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# Patterns of injection drug use cessation during an expansion of syringe exchange services in a Canadian setting

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ABSTRACT

*Background:* Needle and syringe programmes (NSPs) have been shown to reduce HIV risk among people who inject drugs (IDUs). However, concerns remain that NSPs delay injecting cessation.
*Methods:* Individuals reporting injection drug use in the past six months in the greater Vancouver area were enrolled in the Vancouver Injection Drug Users Study (VIDUS). Annual estimates of the proportion of IDU reporting injecting cessation were generated. Generalized estimating equation (GEE) analysis was used to assess factors associated with injecting cessation during a period of NSP expansion.
*Results:* Between May 1996 and December 2010, the number of NSP sites in Vancouver increased from 1 to 29 ($P < 0.001$). The estimated proportion of participants ($n = 2710$) reporting cessation increased from 2.4% (95% confidence interval [CI]: 0.0–7.0%) in 1996 to 47.9% (95% CI: 46.8–48.9%) in 2010 ($P < 0.001$). In a multivariate GEE analysis, the authors observed an association between increasing calendar year and increased likelihood of injecting cessation (Adjusted Odds Ratio = 1.17, 95% CI: 1.15, 1.19, $P < 0.001$).
*Conclusion:* The proportion of IDU reporting injecting cessation increased during a period of NSP expansion, implying that increased NSP availability did not delay injection cessation. These results should help inform community decisions on whether to implement NSPs.
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## 1. Introduction

The implementation of needle and syringe programmes (NSPs) is a key recommendation of international guidelines for the prevention of HIV infection among injection drug users (IDUs; Donoghoe et al., 2009; UNAIDS, 2005). This recommendation is based on decades of research demonstrating the effectiveness of these programmes in reducing HIV risk behaviours and HIV incidence (Cochrane Collaborative Review Group on HIV Infection and AIDS, 2010; Strathdee and Vlahov, 2001), as well as their cost-effectiveness compared to other preventive approaches among IDU populations (Cohen et al., 2004).

Yet, NSPs remain controversial among the general public and policymakers. For example, research indicates that NSPs are not associated with increased drug injecting (Vlahov et al., 2001). However, some concerns persist regarding the possibility that NSPs may enable or encourage injection drug use, prolong the injection drug use careers of their clients, and/or discourage clients from seeking addiction treatment (Voth, 2008). These concerns may be related to findings of earlier studies that found associations between NEP use and HIV risk (Bruneau et al., 1997; Strathdee et al., 1997), and which subsequent studies found could be explained by the fact that NSPs attract high risk IDU (Wood et al., 2007). Collectively, these concerns have impeded global scale-up of NSPs, and have contributed to a situation wherein only an estimated 5% of drug injections worldwide are conducted using sterile equipment provided by a NSP (Degenhardt et al., 2010; Mathers et al., 2010).

Investigating the empirical foundations for such concerns could help to inform future actions to reduce injection drug-related harms, particularly in settings where these harms are at risk of escalating (Horton and Das, 2010). For example, in some US cities (e.g., Washington, DC) where HIV rates are particularly high among IDU, NSPs have been recently scaled back or closed (Kasperowicz, 2011), despite research demonstrating that increased access to NSPs improves use of sterile syringes among IDU (Cooper et al., 2011). Similarly, in Russia, with an IDU population estimated at 1.8 million (Beyrer et al., 2010), policymakers continue to oppose harm reduction measures, including NSPs (Haber et al., 2009). As

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a result only 7% of Russian IDU report access to sterile injecting equipment through NSPs (Mathers et al., 2010). In the absence of such preventive interventions, IDU continue to account for over 60% of all HIV infections in Russia (Beyrer et al., 2010). In Thailand, where less than 1% of IDU have access to NSPs (Mathers et al., 2010), the government's State Council recently ruled that a notification in support of harm reduction by the country's Department of Disease Control was in breach of Thailand's 1979 Narcotic Act, on the basis that needle distribution encourages drug use (Matichon, 2011). As well, although the President's Emergency Plan for AIDS Relief (PEPFAR) recently released guidelines for funding NSPs as part of the US' international response to the spread of HIV (PEPFAR, 2010), legislation has since been introduced in the US House of Representatives that would bar the US from funding NSPs in foreign countries (US Congress, 2011).

Vancouver, Canada has been the site of a well-documented NSP expansion, beginning in the year 2000, when a single centralized syringe exchange programme was transformed into a decentralized, multi-site syringe distribution programme (Kerr et al., 2010). In the context of ongoing concerns regarding the potential for NSPs to encourage or prolong injection drug use, we sought to assess rates of injecting cessation among a sample of IDU in Vancouver during this period of NSP expansion.

## 2. Methods

The study was conducted using STROBE guidelines for the reporting of observational studies (von Elm et al., 2007). First, to describe the pattern of NSP expansion, reports of the number of NSP sites in Vancouver during the study period were obtained from Vancouver Coastal Health, Vancouver's local health authority (Vancouver Coastal Health, 2011). We then conducted trend tests to determine whether the increase in NSP sites by calendar year was significant. Rates of injecting drug use cessation and re-initiation (i.e., a period of injection cessation followed by a resumption of injecting) were derived from the Vancouver Injection Drug Users Study (VIDUS), an open prospective community-recruited cohort of IDU in Vancouver. Beginning in May 1996, active IDU (i.e., those who reported injecting drugs in the previous month) were recruited in the Greater Vancouver region on an ongoing basis throughout the study period. All participants were recruited through street outreach and self-referral, and provided written informed consent prior to entering the study. At baseline and regular semi-annual follow up visits, study participants completed interviewer-administered questionnaires, provided blood samples for diagnostic testing, and underwent physical exam from a research nurse to inspect for stigmata of drug injecting. Participants were reimbursed $20 for each visit and, when appropriate, were referred to additional health care services. Ethical approval for this study has been granted by the University of British Columbia/Providence Health Care Ethics Review Board.

The primary outcome for the current study was injecting cessation, defined as reporting no drug injecting in the prior six months. As noted above, we derived adjusted annual estimates of the proportion of cohort participants, and to control for a potential cohort effect (Keyes et al., 2010), whereby the number of IDU reporting drug use cessation might be expected to increase over time (Nelson et al., 2002), the proportions of those reporting cessation were adjusted for number of years of enrolment in the study. Annual estimates and 95% confidence intervals were then generated for the years 1996–2010.

At this stage, the graphical exploration of the data implied that the NSP site expansion coincided with increased injecting cessation. However, to address potential confounders, we conducted generalized estimating equation (GEE) analyses to determine if rates of cessation changed over time independent of potential confounders, such as rates of addiction treatment uptake. Specifically, univariate and multivariate GEE analyses for binary outcomes were used to determine factors independently associated with injecting cessation among cohort participants. These methods provided modified standard errors adjusted by multiple observations per person using an exchangeable correlation structure (Liang and Zeger, 1986; Zeger and Liang, 1986). As in the first stage of the analysis, we adjusted for year of study recruitment to control for a potential cohort effect. We also adjusted for addiction treatment exposure (including enrolment in methadone treatment or other addiction treatment) to account for its potential effect in promoting injecting cessation. Additional variables were also investigated: age at study entry, gender, Aboriginal ancestry, number of years injecting at baseline, residency in Vancouver's downtown eastside neighbourhood (the site of a large open-air illicit drug market), homelessness, recent heroin injection, recent cocaine injection, recent speedball (i.e., heroin and cocaine in combination) injection, recent non-injection crack use, and frequent injection drug use (daily vs. less than daily). All behavioural variables

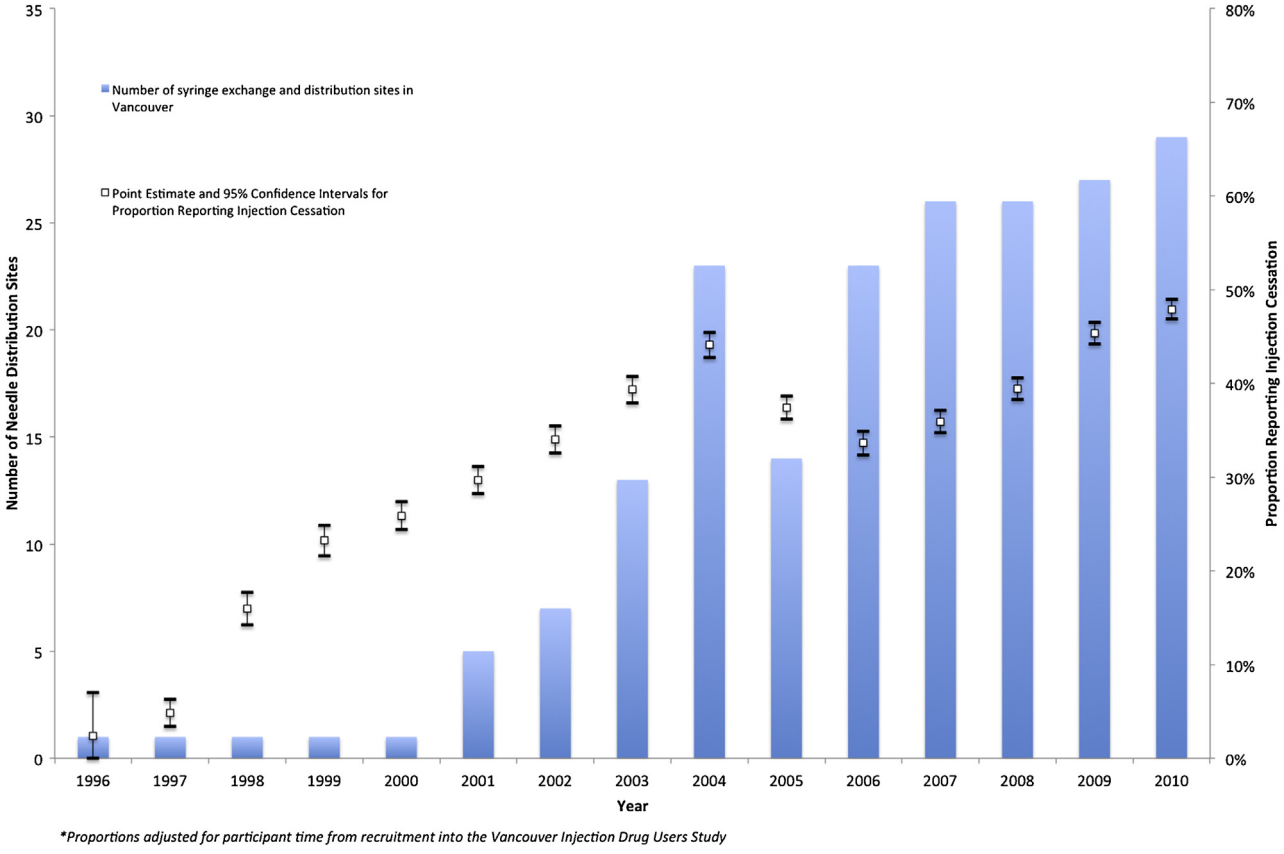


**Fig. 1.** Proportion of injection drug users reporting injection cessation in past 6 months in Vancouver, Canada, 1996–2010.

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