Published in final edited form as:

Am J Addict. 2012 ; 21(1): 23–30. doi:10.1111/j.1521-0391.2011.00194.x.

“Injection First”: A Unique Group of Injection Drug Users in Tijuana, Mexico

Meghan D. Morris, MPH^{1,2}, Kimberly C. Brouwer, PhD¹, Remedios M. Lozada, MD³, Manuel Gallardo, MD², Alicia Vera, MPH¹, and Steffanie A. Strathdee, PhD¹

¹Division of Global Public Health, Department of Medicine, University of California, San Diego, La Jolla, California

²Joint Doctoral Program in Public Health, San Diego State University and University of California, San Diego, California

³Patronato Pro-COMUSIDA AC, Tijuana, Mexico

Abstract

Using baseline data from a study of injection drug users (IDUs) in Tijuana, Mexico (N = 1,052), we identified social and behavioral factors associated with injecting at the same age or earlier than other administration routes of illicit drug use (eg, “injection first”) and examined whether this IDU subgroup had riskier drug using and sexual behaviors than other IDUs. Twelve-percent “injected first.” Characteristics independently associated with a higher odds of “injection first” included being younger at first injection, injecting heroin as their first drug, being alone at the first injection episode, and having a sexual debut at the same age or earlier as when they initiated drug use; family members’ illicit drug use was associated with lower odds of injecting first. When adjusting for age at first injection and number of years injecting, “injection first” IDUs had lower odds of ever overdosing, and ever trading sex. On the other hand, they were less likely to have ever been enrolled in drug treatment, and more commonly obtained their syringes from potentially unsafe sources. In conclusion, a sizable proportion of IDUs in Tijuana injected as their first drug using experience, although evidence that this was a riskier subgroup of IDUs was inconclusive.

INTRODUCTION

Most literature indicates that a period of noninjection illicit drug use precedes the first injection drug-use experience.^{1,2} Factors that influence injection initiation are diverse, but are usually related to the desire to achieve a stronger or more-efficient high, or to curiosity about injection as a mode of administration.^{2–4} A study of young injection drug users (IDUs) in Melbourne, Australia, found that reasons for injecting included a desire to experience an immediate high, curiosity about the effect of the injected drug, and belief that

Address correspondence to: Dr. Strathdee, University of California San Diego, School of Medicine, 9500 Gilman Drive, Mail Code 0507, La Jolla, CA 92093–0507. sstrathdee@ucsd.edu.

Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

it is cheaper or less wasteful than other administration routes.^{2,3} Similar findings have been reported among IDUs in Baltimore, Maryland.⁴

The few studies examining initiation to injection drug use provide general descriptions of initial drugs injected and circumstances surrounding the initial experience.^{5–7} Within a sample of IDUs from Rio de Janeiro, Brazil, most injected the first time in a public place with a drug that they bought themselves (eg, cocaine), and the majority were injected by either a friend or relative.⁶ Similarly, in a study of young IDUs in Baltimore, Maryland, the majority reported injecting the first time in a social setting. However, 22.6% reported self-injecting and 12.7% were alone during their first injection experience.⁸ Previous studies of circumstances surrounding the first injection experience report that individuals are likely to be in their adolescence at first injection episode with an unstable social environment including homelessness, family drug use, incarceration, or unemployment.^{2,3,6}

Social influences, such as peer networks, have also been reported as strong predictors of transitioning to injection drug use,⁹ specifically having a sex partner who injects drugs.⁴ Studies suggest family members, friends, or peers most often introduce others to injection drugs.^{3,10,11} Family substance abuse may shape adolescent substance use through both inattentive parenting,¹² and by providing an environment where drugs are readily available and drug-using behaviors are modeled.¹³ However, little research has examined how family-illicit drug use may influence initiation into injection.

The aims of this study were twofold. First, we aimed to identify background characteristics of individuals who injected as their first illicit drug-use experience. Specifically, we hypothesized that “injection first” individuals would be more likely to report a family member involved in illicit drug use. Second, given these individuals’ accelerated transition into injection drug use, we also examined how their current drug using and sexual behaviors differed compared to individuals who initiated illicit drug use through snorting, smoking, or ingesting. We hypothesized that those who injected at their first drug-use experience would be more likely to report riskier current drug-use behaviors.

METHODS

Study Setting

San Diego, California, and Tijuana, Mexico are located on a major drug-trafficking corridor that brings drugs like methamphetamine, heroin, and marijuana to the United States. The San Ysidro border crossing, which separates the two cities, is the busiest land border crossing in the world.¹⁴ A “spillover” effect from northbound drug shipments has resulted in drugs being sold cheaply and plentifully in Tijuana,¹⁵ resulting in a growing injection drug using problem. In 2003, it was estimated that approximately 6,000 IDUs attend shooting galleries in Tijuana¹⁶, however, the total number of IDUs may be as high as 10,000.¹⁶

Study Population

From 2006 to 2007, IDUs residing in Tijuana, Mexico, were recruited into a longitudinal study examining behavioral and contextual factors associated with HIV, syphilis, and tuberculosis infection, as previously described.¹⁷ IDUs were recruited using respondent-

driven sampling (RDS).¹⁷ A group of “seeds” selected for heterogeneity with respect to age, gender, and geographical location were given uniquely coded coupons to recruit members of their social networks into the study. Recruitment waves continued as subjects returning with coupons were trained to recruit their peers using the same process. Eligibility criteria included being 18 years of age, having injected illicit drugs within the past month, ability to speak Spanish or English, ability to provide informed consent, and having no plans to move out of the city in the next 18 months. We did not exclude participants who had specific psychiatric conditions. However, participants who could not complete the informed consent process were excluded, and participants who were under the influence of drugs were rescheduled for the next day. The Institutional Review Board of the University of California, San Diego and the Ethics Board of the Tijuana General Hospital approved protocols.

Data Collection

Local outreach workers conducted interviews at either a fixed location in the community or at various neighborhood locations through use of a mobile clinic. The interviewer-administered survey elicited information on sociodemographic, behavioral, and contextual characteristics. Drug-use questions included an in-depth history of lifetime and recent illicit drug use, including age of first use by all routes of administration (ie, smoking, snorting, or injection) and specific questions regarding the circumstances surrounding the first injection experience.

Data Analysis

The primary dependent variable for all analyses was injecting drugs before any other illicit drug use, referred to as “injection first.” This binary variable was created by identifying participants who reported injecting any substance at either a younger or the same age as they reported using any illicit drug through a noninjection route. Drug types considered included: marijuana, methamphetamine, cocaine, crack, and heroin, as these were the most common drugs used within the sample. For example, if a participant reported first injecting a drug at age 16 and reported first using either marijuana, cocaine, methamphetamine, or heroin (through snorting or smoking) earlier than age 16, then they were categorized into the non-“injection first” category.

The explanatory variable to address our first research question came from the following measure: “Have any members of your family ever used illicit drugs?” Answers from a follow-up multiple response item asking which family member used illicit drugs were collapsed into two items that reflected either first-generation (eg, parent or sibling) or second-generation (eg, cousin or grandparent) relatives, thus capturing the different degrees of influence. Additional background characteristics included place of birth, number of years currently living in Tijuana, age of first sexual debut, drug first injected, and who they were with during this first injection episode.

To address our second aim, the following five domains were considered in examining differences in sexual and drug-use risk behaviors within the past 6 months: (1) frequency of injection drug use; (2) type of location where drugs were most often injected; (3) syringe sharing behaviors: receptive and distributive syringe sharing; (4) syringe sources; (5)

condom use with regular and casual sexual partners; and (6) trading sex for money, drugs, goods, or shelter (ie, survival sex). Lifetime drug-related variables that pertained to periods following the first drug-use experience (ie, overdose, experience with drug treatment, and survival sex trade) were also considered in these analyses.

Analyses were based on 1,052 subjects out of 1,056 enrolled (four participants lacked data on age at first injection). Characteristics of “injection first” IDUs were compared to non-“injection first” individuals using Pearson’s chi-square tests for categorical variables and *t*-tests for all normally distributed continuous variables. Univariate and multivariate logistic regression were performed to identify factors independently associated with reporting “injection first.” Guided by the two study aims, we developed two multivariate logistic regression models. The first multivariate model explored characteristics or behaviors before or surrounding the injection initiation experience, thus creating a model describing predictors of “injecting first.” The second multivariate model focused on examining sexual and drug-using behaviors to characterize risk behaviors of “injection first” IDUs. Models were developed using a manual procedure where all variables of interest that attained a significance level of 10% were considered in multivariate analyses in order of most-to-least significant. The likelihood ratio statistic was used to compare nested models, retaining variables that were significant at the 5% level. Lack of multicollinearity between covariates in the final models was confirmed by appropriate values of the largest condition index and of the variation inflation factors. RDS-adjusted models were also run to explore potential effects of the RDS recruitment method on our estimates, as described previously.^{17,18} No significant differences between the RDS adjusted and unadjusted models were identified; therefore, unadjusted values are presented. A subanalysis excluding age ties for those who reported initiating injection and noninjection at the same age was also performed.

RESULTS

Characteristics

Of 1,052 IDUs, 124 (12%) reported “injection first,” with 26 of these (20%) reporting the same age for marijuana and injection drug-use initiation, and 19 (15%) reporting the same age for noninjection use of either methamphetamine, cocaine/crack, or heroin as injection initiation. Overall, the median age was 36 (interquartile range [IQR], 31–42) and just over one-quarter (28.5%) were born in Tijuana. Over half had a monthly income of less than 3,500 pesos (approximately 335 \$US). No differences in income, age, or birthplace were found across the two groups. “Injection first” IDUs were significantly more likely to be born in the state of Baja California rather than another Mexican state or another country (41.1% vs. 31.8%, $p = .04$), and had lived in Tijuana a lower number of years (median: 11 years [IQR: 5–27] vs. 15 years [IQR: 5–30], $p = .91$). HIV prevalence, TB prevalence, and lifetime prevalence of syphilis infection as confirmed by *Treponema pallidum* particle agglutination assay (TPPA) was 4.5%, 67%, and 16% respectively, and did not differ significantly between those who injected first and those who first used drugs through other modes of administration (HIV: 6.5% vs. 4.1%, $p = .23$; TB: 70% vs. 66%, $p = .33$; syphilis: 19% vs. 15%, $p = .32$).

Antecedents of Injection Initiation

“Injection first” IDUs were more likely to initiate injection drug use at a younger age than other IDUs (Table 1). A significantly lower proportion of “injection first” IDUs had a family member who had ever used illicit drugs, with the large proportion of those (21%) reporting this being a parent or sibling. Heroin was the most common drug first injected for “injection first” IDUs, followed by cocaine and methamphetamine. Although not significant, a lower proportion of “injection first” IDUs had ever been told by a health-care provider they had depression or anxiety.

Within the context of their first injection drug-use experience, the majority of “injection first” respondents injected heroin (87% vs. 79%) in the company of a friend(s), with a considerable proportion (16%) being alone during this experience, as compared to other IDUs (Table 1). Overall, the majority of participants ($n = 895$) reported their first sexual experience being at a younger age than initiating injection drug use. However, a higher proportion of “injection first” than non-“injection first” IDUs reported their sexual debut being earlier or at the same age as their first injection drug-use experience. Only one “injection first” respondent (1%) reported trading sex for money, drugs, goods, or shelter before initiating injection drug use, compared to 113 (13%) non-“injection first” respondents.

Background Factors Independently Associated with “Injection First”

A total of five background factors were independently associated with “injection first” (Table 1): being younger at the first injection drug-use experience (adjusted odds ratio [AOR] = .89, 95% CI, .85–.93); having a family member who ever used illicit drugs (AOR = .56, 95% CI, .35–.88); reporting heroin as the first drug injected (AOR = 1.90, 95% CI, 1.08–3.37); being alone at the first injection drug-use experience (AOR = 2.02, 95% CI, 1.15–3.57); and reporting a sexual debut earlier or at the same age as initiating injection drug use (AOR = 2.61, 95% CI 1.60–4.27). Excluding age ties did not change the direction or the significance of these associations, nor lead to any new associations.

Risk Behaviors Following the First Injection Experience

Very few differences were found across the two groups regarding drugs used, sexual behaviors within the previous 6 months, or other variables that reflected the period since initiation of injection. Both groups reported the drug most-frequently injected to be heroin alone, or in combination with methamphetamine (Table 2). However, when compared to the non-“injection first” group of IDUs, the “injection first” IDUs were less likely to report smoking or snorting heroin, methamphetamine, or cocaine either in the previous 6 months or during their lifetime. Both lifetime use and recent use of marijuana was significantly lower in the “injection first” group, as well as lifetime use of alcohol (data not shown). However, “injection first” IDUs were more likely to inject drugs at least once per day compared to other IDUs.

The context of drug-use across these two groups did differ in some respects. Not surprisingly, “injection first” IDUs had been injecting for a greater number of years (Table 2). “Injection first” IDUs were more likely to inject most often in their homes, and less

likely to inject at shooting galleries or on the street. “Injection first” IDUs were also significantly less likely to report distributive or receptive syringe sharing. When asked about where they most often purchased syringes, “injection first” IDUs were more likely to report purchasing syringes from a *tiendita* (market). They were also more likely to be aware of the local needle exchange program (NEP). Among those who were aware of the Tijuana NEPs, a greater proportion of “injection first” IDUs reported ever obtaining syringes at NEPs compared to other respondents, but this difference was not statistically significant (82% vs. 67%, $p = .13$). A lower proportion of “injection first” IDU had ever accessed drug treatment. The proportion of drug-related overdose was lower both within the previous 6 months and during their drug-use career. Regarding health-care access in the previous 6 months, while only marginally significant, “injection first” IDUs were more likely to report accessing health-care services, and less likely to report needing to access medical care but not seeking it.

Of the total 1,052 participants, only 280 (27%) reported having intercourse in the previous 6 months. Among these sexually active IDUs, “injection first” IDUs were more likely to report always using a condom with casual sexual partners, but were less likely to report condom use with regular sex partners, and were less likely to have traded sex in exchange for money, drugs, or housing.

Risk Behaviors Independently Associated with “Injection First”

When adjusting for age of first injection drug use and number of years injecting drugs, five factors were independently associated with “injecting first” (Table 2). “Injection first” IDUs were more likely to inject drugs at home in the past 6 months (AOR: 1.47, 95% CI: 1.37–2.07) and were less likely to have ever experienced a drug-related overdose (AOR: .53, 95% CI: .38–.75) or to have ever traded sex for money, drugs, goods, or shelter (AOR: .50, 95% CI: .32–.80). On the other hand, they were more likely to report *tienditas* as their primary syringe source (AOR: 1.52, 95% CI: 1.03–2.25) and were less likely to have ever accessed any form of drug treatment (AOR: .62, 95% CI: .44–.88). Excluding age ties did not change the direction or the significance of these associations.

DISCUSSION

To our knowledge, this is the first examination of a subgroup of IDUs who initiated injection drug use earlier or at the same age as other routes of drug administration. In our study of IDUs from Tijuana, Mexico, approximately 12% reported having “injected first,” with the majority of these individuals initiating with heroin. Our prevalence estimate is significantly larger than the aforementioned Brazilian study of mainly cocaine users which found that <1% of IDUs-initiated injection before other modes of drug use.⁶ Younger age at first injection, having a sexual debut before initiating injection, first injecting heroin, and injecting alone were all independently associated with injecting as the first drug-use experience. In contrast to our hypothesis, having a family member who used illicit drugs was inversely associated with “injecting first.”

Surprisingly, although this subgroup of IDUs entered into illicit drug use in an atypical manner, they were not significantly riskier in terms of their recent drug use or sexual

behaviors. Instead, after controlling for differences in age of first injection drug use and number of years injecting drugs, “injection first” IDUs were more likely to inject at home, and less likely to have ever experienced a drug-related overdose, or to have participated in survival sex in their lifetime. However, they were less likely to have ever been enrolled in drug treatment, and more commonly obtained their syringes from potentially unsafe sources (ie, *tienditas*).

Literature surrounding injection initiation shows that first injection episodes typically involve friends, or drug-using peers who provide expertise or assistance with injecting.^{19–21} Interestingly, when compared to non-“injection first” IDU, the subgroup of IDUs who injected first were more likely to inject alone. Although other studies examining the context of injection initiation report a small minority of subjects inject alone upon their first injection experience,^{2,7,8} unlike our sample, the majority of individuals in these studies did not inject drugs before a period of noninjection drug use. Our findings may imply that these IDUs were knowledgeable enough about the mechanics of injecting that they were able to administer the drug themselves. We speculate that the subgroup of IDUs who “injected first” were most likely exposed to drug use through their communities, peer networks, or sexual partners, but our study lacked additional information on the context of first injection to explore this more closely. Although few participants reported ever being diagnosed with depression or anxiety, it remains possible that injecting alone at the first episode is a proxy for depression or social isolation. Qualitative or mixed-methods studies are needed to provide more information on the social context of injecting first.

We also found that IDUs who injected first were more likely to inject in their home. IDUs who shoot up in their home, instead of public locations such as shooting galleries or the street, typically lack the same circumstance to share used syringes. In a study of IDUs in the South Bronx, New York, those who injected most frequently in their home were less likely to share drugs and syringes.²² Initiating alone and self-injecting may reflect a desire for a level of autonomy or control over the injection experience or personal agency which may translate into a pattern of safer drug-use behaviors.

In contrast to our original hypothesis, those with a drug-using family member were at lower odds of initiating illicit drug use through injecting. There is some literature to support that second-hand experiences with family drug dependence may motivate some young people to avoid or delay injection drug use.^{23–25} In a recent multicity study in the United States, Broz and Ouellet found a tendency for young African American drug users to delay or avoid injecting drugs, with no such trend in young whites, which they speculated may be related to observing the consequences of drug dependency in their communities.²⁴ Using data from the US Household Survey on Drug Abuse, Armstrong reported a similar trend with Blacks born in birth cohorts after 1955.²³ Even though our study participants with a drug-using family member were less likely to “inject first,” they did eventually transition into injecting drugs. Future prospective studies of young non-IDUs are needed to examine how the role of family drug use and drug-dependence affects drug-use trajectories, because our study lacked a non-IDU comparison group.

Although “injection first” IDUs were generally no more risky in terms of their drug-use practices than other IDUs, we found some evidence to suggest that they were more severely drug dependent. “Injection first” IDUs were more likely to inject at least once per day, have injected for a longer duration, and have a lower odds of ever accessing drug treatment. Apart from these indicators, there was only one risk behavior that posed a potential risk of acquiring blood-borne infections among IDUs who injected first. Specifically, “injection first” IDUs were more likely to purchase syringes most often from *tienditas* (markets), and did not obtain syringes more often from the local NEP, even though they were more aware of this program than other IDUs. Anecdotal accounts from study participants and outreach staff describe *tienditas* as a widely used alternative to pharmacies for syringe purchase that sell syringes at a slightly higher price than pharmacies (approximately 12–15 pesos compared to 5–10 pesos). IDUs may experience less stigma and prejudice from *tienditas* than from pharmacy workers, and may be less subject to police harassment. Although *tienditas* are preferable to dangerous syringe sources, such as shooting galleries, they are not regulated like pharmacies and could be selling reused or tampered syringes, thus, not representing a safe syringe source.

We also found that “injection first” IDUs were at lower odds of experiencing a drug-related overdose in their lifetime. Even though these IDUs have injected drugs for a longer duration of time, their less risky and potentially more stable drug-use patterns may have contributed to a lower risk of overdose. Lower levels of lifetime incarceration and homelessness also may have contributed to fewer disruptions in their drug use and, thus, fewer overdose experiences. Given the extended period of heroin use among the entire study population, it was not surprising to find low levels of sexual behaviors in both groups of IDUs, as chronic opiate use has been shown to decrease libido and impair sexual performance.^{26–28}

Because IDUs, who “injected first,” tended to practice safer sexual and drug-using behaviors, they may represent a group of potential opinion leaders²⁹ who could be trained to deliver safer injection messages to their peers through outreach. Community popular opinion leaders have been used successfully to disseminate HIV prevention messages to accelerate behavior change.³⁰ A similar model successfully implemented in Mexico, *Pasa La Voz*, applied RDS to the traditional *promotores* (peer outreach) model to increase HIV testing and related services; such an approach could potentially be applied to the “injection first” subgroup.³¹

Some limitations to our study must be taken into account in the interpretation of results. First, like most epidemiologic studies on drug abuse, ours relied on self-reported data and thus, is subject to recall bias. Because the study instrument was not specifically designed to examine factors related to injecting first, the outcome variable relies on the reported age of several drug-use measures. However, our subgroup analysis showed no differences in multivariate models when age ties were removed. In addition, our study was limited to the measures available for assessing family exposure to illicit drugs. Future studies that examine family size, family structure, and drug-use dynamics within the family in relation to injection initiation experiences are required. Finally, the “injection first” group may be subject to some degree of survival bias if the riskiest of this subgroup died before they could be recruited into this study, and thus, generalizability of these data are limited. Although the

findings reported here are descriptive in nature, they provide a foundation and highlight the need for future prospective studies to examine the broad range of drug-use trajectories before and following injection initiation.

To our knowledge, this is the first study to characterize individuals who initiate illicit drug use through injection, and one of the few studies to examine injection initiation in a resource-limited setting. However, this accelerated pathway into injection drug use may occur more often than previously recognized. Our data provide little support that this IDU subgroup engaged in behaviors that placed them at higher risk of acquiring blood-borne infections. Instead this unique subgroup of IDUs may represent a more stable, less risky group who could act as potential leaders in their community to change social norms and motivate behavior change.

Acknowledgments

This research was funded by grants R01DA019829 (Dr. Strathdee), R01DA023877–02S2 (Ms. Morris), and T32DA023356 from the National Institute on Drug Abuse, Bethesda, MD (Ms. Morris).

We would like to acknowledge Dr. Robin Pollini for her important contributions to the paper, and thank Drs. Richard Garfein, Melanie Rusch, John Clapp, Elva Arredondo, and Hector Lemus for their direction and advice. The authors gratefully acknowledge the contributions of study participants and staff: Pro-COMUSIDA, Prevencasa, and UCSD for assistance with data collection.

References

- Fuller CM, Vlahov D, Arria AM, et al. Factors associated with adolescent initiation of injection drug use. *Public Health Rep.* 2001; 116(Suppl 1):136–145. [PubMed: 11889281]
- Roy E, Haley N, Leclerc P, et al. Drug injection among street youth: The first time. *Addiction.* 2002; 97:1003–1009. [PubMed: 12144603]
- Crofts N, Louie R, Rosenthal D, et al. The first hit: Circumstances surrounding initiation into injecting. *Addiction.* 1996; 91:1187–1196. [PubMed: 8828246]
- Sherman SG, Fuller CM, Shah N, et al. Correlates of initiation of injection drug use among young drug users in Baltimore, Maryland: The need for early intervention. *J Psychoactive Drugs.* 2005; 37:437–443. [PubMed: 16480171]
- Nasir S, Rosenthal D. The social context of initiation into injecting drugs in the slums of Makassar, Indonesia. *Int J Drug Policy.* 2009; 20:237–243. [PubMed: 18554892]
- Oliveira ML, Hacker MA, Oliveira SA, et al. “The first shot”: The context of first injection of illicit drugs, ongoing injecting practices, and hepatitis C infection in Rio de Janeiro, Brazil. *Cad Saude Publica.* 2006; 22:861–870. [PubMed: 16612439]
- Kermode M, Longleng V, Singh BC, et al. My first time: Initiation into injecting drug use in Manipur and Nagaland, north-east India. *Harm Reduct J.* 2007; 4:19–30. [PubMed: 18053266]
- Novelli LA, Sherman SG, Havens JR, et al. Circumstances surrounding the first injection experience and their association with future syringe sharing behaviors in young urban injection drug users. *Drug Alcohol Depend.* 2005; 77:303–309. [PubMed: 15734230]
- Des Jarlais DC, Arasteh K, Semaan S, et al. HIV among injecting drug users: Current epidemiology, biologic markers, respondent-driven sampling, and supervised-injection facilities. *Curr Opin HIV AIDS.* 2009; 4:308–313. [PubMed: 19532069]
- Fuller CM, Vlahov D, Latkin CA, et al. Social circumstances of initiation of injection drug use and early shooting gallery attendance: Implications for HIV intervention among adolescent and young adult injection drug users. *J Acquir Immune Defic Syndr.* 2003; 32:86–93. [PubMed: 12514419]
- Stenbacka M. Initiation into intravenous drug abuse. *Acta Psychiatr Scand.* 1990; 81:459–462. [PubMed: 2356769]

12. Brook JS, Brook DW, De La Rosa M, et al. Adolescent illegal drug use: The impact of personality, family, and environmental factors. *J Behav Med.* 2001; 24:183–203. [PubMed: 11392919]
13. Boyd CJ. The antecedents of women's crack cocaine abuse—Family substance abuse, sexual abuse, depression and illicit drug use. *J Subst Abuse Treat.* 1993; 10:433–438. [PubMed: 8246316]
14. Research and Innovative Technology Administration, Bureau of Transportation Statistics. [Accessed June 15, 2010] 2009. Available at: <http://www.transtats.bts.gov/bordercrossing.aspx>
15. Strathdee SA, Fraga WD, Case P, et al. “Vivo-para-consumirla-y-la-consumo-para-vivir”—[“I live to inject and inject to live”]: High risk injection behaviors in Tijuana, Mexico. *J Urban Health.* 2005; 82:IV58–IV73. [PubMed: 16107441]
16. Magis-Rodriguez C, Brouwer KC, Morales S, et al. HIV prevalence and correlates of receptive needle sharing among injection drug users in the Mexican-U.S. border city of Tijuana. *J Psychoactive Drugs.* 2005; 37:333–339. [PubMed: 16295018]
17. Strathdee SA, Lozada R, Pollini RA, et al. Individual, social, and environmental influences associated with HIV infection among injection drug users in Tijuana, Mexico. *J Acquir Immune Defic Syndr.* 2008; 47:369–376. [PubMed: 18176320]
18. Heckathorn D. Respondent-drive sampling: A new approach to the study of hidden populations. *Social Prob.* 1997; 44:174–199.
19. Harocopos A, Goldsamt LA, Kobrak P, et al. New injectors and the social context of injection initiation. *Int J Drug Policy.* 2009; 20:317–323. [PubMed: 18790623]
20. Roy E, Haley N, Leclerc P, et al. Drug injection among street youths in Montreal: Predictors of initiation. *J Urban Health.* 2003; 80:92–105. [PubMed: 12612099]
21. Small W, Fast D, Krusi A, et al. Social influences upon injection initiation among street-involved youth in Vancouver, Canada: A qualitative study. *Subst Abuse Treat Prev Policy.* 2009; 4:8–16. [PubMed: 19405977]
22. Fernando D, Schilling RF, Fontdevila J, et al. Predictors of sharing drugs among injection drug users in the South Bronx: Implications for HIV transmission. *J Psychoact Drugs.* 2003; 35:227–236.
23. Armstrong GL. Injection drug users in the United States, 1979–2002: An aging population. *Arch Intern Med.* 2007; 167:166–173. [PubMed: 17242318]
24. Broz D, Ouellet LJ. Racial and ethnic changes in heroin injection in the United States: Implications for the HIV/AIDS epidemic. *Drug Alcohol Depend.* 2008; 94:221–233. [PubMed: 18242879]
25. Strathdee SA, Stockman JK. Epidemiology of HIV among injecting and non-injecting drug users: Current trends and implications for interventions. *Curr HIV/AIDS Rep.* 2010; 7:99–106. [PubMed: 20425564]
26. De Leon G, Wexler HK. Heroin addiction: Its relation to sexual behavior and sexual experience. *J Abnorm Psychol.* 1973; 81:36–38. [PubMed: 4690214]
27. Mirin SM, Meyer RE, Mendelson JH, et al. Opiate use and sexual function. *Am J Psychiatry.* 1980; 137:909–915. [PubMed: 6774622]
28. Palha AP, Esteves M. A study of the sexuality of opiate addicts. *J Sex Marital Ther.* 2002; 28:427–437. [PubMed: 12378844]
29. NIMH Collaborative HIV/STD Prevention Trial Group. Methodological overview of a five-country community-level HIV/sexually transmitted disease prevention trial. *AIDS.* 2007; 21(Suppl II):S3–S18.
30. NIMH Collaborative HIV/STD Prevention Trial Group. Formative study conducted in five countries to adapt the community popular opinion leader intervention. *AIDS.* 2007; 21(Suppl II):S91–S98.
31. Ramos RL, Ferreira-Pinto JB, Rusch ML, et al. Pasa la voz (spread the word): Using women's social networks for HIV education and testing. *Public Health Rep.* 2010; 125:528–533. [PubMed: 20597452]

TABLE 1

Background characteristics of IDUs who initiated injection drug use before or at the same time as other routes of drug administration

	"Injection first," <i>n</i> = 124, <i>N</i> (%)	Non-"injection first," <i>n</i> = 928, <i>N</i> (%)	Univariate odds ratio (95% CI)	Adjusted* odds ratio (95% CI)
Median age at first injection drug use [†] (per year)	16.0 (14–20)	20.0 (17–26)	.87 (.84–.91)	.89 (.85–.93)
Primary school education or higher	64 (52)	558 (60)	.70 (.49–1.03)	–
Ever been told by healthcare provider had depression or anxiety	4 (3)	58 (6)	.50 (.18–1.41)	–
Any family member ever used illicit drugs	30 (24)	308 (33)	.64 (.42–.99)	.56 (.35–.88)
Parent or siblings used illicit drugs	25 (21)	217 (24)	.84 (.53–1.34)	–
Cousin, aunt/uncle, or grandparent used illicit drugs	4 (3)	43 (5)	.70 (.45–1.97)	–
Drug first injected				
Heroin	108 (87)	729 (79)	1.84 (1.07–3.19)	1.90 (1.08–3.37)
Cocaine	7 (6)	104 (11)	.47 (.22–1.04)	–
Methamphetamine	4 (3)	25 (3)	1.20 (.41–3.52)	–
Person with first time injected				
Alone	20 (16)	98 (11)	1.63 (.96–2.74)	2.02 (1.15–3.57)
Friend	71 (75)	573 (62)	.83 (.56–1.21)	–
Family member	10 (8)	54 (6)	1.62 (.46–5.71)	–
Sexual partner	4 (3)	22 (2)	1.42 (.70–2.86)	–
Acquaintance/stranger	13 (10)	76 (8)	1.31 (.71–2.44)	–
Sexual debut before or at same age as first injection drug use	45 (36)	112 (12)	4.15 (2.74–6.23)	2.61 (1.60–4.27)
Age first traded sex for money, drugs, goods, or shelter				
Before or at same age as first injection drug use	1 (1)	113 (13)	.06 (.01–.42)	–
After first injection drug use	16 (13)	111 (11)	.94 (.54–1.66)	–
Never traded sex	107 (86)	700 (76)	–	–

* Adjusted for all other variables in the model (*N* = 1,015).

[†] Median, intraquartile range (IQR) reported.

TABLE 2

Past and current risk behaviors of IDUs who initiated injection drug use before or at the same time as other routes of drug administration

	"Injection first," <i>n</i> = 124, <i>N</i> (%)	Non-"injection first," <i>n</i> = 928, <i>N</i> (%)	Univariate odds ratio (95% CI)	Adjusted* odds ratio (95% CI)
Sociodemographics				
Heterosexual	122 (98)	898 (97)	1.90 (.45–8.08)	–
Married	67 (54)	483 (52)	1.08 (.74–1.58)	–
Tested HIV positive at time of study	8 (7)	38 (4)	1.61 (.73–3.54)	–
Slept in a car, abandoned building, shelter, or street in past month	24 (19)	178 (19)	1.01 (.63–1.63)	–
Ever been incarcerated	108 (87)	852 (92)	.60 (.34–1.07)	–
Principal source of income was legal job	40 (32)	222 (24)	1.50 (1.01–2.27)	–
Accessed health-care services [†]	46 (38)	263 (29)	1.46 (.98–2.16)	–
Needed medical care but did not access it	5 (4)	87 (9)	.41 (.16–1.03)	–
Median age of first injection drug use (IQR) [‡]	16 (14–20)	20 (17–26)	.87 (.84–.91)	.87 (.84–.91)
Median number of years injecting drugs (IQR) [‡]	18 (11–25)	14 (9–21)	1.05 (1.03–1.07)	1.02 (1.0–1.04)
Drug-use behaviors				
Inject at least once daily [†]	109 (88)	739 (80)	1.80 (.99–3.29)	–
Drug most frequently injected [†]				
Heroin	64 (52)	533 (58)	.78 (.54–1.16)	–
Heroin + Cocaine (combination)	2 (2)	9 (1)	1.68 (.36–7.86)	–
Heroin + Methamphetamine (combination)	54 (44)	362 (39)	1.21 (.83–1.77)	–
Most often inject at [†]				
Home	79 (64)	510 (55)	1.44 (.98–2.12)	1.47 (1.37–2.07)
Street, alley, or vacant lot	8 (6)	77 (8)	.76 (.36–1.62)	–
Shooting gallery	24 (19)	214 (23)	.80 (.50–1.28)	–
Receptive syringe sharing [†]	63 (51)	556 (60)	.69 (.48–1.01)	–
Distributive syringe sharing [†]	63 (51)	585 (63)	.61 (.42–.88)	–
Lifetime use of marijuana	69 (56)	893 (93)	.09 (.06–.14)	–
Recent use of marijuana [†]	28 (23)	361 (39)	.43 (.28–.68)	–
Lifetime use of alcohol	61 (49)	770 (83)	.20 (.13–.29)	–
Ever experienced drug-related overdose	44 (36)	426 (45)	.65 (.44–.95)	.53 (.38–.75)
Had an abscess [†]	28 (27)	305 (33)	.67 (.43–1.04)	–
Purchased syringe most often from a "safe source" [§]	116 (94)	873 (94)	.91 (.42–1.97)	–
Purchased syringe most often from a <i>tiendita</i> or market	45 (36)	253 (27)	1.52 (1.03–2.25)	1.53 (1.08–2.17)
Aware of needle exchange programs	33 (27)	218 (23)	1.18 (.77–1.81)	–
Used a needle exchange program [†]	27 (82)	150 (67)	2.04 (.81–5.17)	–
Ever accessed drug treatment	45 (39)	444 (49)	.61 (.42–.91)	.62 (.44–.88)

	“Injection first,” <i>n</i> = 124, <i>N</i> (%)	Non-“injection first,” <i>n</i> = 928, <i>N</i> (%)	Univariate odds ratio (95% CI)	Adjusted* odds ratio (95% CI)
Sexual behaviors				
Always used condom with regular sex partner ^{†, //}	1 (6)	18 (12)	.51 (.06–4.13)	–
Always used condom with casual sex partner ^{†, ¶}	8 (45)	69 (42)	1.10 (.41–2.93)	–
Ever traded sex for money, drugs, goods, or shelter	17 (14)	224 (24)	.50 (.29–.85)	.50 (.32–.80)
Traded sex for money, drugs, goods, or shelter [†]	9 (7)	107 (12)	.60 (.29–1.2)	–

* Adjusted for all other variables in the model (*N* = 1,020).

[†] Previous 6 months.

[‡] Median, intraquartile range (IQR) reported.

[§] Pharmacist, needle exchange program, doctor/clinic/hospital, veterinary clinic, or market.

// One hundred sixty-two participants reported a regular sex partner.

¶ One hundred eighty-two participants reported.