HHS Public Access

Author manuscript

Int J Drug Policy. Author manuscript; available in PMC 2016 November 01.

Published in final edited form as:

Int J Drug Policy. 2015 November ; 26(11): 1150–1157. doi:10.1016/j.drugpo.2015.06.002.

Effect of Legal Status of Pharmacy Syringe Sales on Syringe Purchases by Persons Who Inject Drugs in San Francisco and San Diego, CA

Saira S. Siddiqui[1,*], **Richard Armenta**[2,*], **Jennifer L. Evans**[3], **Michelle Yu**[3], **Jazmine Cuevas-Mota**[2], **Kimberly Page**[3], **Peter Davidson**[2], and **Richard S. Garfein**[2,†]

[1]Graduate School of Public Health, San Diego State University, San Diego, CA, USA

[2]Division of Global Public Health, School of Medicine, University of California San Diego, San Diego, CA, USA

[3]Department of Epidemiology and Biostatistics, University of California San Francisco, San Francisco, CA, USA

Abstract

Sharing blood-contaminated syringes is the main risk factor for acquiring and transmitting blood-borne infections among persons who inject drugs (PWID). To reduce this risk, in 2005, California enacted legislation allowing local health jurisdictions to legalize non-prescription syringe sales after approving a disease prevention demonstration project (DPDP). With San Francisco approving a DPDP immediately and San Diego never approving one, we compared PWID across cities for their use of pharmacies PWID to obtain syringes. PWID age 18–30 years old were recruited into separate studies in San Francisco (n=243) and San Diego (n=338) between 2008 and 2011. We used multivariable logistic regression to compare the proportions of PWID who obtained syringes from pharmacies by city while controlling for socio-demographics, injection practices and other risk behaviors. Overall, most PWID were white (71%), male (63%), and between the ages of 18–25 years (55%). Compared to San Francisco, a smaller proportion of PWID in San Diego had bought syringes from pharmacies in the prior three months (16.9% vs. 49.8%; p<0.001), which remained statistically significant after adjusting for socio-demographic and behavioral factors (adjusted odds ratio=4.45, 95% confidence interval: 2.98, 6.65). Use of pharmacies to obtain syringes was greater where it was legal to do so. Public health policy can influence HIV and hepatitis C associated risk among PWID; however, implementation of these policies is crucial for the benefits to be realized.

†Corresponding Author: rgarfein@ucsd.edu.
*Co-primary authors

Keywords

Persons who Inject Drugs; Injection Drug Use; Hepatitis C; Human Immunodeficiency Virus; Pharmacies; Syringe Access; Health Policy

INTRODUCTION

Injection drug use has been found to be a major risk factor in acquiring and transmitting blood-borne pathogens, accounting for the majority of hepatitis C virus (HCV) and 8% of new human immunodeficiency virus (HIV) infections in the United States.[1] These infections can be spread among persons who inject drugs (PWID) through sharing contaminated syringes and drug preparation equipment, high-risk sexual behaviors, and perinatal transmission.[2,3] While syringe exchange programs are an important source for sterile syringes for PWID, they often have limited hours of operation, restrict the number of syringes per exchange, and are inaccessible to PWID without transportation. Thus, pharmacies can be a viable source of sterile syringes for PWID due to the increased availability compared to syringe exchange programs; hence decreasing the HIV prevalence of those PWID who purchase syringes from a pharmacy.[4]

In 2005, California passed Senate Bill 1159, which legalized the sale without a prescription of up to ten hypodermic needles or syringes to persons age 18 years or older for human use, after the local health jurisdiction (typically counties) approved and implemented a Disease Prevention Demonstration Project (DPDP).[5] Once approved, pharmacies within jurisdictions with a DPDP could sell nonprescription syringes after registering with the local health department and agreeing to provide information about accessing drug treatment, testing and treatment for HIV and HCV, and safe disposal of sharps waste. A natural experiment was created since approval was not consistent across the state. San Francisco approved a DPDP in the first year, whereas San Diego never approved a DPDP.[6] In both cities, unrelated studies assessing syringe access among young adult PWID took place concomitantly. Both cities had legal syringe exchange programs (SEPs), although SEP availability in San Francisco was greater than in San Diego. Data collected from San Diego shows that about an average of 300, 000 syringes have been disbursed per year in the past five years while San Francisco has been noted to provide 2.3 million clean syringes per year. [7,8] By comparing data from both studies, we sought to determine whether the prevalence of purchasing new syringes from pharmacies differed by city after controlling for socio-demographic and behavioral factors that could influence syringe sources used by PWID.

METHODS

Study Population

Independent studies involving young adult PWID were implemented concurrently in San Francisco and San Diego. Data were combined for this analysis.

San Diego

The Study To Assess Hepatitis C Risk (STAHR) was a cross-sectional study to estimate the prevalence and identify correlates of HCV and HIV infections among PWID in San Diego. The study took place between March 2009 and June 2010. Details about the study were published elsewhere.[9]

In brief, PWID were identified through venue-based recruitment at San Diego's two SEP locations, street outreach (i.e., word-of-mouth, street intercepts, targeted advertising, and flyers), and respondent driven sampling (RDS).[10] Individuals were eligible if they were 18–40 years old, injected at least once within the past 6 months, currently resided in San Diego County and agreed to serologic testing for HCV and HIV infection. All participants completed a behavioral risk assessment followed by counseling and testing for HCV and HIV infection. Behavioral data were collected using audio computer-assisted self-interviewing (ACASI). The study was approved by the University of California San Diego *Human Research Protections Program*. The current analysis was also approved by the San Diego State University Institutional Review Board.

For the current analysis STAHR participants over 30 years-old were excluded to match the age range of the San Francisco cohort. Of the 566 participants enrolled in STAHR, 338 were between the ages of 18 and 30 years and provided complete responses to questions used in the current analysis.

San Francisco

"U Find Out" (UFO) is a longitudinal cohort study of young adult PWID in San Francisco that has been ongoing since 2000. The study's methods are described elsewhere.[11–13] Participants were recruited through street outreach, targeted advertising and word-of-mouth. Eligibility criteria included age ≤30 years, reported injecting drugs in the prior month, English as their primary language, and no plans to move from San Francisco within the next three months. At baseline, participants completed an interviewer-administered behavioral risk assessment, followed by testing for HCV infection. Participants who tested HCV negative were eligible for the longitudinal cohort. The questionnaire included demographic information and drug-use behaviors in the prior three months. Participants also received pre- and post-test counseling. Since enrollment of new cohort participants was temporarily suspended 2009–2010, we obtained a cross-sectional sample of PWID for the current analysis by including baseline data from individuals enrolled between 2008 and 2011 and follow-up data from the earliest visit during that period for individuals already enrolled in the cohort. A total of 245 unique individuals age 18–30 years were included in this analysis.

Data Collection

The dependent variable for this analysis is accessing new syringes from pharmacies in the past three months. In STAHR, participants were asked, "In the last 3 months, when you used a syringe for injecting drugs, from where did you get the syringe?" and given multiple response options including "from a pharmacist", which was the first option listed. In UFO, participants were asked, "In the last 3 months, did you personally get any new rigs from a pharmacy (including for other people)?", to which they could respond "yes" or "no". From

these two questions, we created a common dependent variable for “Purchased syringe from a pharmacy” coded as “yes” or “no”. The primary covariate in this analysis is the location (San Francisco vs. San Diego).

Sociodemographic Variables—While an extensive set of variables were collected in each study, the current analysis was restricted to questions that were comparable across the studies. In addition to characterizing the sample in terms of sociodemographics, injection practices, and other risk behaviors, we included variables that were considered potential confounders of the putative association between location and accessing syringes from a pharmacy in the prior three months. While the wording of most variables allowed for direct comparisons, recoding was required for the following variables to make them comparable.

Stable Housing—In STAHR, participants were asked “In the past 6 months, where did you sleep most of the time?” and allowed to select one item from a list of options. In UFO, participants were asked “What is the MAIN type of place you lived in the last 3 months?” These variables were combined to produce a variable for “Unstable Housing” that was coded as “yes” if participants selected a non-stable place to live (e.g., on the streets, in a shelter, car, shooting gallery, halfway house, jail, etc.). The reference category is “no”.

Syringe exchange program—In STAHR, participants were asked “Have you used a local syringe exchange program in the last 3 months?” In the UFO participant questionnaire, ‘In the last 3 months did you personally get any new rigs from a needle exchange (including for other people)?” Response categories were ‘yes’ and ‘no’ for both studies. Reference category is “no”.

Income source—Refers to past six months for STAHR and past 3 months for UFO. Income source was collapsed into 4 categories, “income generated from restricted or prohibited activities” (i.e., theft, robbing, stealing, selling syringes, selling drugs or running drugs, trading sex for money, panhandling and other restricted or illicit sources of income), “income from paid work or assistance” (i.e., regular job, temporary employment, public assistance, getting money from friends or family), “income from both sources”, and “income generated from other activities” (i.e., recycling, bartering, stipends, selling crafts). The referent category is income from restricted or prohibited activities.

HCV and HIV status—We used self-reported HIV and HCV infection status because HIV testing was not performed in San Francisco. Self-reported status was determined by asking participants if they had ever been tested for each virus, and if “yes”, they were asked for the test result. In this analysis, “no” to EVER tested was coded as “don’t know/not tested” for the status variable, otherwise status was recorded as “positive” or “negative”.

Injection Frequency—Participants were asked to quantify the number of times they injected per day in the past three months. For descriptive analysis this variable was recoded as “0–2”, “3–5”, “6–10”, “11–20” and “≥21”. For analysis the latter three categories were collapsed due to low cell count and new categories were “0–2” (ref), “3–5”, “ ≥6”.

Drugs Injected—STAHR participants were asked to report the *frequency* of injecting specific drugs in the past three months; whereas UFO participants were asked *whether* they used each drug (yes/no). Thus, the STAHR variables were dichotomized (yes/no) for comparability with UFO data. We further collapsed drug injected into "heroin", which included heroin combined with any other drug (e.g., cocaine, crack and speed) versus "other than heroin". Reference category is "heroin".

Shared Cookers—In the STAHR study, participants were asked of the times they injected in the last 3 months, how often did they "use a cooker with someone or after someone else used it". Participants who responded "less than half the time", "about half of the time", "more than half the time", or "always" to any of these questions were categorized as "yes"; those who responded "never" were categorized as "no" for this analysis. In the UFO study, participants were asked "In the last 3 months, did you EVER share a cooker or other container for dissolving drugs, or used one that had already been used by someone else?" Response categories were "yes" and "no". Reference category is "no". Similarly the variables, Shared Rinse Water and Lent a Used Syringe were re-categorized and examined as was the variable Shared Cookers.

Data Analysis

The dependent variable for this analysis was obtaining syringes from a pharmacy in the past 3 months. Variables were analyzed using frequencies and percentages for categorical variables. Differences by location and pharmacy use were examined using chi-square tests. Logistic regression was used to assess the bivariate and multivariable associations of selected factors with obtaining syringes from a pharmacy. All variables found to be significant ($P \leq 0.20$) in bivariate analysis were considered for inclusion in multivariable analysis. Backward stepwise logistic regression was performed, and factors that were statistically significant ($P \leq 0.05$) in multivariable analysis remained in the final model. Odds ratios (OR) and adjusted odds ratios (AOR) with 95% confidence intervals (CI) are reported to show the strength and direction of these associations. We hypothesized that after controlling for potential confounders, the proportion of PWID who obtained syringes from pharmacies will be greater in San Francisco than in San Diego.

RESULTS

The combined dataset consisted of 334 (58%) PWID from San Diego and 245 (42%) PWID from San Francisco. Overall, the majority were white (71%), male (63%), and between the ages of 18–25 years (55%). Table 1 presents the participant characteristics overall and by location. In both locations, more participants were interviewed in 2010–2011 than in the two years prior, and this difference was greater in San Francisco (p=0.002). Overall, 36% of participants purchased syringes from a pharmacy in the prior three months, which was more prevalent in San Francisco than in San Diego (49.8% vs. 16.9%; p<0.001). Several variables were associated with location and considered potential confounders of the association between location and purchasing syringes from a pharmacy. These included, year of interview, age, race, housing status, income source, education, self-reported HCV infection status, age at first injection, daily injection frequency, and SEP use (all p-values <0.05).

Compared to San Francisco, a significantly higher proportion of PWID in San Diego were 26–30 years old, non-white, stably housed, reported a sole source of income from paid work or assistance, and shared rinse water; a significantly lower proportion had a high school education or higher, positive self-reported HCV test results, purchased a syringe from a pharmacy, used a local SEP, were <15 years old at first injection, injected 0–2 times/day, and injected drugs other than heroin in the last 3 months (all $p<0.05$).

Table 2 shows the results of bivariate analysis of participant characteristics by syringe purchase in a pharmacy. Compared to those who did not purchase syringes from a pharmacy, those who did were more likely to be from San Francisco, interviewed in the later period, were of white race, shared a cooker, lacked stable housing, mostly injected heroin, injected 6 or more times a day, had an education level of high school or greater, received income from paid work or assistance and restricted/prohibited activities and used a local syringe exchange program; they were less likely to report HCV status as positive (all $p<0.20$).

In the multivariable analysis (Table 3), PWID in San Francisco had 4.45 times higher odds of obtaining syringes from pharmacies in the past three months than PWID in San Diego after adjusting for potential confounders (adjusted odd ratio [AOR]=4.45; 95% CI: 2.98–6.65). Other factors independently associated with pharmacy use were white race (AOR=0.49; 95% CI: 0.31–0.75), sharing a cooker in the last 3 months (AOR=1.62; 95% CI: 1.08–2.44) and later year of interview (AOR=2.12; 95% CI: 1.40–3.21).

DISCUSSION

Young adult PWID living in San Francisco, where non-prescription syringe sale was legalized, were 4.45 times more likely to purchase syringes from pharmacies than young adult PWID living in San Diego, where pharmacy syringe sales required a prescription. This association remained statistically significant after controlling for socio-demographic and behavioral factors that differed by city. Notably, less than half of the PWID in either city had obtained new syringes from a pharmacy during the prior three months. Differences in pharmacy use were observed despite the fact that legal SEPs operate in both cities. In fact, because San Diego's SEP operates only six hours per week and has only two locations to serve an area four times more populous than San Francisco, the pressure for PWID to use pharmacies in San Diego should be greater and suggests that legalization of non-prescription syringe sales in San Diego could have an even greater impact than in San Francisco.

Use of pharmacies was also independently associated with White race, sharing a cooker and being interviewed in 2010–2011 versus 2008–2009. This study was possible due to a natural experiment resulting from passage of a California state law that allowed local health jurisdictions to individually opt to allow pharmacies to sell syringes without a prescription. These findings indicate that PWID may be more likely to access syringes from a pharmacy after laws are enacted permitting them to do so. An increase in pharmacy sales during the years of 2010–2011, could be due to the implementation and the awareness of new laws allowing pharmacy access. Furthermore, San Francisco participants had lower educational status, unstable housing, and lack of income from a regular job, yet they were still more

likely to access pharmacies than PWID in San Diego indicating that economic status may not be a major factor involved in pharmacy syringe access. Furthermore, San Francisco participants reported a lower prevalence of HCV infection and risky injection practices. These findings could result from greater access to pharmacies that sell non-prescription syringes among PWID in San Francisco, which is consistent with other studies reporting associations between pharmacy use and lower rates of HIV and HCV infection, as well as lower rates of syringe sharing.[4,14–16]

The finding that more PWID obtained syringes from pharmacies in a city where non-prescription sales are legal is consistent with other studies showing an increase in pharmacy sales by PWID after implementation of non-prescription syringe sales.[15,17,18] For instance, Groseclose and colleagues[18] found an increase in pharmacy access from 19% to 78% after partial repeal of laws surrounding drug paraphernalia and syringe possession. Additionally, several studies found pharmacy access to be associated with reductions in sharing syringes.[14–16,18]

Our study found that white PWID were more likely to access pharmacies than other racial/ethnic groups, which is consistent with other studies.[20–23] Studies have found that Black PWID were less likely to access pharmacies for syringes.[21,24] One reason could be racial bias in the sales of syringes to White versus Black PWID even in absence of laws denying non-prescription syringe sales.[21,24] Availability of pharmacies may also vary by neighborhood. One study found that, in predominantly White districts, there was greater access to pharmacies that sold syringes over the counter than in districts with fewer non-Hispanic White residents.[25] The impact of syringe access on Blacks and other racial/ethnic minority groups could potentially be correlated with their higher prevalence of HIV/AIDS.

Being interviewed later (2010–2011 vs. 2009–2010) was associated with purchasing a syringe from a pharmacy. Despite the approval of a DPDP in San Francisco in 2005,[6] pharmacies may have taken some time implement and widely adopt the practice of syringe selling, which could explain the association with interview period. California passed a new law in January 2012 that legalizes non-prescription syringe sales statewide without the requirement for local health jurisdictions to establish DPDPs and register pharmacies before they can sell syringes without a prescription.[26] Future studies are needed to determine whether this law increased the use of pharmacies among PWID in San Diego.

Sharing a cooker in the last three months was found to be associated with pharmacy use. Sharing equipment such as cookers to prepare and split drugs permits the potential transfer of viral pathogens such as HCV and HIV from one PWID to the next,[27] and has been found to be associated with HCV infection.[9,28] Additionally, studies have found that despite the use of clean syringes, cookers were commonly shared injection items.[29,30] While pharmacies may increase access to sterile syringes for PWID, they are not expected to change the practice of sharing other injection paraphernalia. Furthermore, prevention messages have typically focused on eliminating syringe sharing with little or no information about sharing other injection equipment. Interventions to decrease the sharing of all types of injection equipment are needed.

Limitations

Some limitations should be considered when interpreting these findings. This analysis was restricted to PWID age 18–30 years and may not represent all PWID. However, this age group represents PWID who started injecting after harm reduction messages recommending using new syringes for each injection were widespread making this group more sensitive than older PWID to obtaining syringes from safe sources when possible. Since data for this analysis came from two independent studies and some questions were similar, but not identical across sites, these variables were recoded to make the responses comparable; however, that resulted in sacrificing some detail for those questions. In addition, some potential confounders could not be addressed in our analysis because the questions were only available from one site (e.g., actual HIV/HCV test results, barriers to syringe access, police interactions). Misclassification of the dependent variable could have occurred because the questions were not identical in both cities (i.e., San Diego PWID were asked to select from a list of sources that included a “pharmacy”; whereas, San Francisco PWID were asked if they “personally” obtained syringes from a pharmacy). However, because “pharmacy” was the first response option in the San Diego questionnaire, the response options were temporally similar in both cities; and San Diego PWID could have over-reported pharmacy use if they interpreted the question to include syringes received from others who went to a pharmacy. Thus, any misclassification would have preferentially inflated the prevalence of pharmacy use in San Diego causing our results to be conservative rather than inflated. These data were all self-reported making them vulnerable to problems with recall and socially desirable responding. However, in both cities, a relatively short recall period (last 3 months) was used to minimize problems with recall. Finally, since this was a secondary analysis, the participants could not have known that use of pharmacies to obtain new syringes was the focus of this analysis and avoids the problem of biased reporting of this practice.

CONCLUSIONS

This study found that the use of pharmacies to obtain new syringes was greater in a city where it is legal to do so, and despite legalization in San Francisco, only half of that city’s young adult PWID reported obtaining new syringes from a pharmacy in the past three months. As pharmacists’ attitudes can influence syringe sales to PWID[31], it would be important to determine how widely adopted syringe sales are in San Francisco pharmacies, and to provide education to pharmacists in San Diego to help them implement the new statewide law since it has been shown to increase their willingness to sell syringes to PWID.[19,21] Increasing pharmacists’ willingness to sell syringes to PWID could help reduce the risk of bloodborne viral infections by reducing the need to re-use syringes. As concluded by other studies outreach and education to pharmacists is recommended for increasing their participation in pharmacy syringe sales.[32,33,34]

The study’s findings suggest that health policies around syringe access can have an important impact on reducing HIV and HCV associated risk behaviors among PWID. Future studies evaluating the statewide adoption of non-prescription syringe sales could provide evidence on the effect of policy change on the incidence of these infections. Information gained from this study could help researchers, policy makers and public health practitioners

understand the important role that pharmacies play in increasing access to sterile syringes to PWID so they can adhere to the harm reduction principal of using a new syringe for each injection.

Acknowledgments

We would like to acknowledge the participation of all the STAHR and UFO Study participants without whom this research and the knowledge we gain to help promote health and prevent disease would not be possible. We also thank Michelle Bulterys for editing the manuscript. The STAHR study was funded by a contract from contract (#200-2007-21016) from the Centers for Disease Control and Prevention (CDC), and the UFO study was supported by a grant from the National Institute on Drug Abuse ([NIDA] DA016017). Further support for the UFO study was provided from UCSF CTSI (NIH UL1 RR024131) and UCSF Liver Center (NIH P30 DK 026743). R.S.G. received support for this analysis from NIDA (DA031074). R.A. was supported by a NIDA-funded Diversity Supplement (DA031074-02S1).

References

1. Centers of Disease Control and Prevention [CDC]. [1.5.2014] HIV Surveillance Report, 2011. 2013. Retrieved from http://www.cdc.gov/hiv/topics/surveillance/resources/reports/
2. Nicolosi A, Leite ML, Musicco M, Molinari S, Lazzarin A. Parenteral and sexual transmission of human immunodeficiency virus in intravenous drug users: A study of seroconversion. The Northern Italian Seronegative Drug Addicts (NISDA) study. Am J Epidemiol. 1992; 135(3):225–233. [PubMed: 1312300]
3. Wood E, Kerr T, Stoltz J, et al. Prevalence and correlates of hepatitis C infection among users of North America's first medically supervised safer injection facility. Public Health. 2005; 119(12): 1111–5. [PubMed: 16214189]
4. Friedman S, Perlis T, Des Jaralais D. Laws prohibiting over-the-counter syringe sales to injection drug users: Relations to population density, HIV prevalence, and HIV incidence. Am J Public Health. 2001; 91(5):791–793. [PubMed: 11344889]
5. California Department of Public Health [CDPH]. [Accessed September 22, 2014] Nonprescription sale of syringes (NPSS) in pharmacies: Information for pharmacists, frequently asked questions about the disease prevention demonstration project. 2011. Available at: http://www.cdph.ca.gov/programs/aids/Documents/SAInfoForPharmacistsSB1159.pdf
6. California Department of Public Health. [Accessed September 22, 2014] SB 1159 Report: An Evaluation of Over-the-Counter Sale of Sterile Syringes in California. 2010. Available at: http://www.cdph.ca.gov/programs/aids/Documents/SB1159StateReportFinal.pdf
7. [Accessed: May 27, 2015] Safe Point San Diego Clean Syringe Exchange Program [CSEP]. Annual report. Available at: http://docs.sandiego.gov/councilcomm_agendas_attach/2014/psln_141113_8.pdf
8. San Francisco Aids Foundation [SFAF]. [Accessed: May 27, 2015] Syringe Access Program. Received from: http://sfaf.org/client-services/syringe-access/
9. Garfein RS, Rondinelli A, Barnes RFW, et al. HCV infection prevalence lower than expected among 18–40 year-old injection drug users in San Diego, CA. J Urban Health. 2012; 90(3):516–528. [PubMed: 22766605]
10. Heckathorn DD. Respondent-driven sampling II: Deriving valid population estimates from chain-referral samples of hidden populations. Social Problems. 2002; 49:11–34.
11. Hahn JA, Page-Shafer K, Lum PJ, Ochoa K, Moss AR. Hepatitis C virus infection and needle exchange use among young injection drug users in San Francisco. Hepatology. 2001; 34(1):180–187. [PubMed: 11431749]
12. Hahn JA, Page-Shafer K, Lum PJ, et al. Hepatitis C virus seroconversion among young injection drug users: relationships and risks. J Infect Dis. 2002; 186(11):1558–1564. [PubMed: 12447730]
13. Page K, Hahn JA, Evans J, et al. Acute hepatitis C virus infection in young adult injection drug users: a prospective study of incident infection, resolution, and reinfection. J Infect Dis. 2009; 200(8):1216–1226. [PubMed: 19764883]

14. Calsyn DA1, Saxon AJ, Freeman G, Whittaker S. Needle-use practices among intravenous drug users in an area where needle purchase is legal. AIDS. 1991; 5(2):187–93. [PubMed: 2031691]
15. Golub ET, Bareta JC, Mehta SH, McCall LD, Vlahov D, Strathdee SA. Correlates of unsafe syringe acquisition and disposal among injection drug users, in Baltimore, Maryland. Subst Use Misuse. 2005; 40(12):1751–1764. [PubMed: 16419554]
16. Latkin CA, Forman VL. Patterns of needle acquisition and sociobehavioral correlates of needle exchange program attendance in Baltimore, Maryland, U.S.A. J Acquir Immune Defic Syndr. 2001; 27(4):398–404. [PubMed: 11468429]
17. Coffin PO, Latka MH, Latkin C, et al. Safe syringe disposal is related to safe syringe access among HIV-positive injection drug users. AIDS Behav. 2007; 11(5):652–662. [PubMed: 17053854]
18. Groseclose S, Weinstein B, Jones T, Valleroy L, Fehrs L, Kassler WJ. Impact of increased legal access to needles and syringes on practices of injecting-drug users and police officers--Connecticut, 1992–1993. J Acquir Immune Defic Syndr. 1995; 10:82–89.
19. Fuller CM, Galea S, Caceres W, Blaney S, Sisco S, Vlahov D. Multilevel community-based intervention to increase access to sterile syringes among injection drug users through pharmacy sales in New York City. Am J Public Health. 2007; 97:117–124. [PubMed: 17138929]
20. Bryant J, Treloar C. Risk practices and other characteristics of injecting drug users who obtain injecting equipment from pharmacies and personal networks. Int J Drug Policy. 2006; 17(5):418–424.
21. Costenbader EC, Zule WA, Coomes CC. Racial differences in acquisition of syringes from pharmacies under conditions of legal but restricted sales. Int J Drug Policy. 2010; 21(5):425–428. [PubMed: 20097052]
22. Rudolph AE, Crawford ND, Ompad DC, Benjamin EO, Stern RJ, Fuller CM. Comparison of injection drug users accessing syringes from pharmacies, syringe exchange programs, and other syringe sources to inform targeted HIV prevention and intervention strategies. J Am Pharm Assoc. 2010; 50(2):140–147.
23. Sherman SG, Rusch M, Golub ET. Correlates of safe syringe acquisition and disposal practices among young IDUs: Broadening our notion of risk. J Drug Issues. 2004; 34(4):895–912.
24. Compton W, Cottler L, Decker S, Mager D, Stringfellow R. Legal needle buying in St. Louis. Am J Public Health. 1992; 82(4):595–596. [PubMed: 1546784]
25. Cooper H, Bossak B, Tempalski B, Friedman S, Des Jarlais D. Temporal trends in spatial access to pharmacies that sell over-the-counter syringes in New York City health districts: Relationship to local racial/ethnic composition and need. J Urban Health. 2009; 86(6):929–945. [PubMed: 19911283]
26. California Department of Public Health [CDPH]. [Accessed: September 22, 2014] Nonprescription sales of syringes (NPSS) through licensed pharmacies, Senate Bill 41. 2011. Available at: http://www.cdph.ca.gov/programs/aids/Documents/SB%2041%20-%20Letter%20to%20Stakeholders_Final%2011.20.pdf
27. Clatts MC, Heimer R, Abdala N, et al. HIV-1 transmission in injection paraphernalia: heating drug solutions may inactivate HIV-1. J Acquir Immune Defic Syndr. 1999; 22(2):194–199. [PubMed: 10843535]
28. Thorpe LE, Ouellet LJ, Hershow R, et al. Risk of hepatitis C virus infection among young adult injection drug users who share injection equipment. Am J Epidemiol. 2002; 155(7):645–53. [PubMed: 11914192]
29. Bluthenthal RN, Anderson R, Flynn NM, Kral AH. Higher syringe coverage is associated with lower odds of HIV risk and does not increase unsafe syringe disposal among syringe exchange program clients. Drug Alcohol Depend. 2007; 10(89):214–222. [PubMed: 17280802]
30. Koester S, Booth RE, Zhang Y. The prevalence of additional injection-related HIV risk behaviors among injection drug users. J Acquir Immune Defic Syndr Hum Retrovirol. 1996; 12(2):202–7. [PubMed: 8680893]
31. Cooper E, Dodson C, Stopka T, Riley E, Garfein R, Bluthenthal RN. Pharmacy participation in non-prescription syringe sales in Los Angeles and San Francisco counties, 2007. J Urban Health. 2010; 87(4):543–552. [PubMed: 20549568]

32. Tesoriero J, Battles H, Klein S, Kaufman E, Birkhead G. Expanding access to sterile syringes through pharmacies: assessment of New York's Expanded Syringe Access Program. Journal of the American Pharmacists Association: JAPhA. 2008; 49(3):407–416. [PubMed: 19443321]

33. Fuller CM, Ahern J, Vadnai L, Coffin P, Galea S, Factor SH, Vlahov D. Impact of increased syringe access: preliminary findings on injection drug user syringe source, disposal, and pharmacy sales in Harlem, New York. Journal of the American Pharmacists Association. 2002; 42(6s2):S77–S82.

34. Coffin PO, Fuller C, Blaney S, Vadnai L, Miller S, Vlahov D. Syringe distribution to injection drug users for prevention of HIV infection: opinions and practices of health care providers in New York City. Clinical Infectious Diseases. 2004; 38(3):438–441. [PubMed: 14727219]

- The use of pharmacies to obtain new syringes is greater in a city where it is legal to do so.
- Less than half of persons who inject drugs (PWID) in either city had obtained new syringes from a pharmacy during the prior three months.
- Public health policy can reduce HIV and hepatitis C associated risk behaviors among PWID

Table 1

Characteristics of 18–30 Year Old Persons Who Inject Drugs in San Diego (n=338) and San Francisco (n=245), California, 2008–2011

Characteristic	San Diego n (%)	San Francisco n (%)	Total n (%)	*P-Value*
Year of interview				0.002
2008–2009	159 (47.0)	84 (34.3)	243 (41.7)	
2010–2011	179 (53.0)	161 (65.7)	340 (58.3)	
Age (years)				0.032
18–25	174 (51.5)	148 (60.4)	322 (55.2)	
26–30	164 (48.5)	97 (39.6)	261 (44.8)	
Race				<.001
White	182 (56.9)	174 (71.0)	356 (63.0)	
Non-white	138 (43.1)	71 (29.0)	209 (37.0)	
Gender				0.731
Male	239 (70.7)	175 (72.0)	414 (71.3)	
Female	99 (29.3)	68 (28.0)	167 (28.7)	
Stable housing[b]				<.001
No	123 (36.7)	180 (74.1)	303 (52.4)	
Yes	212 (63.3)	63 (25.9)	275 (47.6)	
Born in U.S.				0.997
No	10 (3.0)	7 (3.0)	17 (3.0)	
Yes	328 (97.0)	230 (97.1)	558 (97.0)	
Income source[b]				<.001
Restricted/prohibited activities	32 (9.5)	35 (14.4)	67 (11.6)	
Paid work or assistance	142 (42.3)	49 (20.2)	191 (33.0)	
Both of above sources	150 (44.6)	152 (62.6)	302 (52.2)	
Other source	12 (3.6)	7 (2.9)	19 (3.3)	
Highest level of education				0.018
<High School	97 (28.7)	92 (38.0)	189 (32.6)	
≥High School	241 (71.3)	150 (62.0)	391 (67.4)	
Self-reported HCV status				<.001
Negative/Don't know	305 (94.7)	193 (80.8)	498 (88.8)	
Positive	17 (5.3)	46 (19.3)	63 (11.2)	
Self-reported HIV status				0.363
Negative/Don't know	314 (96.6)	233 (95.1)	547 (96.0)	
Positive	11 (3.4)	12 (4.9)	23 (4.0)	
Age first injected drugs				<.001
0–15	49 (14.5)	68 (30.0)	117 (20.7)	
16–20	159 (47.2)	107 (47.1)	266 (47.2)	
≥21	129 (38.3)	52 (22.9)	181 (32.1)	
Times inject per day				<.001
0–2	127 (37.9)	128 (52.7)	255 (44.1)	

Characteristic	San Diego n (%)	San Francisco n (%)	Total n (%)	*P-Value*
3–5	178 (53.1)	92 (37.9)	270 (46.7)	
≥6	30 (9.0)	23 (9.5)	53 (9.2)	
First drug injected				0.165
Heroin[c]	201 (62.2)	136 (56.4)	337 (59.8)	
Other drug	122 (37.8)	105 (43.6)	227 (40.3)	
Drugs injected most in last 3 months				<0.001
Heroin [c]	166 (62.4)	191 (78.0)	357 (69.9)	
Other drug	100 (37.6)	54 (22.0)	154 (30.1)	
Lent a used syringe				0.143
No	172 (51.2)	131 (57.5)	303 (53.7)	
Yes	164 (48.8)	97 (42.5)	261 (46.3)	
Shared a cooker				0.412
No	131 (39.5)	105 (42.9)	236 (40.9)	
Yes	201 (60.5)	140 (57.1)	341 (59.1)	
Shared rinse water				<.001
No	142 (42.6)	154 (63.4)	296 (51.4)	
Yes	191 (57.4)	89 (36.6)	280 (48.6)	
Used local syringe exchange program				<.001
No	174 (51.5)	75 (30.6)	249 (42.7)	
Yes	164 (48.5)	170 (69.4)	334 (57.3)	
Purchased syringe from pharmacy				<.001
No	281 (83.1)	123 (50.2)	404 (69.3)	
Yes	57 (16.9)	122 (49.8)	179 (30.7)	

[a] All behavioral variables refer to the past 3 months, unless otherwise indicated.

[b] San Diego: 6 months San Francisco: 3 month

[c] alone or mixed with other drugs

Int J Drug Policy. Author manuscript; available in PMC 2016 November 01.

Table 2

Bivariate Analysis of Factors Associated with Pharmacy Syringe Purchases among 18–30 Year Old Persons Who Inject Drugs, San Diego and San Francisco, California

	Purchased Syringe from a Pharmacy in the last 3 months?				
Characteristic	**Yes n (%)**	**No n (%)**	**Odds Ratios**	**95% CI**	***P-Value***
Year of Interview (n=583)					<.001
2008–2009	48 (19.8)	195 (80.2)	1		
2010–2011	131 (38.5)	209 (61.5)	2.55	1.73–3.74	
Location (n=583)					<.001
San Diego	57 (16.9)	281 (83.1)	1		
San Francisco	122 (49.8)	123 (50.2)	4.89	3.35–7.14	
Age (years) (n=583)					0.289
18–25	93 (28.9)	229 (71.1)	1		
26–30	86 (33.0)	175 (67.1)	1.21	0.85–1.72	
Race (n=565)					<.001
White	133 (37.4)	223 (62.6)	1		
Non-white	43 (20.6)	166 (79.4)	0.43	0.29–0.65	
Gender (n=581)					0.817
Male	128 (30.9)	286 (69.1)	1		
Female	50 (29.9)	117 (70.1)	0.96	0.65–1.41	
Stable housing (n=578)					<.001
No	111 (36.6)	192 (63.4)	1		
Yes	65 (23.6)	210 (76.4)	0.54	0.37–0.77	
Born in U.S. (n=575)					0.683
No	6 (35.3)	11 (64.7)	1		
Yes	171 (30.7)	387 (69.4)	0.81	0.3–2.23	
Income source [b] (n=579)					0.024
Restricted/prohibited activities	21 (31.3)	46 (68.7)	1		
Paid work or assistance	43 (22.5)	148 (77.5)	0.64	0.34–1.18	
Both of above sources	107 (35.4)	195 (64.6)	1.2	0.68–2.12	
Other source	5 (26.3)	14 (73.7)	0.78	0.25–2.46	

Purchased Syringe from a Pharmacy in the last 3 months?					
Characteristic	**Yes n (%)**	**No n (%)**	**Odds Ratios**	**95% CI**	***P-Value***
Education (n=580)					0.179
<High school	51 (27)	138 (73)	1		
≥High school	127 (32.5)	264 (67.5)	1.3	0.89–1.91	
Self-reported HCV status (n=561)					0.015
Negative/Don't know	146 (29.3)	352 (70.7)	1		
Positive	28 (44.4)	35 (55.6)	1.93	1.13–3.29	
Self-reported HIV status (n=570)					0.679
Negative/Don't know	168 (30.7)	379 (69.3)	1		
Positive	8 (34.8)	15 (65.2)	1.2	0.5–2.89	
Used local syringe exchange program (n=583)					0.015
No	63 (25.3)	186 (74.7)	1		
Yes	116 (34.7)	218 (65.3)	1.57	1.09–2.26	
Age first injected drugs (n=564)					0.727
0–15	32 (27.4)	85 (72.7)	1		
16–20	82 (30.8)	184 (69.2)	1.18	0.73–1.92	
≥21	57 (31.5)	124 (68.5)	1.22	0.73–2.04	
Times inject per day (n=578)					0.162
0–2	72 (28.2)	183 (71.8)	1		
3–5	83 (30.7)	187 (69.3)	1.13	0.78–1.64	
≥6	22 (41.5)	31 (58.5)	1.8	0.98–3.32	
First drug injected (n=564)					0.370
Heroin	110 (32.6)	227 (67.4)	1		
Other drugs	66 (29.1)	161 (70.9)	0.85	0.59–1.22	
Drugs injected in last 3 months (n=511)					0.163
Heroin	127 (35.6)	230 (64.4)	1		
Other than heroin	45 (29.2)	109 (70.8)	0.75	0.5–1.13	
Lent a used syringe (n=564)					0.582
No	91 (30.0)	212 (70.0)	1		
Yes	84 (32.2)	177 (67.8)	1.11	0.77–1.58	
Shared a cooker (n=577)					0.019

Int J Drug Policy. Author manuscript; available in PMC 2016 November 01.

Purchased Syringe from a Pharmacy in the last 3 months?					
Characteristic	**Yes n (%)**	**No n (%)**	**Odds Ratios**	**95% CI**	***P-Value***
No	60 (25.4)	176 (74.6)	1		
Yes	118 (34.6)	223 (65.4)	1.55	1.07–2.24	
Share rinse water (n=576)					0.319
No	97 (32.8)	199 (67.2)	1		
Yes	81 (28.9)	199 (71.1)	0.84	0.59–1.19	

[a] per year of increase

[b] P-value obtained using Fisher's Exact Test

Table 3

Multivariable Logistic Regression Analysis of Factors Associated with Pharmacy Syringe Purchases among 18–30 Year Old Persons Who Inject Drugs, San Diego and San Francisco, California (n=559)

Characteristic	Adjusted Odds Ratio	95% CI	P-Value
Location: San Francisco (ref. San Diego)	4.45	2.98–6.65	<0.001
Race: Non-white (ref. White)	0.49	0.31–0.75	0.001
Shared a cooker in past 3 months: Yes (ref. No)	1.62	1.08–2.44	0.021
Year of Interview: 2010–2011 (ref. 2008–2009)	2.12	1.40–3.21	<0.001