



## Risk-Taking Behaviors Among Injecting Drug Users Who Obtain Syringes From Pharmacies, Fixed Sites, and Mobile Van Needle Exchanges

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**ABSTRACT** *Needle-exchange programs (NEPs) have been shown to be effective in reducing harm related to injection drug use and to act as an important link between the injection drug using community and preventive/treatment services. Different needle-exchange distribution methods may reach different subpopulations of injecting drug users (IDUs). We undertook this study to characterize risk behaviors by primary source of clean needles accessed by IDUs in a city with pharmacy access and fixed and mobile exchange programs. We hypothesized there would be a gradient of risk across the three types of distribution. Data were collected from within the Vancouver Injection Drug Users Study (VIDUS), a prospective cohort study. Participants who primarily obtained clean needles from pharmacies, fixed sites, or mobile exchange vans were compared using the Cochran-Armitage trend test to test for trends in increasing risk behaviors across the three types of distribution. Ordinal multivariate regression was used to adjust the associations for potential confounders. Results illustrate clear trends for increasing risk profiles from pharmacy to fixed site to mobile exchange vans. Van users were generally at higher risk than fixed-site and pharmacy users. Independent predictors of van use were fewer years injecting, difficulty finding needles, Aboriginal ethnicity, incarceration in the previous 6 months, and injecting cocaine daily. An important component of needle-exchange programs is outreach to access those who are at highest risk. Use of distribution beyond fixed sites will improve such outreach, thereby increasing program effectiveness and further preventing the transmission of blood-borne infections.*

**KEYWORDS** *Aboriginal, Females, HIV, Injection Drug Users, Needle-Exchange Programs, Pharmacies, Risk Taking, Sex Trade Work.*

### INTRODUCTION

Policymakers continue to debate the role of needle-exchange programs (NEPs) in reducing the transmission of blood-borne infections among injection drug users (IDUs). Although NEPs have been shown to reduce the incidence of human immunodeficiency virus (HIV)<sup>1,2</sup> and hepatitis C virus (HCV),<sup>3,4</sup> the results have not always been consistent.<sup>5,6</sup> NEPs have also been associated with reductions in HIV risk

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behaviors among IDUs.<sup>7-11</sup> Further, NEPs have facilitated entry into drug treatment programs, served as venues for the delivery of clinical services, and established links among the IDU community, health care providers, and social services.<sup>12-15</sup> It has been argued that NEPs are a cost-effective method for supporting safe injection practices and reducing the harm caused by frequent injection drug use.<sup>16</sup>

“First-generation” NEP studies were originally focused on the reduction of HIV transmission among IDUs. Current investigations or “second-generation studies” are conducted to examine why some NEPs appear more effective in reducing HIV transmission, how NEPs can work in conjunction with other prevention efforts, and what components of NEPs enhance or reduce their effectiveness.<sup>17</sup>

Recent studies have shown that IDUs accessing NEPs tend to have higher risk profiles for the transmission of infections.<sup>18-20</sup> In a study conducted by Riley et al.<sup>21</sup> comparing recent NEP users in a city where pharmacy exchange and mobile van exchange are available, the authors found that the two different venues catered to different profiles of users such that mobile-exchange clients used drugs more frequently.<sup>21</sup>

Our setting is unique to many other locations in that needles are available legally through pharmacy sale and also available through fixed and mobile van NEPs. The objective of the present analysis was to characterize risk-taking behaviors according to primary source for clean needles accessed by an open cohort study of IDUs. We hypothesized that there would be a gradient of risk-taking behaviors among IDUs depending on which source for clean needles they primarily accessed. If true, this would have important implications for the design of NEPs, specifically about how to cater NEPs to best suit the risk profiles of IDUs in their communities.

## METHODS

### Study Site

The Downtown Eastside (DTES) is Vancouver’s poorest neighborhood, and many of the city’s IDUs reside in an area of approximately 10 city blocks, where inexpensive housing in the form of hotels and single room occupancies (SROs) abound.<sup>22</sup> There are an estimated 4,000 active IDUs living within the DTES.<sup>23</sup>

Vancouver’s fixed-site NEP was established in 1988 at a central location in a storefront in the DTES. The fixed-site NEP operates from 8:00 A.M. to 8:00 P.M. 7 days a week. It is run by the Downtown Eastside Youth Activities Society (DEYAS) and has exchanged over 1 million needles per year to 1993, 2 million to 1996, and 3 million in 2000. Recognizing the need for better and greater access to needles, the Downtown Eastside Youth Activities Society opened a mobile exchange in 1990 consisting of 1–2 vans (a third van was added in 1997) operating at staggered times between 5:30 P.M. and 8:00 A.M. with regular stops around the DTES and other areas of Vancouver. In addition, needles are legally available for purchase through pharmacies, although the willingness of pharmacists to sell syringes to IDUs is variable. The approximate pharmacy cost for syringes is Can \$30 (approximately US \$20) for a box of 100.

Data were collected within a prospective open cohort study of injection drug users, the Vancouver Injection Drug Users Study (VIDUS). The study office is located in the DTES of Vancouver and has recruited approximately 1,400 Vancouver area IDUs since May 1996. Eligible participants are administered a questionnaire by trained nurse-interviewers and are eligible for follow-up every 6 months. At each

visit, participants provide a venous blood sample that is tested for HIV and HCV. A description of this study has been previously published.<sup>5</sup>

The current analysis was based on data from the enrollment questionnaire, administered between May 1996 and November 2000. The majority of enrollments ( $N = 1,165$ , 81%) were completed during 1996 and 1997. The participants included in this analysis were those that had ever accessed an NEP and who reported primarily accessing pharmacies or the fixed site or van NEPs in the prior 6 months. In the questionnaire, only one source could be chosen as the respondent's primary source.

There were 416 participants excluded from this analysis. Those excluded most frequently obtained clean needles from other sources, including NEPs in other nearby municipalities, friends, on the street, street nurses, or dealers. The diversity of sources accessed for clean needles among these 416 participants precluded their inclusion in the current analysis. We wanted to minimize the misclassification that might have occurred by comparing IDUs who were accessing a variety of other sources and not the three main modalities. While we recognize these users are an important group, for the purpose of this analysis we wanted to compare IDUs who primarily accessed the three main syringe sources of interest.

The risk behaviors under study for this analysis were self-reported behaviors over the 6 months prior to interview. Unstable housing was defined as living in the following locations: no fixed address; transition houses; on the street, squats; hostel/shelter; or hotel room. The neighborhood variable DTES is where the participant has been living. The variable "hard to find needles" was based on a question as to whether respondents currently found it hard to get unused needles when they needed them. HIV and HCV serostatus were determined through venous blood samples collected from participants at the time of the baseline interview. This study was approved by the St. Paul's Hospital Committee on Human Experimentation.

### Statistical Analysis

To test our hypothesis that there is a gradient of risk-taking behaviors among different subpopulations of IDUs depending on their needle access, participants were categorized based on reported primary source for clean needles: pharmacy, fixed site, or mobile van site. The Cochran-Armitage trend test was used to test for trends in risk-taking behaviors across the three sources for clean needles. Ordinal logistic regression of the trichotomous dependent variable (pharmacy, fixed site, van) was undertaken to simultaneously adjust the associations of a number of risk factors with the source of clean needles. For all models, the proportional odds assumption was tested by the score test. All reported *P* values are two sided.

## RESULTS

As of November 2000, a total of 1,437 persons (932 males and 505 females) had completed enrollment questionnaires. The current analysis was based on 1,020 (659 males and 361 females) participants who had ever used an NEP in the downtown eastside and whose primary source for accessing clean needles was the pharmacy, fixed site, or mobile-exchange vans. When analyzing the data for the primary source for clean needles, 64 (6%) participants reported the pharmacy, 768 (75%) the fixed site, and 190 (19%) the van. The categories of interest were very often not those exclusively accessed by the participants; in fact, most of the participants reported accessing two or more of the distribution modalities. However, we have

tested the data to ensure that we have captured the site that is the primary one accessed for these participants.

Table 1 compares the demographic characteristics of participants by primary site of needle access. There were clear trends for increasing proportions of females, Aboriginals, incarceration in the previous 6 months, unemployment, living in the DTES, decreasing age, and daily needle accessing across the three categories. There was no significant trend for HIV or HCV prevalence, although HIV prevalence among pharmacy users was lower than for fixed-site and van users, and HCV prevalence was lower among van users. There was no statistical difference in unstable housing status.

Table 2 compares risk variables among pharmacy, fixed-site, and van users. There were clear trends across the three categories for increasing daily cocaine injection, being paid for sex, finding it hard to locate clean needles, and decreasing number of years injecting. There was no trend for daily heroin use, needle borrowing, and lending, although pharmacy users were more likely to report needle-sharing behaviors.

**TABLE 1. Comparison of characteristics for those reporting primarily pharmacy, fixed site, and mobile van needle-exchange program use in the VIDUS cohort between May 1996 and November 30, 2000 (N = 1,020)**

|                      | Pharmacy<br>(62, 6%) | Fixed<br>(768, 75%) | Van<br>(190, 19%) | <i>P</i> * |
|----------------------|----------------------|---------------------|-------------------|------------|
| Gender               |                      |                     |                   |            |
| Female               | 12 (19%)             | 272 (36%)           | 77 (41%)          | .003       |
| Age                  |                      |                     |                   |            |
| Median age<br>(IQR)  | 36<br>29–41          | 35<br>28–41         | 32<br>26–39       | .025†      |
| Ethnicity            |                      |                     |                   |            |
| Aboriginal           | 9 (15%)              | 206 (27%)           | 63 (33%)          | .005       |
| HIV positive         |                      |                     |                   |            |
| Yes                  | 10 (16%)             | 194 (25%)           | 40 (21%)          | .158       |
| Hepatitis C          |                      |                     |                   |            |
| Yes                  | 55 (89%)             | 634 (83%)           | 149 (78%)         | .157       |
| Employment           |                      |                     |                   |            |
| Yes                  | 18 (29%)             | 120 (16%)           | 25 (13%)          | .001       |
| Housing              |                      |                     |                   |            |
| Unstable             | 41 (66%)             | 555 (72%)           | 131 (69%)         | .859       |
| Jail (last 6 months) |                      |                     |                   |            |
| Yes                  | 13 (21%)             | 267 (35%)           | 76 (40%)          | .012       |
| Neighborhood         |                      |                     |                   |            |
| Downtown Eastside    | 24 (39%)             | 529 (69%)           | 127 (67%)         | .015       |
| Needle-Exchange use  |                      |                     |                   |            |
| Daily                | 9 (15%)              | 306 (40%)           | 94 (49%)          | .001       |
| Weekly               | 17 (27%)             | 366 (48%)           | 75 (39%)          |            |
| >Weekly              | 36 (58%)             | 96 (13%)            | 24 (12%)          |            |

\*Cochran-Armitage trend test; all reported *P* values are two sided.

†By analysis of variance.

**TABLE 2. Comparison of risk-taking behaviors for pharmacy, fixed sites and van users (N = 1,020)**

|                      | Pharmacy<br>(62, 6%) | Fixed<br>(768, 75%) | Van<br>(190, 19%) | <i>P</i> * |
|----------------------|----------------------|---------------------|-------------------|------------|
| Daily drug use       |                      |                     |                   |            |
| Cocaine              | 20 (32%)             | 372 (48%)           | 99 (52%)          | .024       |
| Heroin               | 19 (31%)             | 357 (46%)           | 88 (46%)          | .159       |
| Needle sharing       |                      |                     |                   |            |
| Borrow               | 29 (47%)             | 200 (26%)           | 59 (31%)          | .374       |
| Lend                 | 28 (45%)             | 276 (36%)           | 69 (36%)          | .432       |
| Hard to find needles |                      |                     |                   |            |
| Yes                  | 1 (2%)               | 53 (7%)             | 21 (11%)          | .008       |
| Paid for sex         |                      |                     |                   |            |
| Yes                  | 9 (15%)              | 181 (24%)           | 59 (31%)          | .004       |
| Years of injecting   |                      |                     |                   |            |
| Median               | 16                   | 13                  | 10                | .002†      |
| IOR                  | 9.5–22               | 5–23                | 5–17              |            |

\*Cochran-Armitage trend test; all reported *P* values are two sided.

†By analysis of variance.

Table 3 presents the results of an ordinal regression comparing risk factor covariates across the three types of syringe access. It should be noted that the assumption of proportional odds was first confirmed by a score test. The following independent risk associations with the ordinal access outcome were detected: fewer years injecting, finding it hard to locate needles, being Aboriginal, incarceration in the previous 6 months, and daily cocaine injection.

**TABLE 3. Ordinal logistic regression of risk behaviors across the three categories from pharmacy to fixed site to mobile van**

|                            | Adjusted odds ratios<br>(95% CI) |
|----------------------------|----------------------------------|
| Years fixing               |                                  |
| Per year                   | 0.97 (0.95, 0.98)                |
| Hard to find needles       |                                  |
| Yes versus no              | 1.84 (1.10, 3.07)                |
| Aboriginal                 |                                  |
| Yes versus no              | 1.51 (1.10, 3.07)                |
| Incarceration              |                                  |
| Yes versus no              | 1.51 (1.10, 2.07)                |
| Frequent cocaine injection |                                  |
| ≥1 per day                 | 1.35 (1.01, 1.80)                |

CI, confidence interval.

## DISCUSSION

The dynamic nature of injection drug use is a continual challenge to researchers in measuring the effects of NEPs on risk behaviors, HIV and HCV prevalence.<sup>24</sup> In a recently published article reviewing literature published about NEPs over the past decade, Gibson et al.<sup>25</sup> identified many of the challenges in evaluating NEP effectiveness. One point that was highlighted in the article and other recent literature is that, in some settings (including ours), needles can be obtained not only through NEPs, but also through legal pharmacy sale, suggesting that when NEPs are evaluated in these settings, their effect size may be attenuated by the availability of needles through pharmacy access.<sup>3,25</sup> While the availability of clean needles in the Vancouver setting is more widespread than in many other settings, it is debatable whether the quantity of clean needles or the number of distribution modalities is adequate to meet the required need.<sup>5</sup> Perhaps as important as the distribution of clean needles, NEPs have been shown to establish links between health services and difficult-to-reach IDUs.<sup>11,15,26</sup> Thus, an important question is how NEPs can work more effectively with this vulnerable population given the dynamic and distributed nature of risk-taking behaviors associated with injection drug use.

Mobile van site users in this study were more likely to be younger and have fewer years of injection drug use. Although not statistically significant, the lower rates of HIV and HCV in van users compared with fixed-site users may be explained by the younger age of van users and fewer years injecting.<sup>9</sup> Similarly, the higher prevalence of HCV among the pharmacy attendees may be explained by their longer injection careers. Increased age<sup>11</sup> and more years injecting<sup>5</sup> have been previously identified with the prevalence of blood-borne infections among IDUs. Lower rates of HIV and HCV in van users offer a window of opportunity for prevention efforts, particularly given the high-risk behaviors associated with van use.

Van users were also significantly more likely to be engaged in previously established high-risk behaviors, including frequent cocaine use<sup>27,28</sup> and sex trade work.<sup>19</sup> Furthermore, van users were significantly more likely to be female and Aboriginal. Female IDUs are becoming increasingly vulnerable to HIV infection, particularly those who engage in sex trade work,<sup>18</sup> likely due to increased risk for unsafe sexual<sup>29</sup> and injection practices.<sup>30,31</sup> In our setting, Aboriginal people who use injection drugs have been shown to be particularly vulnerable to HIV infection, which is likely explained by higher rates of participation in risk-taking behaviors.<sup>5,32</sup>

Across the three categories, the likelihood of having been incarcerated in the past 6 months increased. A history of incarceration has been previously identified as being associated with higher rates of HIV and HCV among IDUs.<sup>33,34</sup> Whether drug-using behaviors while in prison increase the rates of HIV and HCV or whether imprisonment and subsequent release increase engagement in high-risk behaviors requires further investigation to implement appropriate prevention efforts.

We have highlighted the importance of having multiple sites for needle distribution and also provided information regarding risk behaviors associated with the different modalities. For cities contemplating the establishment of NEPs, the profile of van users in the present study would suggest that mobile van units are essential for providing services to clients with the highest risk profiles. For those cities currently operating mobile units, it is essential to tailor them to client profiles.

In our setting, van users were significantly more likely to report finding it hard to locate clean needles when needed. The difficult nature of reaching IDUs, who require access to syringes during nighttime hours, combined with higher risk pro-

files presents a challenge to NEPs. Furthermore, the persistent vulnerability among the Aboriginal IDU community<sup>5,32</sup> and among female IDUs who engage in sex trade work<sup>19</sup> warrants further research, particularly addressing how NEPs and mobile van sites can facilitate access to addiction treatment and develop cultural and gender-appropriate prevention programming.<sup>35</sup>

Pharmacy users were more likely than the other two groups to access needles less frequently than once per week. Furthermore, daily injection drug use of either heroin or cocaine is low compared with fixed-site and van site users. The pattern of needle access is not surprising given the drug use profiles of pharmacy users. Pharmacy users were also more likely to be employed and less likely to live in the DTES, to have been recently incarcerated, and to work in the sex trade. Lower rates of HIV among pharmacy users are consistent with their more stable, lower risk profiles; however, the saturation of HCV and the reported sharing behaviors suggest that pharmacy users and established injectors remain an important group to access with regard to education, treatment programs, and greater needle accessibility.

Like many other investigations of IDUs, our study relied on self-reported data; thus, the validity and reliability of responses require careful scrutiny. However, we used comprehensive questionnaire items covering a number of illicit activities and have no reason to suspect that self-reported NEP attendance would vary systematically across other exposure categories. Other researchers have found self-reported risk data to be reliable<sup>36</sup> and not significantly affected by socially desirable responding.<sup>37</sup> Furthermore, as discussed in the Results section, 416 participants were excluded from this analysis. While these participants may be an important comparison group, we felt that the diversity of syringe accessing within this group would dilute any findings if they were compared as a whole.

In our study, IDUs who mainly accessed pharmacies for clean needles generally had lower risk profiles than those who accessed NEPs. However, all participants in this study, regardless of main source for clean needles, showed risk behaviors of concern. Despite pharmacy access that is technically legal, high costs and refusals to sell by individual pharmacies may be contributing to sharing behaviors. Removing cost and social barriers for pharmacy users may be an important prevention tool. Our findings should not be used to deemphasize pharmacy access or to ignore users with lower risk profiles, but rather to make NEP programs and pharmacy access more accessible to those who use these particular modalities.

NEPs present an important opportunity to provide services and support and to maintain contact with this vulnerable population.<sup>12,15</sup> Focus needs to shift from whether needle exchanges are beneficial in the prevention of HIV to how can we can further help make NEPs a more effective intervention tool. Our data illustrate that mobile NEPs may provide a mechanism to reach the most at-risk subpopulations within the IDU community. Tailoring NEPs and pharmacy access to better accommodate the risk profiles of those who use the different modalities may decrease vulnerability to blood-borne infections and increase contact and support of the IDU population.

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