

Awareness of HIV Pre-Exposure Prophylaxis (PrEP) and Predictors of Interest in PrEP Among
HIV-negative Persons Who Inject Drugs in Seattle, Washington

Maria A. Corcoran

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Committee:

Anna Wald

Sara N. Glick

John D. Scott

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Maria A. Corcorran

University of Washington

Abstract

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Maria A. Corcorran

Chair of the Supervisory Committee:

Anna Wald

Department of Medicine, Division of Allergy and Infectious Diseases

Department of Epidemiology

Background: HIV pre-exposure prophylaxis (PrEP) is safe and effective for use in people who inject drugs (PWID), but studies indicate that PrEP is underutilized in this population. We assessed awareness of PrEP and investigated predictors of interest in PrEP among PWID in Seattle, Washington.

Methods: This study analyzed data from a 2019 survey of PWID at 3 Seattle-area syringe service programs (SSPs). PWID who injected drugs in the past three months and were HIV-negative by self-report were included. Descriptive statistics were used to compare PrEP-aware and unaware PWID, and multivariate Poisson regression with robust standard errors was used to estimate adjusted prevalence ratios (APR) for interest in PrEP.

Results: Among 348 HIV-negative PWID, including $\leq 1\%$ who were currently taking PrEP, 51% were knowledgeable of PrEP and 46% were interested in PrEP. Interest in PrEP was inversely associated with prior knowledge of PrEP (APR 0.58, 95% CI 0.45 – 0.74); however, interest in

PrEP was high among a subset of PWID meeting pre-specified risk criteria for HIV (APR 1.53, 95% CI 1.09 – 2.15).

Conclusion: Despite reasonably high knowledge of PrEP and interest in PrEP, current use of PrEP was strikingly low in this urban cohort of PWID. Increasing knowledge of PrEP among PWID may not be sufficient to improve access to and continued use of PrEP among PWID at highest risk for HIV.

INTRODUCTION

The incidence of HIV among persons who inject drugs (PWID) in the United States (US) declined by 31% from 2010 to 2016 (1), owing in part to the success and growth of syringe service programs (SSPs) across the country. Nonetheless, despite recent declines in incident infections, PWID remain disproportionately affected by the HIV epidemic, with an increase in HIV outbreaks among PWID both in the US and abroad over the past decade (2-4). In 2017, 9% of new HIV infections in the United States were among PWID, with PWID accounting for an estimated 17% of persons living with HIV in the US (5, 6). Of the estimated 189,600 PWID living with HIV, 93% have been diagnosed, but only 52% of women and 46% of men are virally suppressed (7). This is well below the 90-90-90 goals set forth by UNADIS (8) and lower than viral suppression rates among HIV-positive men who have sex with men, among whom an estimated 61% are virally suppressed (9).

HIV pre-exposure prophylaxis (PrEP) has been deemed safe and effective for use in PWID, and in 2013 the Centers for Disease Control and Prevention (CDC) released guidelines outlining its use in PWID (10, 11). Despite this, PrEP remains underutilized among PWID, with one study from Philadelphia showing that only 2.6% of PWID had received a prescription for PrEP (12). Similarly, knowledge of PrEP is low among PWID, with several studies showing that only 12 – 31% of PWID are PrEP-aware (12-16). Nevertheless, studies have also shown that when made aware of PrEP, 47 – 79% of PWID reported interest in or willingness to use PrEP, with younger age, female gender, and high risk injection behaviors being positively associated with interest in PrEP (13, 14, 17).

In Seattle and King County, Washington, the prevalence of HIV has historically been low among PWID, particularly among women and men who have sex with women, among whom HIV prevalence is estimated to be 1 – 3% (4). However, a recent cluster of linked HIV cases among

heterosexual men and women living homeless in North Seattle, most of whom inject drugs, exposed the vulnerability of this population to HIV infection (4). While factors driving the emergence of this cluster are complex, a lack syringe and clinical services for PWID in North Seattle, the ongoing opioid epidemic, exchange sex, and a lack of affordable housing were all likely contributing factors (4). In the wake of Seattle's recent HIV cluster, and other similar outbreaks of HIV among PWID in the United States, this study aims to assess awareness of PrEP and investigate predictors of interest in PrEP among PWID at Public Health – Seattle & King County SSPs (3).

METHODS

Study Sample

This study analyzed cross-sectional data from the 2019 Washington State Syringe Exchange Health Survey, a survey administered to clients at three Seattle area SSPs by Public Health - Seattle & King County (PHSKC). This survey, which is conducted biennially, collects information on client demographics, health conditions, drug use, sexual behavior, and healthcare needs. All SSP clients who sought services at one of the three PHSKC SSPs (Downtown, Capitol Hill, South County Outreach Referral and Exchange) during the data collection period were asked to participate in a census sampling approach. Client self-report of prior participation was used to exclude persons who had already answered survey questions during the study period. SSP clients who did not wish to participate were allowed to voluntarily decline. Additional details on survey methodology have been previously published (18-21).

For the purposes of this study, the analytic sample was restricted to persons who reported injecting drugs in the past three months and who reported being HIV negative. Participants who did not know their HIV status, or those who self-reported being HIV positive were excluded.

Data Collection

Data collection occurred over a two-week period of time, from July 8 to July 20, 2019. After providing informed consent, participants were given an interviewer-administered survey.

Interviews were conducted by SSP staff and by interviewers from other surveys of PWID, all of whom had extensive experience working with PWID and populations at risk for HIV. Surveys were primarily conducted on tablets; although paper-based surveys were used for some participants recruited at mobile sites. All data were entered into REDCap (Research Electronic Data Capture) (22, 23). No names or personal identifying information were collected, aside from zip code. In most instances, clients completed the survey in approximately 10-15 minutes. As a token of appreciation, participants received a piece of candy at the completion of the survey.

The Washington State Syringe Exchange Health Survey was conducted for the purposes of public health surveillance and was therefore not considered to be human subjects research. The University of Washington Human Subjects Division reviewed proposed activities for this study and determined it did not involve human subjects and therefore did not require IRB approval.

Measures

The primary outcomes of interest were knowledge of PrEP and interest in PrEP. Knowledge of PrEP was defined by answering “yes” to “Have you ever heard of HIV pre-exposure prophylaxis or PrEP?” Interest in PrEP was defined by answering “very” or “somewhat” to the question: “PrEP is a pill you can take to prevent you from getting HIV. How interested are you in being on PrEP?” Although current use of PrEP was not an exclusion criterion for this study, due to survey skip patterns, interest in PrEP was only assessed among those who were not currently taking HIV PrEP. Potential predictors of interest in PrEP were identified a priori and included: age, gender, race, housing status, engaging in exchange sex, being a man who has sex with men (MSM), drugs used in the past 3 months, number of days injected in the last 7 days, sharing

syringes in the past 3 months, sharing injection equipment in the past 3 months, reporting a sexually transmitted infection (STI) in the past 12 months, having participated in treatment for substance use disorder in the past 12 months, health insurance status, and being at “high-risk” for HIV infection, as described below.

Characteristics of people newly diagnosed with HIV during the 2018 cluster of linked HIV infections in Seattle were evaluated to assess factors that may place PWID at increased risk for HIV (4). Based on characteristics of this cluster, a composite “high-risk” exposure variable was created, reflecting survey participants who self-reported all of the following: living homeless, using methamphetamine and heroin, exchanging sex for money or drugs. For the purposes of this composite variable, homelessness was defined as being “homeless” or having “temporary/unstable” housing. Methamphetamine and heroin use were defined as any use of both drugs, either separately or together (goofball), and not restricted to intravenous use.

Statistical Analysis

Basic descriptive statistics, including means, standard deviations, interquartile ranges, and proportions were used to compare PWID who were and were not PrEP aware. Chi-squared and Fisher exact tests were used to compare proportions between PrEP aware and unaware groups. A Wilcoxon rank sum test with continuity correction was used to compare continuous variables that were not normally distributed.

We used bivariate Poisson regression with a log link and robust standard errors to calculate the prevalence ratio (PR) of being interested in PrEP among HIV-negative PWID who were not currently on PrEP. Variables with a statistically significant association with interest in PrEP, defined as an alpha of ≤ 0.05 , were then included in a multivariate model. Multivariate Poisson regression with a log link and robust standard errors was subsequently used to estimate

adjusted prevalence ratios (APR) for interest in PrEP. Because high-risk individuals by definition were homeless or unstably housed, exchanged sex, and used both methamphetamine and heroin, these individual predictor variables were not included in multivariate Poisson regression when adjusting for high-risk status. All statistical analyses were performed in R, versions 1.1.456 R Studio (© 2009 – 2018 RStudio, Inc.).

RESULTS

Analytic Sample

In total, 432 people completed the 2019 Washington State Syringe Exchange Health Survey. Of these 432 survey participants, 24 (5.6%) were excluded because they reported being HIV positive and 35 (8.1%) because they did not answer questions regarding their HIV status. An additional 25 (5.8%) were excluded because they did not report a history of injection drug use in the past 3 months. This yielded an analytic sample of 348 people who self-reported being HIV negative and had injected drugs in the past 3 months (Figure 1). Among those 348 people, 23 (6.6%) met the pre-specified definition of being high-risk for HIV, based on self-report of being homeless or unstably housed, exchanging sex for drugs or money, and using both methamphetamine and heroin.

Knowledge of PrEP and Demographic Characteristics

Of the 348 persons included in the analytic sample, 178 (51%) reported prior knowledge of PrEP, and 3 reported current PrEP use (0.86% of the entire cohort, 1.7% of those who were PrEP aware). Among those who were currently using PrEP, two were men, one of whom was MSM and reported exchange sex. Demographic characteristics of surveyed participants are presented in Table 1, stratified by PrEP knowledge. Across the entire sample, the median age was 36 years (IQR 30 – 44). The majority of respondents were male (62.1%), and 75.0% were white. Nearly three quarters were homeless or unstably housed (74.4%), and 9.5% reported a

history of exchange sex. Heroin (87.6%) and methamphetamine (78.1%) were the most common drugs used in the past three months, with 76.4% of respondents reporting use of both heroin and meth, either together or separately, in the past three months. Twenty-three participants (6.6%) met the pre-specified definition of being high-risk for HIV. The majority of these individuals were PrEP aware (n=16, 70%); although only 1 (4.3%) reported current PrEP use.

Compared to PrEP-unaware participants, PrEP-aware participants were more likely to be men who have sex with men (9% vs. 2.4%, $p=0.02$), were more likely to report methadone or suboxone use in the past three months (51.1% vs. 35.9%, $p=0.006$), were more likely to have received any treatment for drug use in the past 12 months (58.4% vs. 44.7%, $p=0.01$), and were more likely to have used benzodiazepines or other “downers” in the past three months (30.3% vs. 19.4%, $p=0.03$). Conversely, participants who reported knowledge of PrEP were somewhat less likely to report methamphetamine use than those who reported no knowledge of PrEP (72.3% vs. 84.1%, $p=0.01$).

Predictors of Interest in PrEP

Information on interest in PrEP was available for 341 individuals, 158 (46%) of whom reported being “very” or “somewhat” interested in taking PrEP to prevent HIV. In bivariate, unadjusted regression models, being homeless or unstably housed (PR 1.55, 95% CI 1.12 – 2.13), sharing injection equipment in the past 3 months (PR 1.37, 95% CI 1.09 – 1.73), and using methamphetamine (PR 1.66, 95% CI: 1.16 – 2.38), fentanyl (PR 1.41, 95% CI 1.10 – 1.80), or other opiates aside from heroin and fentanyl (PR 1.33, 95% CI 1.01 – 1.75) were associated with a higher prevalence of interest in PrEP. Similarly, PWID at high-risk for HIV had a 1.56 times higher prevalence of interest in PrEP than those who did not meet criteria for being high-

risk (PR 1.56, 95% CI 1.14 – 2.13). Prior knowledge of HIV PrEP was associated with a lower interest in PrEP (PR 0.58, 95% CI 0.45 – 0.74) (Table 2).

In a multivariate model, adjusting for fentanyl use, use of opiates other than heroin or fentanyl, sharing injection equipment in the past three months, and prior knowledge of PrEP, individuals at high-risk for HIV continued to have a 53% higher prevalence of interest in PrEP when compared to those who did not meet the high risk criteria (APR 1.53, 95% CI 1.09 – 2.15). In this same model, sharing injection equipment in the past three months continued to be associated with a higher prevalence of interest in PrEP (APR 1.25, 95% CI 1.00 – 1.58), and prior knowledge of PrEP remained associated with a lower prevalence of interest in PrEP (APR 0.58, 95% CI 0.45, 0.74). Adjusted prevalence ratios for use of methamphetamine and homelessness were not obtained despite these variables showing statistical significance in bivariate regression, as high-risk individuals by definition used methamphetamine and were homeless.

DISCUSSION

In this study of HIV-negative PWID in Seattle, Washington, we found a very low frequency of PrEP use despite half of survey participants reporting prior knowledge of PrEP and 46% reporting interest in PrEP. Although persons at high risk for HIV – defined by a priori criteria based on a recent outbreak of HIV among PWID in Seattle (4) – had a higher prevalence of interest in PrEP, the negative association we found between prior knowledge of PrEP and interest in PrEP suggests increasing knowledge of HIV PrEP among PWID may not be sufficient to promote PrEP uptake, and further efforts are needed to understand perceptions of risk for HIV and barriers and facilitators of PrEP use in this marginalized population.

The low prevalence of current PrEP use observed in our cohort is consistent with that reported in other studies of PWID. In a cross-sectional survey of 265 HIV-uninfected PWID in Baltimore, researchers reported that only 2 survey respondents were currently taking PrEP (14). Surveys of PWID in Philadelphia (12) and San Francisco (24) report similarly low prevalence of PrEP use, 2.6% and 3.0% respectively, and a study of 152 SSP clients in Miami found that no participants were taking PrEP (25). Although several of the aforementioned studies cite limited knowledge of PrEP as a major factor influencing PrEP uptake, our study found relatively high knowledge of PrEP among PWID in comparison to other similar cohorts (12-16, 25). One reason for this may be that our sample consisted of PWID who receive harm reduction services at health department affiliated SSPs and were therefore likely to be exposed to public health messaging, including messaging surrounding PrEP. Nevertheless, there was no appreciable difference in PrEP use between our sample and other representative samples of PWID (12, 14, 24, 25) despite multiple stated risk factors for HIV in our cohort, including exchange sex and sharing of injection equipment. Moreover, we observed a negative association between prior knowledge of PrEP and interest in taking PrEP, suggesting that knowledge alone is not sufficient to promote higher uptake and sustained use of PrEP in this population. While factors driving this inverse association require further investigation, our findings suggest that PWID in Seattle may not perceive themselves to be at risk for HIV, may find PrEP to be an unacceptable intervention for HIV prevention, or may be experiencing other unmeasured barriers to PrEP use.

It is notable, however, that in our study meeting pre-specified local criteria for being at high-risk for HIV was associated with greater interest in PrEP, despite a high baseline knowledge of PrEP in this group. While factors driving this association cannot be ascertained from our data, the association suggests that high-risk individuals likely perceive themselves to be at elevated risk for HIV, either due to sexual or injection risk behaviors, or a combination of the two. These findings are in keeping with a prior study from Baltimore, which showed that interest in PrEP

was associated with meeting eligibility criteria for PrEP (14), and they are consistent with a prior study by Footer et al. showing that women who engage in exchange sex and inject drugs are highly interested in PrEP. However, the women in this study cited several barriers to PrEP use, including stigma, side effects and structural vulnerabilities that are also likely to pertain to the Seattle population. (26). Our findings suggest there are significant barriers to PrEP use among PWID, despite interest among high-risk individuals, and further research to understand the determinants of PrEP uptake and sustained use in this population is urgently needed.

Despite stated interest in PrEP among high-risk PWID in Seattle, no clear consensus on how to best deliver PrEP services to this population has emerged. If we were to assume that the proportion of PWID in our survey who met criteria for being high-risk for HIV (6.6%) was representative of the proportion of PWID in King County who are truly at highest risk for HIV, then operationalizing PrEP delivery for this group would involve treating approximately 1,749 of the 26,500 PWID in the county with PrEP (27). While this is undoubtedly an underestimate of those at highest risk for HIV, as it does not take into account the overlapping risks experienced by MSM who inject drugs, this estimate suggests that a large number of PWID in King County would benefit from PrEP use. While considerable uncertainty as to the barriers and facilitators of PrEP uptake and sustained use exist in this population, our findings support the general acceptability of HIV PrEP amongst high-risk PWID and further argue that urgent efforts are needed to investigate implementation strategies for the delivery of comprehensive HIV prevention care among those PWID who are both at highest risk for HIV and also most interested in the use of PrEP for HIV prevention.

There are several limitations to our study. All findings are based on cross-sectional survey data that relied on participant self-report. HIV status was not confirmed by laboratory testing, and therefore some degree of misclassification may exist. Furthermore, our results are subject to

social desirability bias given that surveys were administered to PWID by SSP staff. Our definition of high-risk was based on characteristics of the 2018 cluster of linked HIV infections among homeless PWID in Seattle and does not take into account more granular risk data including condom use and sharing of syringes and other injection equipment that place PWID at risk for HIV. As such, this definition of high-risk may be missing subsets of PWID who are at elevated risk for HIV based on specific sexual and injection risk behaviors. Finally, data presented in this study were obtained from a subset of PWID who are already accessing harm reduction services in Seattle and is likely not representative of all PWID in Seattle and King County. Given their engagement in harm reduction services, PWID in this sample may be more knowledgeable of other prevention interventions, including PrEP, and they may be more likely to report interest in other modalities for HIV prevention.

CONCLUSION

In this sample of HIV-negative PWID in Seattle, Washington, less than 1% were currently taking PrEP, 51% reported prior knowledge of PrEP and 46% reported interest in PrEP. In comparison to the remainder of the cohort, interest in PrEP was higher among a small group of PWID meeting pre-specified risk criteria for HIV acquisition. Nevertheless, across the cohort as a whole, prior knowledge of PrEP was inversely associated with interest in PrEP. Our results suggest that increasing knowledge of HIV PrEP among PWID may not be sufficient to promote PrEP uptake, and further efforts are needed to understand perceptions of risk for HIV, determinants of PrEP use, and investigate successful strategies for PrEP implementation and delivery in this marginalized population.

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Table 1. Demographic Characteristics of People Who Inject Drugs and Access Harm Reduction Services at Public Health – Seattle & King County Syringe Service Programs

	All PWID (n=348)	PrEP Aware (n= 178)	PrEP Unaware (n= 170)	p-value [^]
High-risk for HIV (%) (meth/heroin, exchange sex, and homeless)	23 (6.6)	16 (9.0)	7 (4.1)	0.11
Median age in years (IQR)	36 (30 - 44)	36 (30 – 43)	36 (30 – 46)	0.56#
Gender (%)				0.10&
Man	216 (62.1)	103 (57.9)	113 (66.5)	
Woman	130 (37.4)	73 (41.0)	57 (33.5)	
Trans / Genderqueer / Nonbinary	2 (0.6)	2 (1.1)	0 (0)	
Race (%)				
White	261 (75.0)	131 (73.6)	130 (76.5)	0.62
Black / African American	20 (5.7)	11 (6.2)	9 (5.3)	0.90
Latinx/Hispanic	28 (8.0)	17 (9.6)	11 (6.5)	0.39
Am. Indian / Alaska Native	45 (12.9)	21 (11.8)	24 (14.1)	0.63
Asian / Pacific Isl. / Nat. Hawaiian	27 (7.6)	15 (8.4)	12 (7.1)	0.78
Other	9 (2.6)	6 (3.4)	3 (1.8)	0.50&
Homeless (%)	259 (74.4)	130 (73.0)	129 (75.9)	0.63
Exchange sex (%)	33 (9.5)	22 (12.4)	11 (6.5)	0.09
MSM (%)	20 (5.7)	16 (9.0)	4 (2.4)	0.02
Drug(s) used in past 3 months (%)*				
Heroin	305 (87.6)	158 (88.8)	147 (86.5)	0.63
Methamphetamine	271 (78.1)	128 (72.3)	143 (84.1)	0.01
Goofball (meth & heroin)	201 (57.8)	100 (56.2)	101 (59.4)	0.62
Crack cocaine	69 (19.8)	36 (20.2)	33 (19.4)	0.96
Powder cocaine	54 (15.6)	30 (16.9)	24 (14.2)	0.59
Speedball (cocaine & heroin)	48 (13.8)	31 (17.4)	17 (10.0)	0.06
Fentanyl	61 (17.7)	24 (13.6)	37 (21.9)	0.06
Other opiate medication	47 (13.5)	24 (13.5)	23 (13.6)	1.0
Benzodiazepines / Downers	87 (25)	54 (30.3)	33 (19.4)	0.03
Methadone or suboxone in past 3 months (%)**	152 (43.7)	91 (51.1)	61 (35.9)	0.006
Alcohol use in past 3 months (%)	121 (34.9)	65 (36.7)	56 (32.9)	0.53
Median number of days injected drugs in past 7 days (IQR)	7 (5.0 – 7.0)	7.0 (4.0 – 7.0)	7.0 (7.0 – 7.0)	0.10#
Shared syringes in past 3 months (%)	50 (14.4)	28 (15.7)	22 (12.9)	0.56
Shared other injection equipment in past 3 months (%)	160 (46.1)	79 (44.4)	81 (47.9)	0.58
Drug treatment in past 12 months (%)	180 (51.7)	104 (58.4)	76 (44.7)	0.01
Health insurance (%)	317 (91.1)	162 (91.0)	155 (91.2)	1.0
History of hepatitis C (%)	153 (45.8)	81 (46.0)	72 (45.6)	1.0
STI in past 12 months (%)	9 (2.6)	6 (3.4)	3 (1.8)	0.50&
Jail or prison in past 12 months (%)	131 (37.6)	62 (34.8)	69 (40.6)	0.32

*Drugs used by themselves in the past 3 months, including both injection and non-injection use

**Does not distinguish between those who were prescribed methadone or suboxone and those who used these drugs without a prescription.

[^]Chi-squared test used unless otherwise specified

#Wilcoxon rank sum test with continuity correction

&Fisher exact test

Table 2. Association Between Demographic Characteristic and Interest in HIV Pre-Exposure Prophylaxis Among People Who Inject Drugs and Access Harm Reduction Services at Public Health – Seattle and King County Syringe Service Programs

	Unadjusted Prevalence Ratio (95% CI)	p-value	Adjusted [^] Prevalence Ratio (95% CI)	p-value
High-risk for HIV (meth/heroin, exchange sex, and homeless)	1.56 (1.14, 2.13)	0.005	1.53 (1.09, 2.15)	0.01
Age	0.99 (0.98, 1.00)	0.20		
Gender				
Men	Ref	--		
Woman	0.96 (0.76, 1.20)	0.70		
Trans / genderqueer / nonbinary [‡]	--	--		
Race				
White	0.89 (0.69, 1.14)	0.36		
Black / African American	1.08 (0.69, 1.71)	0.73		
Latinx/Hispanic	0.84 (0.52, 1.35)	0.46		
Am. Indian / Alaska Native	1.30 (0.81, 2.09)	0.07		
Asian / Pacif. Isl. / Nat. Hawaiian	1.27 (0.89, 1.80)	0.18		
Other	0.27 (0.04, 1.66)	0.16		
Homeless*	1.55 (1.12, 2.13)	0.008	--	
Exchange Sex	1.33 (0.97, 1.83)	0.08		
MSM[‡]	0.66 (0.33, 1.29)	0.22		
Drug(s) used in past 3 months				
Heroin	1.12 (0.77, 1.63)	0.54		
Methamphetamine*	1.66 (1.16, 2.38)	0.006	--	
Goofball (meth & heroin)	1.25 (0.98, 1.59)	0.08		
Crack cocaine	0.92 (0.69, 1.24)	0.60		
Powder cocaine	0.95 (0.69, 1.31)	0.75		
Speedball (cocaine & heroin)	0.86 (0.59, 1.23)	0.40		
Fentanyl	1.41 (1.10, 1.80)	0.006	1.19 (0.93, 1.52)	0.18
Other opiate medication	1.33 (1.01, 1.75)	0.04	1.26 (0.96, 1.66)	0.10
Benzodiazepines / Downers	0.99 (0.76, 1.29)	0.94		
Number of days injected in last 7 days	1.04 (0.98, 1.10)	0.21		
Shared syringes in past 3 months	1.17 (0.88, 1.57)	0.28		
Shared other injection equipment in past 3 months	1.37 (1.09, 1.73)	0.007	1.25 (1.00, 1.58)	0.05
PrEP aware	0.58 (0.45, 0.74)	<0.001	0.58 (0.45, 0.74)	<0.001
STI in last 12 months	0.96 (0.46, 2.01)	0.92		
Drug treatment in past 12 months	0.85 (0.68, 1.07)	0.16		
Health insurance	0.83 (0.59, 1.17)	0.28		

[^]Adjusted for use of fentanyl and other opiates in the past three months, sharing injection equipment in the past three months and awareness of PrEP.

[‡]Number of transgender / genderqueer / nonbinary persons was too small to run regression model.

*Variable not included in the adjusted model, despite statistical significance in bivariate analysis, as person who are high-risk are by definition homeless and use methamphetamine.

[‡]In comparison to men who did not report sex with other men.

FIGURE LEGEND

Figure 1. Study Sample and Exclusion Criteria

In total 432 individuals completed the 2019 Washington State Syringe Exchange Health Survey. Twenty-four were HIV-positive by self-report and therefore excluded. An additional 35 individuals were excluded, as information on their HIV status was unavailable. Among the remaining 373 individuals who were HIV-negative by self-report, 25 were excluded due to a lack of self-reported injection drug use in the past 3 months. This yielded an analytic sample of 348 individuals.

Figure 1.

