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Initiating persons into injection drug use in rural West Virginia, USA.

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Abstract

Background: While prior research has explored factors associated with people who inject drugs (PWID) initiating others into drug injection in urban settings, very little work has been done to understand this behavior among rural PWID in Appalachia.

Objectives: We aim to identify factors associated with PWID initiating injection-naïve individuals into drug injection in a rural community in West Virginia (WV).

Methods: Data were derived from a cross-sectional survey of 420 rural PWID (163 women) in Cabell County, WV in June-July 2018 who indicated recent (past 6 months) injection drug use. Individuals completed a survey that included measures on socio-demographics and injection socialization behaviors. We used logistic regression to identify factors associated with PWID recently initiating someone for their first injection.

Results: A minority (17%) reported recently initiating someone for their first injection. In multivariable regression, recent injection initiation was independently associated with number of injections per day (adjusted odds ratio [aOR] 1.16; 95% confidence interval [CI]:1.07,1.25), recent injection in front of an injection-naïve person (aOR 2.75; 95% CI: 1.25,6.04), recent describing

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how to inject drugs to an injection-naïve person (aOR 5.83; 95% CI: 2.71,12.57), and recent encouragement of an injection-naïve person to inject (aOR 7.13; 95% CI: 2.31,21.87).

Conclusion: Injection initiation was independently associated with several injection socialization behaviors involving injection-naïve individuals. PWID who recently initiated injection-naïve individuals had higher odds of frequent injection. Educating rural PWID about how their behaviors can influence others and the importance of engaging in safe injection practices could carry significant public health utility.

Keywords

injection drug use; rural health; injection initiation; people who use drugs; harm reduction

Introduction

The modern opioid crisis in the United States has gained national attention in part due to increased risks for injection drug use-associated HIV outbreaks and opioid-associated overdoses in the rural Midwest and Appalachian regions of the United States. In 2015, a rural county in Indiana that typically saw 5 incident cases of HIV per year experienced an opioid-injection associated HIV outbreak with 181 new cases diagnosed in one year (Peters et al., 2016). Predominately rural states, such as Kentucky, Tennessee, and Georgia, experienced a 200% increase in HCV cases among young people from 2006 to 2012 (Suryaprasad et al., 2014). These increases in HIV and HCV were largely attributed to increases in drug injection. Surveillance data from drug treatment admissions in West Virginia, Tennessee, and Kentucky also demonstrate the worsening opioid crisis with a 12.6% increase in opioid-related injection drug treatment admissions from 2006 to 2012 (Zibbell et al., 2015). Despite evidence that rural communities are disproportionately affected by the modern opioid crisis, little research has been conducted to understand drug injection initiation among rural populations of people who inject drugs (PWID).

There are a variety of reasons why individuals transition to injection drug use, including: economic benefits; social network influences; curiosity; and searching for stronger drug effects (Bryant & Treloar, 2008; Crofts, Louie, Rosenthal, & Jolley, 1996; Draus & Carlson, 2006; Fitzgerald, Louie, Rosenthal, & Crofts, 1999; Frajzyngier, Neaigus, Gyarmathy, Miller, & Friedman, 2007; Harocopos, Goldsamt, Kobrak, Jost, & Clatts, 2009; Khobzi et al., 2009; Mars, Bourgois, Karandinos, Montero, & Ciccarone, 2014; Sherman, Smith, Laney, & Strathdee, 2002). Research has also found that transitioning to drug injection is associated with individuals having limited formal education; exposure to childhood and recent violence; polysubstance use; homelessness; sex work; and poverty (Ben Hamida et al., 2018; Bluthenthal et al., 2014; Carlson, Nahhas, Martins, & Daniulaityte, 2016; Crofts et al., 1996; Fuller et al., 2002; Roy, Boivin, & Leclerc, 2011; Roy, Haley, Leclerc, Cedras, & Boivin, 2002; Young & Havens, 2012). Most people who transition to drug injection are injected for the first time by established PWID who are in their social networks, such as friends, acquaintances, and intimate partners (Crofts et al., 1996; Draus & Carlson, 2006; Frajzyngier et al., 2007; Rotondi et al., 2014; Roy et al., 2002; Sherman et al., 2002). Further, injection-naïve people often seek out PWID to facilitate their first injection (Barnes, Des Jarlais, Wolff, Feelemyer, & Tross, 2018; Crofts et al., 1996; Harocopos et al., 2009;

Kolla et al., 2015; Mars et al., 2014; Simmons, Rajan, & McMahon, 2012; Tuchman, 2015; Wenger, Lopez, Kral, & Bluthenthal, 2016). Most PWID who report having initiated others note their reluctance to assist but ultimately report doing so as a strategy to prevent immediate harm to the initiate as they knew how to more safely inject or because they received drugs or money in exchange for their assistance (Barnes et al., 2018; Kolla et al., 2015; Simpson, Kral, Wenger, & Bluthenthal, 2018; Wenger et al., 2016). Injection initiation is also associated with high-risk behaviors among both initiates and initiators, such as syringe sharing and polysubstance use (Young & Havens, 2012). While these studies are informative, there is an ongoing need to better understand the context of rural injection drug use and how to break the cycle of injection initiation in Appalachia.

Existing literature surrounding injection initiation primarily reflects urban PWID populations (Paquette & Pollini, 2018). The small amount of literature that exists on injection initiation in rural contexts explores this behavior from the perspective of the initiate (Syvertsen, Paquette, & Pollini, 2017; Young & Havens, 2012; Young, Larian, & Havens, 2014). Despite the worsening opioid crisis in the rural US, there is a dearth of research that explores factors associated with PWID injecting drug injection-naïve individuals for the first time. This represents a significant gap in both the HIV and overdose prevention literature that warrants exploration. In this analysis, we report on the characteristics and behaviors of rural PWID in West Virginia that recently initiated someone into drug injection. We also examine factors associated with PWID having injected someone for their first injection in the last 6 months.

Methods

Study design & data collection

Data were collected as part of a study designed to estimate the size of the PWID population in Cabell County, West Virginia, USA (Allen et al., 2019a, 2019b, 2019c). In brief, we used the capture-recapture method for population estimation and surveyed individuals over 2 two-week periods in June and July 2018 in Cabell County, WV. For the purposes of this analysis, we classified Cabell County as rural given that its population density (342.8 persons per square mile) is in stark contrast to those of cities where existing injection initiation studies were conducted; for example, the population densities of Baltimore, MD, San Francisco, CA, and Los Angeles, CA are 7,671.5, 17,179.1, and 8,092.3 persons per square mile, respectively (US Census Bureau, 2017). Further, the US Census Bureau characterizes more than 85% of the land space in Cabell County as rural (US Census Bureau, 2012). Participants were recruited over two phases (the capture and recapture phases). The capture phase was conducted at the Cabell-Huntington Health Department in their harm reduction program while the recapture phase took place in community locations throughout Cabell County where PWID were known to congregate (e.g., public parks, neighborhoods known for drug use). The survey included measures related to socio-demographics, substance use, and injection socialization and initiation behaviors. Given drug injection-associated stigma, inclusion criteria were broad: (1) 18 years old or older; (2) ever used drugs via any administration method. Further, all data were collected via audio computer-assisted self-interview (ACASI) on tablets with headphones. For the present analysis, we restricted the

analytic sample to those individuals who reported having recently (last 6 months) injected drugs (N=420). Participants were compensated for completing the survey with a snack bag or \$10 grocery gift card. The study was reviewed and approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Main outcome

The primary outcome for this analysis was recently injecting a drug injection-naïve individual for their first injection, which was asked (yes/no) as follows, “In the past 6 months, have you injected someone for their first hit? By this I mean giving someone their first hit or injection.”

Independent variables

Socio-demographics and structural vulnerabilities—Age was analyzed as a continuous variable. Gender (male vs. female) and race/ethnicity (White, non-Hispanic vs. all others) were dichotomized. Housing insecurity was ascertained via asking participants if they considered themselves currently homeless. Sexual minority status included individuals that identified as lesbian, gay, bisexual, or other sexual identity. Education was dichotomized to non-high school graduate and high school graduate or higher. Food insecurity was defined as going to bed hungry at least once per week.

Substance use—Years since each participant first started injecting any drug was created by subtracting participants’ current age from the reported age when they first injected and was analyzed as a continuous variable. Number of injections per day (“how many times do you inject drugs on a typical day?”) was a continuous measure, and values at 50 injections per day or greater were recoded as missing (n=2). We also collected data on the most common location for injecting drugs in the past 6 months with answer options including: a stairwell in a building or business; an abandoned building; in a car, truck, or other vehicle; in a public bathroom; on the street; at the park or other greenspace; at your home; and at someone else’s home. These responses were then dichotomized to non-public and public injection with those who answered with ‘at your home’ or ‘at someone else’s home’ considered as not engaging in public injection (Hunter et al., 2018); all other responses were categorized as injecting in public. We also asked how many people they typically use drugs with in the past 6 months with response options trichotomized as: using alone; using with one other person; and using with two or more people. Based on the high prevalence of multiple types of drugs injected recently, we created a composite measure of the number of types of drugs injected in the past 6 months that ranged from 1 to 7 based on the number of types of drugs each participant endorsed having recently injected. Types of injection drugs included: cocaine, heroin, crystal methamphetamine, pain killers (oxycontin, percocet, codeine, darvon, percodan, dilaudid, demerol), speedball (cocaine and heroin), fentanyl, and suboxone/buprenorphine. Receptive syringe sharing was measured by asking if they had reused a syringe that they knew had been used by someone else in the last 6 months. Lastly, we asked participants if they had recently (past six months) been arrested or engaged in transactional sex work (“trading oral, vaginal, or anal sex for things like money, food, drugs, or favors”).

Injection socialization measures—We included four injection socialization measures that have been shown to be related to injection initiation (Bluthenthal et al., 2015; Bluthenthal et al., 2014; Khobzi et al., 2009; Strike et al., 2014). These measures determined dichotomously (yes/no) about the past 6 months: “have you explained or described how to inject to someone who had never injected an illicit drug (i.e., a non-injector)?”; “have you spoken positively about injecting to someone who had never injected any drug?”; “have you injected drugs in front of someone who had never injected drugs?”; and “have you encouraged someone to inject who had never injected drugs?”.

Statistical analysis

We used bivariate logistic regressions to explore associations between the covariates and our primary outcome (recent injection initiation). Multivariable logistic regression was used to identify factors associated with injection initiation. Variables that were significantly associated ($p < .05$) with injection initiation in bivariate analyses were included in the multivariable analyses. We also retained gender as a covariate, which existing literature has identified as being associated with injection initiation (Ben Hamida et al., 2018; Crofts et al., 1996; Draus & Carlson, 2006). Results reported are odds ratios of initiating someone in the past 6 months, 95% confidence intervals, and p-values with the threshold for statistical significance held at $p\text{-value} < 0.05$. Model fit was assessed using Hosmer-Lemeshow goodness-of-fit test with 10 quantiles due to the number of covariate patterns. Statistical analyses were conducted using Stata/SE 15.1 (StataCorp, College Station, TX, USA).

Results

The PWID in our sample had an average age of 35.8 years (range 19–63 years), 61% were male, and the majority identified as White, non-Hispanic (84%) (Table 1) [Table 1 near here]. Participants reported experiencing several structural vulnerabilities: 27% did not graduate high school, 56% considered themselves homeless, and 65% reported going to bed hungry at least once per week. Seventy-two (17%) participants reported recently injecting someone for their first injection.

Participants reported injecting on average 3.3 types of drugs (median: 3 types of drugs) during the past 6 months. The most common drug injected was heroin (81%) followed by crystal methamphetamine (71%) and fentanyl (55%). Our sample reported injecting on average 4.4 times per day. When asked how many people they typically use drugs with, participants reported: using drugs alone (32%), using with one other person (32%), using with two or more people (37%). Receptive syringe sharing was relatively common with 43% reporting receptive syringe sharing in the past 6 months. The most commonly reported injection socialization behavior was injecting in front of an injection-naïve person (44%), and the least commonly reported was encouraging someone to start injecting drugs (8%).

Unadjusted Logistic Regression

Among our sociodemographic and structural vulnerability measures, several were found to be significantly associated with injection initiation in bivariate analysis, including age (odds ratio [OR] 0.96, 95% confidence intervals [CI]: 0.93, 1.00), identifying as a race/ethnicity

other than White, non-Hispanic (OR 1.89, 95% CI: 1.01, 3.53), homelessness (OR 2.16, 95% CI: 1.25, 3.75), recent arrest (OR 2.48, 95% CI: 1.48, 4.16), and transactional sex work (OR 2.15, 95% CI: 1.20, 3.85) (Table 2) [Table 2 near here]. With respect to our substance use measures, factors associated with recent injection initiation were: number of injections per day (OR 1.09, 95% CI: 1.03, 1.15), using drugs with two or more people versus using drugs alone (OR 2.24, 95% CI: 1.19, 4.19), number of drugs injected in past 6 months (OR 1.47, 95% CI: 1.26, 1.71), and receptive syringe sharing (OR 3.53, 95% CI: 2.05, 6.06). All four injection socialization measures were significantly associated with recent injection initiation: injected in front of non-injectors (OR 7.12, 95% CI: 3.82, 13.28); described injection to an injection-naïve person (OR 13.08, 95% CI: 7.15, 23.94); spoke positively about injection (OR 6.50, 95% CI: 3.76, 11.21); and encouraged a non-injector to inject (OR 22.61, 95% CI: 9.64, 53.03). Number of drugs recently injected was highly correlated with average number of injections per day, and public injection was highly correlated with homelessness; as a result, number of drugs injected and public injection were excluded from the multivariable model.

Adjusted Logistic Regression

Factors independently associated with recent injection initiation included number of injections per day (aOR 1.16, 95% CI: 1.07, 1.25) as well as three of the four injection socialization behaviors: injecting in front of non-injectors (aOR 2.75, 95% CI: 1.25, 6.04); describing injection to a non-injector (aOR 5.83, 95% CI: 2.71, 12.57); and encouraging injection initiation (aOR 7.13, 95% CI: 2.32, 21.87). Neither speaking positively about injection initiation to an injection-naïve person nor any of the sociodemographic and structural vulnerability measures were found to be independently associated with recent injection initiation. The goodness-of-fit test indicates adequate fit of the multivariable model (p-value=0.237).

Discussion

Our study is the first of which we are aware to examine factors associated with PWID initiating persons into drug injection in rural Appalachia, an area deeply affected by the opioid-related overdose crisis. We found that seventeen percent of rural PWID had recently initiated someone into injection drug use for the first time. This prevalence is comparable if not higher than what others have found in urban settings. Reports of initiating others in the past 6 months vary from 4% in Tijuana, Mexico to 19% in Toronto, Canada (Ben Hamida et al., 2018; Rotondi et al., 2014). However, we found a higher prevalence of injection initiation than research from two US cities, Los Angeles and San Francisco, where reports of initiating in the past 12 months was 7% (Bluthenthal et al., 2014). Further, researchers also found in an urban-based sample in Australia that only 17% of PWID had ever initiated someone into injection drug use (Bryant & Treloar, 2008). Our findings are particularly striking given that rural communities have a shorter history of injection drug use than urban communities (Cicero, Ellis, Surratt, & Kurtz, 2014). As our study is the first to report injection initiation prevalence in a rural area, more studies are needed to corroborate these results.

In multivariable analyses, we found that PWID having recently initiated people into drug injection was independently associated with the number of injections PWID reported on a typical day and three injection socialization measures. An additional injection per day was associated with a 16% increase in the odds of having initiated someone into drug injection. There are several reasons why PWID who inject more frequently may be susceptible to initiating someone. First, PWID who inject more frequently may be willing to leverage their drug use expertise to acquire drugs, a practice that has been demonstrated in other research (Kolla et al., 2015; Mars et al., 2014). Second, PWID who inject more frequently may have more interactions with non-injectors, increasing their likelihood of injecting someone for their first injection. Third, many studies have discussed the normalization process that occurs when established PWID inject in front of injection-naïve individuals; this behavior has been shown to lessen negative attitudes and fears toward injecting and may also inadvertently educate people about the injection process (Ben Hamida et al., 2018; Draus & Carlson, 2006; Harocopos et al., 2009; Sherman et al., 2002). Additional research is needed to better understand the relationships between people who initiate others into injection in rural communities and how respective levels of substance use may augment injection initiation behaviors.

Three injection socialization measures were independently associated with having recently initiated people into drug injection. Encouraging and describing injection to a non-injector imply active roles by the initiator that may increase the likelihood of non-injectors consenting to injection. In contrast, injecting in front of an injection-naïve person, a more passive action, was also associated with injection initiation. Qualitative research among recent drug injection initiators has found that passive actions, such as witnessing established PWID inject, have a lasting impact on their perceptions and influence their decisions to transition to injection drug use (Draus & Carlson, 2006; Harocopos et al., 2009; Mars et al., 2014). While we cannot ascertain with the available data the degrees to which the active and passive actions of established PWID directly influence non-injectors, they do suggest that the context of injection initiation among rural PWID may have many parallels to urban PWID populations. However, given that PWID in rural communities may be closely linked by familial ties (Coyne, Demian-Popescu, & Friend, 2006; Dew, Elifson, & Dozier, 2007), additional work is needed to understand how injection socialization behaviors may differ not only between urban and rural PWID, but also how the associations between injection socialization behaviors and injection initiation may vary by the types of relationships (e.g., family member, sex partner) among initiators and initiates.

Our findings occur in the context of a deepening opioid-related overdose crisis in rural communities and underscore the need for the design and implementation of interventions that are tailored to the needs of rural PWID in Appalachia that aim to not only reduce injection drug use associated consequences (e.g., HIV, overdose), but also break the cycle of injection initiation. Rural Appalachia may be an ideal setting to implement a behavioral, peer-based intervention aimed at preventing injection initiation and associated consequences (Young, Jonas, Mullins, Halgin, & Havens, 2013). One promising peer-based intervention is the Change the Cycle intervention, a guided, brief discussion around injection initiation behaviors, which has led to moderate decreases in initiation socialization behaviors among current injectors (Strike et al., 2014). An injection initiation intervention could include many

of the concepts from related HIV prevention interventions, emphasizing safer injection practices, connections to community resources, and accurate knowledge about HIV and other bloodborne diseases.

It is important to interpret our findings with considerations for associated ethical issues surrounding injection initiation. As noted by Barnes et al. (2018), injection initiation interventions should be “designed to affirm the autonomy of PWID to arrive at conclusions consistent with their own principles around helping [to initiate others into injection drug use].” It is possible that established PWID helping drug injection-naïve individuals inject for the first time could carry less harm than if the individual attempted to inject without the supervision, support, and guidance of existing PWID.

Our findings should be viewed considering potential methodological limitations. The study was cross-sectional, and we are not able to evaluate the temporal relationships between injection initiation behaviors and our measures of interest. We only had one question to measure initiation, and as a result, we lack context surrounding the initiation event, such as the relationships between individuals involved and the number of people initiated in the six-month period. Additional research exploring contexts of injection initiation in rural contexts is warranted. Further, assisting someone with their first injection is generally discouraged among PWID, and as such, subject to social desirability bias (Small, Fast, Krusi, Wood, & Kerr, 2009). We attempted to diminish potential social desirability effects by setting broad inclusion criteria, using ACASI technology, and keeping study participation anonymous (Allen et al., 2019c). An additional limitation is that our sample primarily identified as White, non-Hispanic, limiting our ability to draw distinctions between racial and ethnic groups. This limitation reflects the racial homogeneity in West Virginia and Cabell County (US Census Bureau, 2017). Finally, our sample may not reflect PWID residing in remote areas of Cabell County as many of those areas lack sidewalks, public locales, and other locations in which we could reasonably interact with PWID (Allen et al., 2019c). Future work should seek to oversample rural PWID residing in remote areas of rural counties. Our study also is characterized by numerous strengths. We were able to engage a large, rural PWID sample. We also engaged PWID in remote areas of Appalachia, enhancing how we understand rural drug use. Finally, our model investigated a combination of characteristics and behaviors associated with PWID having initiated someone to drug injection.

In conclusion, our findings build on existing literature by demonstrating that among rural PWID, injection initiation was associated with injecting more frequently and three injection socialization measures. Given the worsening nature of the opioid crisis in rural communities, there is an urgent need for additional research to better understand injection initiation. Designing and implementing interventions that aim to break the cycle of injection initiation in rural Appalachia will require an in-depth understanding of the drug injection initiation and how to engage individuals in interventions that respect the autonomy of PWID while providing essential harm reduction information.

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Table 1.

Sample characteristics of people who inject drugs by recent (past 6 months) engagement in injection initiation of others in Cabell County, West Virginia, USA, June-July 2018 (N=420).

	Total, n=420 N (%)	No recent injection initiation, n=348, N (%)	Recent injection initiation, n=72, N (%)	P
DEMOGRAPHICS & STRUCTURAL VULNERABILITIES				
Age, mean (SD)	35.8 (8.5)	36.2 (8.6)	33.7 (8.0)	0.028
Gender				0.189
Male	257 (61.2)	208 (59.8)	49 (68.1)	
Female	163 (38.8)	140 (40.2)	23 (31.9)	
Race/Ethnicity				0.043
White, non-Hispanic	341 (83.6)	289 (85.3)	52 (75.4)	
Other	67 (16.4)	50 (14.7)	17 (24.6)	
High school or equivalent education or more	304 (72.6)	257 (74.1)	47 (65.3)	0.128
Sexual Minority	73 (17.4)	61 (17.6)	12 (16.7)	0.853
Consider self homeless	235 (56.0)	184 (52.9)	51 (70.8)	0.005
Goes to bed hungry at least once per week	272 (64.8)	221 (63.5)	51 (70.8)	0.236
Arrested, past 6 months	141 (33.6)	104 (29.9)	37 (51.4)	<0.001
Engaged in sex work, past 6 months	77 (18.3)	56 (16.1)	21 (29.2)	0.009
SUBSTANCE USE				
Years since injection initiation, mean (SD)	10.9 (9.2)	11.0 (9.4)	10.1 (8.3)	0.444
Number of times inject per day, mean (SD)	4.4 (3.9)	4.1 (3.7)	5.7 (4.7)	0.002
Number of drugs injected, last 6 months, mean (SD) (range: 1–7)	3.3 (1.7)	3.1 (1.6)	4.3 (1.9)	<0.001
Injection drug use, last 6 months				
Cocaine	144 (34.3)	108 (31.0)	36 (50.0)	0.002
Heroin	340 (81.0)	278 (79.9)	62 (86.1)	0.221
Speedball	161 (38.3)	124 (35.6)	37 (51.4)	0.012
Crystal Methamphetamine	298 (71.1)	234 (67.4)	64 (88.9)	<0.001
Painkillers	99 (23.6)	69 (19.8)	30 (41.7)	<0.001
Fentanyl	230 (54.8)	181 (52.0)	49 (68.1)	0.013
Suboxone or Buprenorphine	127 (30.2)	98 (28.2)	29 (40.3)	0.042
Use drugs with people				0.008
No, use alone	133 (31.7)	116 (33.3)	17 (23.6)	
One person	133 (31.7)	116 (33.3)	17 (23.6)	
Two or more people	154 (36.7)	116 (33.3)	38 (52.8)	
INJECTION SOCIALIZATION BEHAVIORS				
Described injection to a non-injector, past 6 months	124 (29.5)	69 (19.8)	55 (76.4)	<0.001
Spoke positively about injection to a non-injector, past 6 months	96 (22.9)	56 (16.1)	40 (55.6)	<0.001
Injected in front of non-injectors, past 6 months	186 (44.3)	128 (36.8)	58 (80.6)	<0.001
Encouraged a non-injector to inject, past 6 months	33 (7.9)	8 (2.3)	25 (34.7)	<0.001

Table 2.

Unadjusted and adjusted factors associated with initiating someone into injection drug use in the last 6 months among people who inject drugs in Cabell County, WV (N=420).

	Unadjusted			Adjusted		
	OR	95% CI	p-value	aOR	95% CI	p-value
SOCIODEMOGRAPHICS & STRUCTURAL VULNERABILITIES						
Age	0.96	0.93 – 1.00	0.029	1.02	0.97 – 1.06	0.516
Gender						
Male	1	REF	--	1	REF	--
Female	0.70	0.41 – 1.20	0.191	0.79	0.37 – 1.72	0.558
Race/Ethnicity						
White, non-Hispanic	1	REF	--	1	REF	--
Other	1.89	1.01 – 3.53	0.046	1.84	0.73 – 4.67	0.199
High school or equivalent education or more	0.66	0.38 – 1.13	0.130			
Sexual Minority	0.94	0.48 – 1.85	0.853			
Consider self homeless	2.16	1.25 – 3.75	0.006	1.58	0.76 – 3.28	0.225
Goes to bed hungry at least once per week	1.40	0.80 – 2.43	0.238			
Arrested, past 6 months	2.48	1.48 – 4.16	0.001	1.71	0.83 – 3.51	0.145
Engaged in sex work, past 6 months	2.15	1.20 – 3.85	0.010	1.16	0.48 – 2.84	0.742
SUBSTANCE USE						
Years since injection initiation, mean (SD)	0.99	0.96 – 1.02	0.444			
No. of times inject per day, mean (SD)	1.09	1.03 – 1.15	0.004	1.16	1.07 – 1.25	<0.001
No. of drugs injected, last 6 months, mean (SD) (range: 1–7)	1.47	1.26 – 1.71	<0.001			
Injected in public, past 6 months	1.64	0.98 – 2.75	0.059			
Receptive syringe sharing, past 6 months	3.53	2.05 – 6.06	<0.001	1.94	0.90 – 4.16	0.091
Use drugs with people						
No, use alone	1	REF	--	1	REF	--
One person	1.00	0.49 – 2.05	1.000	0.64	0.24 – 1.72	0.371
Two or more people	2.24	1.19 – 4.19	0.012	0.87	0.36 – 2.08	0.754
INJECTION SOCIALIZATION BEHAVIORS						
Injected in front of non-injectors, past 6 months	7.12	3.82 – 13.28	<0.001	2.75	1.25 – 6.04	0.012
Described injection to a non-injector, past 6 months	13.08	7.15 – 23.94	<0.001	5.83	2.71 – 12.57	<0.001
Spoke positively about injection to a non-injector, past 6 months	6.50	3.76 – 11.21	<0.001	1.79	0.82 – 3.89	0.144
Encouraged a non-injector to inject, past 6 months	22.61	9.64 – 53.03	<0.001	7.13	2.32 – 21.87	0.001