not condoning it, I’m trying to help her make money.”

Few participants reported always using condoms. Among participants who did not use condoms, some explained that it was because their relationships were monogamous, though

in most cases it would later become clear that they were not, as reported previously (Bazzi et al., 2018). Additionally, some participants indicated that condoms were not always available, and others stated that they never used condoms, regardless of who their sexual partner was, as a preference. As P05 stated, “[I] never, never, never ever put a condom on with that girl. I don’t think I did one time.”

Many participants also described having condomless sex with casual partners with whom they were not monogamous. Though several of these participants expressed concern about HIV and were, at least in part, aware of their sexual risk, these concerns did not always lead to condom use because substance use often impaired participants’ judgement and caused them to forget to use condoms:

P16: When you’re using, especially if you’re drinking and using heroin, you won’t even [remember]. You’ll be so oblivious to what’s going on, you’ll literally just go with it and not even think of using protection. (29-year-old cisgender man)

Other individuals with multiple partners explained that condom use varied according to the nature of the relationship. While sex that was planned in advance often involved condoms, spontaneous or unexpected sex did not, as explained by one 39-year-old transgender woman:

P06: Sometimes in the spirit of the moment. [I] think it’s not even brought up or asked, it’s just like right to it, you know? But then when you’re conversing with a person and we’re taking our time with it, of course it’s going to come up and everything else like that and so we’ll use it, we’ll use the condoms and everything else like that. But sometimes it’s just spur of the moment thing where we just, we just get right to it, you know?

Drug use and injection with sexual partners

Injection drug use with sexual partners was common across participants regardless of relationship type. For example, participants described injecting drugs with steady or casual partners, whether monogamous or not. Participants also described injecting drugs before, during, and after sex, and a minority reported that they were not able to have sex without injecting drugs first because they were accustomed to the perceived increase in pleasure. The types of drugs used (e.g. opioids vs. stimulants), as well as the timing of drug use vis-à-vis sexual encounters, varied and depended on individual preferences and the anticipated effects of drugs, as explained by one 43-year old cisgender man:

B06: If it’s cocaine or crack, I’m gonna have sex first ‘cause afterwards, I won’t have that desire or urge. But heroin, it doesn’t matter; before or after.

Some participants also described injecting drugs discreetly before engaging in sexual activity while their sexual partners were unaware. In these cases, participants did not want their partners to know that they used drugs, or were unsure if their partners also used drugs or not. For example, when asked how drugs factored into her sexual encounters, P06 reported trying to use drugs before she was with casual partners because “sometimes you don’t want them to see [drug use] because they don’t do it, probably.”

Among participants experiencing homelessness or housing instability, injecting drugs together with sexual partners often occurred at different times than sex encounters due to lack of privacy. While these individuals could inject drugs together in any number of public or private locations, sexual encounters were more limited to private areas. When asked if sex happened along with drug use, one 35-year-old cisgender woman participant responded:

B16: If we have a place where we can [have sex], yeah, definitely. But with us being homeless, it's kind of hard to, you know, get it in whenever we can, [or] want to. So, yeah, if we have a hotel room or something, yeah, definitely.

Notably, one participant discussed sex parties which often involved injection drug use. These parties spanned multiple days and involved multiple MSM (including male sex workers), drug use (including injection of crystal meth and Liquid GHB), and condomless anal sex:

B14: So, um, when I have guys come over they do it for me, they'll either shoot me up or I'll go to a party, sex party. These are what gay people do when they do a lot of crystal meth, they go to these parties and they do it there. Yeah, they go to these little parties and then it's like, tons of people there and no one's using condoms ...
(42 year old cisgender man)

Exchanging sex for money or drugs

Many participants, including individuals of all gender identities represented in our sample, reported exchanging sex for money or drugs. The patterns of "sex work" behaviors varied across the sample from unplanned or isolated occurrences to planned sex work as a primary income source. Some participants who reported regular, planned sex work, like P08, viewed sex work as an efficient way to make money quickly:

P08: So, when you have a [drug] habit, it's kind of hard to, even if you have a job, it's hard to maintain it, so you can either steal or do sex work or beg for money, and begging takes a lot of time. It takes hours ... and sex work is just fast. (35 year old genderqueer person)

Most participants who reported incidental sex work explained that they exchanged sexual favors for drugs or money to purchase drugs, or while they were already high. Participants engaging in incidental sex work, which was more spontaneous and unplanned, reported varying degrees of condom use. Some of these participants contradicted themselves over the course of interviews, initially stating that they tried to use condoms consistently in these encounters but then later explaining that condoms were not always used. Participant P15, a 59-year-old cisgender man, described being high and unable to plan on consistently using condoms during sex work:

P15: I'll be so high ... This person wants that, that person wants that, and I want that. So, you really don't realize what you're doing. You're high ... you just don't want to realize what you're doing since you're high ... condoms don't happen all the time.

Notably, some participants explained that even if condoms were available and sex work was planned, they still might elect to have condomless sex. One cisgender woman sex worker reported using condoms with sexual partners about "75 percent of the time", despite "always

having condoms.” Another participant, a 35-year-old cisgender woman (B10) who occasionally did sex work, mentioned that condom use was inconsistent during her limited experiences exchanging sex for money, despite her intention to always use them:

B10: I had sex five times in two years for money. It was more with the oral sex, but yes, if they didn't want to use a condom, then I got out of the car. Not to say there wasn't a few times that I was dope-sick and in a rush and, yeah, I did [have condomless sex]. If I said I never did, I'd be lying to you.

In contrast, participants who reported more consistent sex work explained that they were more likely to use condoms with new clients than with more regular, repeat clients with whom they had developed higher levels of trust and no longer prioritized condoms:

INTERVIEWER: With your dates, do you usually use condoms?

B04: Most of the time. There have been times that I haven't, but usually only with the regular clients, which I've built enough of a trusting relationship that I am confident when I ask them if they have anything. When they say no, I believe them. And I always ask. (24-year-old cisgender woman)

Some male participants expressed that they were reluctant to disclose their sex work with male clients to their clinical care providers because of stigma around homosexuality or because they did not want to be assumed to be gay. This concern also manifested as reluctance to visit health establishments with reputations for serving MSM. Both key informants and participants remarked that conversations about same-sex sexual encounters and risk were difficult for men who did not identify as gay, but exchanged sex with men for drugs or money to buy drugs:

P09: Sometimes I feel kind of embarrassed to be here because I don't want the wrong person walking through the door, saying “Oh, he's here, he's gay?” I'm not gay, I'm just bisexual instead [and] I need to be with somebody to get money to get my drugs, you know? It's all messed up but that's how I get my drugs. (48-year-old cisgender male)

In contrast, many female participants who engaged in sex work expressed more willingness to disclose their sex work to providers. This sentiment was echoed by key informants who were health and social service providers and believed that women were more open about their sexual behavior than men. However, some female sex workers experienced physical and sexual violence from clients or intimate partners, and were reluctant to report it to the police for fear of retribution. This unequal power dynamic precluded condom use:

B04: Like I'm— “This is how it goes. Ever done a date before? You get to give the shit first.” And he like pulled a knife out on me and I was like “I'm not playing.” He was like “Take your fucking pants off and get over here, you'll get the shit after.” And I knew right then he was gonna beat me. (24-year-old cisgender female)

Overall, participants reported a high degree of overlapping drug use with both repeated and one-time clients when exchanging sex for money or drugs, as well as inconsistent condom use due to impairment, threats of violence, or simply not wanting to use them with repeated clients or trusted partners.

Key informant perspectives on overlapping injection and sexual HIV risk of PWID and PrEP as a prevention tool

Key informants expressed concern that, over the past few years, injecting crystal methamphetamine had become increasingly prevalent among local MSM who injected drugs. Such behaviors introduced injection-related HIV risk to the sexual risks already present in MSM cruising environments. One CBO staff member was concerned about the marked increase in injection methamphetamine use in cruising areas, where it was previously smoked:

KB01: I've just learned [that] recently, somewhere in the last five years, everyone's begun to shoot [crystal meth]. It's wasteful in a sense to smoke anything, because, you know, you're exhaling it. So people kind of learned and got past the needle fear and, you know, all it takes is one time to try something and enjoy it to [then] be like "Oh, I'm no longer afraid of needles." ... But everyone's using crystal and heroin in the [cruising area].

Additionally, key informants recognized that consistent condom use was not always possible. When speaking about women who had done sex work, for example, key informant (KB05) believed that unplanned sex encounters were more likely to involve condomless sex:

KB05: It's not really the sex workers I'm concerned about, you know, if they're professional sex workers, they're probably a little better at it. It's the women that are out there just spontaneously, impulsively doing it who don't have the experience [and] in that reckless moment, are much more likely to take a chance.

Despite the types of overlapping sexual and injection-related HIV-risk behaviors described above and expressed barriers to consistent condom use, some key informants, particularly clinical care providers, discussed how limited time and competing substance use related priorities (e.g. HCV and overdose) were impediments to discussing HIV risks with patients who inject drugs. One staff member at a drop-in HIV and STI testing center commented:

KB03: I think there's like other sorts of priorities. I don't know if that's the right way to say it, and maybe this is my flawed thinking. I mean, I've been in substance abuse [work] for a while and you always think like, if you hear someone's prostituting or, MSM or that kind of stuff, you start to think, okay, HIV's a possibility ... [But] when I hear, you know, a 23-year-old Lexington white, straight, IV heroin addict, I'm not thinking HIV, I'm thinking hepatitis. I'm thinking overdose. I'm thinking, you know, endocarditis, like the bacterial infections, cellulitis, abscess, that kind of stuff. HIV's sort of not on my radar.

Like KB03, some providers acknowledged that they did not consider injection drug use alone to be a significant HIV risk or indication for PrEP, and one admitted entirely forgetting that PWID are indicated for PrEP. Although most key informants agreed that their sexual behaviors made some PWID good candidates for PrEP, some were concerned that sexual risks could be missed during medical visits scheduled for other purposes.

KB02: Because everyone just focuses so much on everything else, that sex kind of falls to the wayside ... They're asking them if they use clean needles, are they sharing needles with anybody, but they're really not asking if they even have sex.

Most of the time, I think that [sex] kind of falls to the back ... So PrEP never really comes up. And I think that a lot of people don't even realize that PrEP is for women. Even for the few that know about it, they think it's just for gay guys; they don't realize that it's for women too.

Overall, key informants acknowledged that limited engagement with clinical services by PWID made detailed discussions about sexual risk difficult, particularly given multiple competing health priorities; as a result, discussions about PrEP rarely happened with PWID.

Discussion

This qualitative study identified specific contexts in which overlapping sexual and injection-related HIV risk behaviors co-occur. Taken together, our findings corroborate the current inclusion of PWID as a population which could benefit from PrEP. Our findings provide qualitative context to previous epidemiological studies which suggest high rates of sexual risk behaviors among this population nationally and have influenced current CDC PrEP guidelines (Steffanie A Strathdee & Stockman, 2010). In addition to their pre-disposition to HIV *via* injection-related risk behaviors, many PWID could also benefit from PrEP due to their sexual behaviors. In particular, we found that multiple concurrent sexual partnerships, using and injecting drugs with sexual partners, and engagement in sex work increase the sexual risk for HIV among many PWID, which is compounded by the inconsistent condom use that is common in each of these different contexts. We also found that these contexts of overlapping risk were not mutually exclusive and often co-occurred, with many participants describing engaging in more than one set of overlapping risks (e.g. inconsistent condom use and injecting drugs together with various types of steady, casual, and sex work partners). These overlapping risk dynamics, coupled with participants' reluctance to disclose stigmatized sexual risk behaviors to healthcare providers, and providers' reluctance to discuss sexual risks with PWID highlight important potential gaps in clinical care for sexually-active PWID.

Multiple sexual partnerships were reported by many individuals of all gender identities in our sample, and though multiple partnerships alone may not cause HIV infection, they result in denser networks of sexual partners through which HIV can more easily spread (Steffanie A. Strathdee & Sherman, 2003). The majority of participants also reported exchanging sex for money or drugs, whether occasionally or regularly, also with varying levels of condom use, further increasing their sexual risk for HIV. The HIV risks inherent in both the non-transactional and transactional sexual partnerships of PWID were compounded by frequent drug use and injection (Kerr et al., 2016; Steffanie A. Strathdee & Sherman, 2003) with their partners. While PWID comprise a group that is readily identified as being susceptible to HIV acquisition *via* injection-related behaviors (e.g. receptive syringe sharing), our findings highlight the predominant patterns of concurrent, overlapping sexual risks for HIV that can vary over time which are potentiated by, and extend well beyond, injection-related risks alone.

Current HIV prevention efforts focused on injection drug use alone may not be enough to meet the prevention needs of this population. While increasing access to sterile syringes

through SSPs and other venues (e.g. pharmacies) helps reduce injection-related HIV transmission among PWID (Bramson et al., 2015; Des Jarlais et al., 2015), such efforts are insufficient in reducing high risk sexual behaviors (Falck, Wang, Carlson, & Siegal, 1997; Semaan et al., 2002; Spiller et al., 2015; Steffanie A. Strathdee & Sherman, 2003). In depth data from our qualitative study helps support and contextualize this prior literature on sexual risk among PWID.

Furthermore, although we did not systematically assess it, coercive sex and sexual violence (i.e. rape) emerged as a common experience among some participants in this sample, in the context of both transactional and non-transactional sex. Prior research has found that female PWID, and in particular, female PWID who engage in sex work, are disproportionately impacted by sexual violence (Williams, Dangerfield, Kral, Wenger, & Bluthenthal, 2019). As victims of rape and other forms of sexual violence, they may not have agency over condom use (Medina-Perucha et al., 2019); as such, interventions focused on condom use without PrEP may still render some PWID, particularly female PWID who engage in sex work, vulnerable to HIV infection in instances of sexual coercion and violence.

PrEP, therefore, could be a valuable supplement to HIV prevention efforts focused on both injection (Choopanya et al., 2013) and sexual risk (Baeten et al., 2012; Grant et al., 2010) among this population. Despite current Public Health Service and Centers for Disease Control guidelines for its use among PWID (Centers for Disease Control and Prevention, & US Public Health Service, 2018), awareness and uptake of PrEP among PWID has been low (Bazzi et al., 2018; Conrad et al., 2015; Nelson et al., 2015). Suboptimal healthcare utilization (Stopka, Hutcheson, & Donahue, 2017) may limit potential to learn about PrEP as an HIV prevention option. Moreover, PWID may be reluctant to disclose sexual risk behaviors with providers because of stigma around sex work, homosexuality, injection drug use during sex, or other reasons (Paquette, Syvertsen, & Pollini, 2018). In particular, PWID who sell sex may be apprehensive about revealing these behaviors in a clinical setting for fear of legal consequences, or, as seen with our participants, be unwilling to access services targeted toward MSM or sex workers to avoid being labeled as such. Additionally, many PWID in this sample reported stigma and discrimination from clinical care providers for reasons relating to their injection drug use overall (Biancarelli et al., 2019), which may limit candid discussions between PWID and healthcare providers about HIV risk, particularly sexual risk, and PrEP as a prevention option.

Even when HIV risks are known, studies have shown that many clinicians are unwilling or unprepared to prescribe PrEP to PWID (Adams & Balderson, 2016; Krakower, Beekmann, Polgreen, & Mayer, 2016). Specialized efforts may be needed to increase healthcare providers' awareness of the types of overlapping risks highlighted by our study because they may not be easily identified in clinical settings. As our findings highlight, providers may not view injection drug use as a significant HIV risk factor and may not have the time or willingness to assess the numerous and complex sources of sexual risk in their patients who inject drugs. Moreover, healthcare providers may avoid exploring overlapping risks and indications for PrEP because of other priorities related to substance use (e.g. HCV, overdose) or anticipated provider or patient discomfort discussing sexual behavior (Centers for Disease

Control and Prevention, & US Public Health Service, 2018). Thus, PWID with overlapping sexual and injection risks for HIV may be overlooked as PrEP candidates in clinical settings.

Despite the aforementioned HIV risks as well as barriers to PrEP-related care among this population, few intervention methods have been proposed to optimize PrEP uptake in this population. In order to address individual-level barriers to PrEP uptake (such as low levels of knowledge), PWID may benefit from increased messaging about PrEP and PrEP access, direct community outreach, and diffusion of information through peer networks, among other interventions. Interpersonal-level barriers to PrEP uptake, including low provider readiness to prescribe the medication, or experienced discrimination, might be addressed through cultural competency trainings for healthcare professionals, or by connecting PWID to CBO staff members who can provide longitudinal support for navigating the PrEP uptake process and initial clinical appointments. Potential interventions for this population have been discussed by the authors in detail elsewhere (Biello et al., 2018).

These findings must be considered in the context of several limitations. First, our sample was recruited from community-based organizations in two urban centers in the US Northeast and may not generalize to populations outside of similar urban areas. We also used purposive sampling to select participants engaging in high-risk behaviors such as receptive syringe sharing; as such, our sample may reflect more risk behaviors than other PWID accessing these same CBOs. In order to verify the generalizability of these findings, further work is needed to contextualize risk among rural PWID and those not accessing health or harm reduction services. Lastly, although research staff took time to emphasize confidentiality and build trust with participants, social desirability bias may have influenced the reported risk behaviors. Nonetheless, our findings provide critical insight into the complexity of overlapping sexual and injection risks for HIV among PWID.

Conclusion

HIV prevention efforts must acknowledge the overlapping patterns of sexual and injection-related HIV risk behaviors that PWID experience. Our findings suggest that many PWID may be clinically indicated for PrEP through sexual risk behaviors alone, although these risks may not be identified in clinical settings or addressed through injection-related risk reduction programming; therefore, PrEP should be considered as a supplement to current HIV prevention efforts for PWID.

Acknowledgments

Funding

The Boston-Providence Center for AIDS Research collaborative developmental grant (NIH grant P30AI042853), NIH/NIDA grant K01DA043412, NIH/NIMH Research Supplement to Promote Diversity in Health-Related Research (3R34MH110369-02S1), and the BU Peter Paul Career Development Professorship.

References

- Adams LM, & Balderson BH (2016). HIV providers' likelihood to prescribe pre-exposure prophylaxis (PrEP) for HIV prevention differs by patient type: A short report. *AIDS Care*, 28(9), 1154–1158. doi:10.1080/09540121.2016.1153595 [PubMed: 26915281]

- Baeten JM, Donnell D, Ndase P, Mugo NR, Campbell JD, Wangisi J, ... Celum C (2012). Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *New England Journal of Medicine*, 367(5), 399–410. doi:10.1056/NEJMoa1108524 [PubMed: 22784037]
- Baker A (2016). The ongoing battle for syringe exchange. *Journal of AIDS and HIV Infections*, 2(1), 101. doi:10.15744/2454-499X2.101
- Bazzi AR, Biancarelli DL, Childs E, Drainoni M-L, Edeza A, Salhaney P, ... Biello KB (2018). Limited knowledge and mixed interest in pre-exposure prophylaxis for hiv prevention among people who inject drugs. *AIDS Patient Care and STDs*, 32(12), 529–537. doi:10.1089/apc.2018.0126 [PubMed: 30311777]
- Beletsky L, Grau LE, White E, Bowman S, & Heimer R (2011). The roles of law, client race and program visibility in shaping police interference with the operation of US syringe exchange programs. *Addiction*, 106(2), 357–365. doi:10.1111/j.1360-0443.2010.03149.x [PubMed: 21054615]
- Biancarelli DL, Biello KB, Childs E, Drainoni M, Salhaney P, Edeza A, ... Bazzi AR (2019). Strategies used by people who inject drugs to avoid stigma in healthcare settings. *Drug and Alcohol Dependence*, 198, 80–86. doi:10.1016/j.drugalcdep.2019.01.037 [PubMed: 30884432]
- Biello KB, Bazzi AR, Mimiaga MJ, Biancarelli DL, Edeza A, Salhaney P, ... Drainoni ML (2018). Perspectives on HIV pre-exposure prophylaxis (PrEP) utilization and related intervention needs among people who inject drugs. *Harm Reduction Journal*, 15(1), 55. doi:10.1186/s12954-018-0263-5 [PubMed: 30419926]
- Bogart LM, Kral AH, Scott A, Anderson R, Flynn N, Gilbert ML, & Bluthenthal RN (2005). Sexual risk among injection drug users recruited from syringe exchange programs in California. *Sexually Transmitted Diseases*, 32(1), 27–34. doi:10.1097/01.olq.0000148294.83012.d0 [PubMed: 15614118]
- Bramson H, Des Jarlais DC, Arasteh K, Nugent A, Guardino V, Feelemyer J, & Hodel D (2015). State laws, syringe exchange, and HIV among persons who inject drugs in the United States: History and effectiveness. *Journal of Public Health Policy*, 36(2), 212–230. doi:10.1057/jphp.2014.54 [PubMed: 25590514]
- Brook DW, Brook JS, Rosenberg G, Whiteman M, Masci JR, Roberto J, & de Catalogne J (2000). Longitudinal pathways to condom use: A psychosocial study of male IDUs. *Journal of Addictive Diseases*, 19(1), 55–69. doi:10.1300/J069v19n01_05 [PubMed: 10772603]
- Bull SS, Piper P, & Rietmeijer C (2002). Men who have sex with men and also inject drugs—profiles of risk related to the synergy of sex and drug injection behaviors. *Journal of Homosexuality*, 42(3), 31–51. doi:10.1300/J082v42n03_03 [PubMed: 12066991]
- Canary L, Hariri S, Campbell C, Young R, Whitcomb J, Kaufman H, & Vellozzi C (2017). Geographic disparities in access to syringe services programs among young persons with hepatitis C virus infection in the United States. *Clinical Infectious Diseases*, 65(3), 514–517. doi:10.1093/cid/cix333 [PubMed: 28402431]
- Centers for Disease Control and Prevention, & US Public Health Service. (2018). Preexposure prophylaxis for the prevention of HIV infection in the United States—2017 Update: a clinical practice guideline. Atlanta: CDC.
- Chapin-Bardales J, for the NHBS study group, Masciotra S, Smith A, Hoots BE, Martin, ... Paz-Bailey G (2019). Characteristics of persons who inject drugs with recent HIV infection in the United States: National HIV behavioral surveillance, 2012. *AIDS and Behavior*, 1–9. doi:10.1007/s10461-019-02420-z
- Choopanya K, Martin M, Suntharasamai P, Sangkum U, Mock PA, Leethochawalit M, ... Vanichseni S (2013). Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok Tenofovir Study): A randomised, double-blind, placebo-controlled phase 3 trial. *The Lancet*, 381(9883), 2083–2090. doi:10.1016/S0140-6736(13)61127-7
- Cicero TJ, Ellis MS, & Harney J (2015). Shifting patterns of prescription opioid and heroin abuse in the United States. *New England Journal of Medicine*, 373(18), 1789–1790.
- Conrad C, Bradley HM, Broz D, Buddha S, Chapman EL, Galang RR, ... Duwve JM (2015). Community outbreak of HIV infection linked to injection drug use of Oxymorphone—Indiana, 2015. *MMWR. Morbidity and Mortality Weekly Report*, 64(16), 443–444. [PubMed: 25928470]

- Corbin J, Strauss A, & Strauss AL (2014). *Basics of qualitative research*. Thousand Oaks, CA: Sage.
- Cranston K, Alpren C, John B, Dawson E, Roosevelt K, Burrage A, ... DeMaria A (2019). HIV diagnoses among persons who inject drugs - Northeastern Massachusetts, 2015–2018. *Mmwr. Morbidity and Mortality Weekly Report*, 68(10), 253–254. doi:10.15585/mmwr.mm6810a6 [PubMed: 30870405]
- Des Jarlais DC, Nugent A, Solberg A, Feelemyer J, Mermin J, & Holtzman D (2015). Syringe service programs for persons who inject drugs in urban, suburban, and rural areas—United States, 2013. *Mmwr. Morbidity and Mortality Weekly Report*, 64(48), 1337–1341. doi:10.15585/mmwr.mm6448a3 [PubMed: 26655918]
- Escudero DJ, Lurie MN, Kerr T, Howe CJ, & Marshall BD (2014). HIV pre-exposure prophylaxis for people who inject drugs: A review of current results and an agenda for future research. *Journal of the International AIDS Society*, 17(1), 18899–18EOA. doi: 10.7448/IAS.17.1.18899 [PubMed: 24679634]
- Falck RS, Wang J, Carlson RG, & Siegal HA (1997). Factors influencing condom use among heterosexual users of injection drugs and crack cocaine. *Sexually Transmitted Diseases*, 24(4), 204–210. doi:10.1097/00007435-199704000-00004 [PubMed: 9101631]
- Golden MR, Lechtenberg R, Glick SN, Dombrowski J, Duchin J, Reuer JR, ... Buskin SE (2019). Outbreak of human immunodeficiency virus infection among heterosexual persons who are living homeless and inject drugs—Seattle, Washington, 2018. *Mmwr. Morbidity and Mortality Weekly Report*, 68(15), 344. doi:10.15585/mmwr.mm6815a2 [PubMed: 30998671]
- Gonsalves GS, & Crawford FW (2018). Dynamics of the HIV outbreak and response in Scott County, IN, USA, 2011–15: a modelling study. *The Lancet HIV*, 5(10), e569–e577. doi:10.1016/S2352-3018(18)30176-0 [PubMed: 30220531]
- Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, ... Glidden DV (2010). Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*, 363(27), 2587–2599. doi:10.1056/NEJMoa1011205 [PubMed: 21091279]
- Guise A, Albers ER, & Strathdee SA (2017). PrEP is not ready for our community, and our community is not ready for PrEP: pre-exposure prophylaxis for HIV for people who inject drugs and limits to the HIV prevention response. *Addiction*, 112(4), 572–578. doi:10.1111/add.13437 [PubMed: 27273843]
- Kerr T, Shannon K, Ti L, Strathdee S, Hayashi K, Nguyen P, ... Wood E (2016). Sex work and HIV incidence among people who inject drugs. *AIDS (London, England)*, 30(4), 627–634. doi:10.1097/QAD.0000000000000948
- Krakower DS, Beekmann SE, Polgreen PM, & Mayer KH (2016). Diffusion of newer HIV prevention innovations: Variable practices of frontline infectious diseases physicians. *Clinical Infectious Diseases*, 62(1), 99–105. doi:10.1093/cid/civ736 [PubMed: 26385993]
- Lansky A, Finlayson T, Johnson C, Holtzman D, Wejnert C, Mitsch A, ... Crepez N (2014). Estimating the number of persons who inject drugs in the United States by meta-analysis to calculate national rates of HIV and hepatitis C virus infections. *PloS One*, 9(5), e97596. doi: 10.1371/journal.pone.0097596 [PubMed: 24840662]
- Liang TJ, & Ward JW (2018). Hepatitis C in injection-drug users - A hidden danger of the Opioid Epidemic. *The New England Journal of Medicine*, 378(13), 1169–1171. doi:10.1056/NEJMp1716871 [PubMed: 29601263]
- MDPH. (2017). HIV New Cases among IDUs Alert/Mass Dept of Health - Massachusetts Department of Public Health raises level of concern about increased HIV transmission through injection drug use, in light of the current epidemic of opiate/opioid misuse and recent observations. [Press release]. Retrieved from http://www.natap.org/2017/HIV/120817_02.htm.
- Medina-Perucha L, Family H, Scott J, Chapman S, & Dack C (2019). Factors associated with sexual risks and risk of STIs, HIV and other blood-borne viruses among women using heroin and other drugs: A systematic literature review. *AIDS and Behavior*, 23(1), 222–251. doi:10.1007/s10461-018-2238-7 [PubMed: 30073636]
- Nash B (2019). HIV cluster confirmed in Cabell County. Retrieved from https://www.wvgazette.com/news/health/hiv-cluster-confirmed-in-cabell-county/article_4a53f052-af0e-5172-83e4-faab25ccfc82.html.

- Nelson LS, Juurlink DN, & Perrone J (2015). Addressing the opioid epidemic. *JAMA*, 314(14), 1453–1454. doi:10.1001/jama.2015.12397 [PubMed: 26461995]
- NKHD. (2018). Health Officials See Increase in HIV Infection Among Individuals Who Inject Drugs [Press release]. Retrieved from <https://nkyhealth.org/2018/01/09/health-officials-see-increase-in-hiv-infection-among-individuals-who-inject-drugs/>.
- Paquette CE, Syvertsen JL, & Pollini RA (2018). Stigma at every turn: Health services experiences among people who inject drugs. *International Journal of Drug Policy*, 57, 104–110. doi:10.1016/j.drugpo.2018.04.004 [PubMed: 29715589]
- Semaan S, Des Jarlais DC, Sogolow E, Johnson WD, Hedges LV, Ramirez G, ... Needle R (2002). A meta-analysis of the effect of HIV prevention interventions on the sex behaviors of drug users in the United States. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 30, S73–S93. [PubMed: 12107362]
- Somlai AM, Kelly JA, McAuliffe TL, Ksobiech K, & Hackl KL (2003). Predictors of HIV sexual risk behaviors in a community sample of injection drug-using men and women. *AIDS and Behavior*, 7(4), 383–393. [PubMed: 14707535]
- Spiller MW, Broz D, Wejnert C, Nerlander L, & Paz-Bailey G (2015). HIV infection and HIV-associated behaviors among persons who inject drugs—20 cities, United States, 2012. *MMWR. Morbidity and Mortality Weekly Report*, 64(10), 270–275. doi:10.15585/mmwr.mm6701a5 [PubMed: 25789742]
- Stopka TJ, Hutcheson M, & Donahue A (2017). Access to healthcare insurance and healthcare services among syringe exchange program clients in Massachusetts: Qualitative findings from health navigators with the iDU (“I do”) Care Collaborative. *Harm Reduction Journal*, 14(1), 26. doi: 10.1186/s12954-017-0151-4 [PubMed: 28521814]
- Strathdee SA, & Sherman SG (2003). The role of sexual transmission of HIV infection among injection and non-injection drug users. *Journal of Urban Health*, 80(4 Suppl 3), iii7–iii14. doi: 10.1093/jurban/jtg078 [PubMed: 14713667]
- Strathdee SA, & Stockman JK (2010). Epidemiology of HIV among injecting and non-injecting drug users: Current trends and implications for interventions. *Current HIV/AIDS Reports*, 7(2), 99–106. doi:10.1007/s11904-010-0043-7 [PubMed: 20425564]
- Williams JE, Dangerfield DT, Kral AH, Wenger LD, & Bluthenthal RN (2019). Correlates of Sexual Coercion among People Who Inject Drugs (PWID) in Los Angeles and San Francisco, CA. *Journal of Urban Health*, 96(3), 469–476. doi:10.1007/s11524-018-0238-6 [PubMed: 29616449]

Table 1.

Characteristics of a sample of people who inject drugs in Providence, Rhode Island and Boston, Massachusetts, USA (2016–2017) ($n = 33$).

<i>Socio-Demographics</i>	<i>n (%)</i> *
City	
Boston	16 (48%)
Providence	17 (52%)
Age in years; median (interquartile range; IQR)	36 (32–48)
Race (categories are not mutually exclusive)	
American Indian or Alaska Native	3 (9%)
Black or African American	7 (21%)
White	22 (67%)
Other	5 (15%)
Ethnicity: Hispanic/Latino	8 (24%)
Gender	
Male	18 (55%)
Female	13 (39%)
Transwoman	1 (3%)
Genderqueer	1 (3%)
Sexual orientation	
Heterosexual or “Straight”	21 (64%)
Bisexual	8 (24%)
Homosexual or Gay	4 (12%)
Educational attainment	
Less than high school	9 (27%)
High school or GED	13 (39%)
Some college (no degree)	11 (33%)
Employment status (categories are not mutually exclusive)	
Employed full time (30+ hours per week)	2 (6%)
Employed part time (<30 hours per week)	5 (15%)
Unemployed	23 (70%)
Retired	1 (3%)

<i>Socio-Demographics</i>	<i>n (%)</i> [*]
Disabled	5 (15%)
Health insurance: has public health insurance	32 (97%)
Sexual Health and Behaviors	
HIV testing, past year (number of times; <i>n</i> = 32)	
0	2 (6%)
1–2	18 (56%)
3+	12 (37%)
STI testing, past year	24 (73%)
Diagnosed with STI (excluding HCV), past year	15
Diagnosed with HCV, ever	26 (79%)
Number of sex partners, past 3 months	
0	6 (18%)
1	12 (36%)
2	6 (18%)
3–9	4 (12%)
10+	5 (15%)
Condom use, past 3 months (vaginal or anal sex; <i>n</i> = 27 with 1 sex partner)	
Never	11 (41%)
Rarely/Sometimes	8 (30%)
Usually	3 (11%)
Always	5 (19%)
Substance Use Behaviors	
Frequency of drug injection, past 3 months	
Once a Week or Less	5 (15%)
2 to 6 Days a Week	8 (24%)
Once a Day Everyday	3 (9%)
More Than Once a Day Everyday	17 (51%)
Drugs injected, past 3 months (not mutually exclusive)	
Heroin	31 (94%)
Prescription opioids	3 (9%)
Methadone	1 (3%)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

<i>Socio-Demographics</i>	<i>n (%)</i> [*]
Cocaine	23 (70%)
Crack	13 (39%)
Crystal Methamphetamine	11 (33%)
Cocaine / Heroin Combination (“Speedball”)	12 (36%)
Current syringe access (not mutually exclusive)	
Syringe Service Program (“Syringe Exchange”)	27 (82%)
Pharmacy	10 (30%)
Other people	5 (15%)
Number of people from whom participant received a used syringe, past month	
0	14 (42%)
1–2	15 (45%)
3	4 (12%)
Any distributive or receptive syringe sharing, past month	
<i>PrEP Knowledge</i>	
Had Heard of Oral PrEP Prior to Study Participation	21 (64%)
	12 (36%)

* May exceed 100% when categories were not mutually exclusive.

Table 2.

Employment characteristics of key informants with professional experience providing PrEP or other health or harm reduction services to PWID ($n = 12$).

Location	<i>N</i>
Massachusetts	8
Rhode Island	4
Education Level	
High school or GED	1
Some college	3
College degree	1
Graduate/professional degree	7
Organization Type (not mutually exclusive)	
Drop-in HIV/STI/HCV testing center	7
HIV primary care clinic/hospital	5
Methadone clinic	1
Substance use clinic	1
Syringe service program	3
State public health department	1
Job Titles	
Clinician and Researcher	5
Program Coordinator/Manager	5
Outreach Worker/Navigator	2
Years of experience in HIV and/or PWID	
0–5	3
6–10	3
11+	6