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Injection drug use cessation and use of North America's first medically supervised safer injecting facility

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ABSTRACT

Background: Vancouver, Canada has a pilot supervised injecting facility (SIF), where individuals can inject pre-obtained drugs under the supervision of medical staff. There has been concern that the program may facilitate ongoing drug use and delay entry into addiction treatment.

Methods: We used Cox regression to examine factors associated with the time to the cessation of injecting, for a minimum of 6 months, among a random sample of individuals recruited from within the Vancouver SIF. In further analyses, we evaluated the time to enrolment in addiction treatment.

Results: Between December 2003 and June 2006, 1090 participants were recruited. In Cox regression, factors independently associated with drug use cessation included use of methadone maintenance therapy (Adjusted Hazard Ratio [AHR] = 1.57 [95% Confidence Interval [CI]: 1.02–2.40]) and other addiction treatment (AHR = 1.85 [95% CI: 1.06–3.24]). In subsequent analyses, factors independently associated with the initiation of addiction treatment included: regular SIF use at baseline (AHR = 1.33 [95% CI: 1.04–1.72]); having contact with the addiction counselor within the SIF (AHR = 1.54 [95% CI: 1.13–2.08]); and Aboriginal ancestry (AHR = 0.66 [95% CI: 0.47–0.92]).

Conclusions: While the role of addiction treatment in promoting injection cessation has been well described, these data indicate a potential role of SIF in promoting increased uptake of addiction treatment and subsequent injection cessation. The finding that Aboriginal persons were less likely to enroll in addiction treatment is consistent with prior reports and demonstrates the need for novel and culturally appropriate drug treatment approaches for this population.

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1. Introduction

Illicit injection drug use continues to fuel infectious disease and fatal overdose epidemics in many settings, and has prompted substantial community concerns due to public drug use and publicly discarded syringes (Doherty et al., 1997; Garfield and Drucker, 2001; Karon et al., 2001). Public health programming aimed at reducing the harms of injection drug use have been limited, in part, due to the difficulties in reaching people who use injection drugs

(IDU) for the purposes of providing addiction treatment services, even when such services are available (Grund et al., 1992; Neaigus et al., 1994).

In an effort to address outstanding public health and public disorder concerns stemming from injection drug use, an increasing number of cities have opened medically supervised safer injection facilities (SIF), where people who use injection drugs can inject pre-obtained illicit drugs under the supervision of healthcare professionals (Kimber et al., 2003; MSIC Evaluation Committee, 2003; Wood et al., 2004a). Within SIF, individuals are typically provided with sterile injecting equipment and emergency intervention in the event of an accidental overdose, as well as medical care either on site or through referral (Dolan et al., 2000; Wright and Tompkins, 2004). There are now approximately 65 sanctioned supervised drug consumption facil-

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ities in operation internationally (Joseph Rowntree Foundation, 2006).

On September 22, 2003, Vancouver, Canada opened North America's first government sanctioned SIF (Wood et al., 2004a). Although the opening of the SIF has been associated with reduced public drug use (Wood et al., 2004b), and HIV risk behaviour (Kerr et al., 2005), the program is controversial and there remains concern that it enables drug use and reduces the likelihood that IDU will seek to reduce or quit their illicit drug use (Yamey, 2000; Gandey, 2003; Wood et al., 2004a, 2008; Jones, 2006; International Narcotics Control Board, March 5, 2008).

To examine this question, a number of studies have been conducted to explore the relationship between SIF attendance and engagement with addiction treatment programs. An evaluation of the SIF in Sydney Australia, demonstrated that individuals who frequently used the facility were more likely to be referred to drug treatment than other clients (Kimber et al., 2008). In Vancouver, an earlier analysis found that frequent use of the SIF and contact with addictions counsellors at the facility were both independently associated with increased entry into medical detoxification, and that entry into detoxification spurred entry into other treatments (Wood et al., 2006). Another study subsequently found that the SIF opening was independently associated with a 30% increase in detoxification service use among SIF clients (Wood et al., 2007a). Although these analyses imply a positive impact of SIF use on enrolment in detoxification programs, no studies have examined the direct relationship between the use of Vancouver's SIF and entry into other types of addiction treatment (e.g., residential treatment, methadone maintenance therapy), and more importantly, no studies have evaluated rates of injection cessation among SIF clients. The present study was conducted to examine factors associated with drug use cessation among IDU using Vancouver's SIF, and to examine the potential role of SIF in facilitating injection cessation among this population.

2. Methods

The Vancouver SIF has been evaluated through the Scientific Evaluation of Supervised Injecting (SEOSI) cohort, which has been described in detail previously (Wood et al., 2004c). Briefly, the cohort was assembled through random recruitment of IDU from within the SIF. Among individuals who were recruited, an interviewer-administered questionnaire was administered at baseline and at semi-annual follow-up visits. Since health service use may be over-reported by IDU (Wood et al., 2004c), the informed consent included a request to perform linkages with administrative health databases. The present study was approved by a Research Ethics Board of the University of British Columbia.

2.1. Factors associated with time to cessation of injecting

As previously (Shah et al., 2006; DeBeck et al., 2009), injection cessation was based on self-report and defined as a period of at least 6 months without any episodes of drug injecting. To assess the potential connection between SIF attendance, participation in addiction treatment, and injection cessation, we began by examining factors potentially associated with the time to cessation of injection drug use. Variables of interest included: age (per 10 years older), number of years injecting illicit drugs (per additional year), gender (female vs. male), Aboriginal ancestry defined as a person who self-reported as being Aboriginal, Métis, Inuit or First Nations (yes vs. no), homelessness defined as having no fixed address (yes vs. no), sex work involvement (yes vs. no), daily cocaine injection (yes vs. no), daily heroin injection (yes vs. no), daily crack cocaine use (yes vs. no), current methadone maintenance use (yes vs. no), and current use of other addiction treatment (excluding methadone) defined as reporting being enrolled in a detoxification program, a recovery house, a residential addiction treatment centre, or engaging with an addictions counselor or participating in peer support programs, i.e., Narcotics Anonymous (yes vs. no). Injection drug use variables were measured at baseline while all other drug use and behavioural variables were time-updated based on each semi-annual follow-up period and, unless otherwise noted, refer to the 6-month period prior to the interview. Unless otherwise indicated, all variable definitions have been used extensively and were identical to earlier reports (Wood et al., 2005b).

Table 1
Characteristics of study sample at baseline ($n=902$).

Characteristic	Median	IQR ^a
Age	39	33–45
Yrs injecting	17	9–26
Characteristic	<i>n</i>	%
Female gender	266	29
Aboriginal ancestry	180	20
Homeless ^b	167	19
Sex work ^b	204	23
Daily cocaine injection ^b	286	32
Daily heroin injection ^b	448	50
Daily crack smoking ^b	439	49
Regular SIF use ^b	335	37
Current methadone treatment (MT)	209	23
Current other treatment (no MT)	87	10
Current any treatment	281	31
History of any treatment	746	83

^a Interquartile range.

^b Activities or situations referring to previous 6 months.

2.2. Factors associated with time to addiction treatment use

After exploring for a potential relationship between engagement with addiction treatment programs and injection cessation, we then assessed whether SIF use was associated with entry into any of these same addiction treatment programs (combined endpoint included all treatment modalities described above). Specifically, we tested whether regular SIF use at baseline (at least one visit per week vs. less than one visit per week as identified through linking to each participant's record in the SIF database) was associated with time to enrolment in any addiction treatment program. In addition, we recognized that a primary causal mechanism through which IDU could be encouraged to enter other addiction treatment programs would be through contact with the addiction counselor who works within the SIF. Therefore, we linked to each participant's service use history within the SIF database to determine if each participant had met with the addiction counselor before the event or censor date. The other variables of interest considered to be potentially associated with time to entry into addiction treatment programs included any history of engaging in addiction treatment programs, as well as the same socio-demographic and drug use variables included in the previous analysis.

2.3. Statistical analyses

For both analyses, variables potentially associated with each outcome of interest were modeled in unadjusted and adjusted Cox regression analyses. Here, time zero was the date of recruitment into the study for all participants and the event dates were defined as the date of the first questionnaire at which participants reported either injection cessation in the previous 6 months or engagement in addiction treatment. In the first analysis participants who remained persistent active injectors were censored as of their last study follow-up or June 2006 whichever came first. Similarly, participants in the second analysis who did not enroll into addiction treatment were censored as of their last study follow-up or June 2006 whichever came first. The multivariate models included all *a priori* defined variables of interest to adjust for potential confounding. All statistical analyses were performed using SAS 9.1. All *p*-values were two-sided.

3. Results

By June 2006, 6747 unique individuals were registered at the SIF, and between 1 December 2003 and 1 June 2006, 1090 individuals were randomly recruited into SEOSI. Among this group 188 (17%) individuals did not return for a second study visit during our study period and were therefore not included in our statistical analyses. These 188 participants were more likely to be younger in age, to have been injecting for fewer years, to be homeless, and less likely to be enrolled in methadone treatment, or any addiction treatment program (all $p < 0.02$). Otherwise, the two groups were similar in terms of all other variables listed in Table 2 (all $p > 0.05$). The baseline characteristics of the remaining 902 participants are presented in Table 1. This sample contributed 3315 observations and the median number of study visits was 3 (IQR = 2–4).

Table 2
Cox proportional hazard analyses of factors associated with time to injection cessation among clients of Vancouver's supervised injecting facility.

Characteristic	Unadjusted		Adjusted	
	Hazard ratio	(95% CI) ^a	Hazard ratio	(95% CI)
Methadone treatment ^e Yes vs. no	1.56	(1.03–2.36)	1.57	(1.02–2.40)
Other addiction treatment ^e Yes vs. no	1.79	(1.04–3.07)	1.85	(1.06–3.24)
Older age Per 10 years older	1.07	(0.85–1.35)	0.99	(0.95–1.02)
Years injecting Per additional year	1.01	(0.99–1.03)	1.01	(0.98–1.04)
Gender Female vs. male	0.67	(0.41–1.09)	0.79	(0.44–1.42)
Aboriginal ancestry ^b Yes vs. no	0.83	(0.48–1.42)	0.94	(0.54–1.64)
Homeless ^c Yes vs. no	0.87	(0.51–1.49)	0.96	(0.55–1.68)
Sex work ^c Yes vs. no	0.65	(0.36–1.19)	0.83	(0.40–1.73)
Daily cocaine injection ^d Yes vs. no	0.74	(0.48–1.16)	0.78	(0.50–1.22)
Daily heroin injection ^d Yes vs. no	0.62	(0.41–0.95)	0.69	(0.44–1.06)
Daily crack cocaine smoking ^e Yes vs. no	0.75	(0.50–1.14)	0.90	(0.59–1.38)

^a CI = confidence interval.

^b Aboriginal ancestry was defined as a person who self-reported as being Aboriginal, Métis, Inuit or First Nations.

^c Activities or situations referring to previous 6 months.

^d Measured at baseline, referring to 6 months prior to baseline.

^e Represents current engagement.

After 24 months of enrolment in the cohort the cumulative incidence of injection cessation was 23.06% (95% Confidence interval CI: [16.2–29.9%]). For the analysis of injection cessation 902 participants contributed 2162 observation and there were a total of 95 events of injection cessation. In the unadjusted Cox analysis (see Table 2), factors statistically associated with time to injection cessation were daily heroin injection, methadone maintenance therapy, and use of other addiction treatment. In the adjusted Cox model (see Table 2), factors independently associated with time to injection cessation were methadone maintenance therapy and use of other addiction treatment.

In our analysis of time to entry into addiction treatment, the cumulative incidence of entry into addiction treatment after 24 months of enrolment in the cohort was 57.21% (95% CI: 50.9–63.5%). At baseline 281 participants were currently enrolled in some type of addiction treatment. The remaining 621 participants contributed 1234 observations and there were a total of 261 events of entry into addiction treatment. In the unadjusted Cox analysis, factors statistically associated with the time to initiation of addiction treatment included Aboriginal ancestry (HR = 0.65 [95% CI: 0.47–0.90]), regular SIF use at baseline (HR = 1.42 [95% CI: 1.11–1.81]), any contact with the addiction counselor within the SIF (HR = 1.67 [95% CI: 1.24–2.25]), and history of any engagement with addiction treatment (HR = 1.62 [95% CI: 1.19–2.20]). In the adjusted Cox model (Fig. 1), factors independently and positively associated with the time to initiation of addiction treatment were regular SIF use at baseline (AHR = 1.33 [95% CI: 1.04–1.72]), having any contact with the addiction counselor within the SIF (AHR = 1.54 [95% CI: 1.13–2.08]), and history of any engagement with addiction treatment (AHR = 1.55 [95% CI: 1.14–2.12]); engagement in sex work became significantly negatively associated with initiation of addiction treatment (AHR = 0.59 [95% CI: 0.38–0.93]), and

Aboriginal ancestry remained negatively associated with time to initiation of addiction treatment after adjustment (AHR = 0.66 [95% CI: 0.47–0.92]).

4. Discussion

Among IDU who attended Vancouver's supervised injecting facility, regular use of the SIF and having contact with counselors at the SIF were associated with entry into addiction treatment, and enrolment in addiction treatment programs was

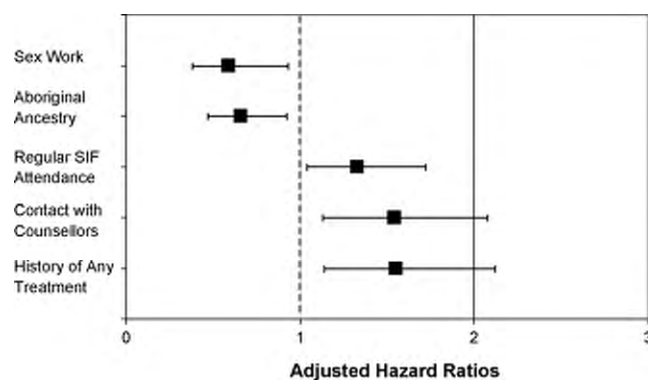


Figure 1. Factors associated with time to enrolment in addiction treatment among clients of Vancouver's supervised injection facility. Notes: 'Regular SIF Attendance' was measured at baseline and defined as visiting the SIF at least once per week vs. visiting the SIF less than once per week; 'Contact with Counsellors' refers to meeting with an addictions counselor at the SIF and was measured through data linkage to the SIF administrative database; 'History of Any Treatment' was defined as any history of engaging in any type of addiction treatment programs.

positively associated with injection cessation. Although SIF in other settings have been evaluated based on wide range of outcomes (Dolan et al., 2000; Kimber et al., 2003; MSIC Evaluation Committee, 2003), our study is the first to consider the potential role of SIF in supporting injection cessation. While our study is unique, our findings build on previous international analyses demonstrating a link between SIF attendance and entry into detoxification programs (Wood et al., 2006, 2007a; Kimber et al., 2008).

A postulated benefit of SIF is that, by providing a sanctioned space for illicit drug use, a hidden population of IDU can be drawn into a healthcare setting so that service delivery can be improved. The present study provides additional evidence that SIF appear to promote utilization of addiction services and builds on past evaluations to demonstrate that, through this mechanism, they may also lead to increased injecting cessation. While these findings are encouraging, it is concerning that Aboriginal participants were less likely to enter addiction treatment. This finding is consistent with prior reports (Wood et al., 2005a, 2007b), and highlights the need for innovative and culturally appropriate addiction treatment services developed with full consultation with Aboriginal people who use drugs.

This study has several limitations. Firstly, given that addiction is recognized to be a chronic relapsing condition (Galai et al., 2003; Evans et al., 2009), our definition of injection cessation is restricted to a relatively short period of injection cessation. Nevertheless, our findings are compelling and it is noteworthy that this definition of cessation has been consistently used in the injection drug use literature. Secondly, there are a number of limitations associated with the observational nature of our study. For one, the present study is limited in that the control group included non-frequent SIF users. As has been described previously (Lurie, 1997), selecting adequate control groups is particularly challenging in observational studies examining the use of healthcare services for IDU. While a randomized control trial would be an optimal evaluation strategy, interventional study designs to evaluate SIF have been deemed unethical (Christie et al., 2004). Given this limitation it is possible that individuals who are more concerned with their health may be independently more likely to visit a SIF, seek addiction treatment and experience periods of injection cessation. However, previous studies have shown that SIF attract individuals with markers generally associated with lower rates of health-related behaviours (Wood et al., 2005b; Tyndall et al., 2006). Furthermore, although cohort studies can not demonstrate causality, our analyses adjusted for potential confounders, and the present study complements emerging data from several sources that imply SIF can help link IDU to addiction treatment. Nevertheless, the observational nature of our study precludes inferences regarding causation.

There are also a number of limitations associated with some of our measures. Specifically, we do not have information on the level of psychological counselling involved in the various types of addiction treatment, which is a factor that could influence the relationship between addiction treatment and injection cessation. In addition, many of our measures relied on self-report and are susceptible to socially desirable reporting as well as recall bias. However, we have no reason to suspect that this would be differential based on our outcomes of interest and note that all study participants openly reported injection drug use at baseline. Lastly, it is important to recognize that although our sample is representative of SIF clients in Vancouver, these findings may not be generalizable to other settings.

The present study demonstrates associations between attendance and contact with addiction counselors at SIF, entry into addiction treatment programs, and cessation of injection drug

use. Although our observational study cannot determine causation, these findings contribute to a growing body of literature suggesting a link between SIF attendance and entry into addiction treatment.

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Contributors

The specific contributions of each author are as follows: KD, TK and EW were responsible for study design and prepared the first draft of the analysis; RZ conducted the statistical analyses; LB, DM, MT and JM contributed to the main content and provided critical comments on the final draft. All authors approved the final manuscript.

Conflict of interest

Dr Julio Montaner has received grants from, served as an ad hoc advisor to, or spoke at various events sponsored by; Abbott, Argos Therapeutics, Bioject Inc, Boehringer Ingelheim, BMS, Gilead Sciences, GlaxoSmithKline, Hoffmann-La Roche, Janssen-Ortho, Merck Frosst, Pfizer, Schering, Serono Inc, TheraTechnologies, Tibotec, Trimeris. Authors declare no other competing interests.

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