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## Factors that Influence Perception of HIV Risk and Willingness to Use Pre-Exposure Prophylaxis in People Who Inject Drugs

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### Authors

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## ORIGINAL RESEARCH

# Factors that Influence Perception of HIV Risk and Willingness to Use Pre-Exposure Prophylaxis in People Who Inject Drugs

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**Introduction:** Sexual and injection behaviors increase the risk of HIV transmission in people who inject drugs (PWID). We aimed to determine the prevalence of sexual and drug behaviors that increase HIV risk in PWID hospitalized for infections related to injection drug use in Maine. We also examined factors that influenced their perception of HIV risk and willingness to take pre-exposure prophylaxis (PrEP).

**Methods:** We surveyed 101 PWID with infections related to injection drug use who were hospitalized at 4 hospitals in Maine. T-tests assessed differences in means of bacterial infection risk scores and willingness to take PrEP based on different sociodemographic factors.

**Results:** PWID engaging in unsafe sexual behavior had a higher mean score of bacterial infection risk than those engaging in safer sexual behavior (3.90 vs 3.07;  $P = .06$ ). PWID with lower educational attainment had a lower mean score of willingness to take PrEP than those with a higher educational attainment (3.19 vs 3.85;  $P = .02$ ). Willingness to take PrEP was positively associated with the level of educational attainment (odds ratio, 2.14; 95% CI, 1.01-4.93;  $P = .048$ ).

**Discussion:** Our findings associated willingness to take PrEP with educational attainment. To prevent HIV infection, harm reduction programs that discuss risk behaviors with PWID could be expanded, especially in rural areas where people have lower educational levels.

**Conclusions:** We found that injection and sexual risk behaviors co-occurred in PWID, PWID had an overall perception of low HIV risk, and willingness to take PrEP was positively associated with the level of educational attainment.

**Keywords:** HIV, substance use disorder, sexual behavior, pre-exposure prophylaxis, rural health services

People who inject drugs (PWID) are at risk for HIV infection and account for approximately 10% of new HIV diagnoses in the United States.<sup>1</sup> Risk factors for HIV transmission among PWID include sharing drug-injection equipment, such as needles, syringes, and cookers.<sup>1</sup> HIV transmission associated with unsafe injection practices can be minimized via access to syringe service programs (SSPs), in which PWID can exchange used needles and syringes for sterile ones. However, SSPs vary in distribution throughout the United States and are largely inaccessible to

PWID from more rural areas like Maine.<sup>2,3</sup> Several studies have noted that sexual risk behaviors (eg, having sex in exchange for money, inconsistent condom use, having multiple sexual partners) tend to co-occur with unsafe injection behaviors in PWID and may contribute to the spread of HIV.<sup>4</sup>

Prior studies also note that a constellation of psychosocial vulnerabilities (eg, stigma associated with drug use and HIV) may underlie why people either abstain from sex or pursue unsafe sex (with a relative unlikelihood to engage in safer sex).<sup>5</sup> To reduce HIV incidence in PWID who are at high risk of HIV infection, the Centers for Disease Control and Prevention recommend a daily dose of oral pre-exposure prophylaxis (PrEP).<sup>6</sup> However, people can face several challenges in accessing PrEP. Some

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reasons for low uptake and adherence include stigma associated with PrEP use, a perception of low HIV risk, and a daily dosing regimen of the drug.<sup>7</sup> Providers also may not view injection drug use as a significant risk factor for HIV and consequently abstain from discussing PrEP and prescribing the drug to PWID.<sup>8,9</sup>

These challenges underscore the importance of optimizing PrEP uptake in PWID from largely rural states such as Maine, where there were only 7 operational SSPs in 2019-2020 when this study was conducted. In this study, we aimed to better understand risk-taking behaviors and attitudes toward PrEP use among PWID. We set out to determine the prevalence of sexual and drug behaviors that increase HIV risk for PWID and examine factors that influence the perception of HIV risk and willingness to take PrEP among PWID in a rural state.

## METHODS

### Study design

This study is a cross-sectional analysis of PWID with infections associated with injection drug use who were hospitalized at 4 hospitals in Maine between January, 2019 and March, 2020.<sup>3</sup> Data were collected through the electronic health record and an audio computer-assisted survey as part of a larger initial 18-month cross-sectional study.<sup>3</sup> We focused our data analysis on survey questions specific to sexual behaviors, injection practices, HIV awareness, and attitudes toward drug programs. The MaineHealth Institutional Review Board approved this study.

### PRIMARY OUTCOME

The primary outcome was willingness to use PrEP, which was measured by answers to the question, “How willing would you be to take a pill a day (pre-exposure prophylaxis, ie, PrEP) if you thought it would decrease your chances of getting HIV?” Responses were on a 5-point Likert scale ranging from “very unwilling” to “very willing” (Table 1).

### VARIABLES

**Demographics.** “Rural” was defined as “isolated rural,” “small rural,” and “large rural.” An area’s rurality was determined based on the rural-urban commuting area (RUCA) code associated

with a participant’s ZIP code.<sup>10</sup> Insurance was collected through the electronic health record and categorized. A collapsed category of “Insured” participants was created. This category consisted of anyone who stated that they are insured under “Medicaid,” “Medicare,” “Dual Medicare/Medicaid,” or through “Commercial” insurance. “Uninsured” participants were those who reported they had “No insurance.”

**Secondary outcome.** The Bacterial Infections Risk Scale for Injectors (BIRSI)-7, a 7-item index, was used to measure unsafe injection behavior, such that a higher score indicated poorer hygiene and practice.<sup>11</sup> The BIRSI-7 score was based on a combination of different injection practices, such as the frequency of re-using cookers and filters, handwashing before injecting, and cleaning skin before injecting.

**Independent variables.** Unsafe sexual behavior was assessed based on yes/no responses to behavioral questions about using condoms during the last sexual encounter; not having sex in exchange for money, drugs, or a place to stay; and not having sex with other PWID. Respondents were classified as engaging in “unsafe sexual behavior” if they answered yes to engaging in at least one unsafe sexual behavior. Perception of HIV risk was categorized as “low” if a participant answered that they are “very unlikely” or “somewhat unlikely” to become infected with HIV from either injecting drugs or having sex in the next 6 months. Perception of HIV risk was categorized as “high” if participants answered that they are “very likely,” “somewhat likely,” or “neither likely nor unlikely” to become infected with HIV. Other variables in Table 1 were collected via self-report.

### STATISTICAL ANALYSIS

T-tests were conducted to compare differences between means of PrEP willingness and sociodemographic characteristics, such as sex, sexual orientation, experiencing homelessness, health insurance status, RUCA codes, educational attainment, and perception of HIV risk from injection behavior and sexual behavior. Separate t-tests were also performed to establish differences in means of BIRSI-7 scores between PWID with safer sexual behavior versus those with unsafe sexual behavior.

**Table 1.** Select Characteristics of Study Participants

<b>Sociodemographic</b>	<b>Data value*</b>
Sex, N (%)	
Male	44 (44)
Female	57 (56)
Age, y, median (IQR)	35 (31-40)
Race, N (%)	
White	95 (94)
Black	1 (1)
Hispanic	0 (0)
Unknown	2 (2)
Other	3 (3)
Sexual orientation, N (%)	
Heterosexual	83 (82)
Bisexual	16 (16)
Gay or lesbian	2 (2)
Experiencing homelessness, N (%)	46 (46)
RUCA codes, N (%)	
Urban	66 (65)
Rural	35 (35)
Educational attainment, N (%)	
High school, GED, or less	62 (61)
2- to 4-year college degree or some college (no degree)	39 (39)
Health insurance status <sup>†</sup> , N (%)	
Uninsured	25 (25)
Insured	74 (75)
Injection risk behavior	
BIRSI-7 score, average (SD)	3.77 (1.61)
Sexual risk behavior	
Number of sexual contacts 30 days before hospitalization, median	1
No condom during last sexual encounter, N (%)	78 (78)
Sex in exchange for money/drugs/place to stay, N (%)	12 (12)
Sex with people who inject drugs, N (%)	45 (46)
HIV testing	
Ever tested for HIV, N (%)	95 (95)
How many times tested, average	4
Willingness to take PrEP, N (%)	
Very willing	31 (31)
Somewhat willing	23 (23)
Neutral	23 (23)
Somewhat unwilling	8 (8)
Very unwilling	16 (16)
Discussed PrEP with health care provider	8 (8%)

**Table 2.** PrEP Willingness by Patient Characteristics

<b>Patient characteristics</b>	<b>Willingness to take PrEP*</b>	<b>P value</b>
<b>Sex</b>		
Female (N= 57)	3.54	.43
Male (N= 44)	3.32	
<b>Sexual Orientation</b>		
Heterosexual (N= 83)	3.40	.47
Bisexual, gay, or lesbian (N= 18)	3.67	
<b>Experiencing homelessness</b>		
Yes (N= 46)	3.48	.83
No (N= 55)	3.42	
<b>Health insurance status</b>		
Insured (N= 74)	3.43	.83
Uninsured (N= 25)	3.36	
<b>RUCA codes</b>		
Rural (N= 35)	3.03	.03
Urban (N= 66)	3.67	
<b>Education</b>		
High school, GED, or less (N= 62)	3.19	.02
Some college or 2- to 4-year degree (N= 39)	3.85	
<b>Perception of HIV risk from injection behavior</b>		
Low (N= 84)	3.41	.23
High (N= 8)	4.00	
<b>Perception of HIV risk from sexual behavior</b>		
Low (N= 88)	3.45	.68
High (N= 4)	3.75	

Abbreviations: GED, General Educational Development; PrEP, pre-exposure prophylaxis; RUCA, rural-urban commuting area.

\*Willingness to take PrEP was based on responses to a 5-point Likert scale ranging from “very unwilling” to “very willing.” A higher number corresponds to a higher willingness to take PrEP once daily to decrease the chances of HIV infection.

To test whether certain sociodemographic factors contributed more than others to observed differences, an ordered logit was performed. The primary outcome was willingness to use PrEP, controlling for rurality and educational attainment. These 2 sociodemographic factors were chosen for the ordered logit based on previous studies examining sexual risk among PWID.<sup>4,8</sup> For other covariates that were considered in the original model, refer to Table 1. All analyses were performed using Stata Version 16.0.<sup>12</sup>

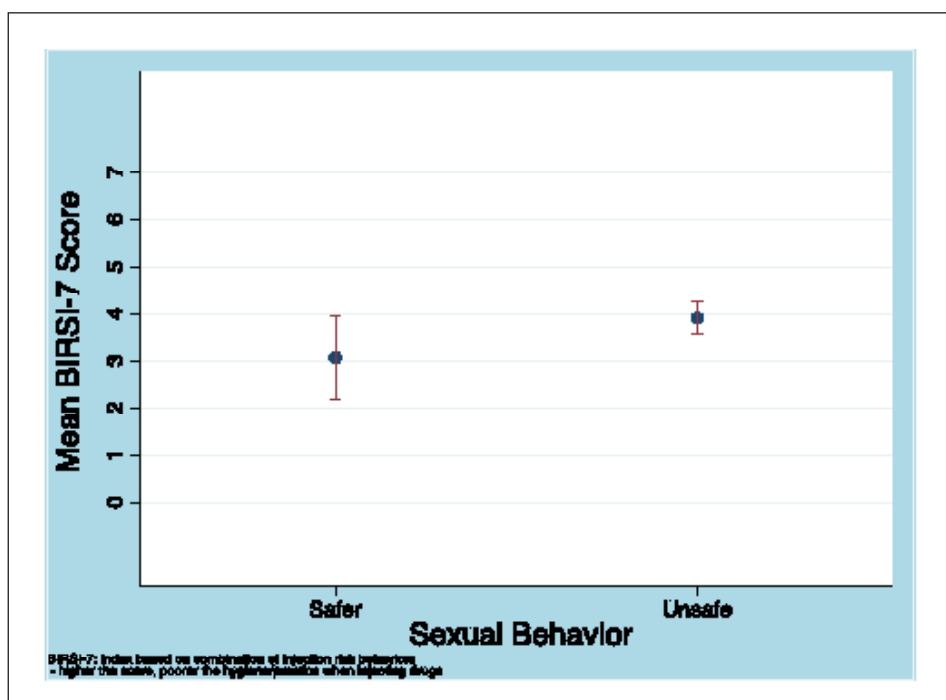
## RESULTS

This study included 101 participants. Among the participants, 31% stated that they were “very willing” and 23% stated that they were “somewhat willing” to take PrEP. Also, 8% of participants stated that they were “somewhat unwilling” and 16% of participants stated that they were “very unwilling” to take PrEP (Table 1). PWID with lower educational attainment status (high school, GED [General Educational Development], or less) had a lower mean score of willingness to take PrEP than those with higher educational attainment (3.19 vs 3.85;  $P = .02$ ). PWID from rural areas had a lower mean score of PrEP willingness than those from urban areas (3.03 vs 3.67;  $P = .03$ ). Among the participants, 84/92 (91%) had a perception of low HIV risk from injecting drugs, and 88/92 (96%) had a perception of low

HIV risk from sexual behavior (Table 2). Individuals engaging in unsafe sexual behavior ( $N = 83$ ) had a marginally higher mean BIRSI-7 score than those engaging in safer sexual behavior ( $N = 15$ ) (3.07 vs 3.90;  $P = .06$ ) (Figure 1). In our regression model, willingness to take PrEP was positively associated with the level of educational attainment (adjusted odds ratio, 2.14; 95% CI, 1.01-4.93,  $P = .048$ ).

## DISCUSSION

Findings from this study with hospitalized PWID suggest that PWID with a lower level of educational attainment are less willing to take PrEP to decrease their chances of HIV infection. Hospitalized PWID from rural areas are similarly less willing to take PrEP. Our regression model indicated that willingness to take PrEP was positively associated with level of educational attainment. The perception of HIV risk from injection drug use and sexual behavior was low among hospitalized PWID, although most PWID reported engaging in unsafe sexual behavior and unsafe injection drug use. PWID engaging in safer sexual behavior had a lower BIRSI than those engaging in unsafe sexual behavior, although this finding was not significant.



**Figure 1.** Co-occurrence of Injection and Sexual-Related Risk Behavior in PWID ( $N=101$ ). Abbreviations: BIRSI-7, Bacterial Infections Risk Scale for Injectors

## IMPLICATIONS

The positive association between educational attainment and willingness to take PrEP highlights the importance of targeting future HIV prevention efforts toward PWID in rural areas, where individuals have disproportionately lower educational levels. The perception of low HIV risk among PWID who participate in unsafe sexual and injection-related behaviors and across different sociodemographic characteristics supports the importance of expanding SSPs throughout Maine. These programs discuss risk behavior with PWID and could help this population understand why they are at high risk for HIV.<sup>3</sup> Given the co-occurrence of injection and sexual-related risk behaviors in PWID, our findings support that comprehensive efforts to prevent HIV in PWID should include evaluating sexual risk for HIV transmission.

### Limitations

Our study had several limitations. Our sample size was small (N= 101) and underpowered to address our study question. Not all participants answered every survey question, decreasing the sample size for our analyses. Notably, only 92 participants responded to the questions regarding HIV risk perception from drug use/sexual behavior. Also, only 98 participants responded to questions regarding condom use during their last sexual encounter; having sex in exchange for money, drugs, or a place to stay; and having sex with people who inject drugs. We attribute the lack of statistical significance in mean BIRSI-7 scores between PWID engaging in safer sexual behavior versus those engaging in unsafe sexual behavior to the small sample size.

Although the PWID in this our may be good representatives of groups at risk for HIV in Maine, findings from our population may not be generalizable to other geographic regions within the United States. Similarly, because our participants were all hospitalized with an injection-related infection, our sample may not represent PWID who are at lower risk of developing infectious complications from drug use. Most participants in this study self-identified as white and heterosexual, further limiting generalizability to more diverse populations. Further research would benefit from sampling a larger, more diverse population of PWID to assess the prevalence of HIV-related risk behaviors and interest in PrEP.

## CONCLUSIONS

Our findings suggest overlap in the co-occurrence of injection-related and sexual-related risk behavior in PWID. We also noted an overall perception of low HIV risk in PWID, despite participation in unsafe behavior, and we provided information about factors that may influence willingness to use PrEP.

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**Conflict of interest:** none

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