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Syringe services program (SSP) initiation among individuals who inject drugs in Appalachian Kentucky

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Abstract

Syringe services program (SSP) initiation among individuals who inject drugs in Appalachian Kentucky

By Paige E. Gugerty

There has been a rapid expansion of SSPs into rural areas due to an uptick in drug-related epidemics, such as overdose, human immunodeficiency virus (HIV), and Hepatitis C virus (HCV). People who inject drugs (PWID) in rural areas experience similar barriers to SSP uptake as urban counterparts, including stigma, policing, and fear of losing child custody (Ibragimov et al., 2021). Rapid uptake is key to mitigating drug-related harms, as SSPs often provide services including sterile supplies, viral testing, and linkage to care. The purpose of this study is to identify characteristics of PWID who initiated SSP uptake and to understand correlates to uptake in Appalachian Kentucky. The sample was created from the Gateway2Health cohort, which is part of the CARE2HOPE study. To enroll, participants must be at least 18 years old, live in one of five counties most impacted by the opioid epidemic, and have either used an opioid to get high or injected any drug in the past 30 days. We restricted the sample to PWID who had recently injected drugs to get high, who had never gone to an SSP, and who completed the third survey. Key measures included SSP uptake and gender/sex, as well as covariates related to demographics and injection drug use. Descriptive statistics and bivariate logistic regressions were used to evaluate the associations between SSP uptake and the covariates, adjusting for clustering in response-drive sampling (RDS). We found that 41.4% sample reported initiating SSP uptake in the 6 months preceding Wave 3. Additionally, there was a statistically significant association between SSP uptake and gender/sex, as PWID who identified as male were 2.7 times more likely to report SSP uptake than individuals who identify as female [90% CI: (1.0, 7.1)]. Our findings highlight the need to continue boosting SSP initiation among rural PWID, especially among females. Small sample size was major limitation to this study after restricting to PWID who did not attend SSP at Wave 1, so to continue gaining insight into SSP uptake, we need studies with larger samples of PWID who did not go to SSPs at baseline.

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Introduction

Over the past decade, syringe service program (SSPs) in the US have been rapidly expanding from cities to rural areas, in response to the uptick in drug-related epidemics like overdoses, HIV, and HCV among people who inject drugs (PWID) in rural areas. In 2015, it was estimated that HIV prevalence rates in rural areas were approaching rates of urban areas, and since then there has been a sharp uptick of HIV incidence rates in rural communities, particularly in the South (HIV Prevention and Treatment Challenges in Rural America, 2020; Iyer, n.d.). HCV infections, which can be viewed an indicator to an impending surge in HIV rates and are vital public health problems in and of themselves, increased by 364% among persons aged 30 and older in central Appalachia from 2006 – 2012 (Zibbell et al., 2015; Cloud et al., 2019; Lancaster et al., 2020). SSPs are crucial to HIV and HCV prevention because they not only distribute sterile syringes, needles, and supplies to PWID, but also safely remove used syringes or needles from communities (Des Jarlais et al., 2015). SSPs are also essential to overdose prevention support by distributing naloxone and fentanyl test strips, as well as coordinating linkage to care for substance use disorders upon request (Uyei et al., 2017).

In response to these epidemics, SSPs have rapidly expanded into rural areas since 2015. In 2013, it was documented that there were only 30 SSPs operating in rural areas in the US, which were often strapped with a fraction of the budgets of urban and suburban programs due to the lower total number of syringes exchanged (Des Jarlais et al., 2015). Kentucky is a good example of the rapid expansion of SSPs into rural areas since 2015: by 2020 it was reported that over 70 programs were operating across this predominately rural state, with just under half (n =

32) operating in rural counties (Kentucky Cabinet for Health and Family Services HIV/AIDS Branch, 2017).

Expansion of these programs is not enough, however: curbing epidemics of drug-related harms is also contingent on rapid uptake. SSPs provide PWID and community members with sterile needles or syringes, and other sterile supplies to aid with safe injection practices. Additionally, SSPs often provide HIV/HCV testing, counseling, and linkage to care, naloxone and fentanyl test strips, linkage to substance use disorder treatment, wound treatment and care, and condoms and other supplies to promote safer sex.

Unfortunately, multiple barriers exist to uptake even when SSPs are available. In urban areas, research has found that drug use stigma, discrimination by healthcare workers against individuals who use drugs, and anticipatory stigma are barriers to uptake (Muncan et al., 2020). This research has recently expanded to encompass SSP uptake in rural regions, and has found that barriers to rapid uptake of SSPs include different forms of stigma, fear of policing and arrest, and concern of losing custody to children if reported to child protection services (Ibragimov et al., 2021). In Appalachian Kentucky, PWID also reported barriers such as transportation, limited hours of operation, and lack of confidentiality (Surratt et al., 2020). Facilitators to rapid SSP uptake in rural areas include strong social networks to encourage PWID to access SSPs and ease of accessing sterile syringes, needles, and other equipment at SSPs (Ibragimov et al., 2021).

The purpose of the present analysis is to identify the characteristics of PWID who initiated use of SSPs, as well as to understand the correlates to SSP uptake in Appalachian Kentucky. The analysis leverages existing research on PWID and SSPs in rural areas in terms of

demographic characteristics and different forms of stigma and builds upon it by looking specifically at SSP uptake over a 12-month period and correlates to uptake in several counties at the heart of the US rural opioid epidemic. In the US, Kentucky is the rural epicenter of drug-related epidemics, as a 2016 recent analysis ranked eight counties in Appalachian Kentucky among the top 5th percentile of the most vulnerable US counties due to the rapid transmission of HIV and HCV among PWID because of the impact of the opioid epidemic in the region (Van Handel et al., 2016). In response to the 2015 HIV outbreak among people who inject prescription drugs in southern Indiana, the Kentucky General Assembly first authorized health departments to operate SSPs in the same year (Surratt et al., 2020). Subsequently, as of 2022, 81 SSPs are currently operating across Kentucky (Kentucky Cabinet for Health and Family Services HIV/AIDS Branch, 2017). At issue in the present analysis is uptake of these vital programs by local PWID.

Methods

The present analysis explores SSP uptake and its correlates among PWID in the Gateway2Health cohort. The Gateway2Health cohort was established in 2018-2019, and is part of the CARE2HOPE study. The CARE2HOPE study is part of the broader Rural Opioid Initiative (ROI) Research Consortium, which includes studies in rural areas of New England, West Virginia, North Carolina, Kentucky, Ohio, Illinois, Wisconsin, and Oregon that have been epicenters for the rural opioid and methamphetamine epidemics, resulting in communities that are vulnerable to substance use disorder, HIV and HCV outbreaks, and other drug-related harms (CIRG, 2022). To be eligible for enrollment in the Gateway2Health cohort, individuals must have been at least 18 years old, have lived in one of the five rural Appalachian Kentucky counties impacted by the

opioid epidemic at the time of the study, and have used an opioid to get high or injected any drug to get high within the past 30 days. Once enrolled, study participants could recruit additional individuals using respondent-driven sampling (RDS). After providing consent, individuals participated in surveys with trained interviewers every six months. Interview topics include demographic characteristics, drug use behaviors, sexual and drug-related risk behaviors, and healthcare service engagement. Participants were compensated $20 for each survey for their time and participation.

Sample

The analytical sample was restricted to participants who injected drugs to get high within the past six months at their first and third survey interviews (Wave 1 and Wave 3), who had never gone to SSP at Wave 1, and who also took part in a third follow-up survey (Wave 3).

Measures

SSP uptake is the primary outcome variable, and was created by merging the Wave 1 and Wave 3 datasets, then creating a binary variable that equaled 1 if a participant in the analytic sample (i.e., who had never gone to an exchange) had visited an SSP within the past six months preceding the Wave 3 survey, and 0 otherwise.

All other covariates were created from the Wave 1 survey, including: age, gender/sex, houselessness in past 6 months, distance to nearest SSP, injection frequency, and drug of choice. More information on sample demographics and each covariate is presented in Table 1.

Analysis

In preparation for the analysis, we controlled for suspected confounding variables by using a combination of what has been done in the literature, directed acyclic graphs (DAGs),

and assessing bivariate correlations. We also controlled for clustering within RDS chains by adjusting for participant cluster IDs and RDS seed information in the analysis, to detect if responses are dependent across individuals within the same recruitment chain. We assessed for collinearity in this stage, and did not find any evidence of collinearity between variables.

The analysis included descriptive statistics to characterize the sample. We examined correlations using bivariate logistic regression models, with a statistical significance level set at $p < 0.10$, given the sample size. The only covariate that was found to be statistically significant from the bivariate logistic regression models was sex/gender, so we consider the logistic regression model between this covariate and SSP uptake to be our final model, adjusting for RDS chain. All analysis was conducted in SAS 9.4.

Results

The sample included 58 PWID total, and approximately 62.1% of individuals identified as male. The mean age was 36.1 [standard deviation (SD) = 8.8] years, and the participants' ages spanned from 21-58. A Wave 1, 39.7% of the population reported being houseless at any time in the prior six months. A majority of the sample (67.2%) reported being able to access the nearest SSP by car in less than 30 minutes. Over a quarter all participants (27.3%) reported injecting drugs to get high 2-3 times per day. Heroin was reported as a common drug of choice to get high by 43.1% of participants.

We found that only 41.4% of the total sample reported visiting an SSP for the first time in the six months preceding the Wave 3 survey. A full summary of sample characteristics can be found in Table 1 below. Following Table 1 are a series of figures illustrating the relationships between SSP uptake and each covariate (Figures 1-6).

Table 1 – Sample characteristics of PWID by SSP uptake

	SSP uptake (n = 24)	No SSP uptake (n = 34)	Total (n = 58)
Age (years)			
20-29	25.0%	26.5%	25.9%
30-39	41.7%	35.3%	38.0%
40-49	25.0%	29.4%	27.6%
50+	8.3%	8.8%	8.6%
Gender/sex, male (%)	75.0%	52.9%	62.1%
Recent houselessness	41.7%	38.2%	39.7%
Distance to nearest SSP			
Walking Distance	29.2%	17.7%	22.4%
Less than 30 min. drive	62.5%	70.6%	67.2%
More than 30 mins. or unsure	8.3%	11.8%	10.3%
Injection frequency			
More than 3 times/day	13.0%	15.6%	14.6%
2-3 times/day	13.0%	37.5%	27.3%
Daily	34.8%	9.4%	20.0%
Weekly	13.0%	15.6%	14.6%
Less than weekly	26.1%	21.9%	23.6%
Drug of choice			
Heroin	45.8%	42.2%	43.1%
Opiate painkillers	12.5%	26.5%	20.7%
Buprenorphine or methadone	4.2%	5.9%	5.2%
Stimulants	33.3%	23.5%	27.6%
Marijuana	4.2%	2.9%	3.5%

Figure 1 – a. Age category frequency among PWID who initiated SSP uptake (left); **b.** Age category frequency among PWID who did not initiate SSP uptake (right)

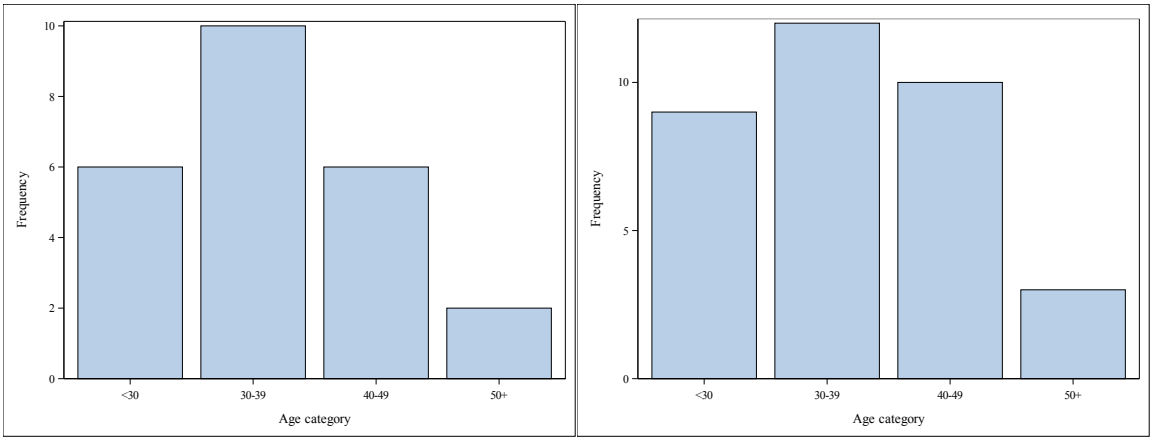


Figure 2 – a. Gender/sex breakdown among PWID who initiated SSP uptake (left) **b.** Gender/sex breakdown among PWID who did not initiate SSP uptake (right)

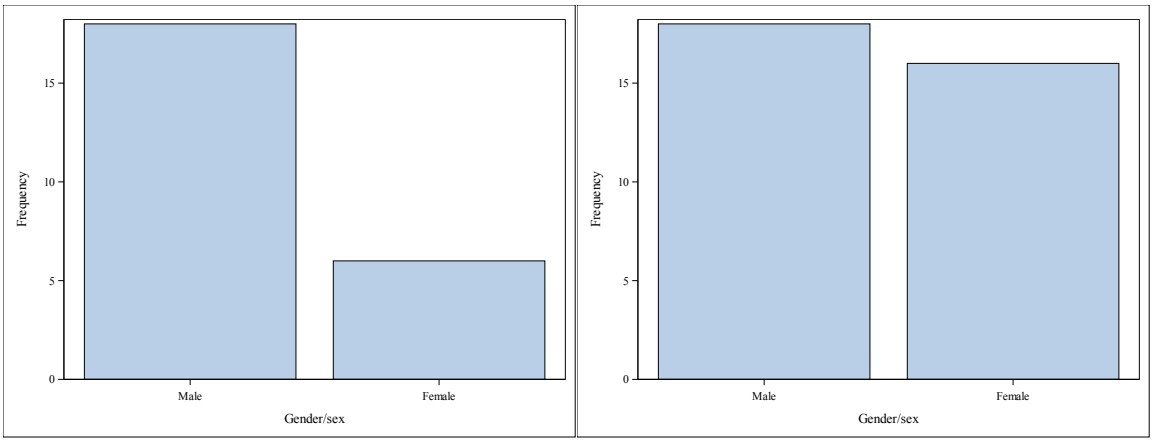


Figure 3 – a. Houselessness frequency among PWID who initiated SSP uptake (left) **b.** Houselessness frequency among PWID who did not initiate SSP uptake (right)

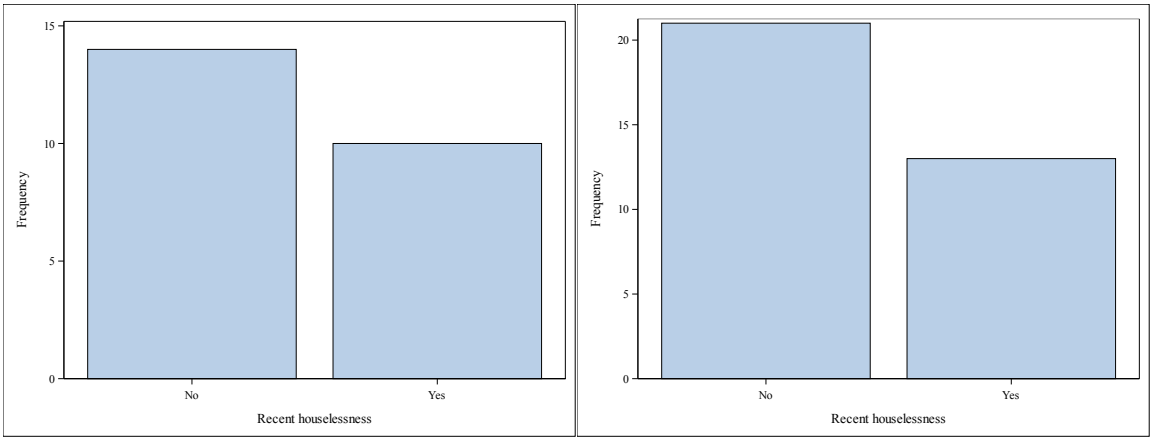


Figure 4 – a. Distance to nearest SSP breakdown among PWID who initiated SSP uptake (left) **b.** Distance to nearest SSP breakdown among PWID who did not initiate SSP uptake (right)

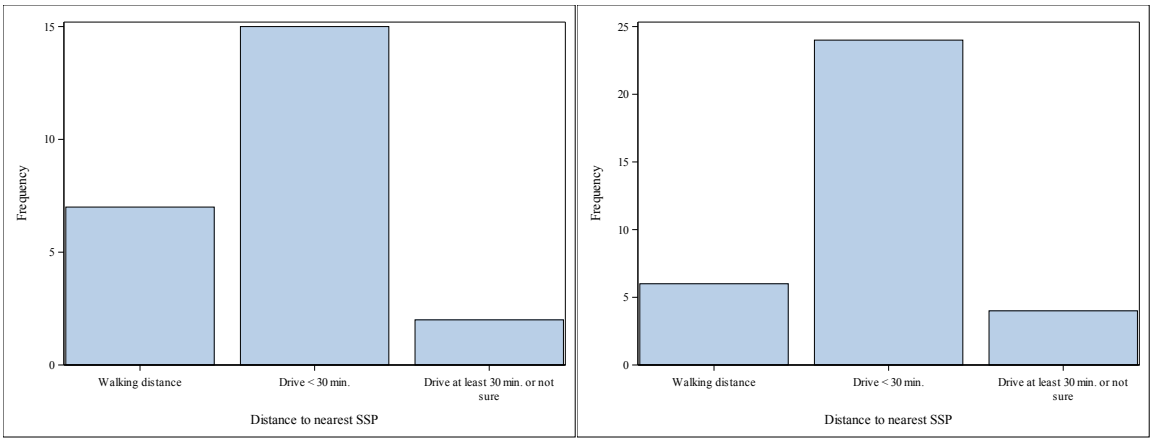


Figure 5 – a. Injection frequency distribution among PWID who initiated SSP uptake (left) **b.** Injection frequency distribution among PWID who did not initiate SSP uptake (right)

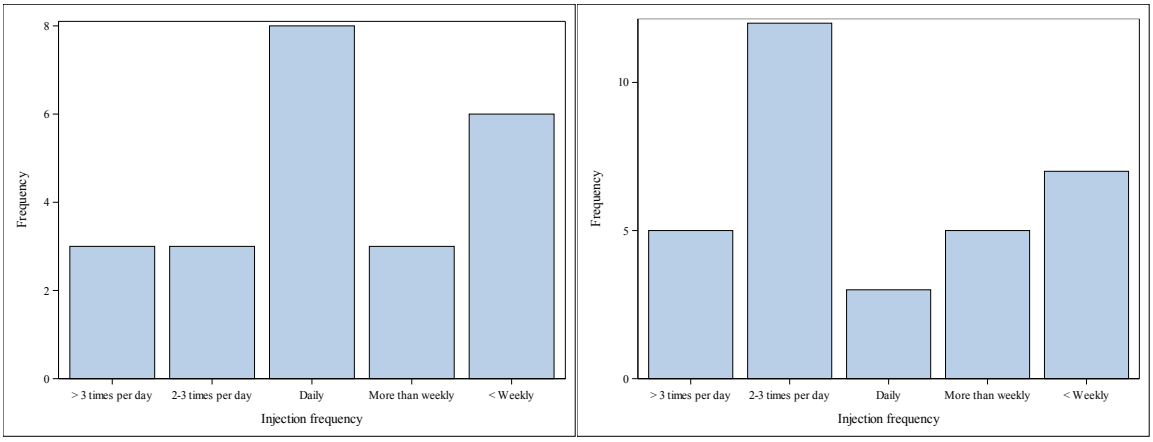
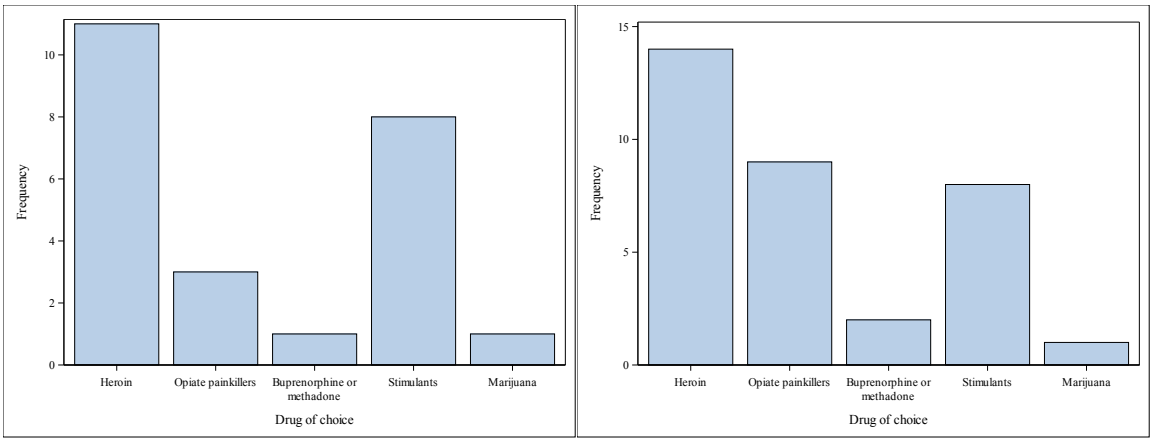


Figure 6 – a. Drug of choice frequency among PWID who initiated SSP uptake (left) **b.** Drug of choice frequency among PWID who did not initiate SSP uptake (right)



At the beginning of the analysis, we ran bivariate logistic regression models to analyze the relationships between SSP uptake and each covariate. We found that the relationship between SSP uptake and gender/sex was statistically significant in the sample, as individuals who identified as male were approximately 2.7 times more likely to initiate SSP uptake for the first time in the six months preceding the Wave 3 survey than individuals who identified as female [90% CI: (1.0, 7.1)].

Through the bivariate logistic regression models, we gained insights into the relationship between SSP uptake and the rest of the covariates, despite none of them turning out to be statistically significant when alpha is set to 0.10. The bivariate model between SSP uptake and age category showed that individuals between the ages of 30-39 were 1.3 times more likely to initiate SSP uptake in the months preceding the Wave 3 survey than individuals between the ages of 20-29 [90% CI: (0.4, 4.1)]. Individuals who reported being houseless in the six months leading up to the Wave 1 survey were 1.2 times more likely to initiate SSP uptake than individuals who did not report being houseless [90% CI: (0.4, 3.2)]. Increased travel time to nearest SSP seemed to have a negative impact on SSP uptake – in the sample, we found that participants who lived more than 30 minutes away from the nearest SSP via car were 57% less likely to initiate SSP uptake [90% CI: (0.1, 2.8)]. Individuals who injected drugs to get high daily were 4.7 times more likely to initiate SSP uptake than individuals who injected drugs more than three times a day [90% CI: (0.9, 23.6)]. Participants who used stimulants like cocaine, crack, methamphetamine, crystal meth, or amphetamine were 1.3 times more likely to initiate SSP uptake than individuals who reported using heroin frequently to get high [90% CI: (0.4, 3.7)]. More information on bivariate logistic regression analysis between SSP uptake and each covariate can be found in Table 2.

Table 2 – Results of bivariate logistic regression analysis between SSP uptake and covariates

	OR	90% CI
Age (years)		
20-29	-	-
30-39	1.3	(0.4, 4.1)
40-49	0.9	(0.2, 3.6)
50+	1.0	(0.2, 6.0)
Gender/sex (male)	2.7	(1.0, 7.1)
Recent houselessness	1.2	(0.4, 3.2)
Distance to nearest SSP		
Walking Distance	-	-
Less than 30 min. drive	0.5	(0.2, 1.7)
More than 30 mins. or unsure	0.4	(0.1, 2.8)
Injection frequency		
More than 3 times/day	-	-
2-3 times/day	0.4	(0.1, 2.1)
Daily	4.7	(0.9, 23.6)
Weekly	1.1	(0.2, 5.4)
Less than weekly	1.5	(0.3, 7.3)
Drug of choice		
Heroin	-	-
Opiate painkillers	0.4	(0.1, 1.6)
Buprenorphine or methadone	0.6	(0.1, 5.8)
Stimulants	1.3	(0.4, 3.7)
Marijuana	1.3	(0.1, 16.7)

Discussion

Key Results

In the sample, we found that 41.4% of total participants reported visiting an SSP for the first time in the six months preceding the Wave 3 survey, which suggests that there is opportunity for improvement in terms of SSP uptake in rural areas like Appalachian Kentucky. Through the analysis, we found a statistically significant association between SSP uptake and gender/sex, as individuals who identified as male were 2.7 times more likely to initiate SSP uptake than individuals who identified as female [90% CI: (1.0, 7.1)].

Limitations

There are several limitations in this study that could impact the interpretation of our results. After restricting by recent injection drug use and individuals who had not gone to an SSP before the Wave 1 survey, the sample size was very small (n = 58), which presents issues with generalizability, precision, and statistical power. Additionally, the sample was limited in terms of heterogeneity and participants are primarily White. For example, whereas other ROI study sites may have more diverse study populations in terms of race and ethnicity, our sample was 96.6% non-Hispanic White. Due to this and generalizability issues, we have concerns about the external validity of our findings in similar U.S. rural populations of PWID. In the analysis, we were plagued by small sample size and cell sizes, leading to decreased statistical power and lack of precision.

Interpretation

With less than half of participants reporting SSP uptake (41.4%), we would implore further analysis and perhaps individual- and community-level interventions to boost SSP uptake among PWID in rural areas. Furthermore, the finding that individuals who identify as male are 2.7 times more likely to have initiated SSP uptake ties into previous studies on gender/sex and SSP utilization, as well as qualitative analysis on the impact of different forms of stigma on SSP uptake. In a similar sample in Appalachian Kentucky, it was previously found that there was not statistically significant association between gender/sex and SSP uptake after adjusting for age, education, injected in the last 30 days, and current drug of choice [PR: 1.04; 95% CI: (0.72, 1.51)] (Lancaster et al., 2020). We suspect that there might be differences between our finding and the previous finding due to discrepancies in sample size, which made us unable to adjust

for potential confounders like age, education, injection drug use in the past 30 days, and drug of choice. Additionally, the previous study was cross-sectional and analyzed PWID who had not used SSPs in terms of barriers to SSP uptake, rather than examining SSP uptake among PWID who had never attended SSP in a longitudinal approach (Lancaster et al., 2020). Because of the increased trajectory of epidemics related to drug-related harms and the qualitative findings on the relationship between SSP uptake and various forms of stigma, we recommend continuing to explore SSP uptake among PWID in rural areas to continue to better the health outcomes of individuals who inject drugs and reduce the burden of drug-related epidemics like overdose, HIV, and HCV. To address stigma specifically, we might try to implement improvements to help PWID who identify as female feel more comfortable attending SSPs for the first time through targeted marketing, expanding ease of access in terms of location and hours, and ensuring that SSP staff are representative of the variety of clientele and approachable and inclusive on-site. For future studies, the ideal would be to study larger cohorts of PWID who have not been to SSP, in order to try to increase SSP uptake in rural areas.

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