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Incarceration experiences in a cohort of active injection drug users

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Abstract

Background. *Incarceration has been associated with a number of health-related harms among injection drug users (IDU). However, little is known about the prevalence and correlates of incarceration among community-based samples of IDU.* ***Methods.*** *We examined the prevalence and correlates of recent incarceration among IDU in the Scientific Evaluation of Supervised Injecting (SEOSI) cohort examined between 1 July 2004 and 30 June 2006 using generalised estimating equations (GEE).* ***Results.*** *A total of 902 individuals were included in the analysis, of whom 255 (28.72%) were female and 536 (59.42%) reported a history of incarceration. In a multivariate GEE model, recent incarceration was associated positively and independently with a number of high-risk drug using behaviours, including syringe sharing.* ***Conclusions.*** *An alarmingly high proportion of active IDU reported recent incarceration and injecting while incarcerated. Recent incarceration was associated independently with syringe sharing. These findings add further evidence to repeated demands for an expansion of appropriate harm-reduction measures in Canada's prisons.* [Milloy M-J, Wood E, Small W, Tyndall M, Lai C, Montaner J, Kerr T. Incarceration experiences in a cohort of active injection drug users. *Drug Alcohol Rev* 2008;27:693–699]

Key words: GEE, HIV, IDU, incarceration, injection drug users.

Introduction

Individuals who inject drugs contend typically with an array of medical, social and legal harms [1–4]. Because the dominant societal response to injection drug use in most jurisdictions continues to be arrest and punishment, one nearly unavoidable experience for injection drug users (IDU) is incarceration. For example, in samples of IDU in Thailand [5], the United States [6,7] and Spain [8], between 55% and 96% of study participants reported a history of detention.

For many IDU, prisons are characterised by increased risks to health and safety. Although incarcerated IDU typically inject less often than in community settings [9–11], the scarcity of sterile syringes and the punitive consequences of drug use promote higher-risk injection practices [7,12,13]. A substantial proportion of inmates in a variety of settings have reported injection while incarcerated [14–17] and sharing of needles with one or more partners [13,14,18,19]. Opportunities for harm reduction among inmates, where available, are typically limited in comparison to services in the general community [16,20,21]. As a result, among inmates, rates of infection with blood-borne pathogens such as hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus type 1 (HIV) are often much higher than in the non-incarcerated population [9,10,22–24]. In some areas, such as Asia, Eastern Europe and the countries of the former Soviet Union, the continued expansion of the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) pandemic is being driven largely by new infections in IDU, which are often acquired while behind bars [25].

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In Canada, surveillance by the Correctional Service of Canada (CSC), the government agency responsible for the country's federal prisons, has found high levels of HIV, HCV and HBV [26]. However, the screening programme is voluntary and CSC officials admit that the results could 'severely underestimate' the true burden of infectious disease [26]. Risk behaviours that promote transmission of blood-borne pathogens, such as syringe sharing, have been reported in cross-sectional surveys [14,22,27] and qualitative studies [13,28] of incarcerated populations in various settings. Currently, few harm reduction measures are available to Canadian prisoners [13,21] and CSC has rejected repeated calls to initiate a pilot prison-based needle-exchange programme [29,30], stating that it will focus instead on interdiction of drug supply and inmate education [30,31]. Concurrently, Canadian Prime Minister Stephen Harper announced a new anti-drugs strategy that ended the federal government's commitment to harm reduction and promised increased legal and financial emphases on enforcement and incarceration [32].

The federal government's commitment to enforcement over harm reduction is of concern, given recent evidence from Vancouver's HIV outbreak that IDU incarcerated in the previous 6 months are 2.7 times more likely to seroconvert to HIV [33] and given that an external evaluation concluded that 21% of infections in the city's Downtown Eastside were attributable to incarceration [34]. However, we know of no Canadian studies which have investigated the level or factors associated with incarceration among a community-recruited cohort of active IDU or the level of injecting within prisons. Therefore, the present study was conducted to investigate incarceration among a community-recruited cohort of active IDU in Vancouver, Canada.

Methods

Vancouver's Downtown Eastside (DTES) neighbourhood is the focus of well-documented outbreaks of HIV and HCV among the estimated 5000 residents who inject drugs [35]. In September 2003, North America's first government-sanctioned supervised injection facility (SIF) opened in the DTES. The SIF, known as Insite, is being evaluated using the Scientific Evaluation of Supervised Injecting (SEOSI) cohort which has been described in detail previously [36]. In brief, the SEOSI cohort is a representative sample of Insite users [37]. The sample was derived through random recruitment of SIF users who provided informed consent to enrol into the study. Recruitment involves using random number generation to select blocks of time during Insite's hours of operation (between 10.00 a.m. and 4.00 a.m., 7 days a week). During these times, users of the SIF are invited to enroll in the SEOSI study. A nominal financial stipend (CDN$20) is offered to those who attend the research site, located near Insite. A venous blood sample is drawn for HIV and HCV testing and an interviewer-administered questionnaire is conducted with those who provide informed consent. The SEOSI cohort has been approved by the University of British Columbia/Providence Healthcare Research Ethics Board.

This analysis includes all participants who completed semi-annual follow-up visits between 1 July 2004 and 30 June 2006 (i.e. four separate 6-month follow-up periods were considered). The primary end-point of interest in this study was recent incarceration, or reporting being in jail, prison or detention overnight or longer at any period in the previous 6 months. This definition is relevant as all participants were over the age of 18 years, and would therefore have been placed in an adult jail as opposed to youth detention. We considered variables associated potentially with incarceration, including those variables associated with incarceration in previous analyses [38–40] including: age; gender; Aboriginal ancestry (yes vs. no); frequent cocaine use (yes vs. no); frequent heroin use (yes vs. no); frequent crack cocaine use (yes vs. no); frequent crystal methamphetamine use (yes vs. no); residence in the DTES (yes vs. no); unstable housing (yes vs. no); involvement in the sex trade (yes vs. no); sharing syringes (yes vs. no); binge drug use (yes vs. no); public drug use (yes vs. no); condom use with regular partners (yes vs. no); condom use with casual partners (yes vs. no); non-fatal overdose (yes vs. no); drug dealing (yes vs. no); treatment for drug use (yes vs. no); methadone maintenance therapy (MMT) use (yes vs. no); and years injecting. All dichotomous behavioural variables were in regard to the 6 months prior to the interview except for residence in the DTES and MMT use, which referred to current status. As in previous work [41], people who reported using cocaine, crack cocaine, heroin or crystal methamphetamine one or more times per day were defined as frequent cocaine, crack cocaine, heroin or crystal methamphetamine users. Unstable housing was defined as living in a single-room occupancy hotel, shelter or being homeless [41].

We began by examining univariate associations between the explanatory variables and recent incarceration. Because analyses of factors associated potentially with recent incarceration during follow-up included serial measures for each subject, we used generalised estimating equations (GEE) for binary outcomes with logit-link for the analysis of correlated data. This approach allows for the identification of factors associated independently with the outcome during the entire study period [42]. Standard errors are calculated using an exchangeable correlation structure and adjusted by multiple observations per person. As each individual can report incarceration or no incarceration

during the previous 6 months at each study visit, a GEE model examines behaviours and characteristics correlated with times when incarceration did or did not occur within and between individuals. This approach has been used to analyse data sets containing repeated measures of a binary variable, such as longitudinal cohorts, for example in a study identifying correlates of access to drug treatment in a prospective cohort of IDU [43].

Next we fitted a multivariate GEE model using a model-building protocol defined a priori to include all explanatory variables with a p-value smaller than 0.05 in univariate analyses. In subanalyses, we also determined the proportion of participants who reported injecting in jail at some point during follow-up. All statistical procedures were performed using SAS software version 8.0 (SAS, Cary, NC, USA). All p-values are two-sided.

Results

Between 1 July 2004 and 30 June 2006, 902 individuals completed the interviewer-administered questionnaire and were included in this analysis. Of these, 255 (28.27%) were female and the median age at the most recent study visit was 40.9 years [interquartile range (IQR): 35.6 – 47.3].

In total, the 902 individuals contributed 2237 observations to the analysis. The median number of visits by each participant was 3 (IQR: 2 – 3). In total, 536 (59.42%) participants reported being incarcerated at some point since initiating injection drug use. Overall, 423 (46.90%) participants reported an incarceration event at some point during follow-up, with 674 (30.13%) observations involving an incarceration event. 29 (3.22%) of participants reported ever injecting in jail during follow-up, with 33 (5.05%) of 674 observations reporting injecting while incarcerated.

As shown in Table 1, incarceration was associated positively with unstable housing, residence in the DTES, frequent heroin use, frequent crack cocaine use, public injecting, non-fatal overdose, sharing syringes, drug dealing and condom use with casual partners. Age was associated inversely with recent incarceration, as was female gender and current MMT use. Factors associated independently with recent incarceration in the multivariate GEE analysis are also shown in Table 1. They include unstable housing [adjusted odds ratio (AOR) = 1.92, 95% confidence interval (CI): 1.43 – 2.56]; residence in the DTES (AOR = 1.42, 95% CI: 1.09 – 1.85); frequent heroin use (AOR = 1.32, 95% CI: 1.07 – 1.63); public injecting (AOR = 1.63, 95% CI: 1.30 – 2.03); sharing syringes (AOR = 1.40, 95% CI: 1.03 – 1.89); and drug dealing (AOR = 1.61, 95% CI: 1.30 – 1.99). Older age (AOR = 0.97, 95% CI: 0.95 – 0.98), female gender (AOR = 0.51, 95% CI: 0.40 – 0.65) and current MMT use (AOR = 0.75, 95% CI: 0.60 – 0.93) were each protective for incarceration in the last 6 months.

We recognised that the window for HIV and HCV seroconversion was too brief in the study period to allow for an investigation of the impact of recent incarceration on risk of infection. Given the association with syringe sharing observed above, we examined potential associations between ever being incarcerated and prevalence of both HIV and HCV infection. We conducted two separate sub-analyses using incarceration overnight or longer since initiating injection drug use as the dependent variable. In multivariate GEE models that adjusted for all factors associated with incarceration in univariate analyses, we found that a history of incarceration was associated with both HIV (AOR 1.64, 95% CI: 1.21 – 2.23; $p < 0.01$) and HCV (AOR 1.94, 95% CI: 1.46 – 2.58; $p < 0.0001$) infection.

Discussion

In this study we observed that incarceration was a common experience among IDU using a local supervised injection site, with over half the study population reporting a history of incarceration and almost one-third reporting recent incarceration at each study visit. Further, 29 (3.22%) of participants who reported an incarceration event during follow-up also reported injecting while in jail. Consistent with what is known about the adult prison population in Canada [44], males in our study were more likely than females to have been incarcerated. However, although it is well known that the Aboriginal population is over-represented in Canadian prisons [45], Aboriginal ancestry was not associated with incarceration in our study. In separate sub-analyses, infection with HIV or HCV was associated positively with having been incarcerated overnight or longer since initiating injection drug use. In the multivariate GEE model, recent incarceration was associated positively with a number of high-risk drug-using practices, including public injecting, frequent heroin use and syringe sharing.

Our findings support previous work suggesting that the sharing of used syringes within prisons may be responsible for the transmission of blood-borne pathogens in incarcerated populations [22,26,46,47] and may potentially be a significant source of infectious disease transmission among IDU populations and their sexual partners in Canada [33,34]. Our findings are not consistent with an earlier cross-sectional study from the province of Ontario, which found a similar level of syringe sharing in prison and non-prison environments [14]. Although not verified by our data, it may be that the differences in syringe sharing across injection settings (i.e. prison vs. non-prison environments) may be explained by the availability of harm reduction programmes such as needle exchange and supervised

Table 1. *Univariate and multivariate GEE* of factors associated with recent incarceration (n = 902)*

Characteristic	Unadjusted odds ratio (95% CI‡)	*p*-value	Adjusted odds ratio (95% CI‡)	*p*-value
Age (per year older)	0.96 (0.95 – 0.97)	< 0.001	0.97 (0.95 – 0.98)	< 0.001
Gender (female vs. male)	0.66 (0.53 – 0.82)	< 0.001	0.51 (0.40 – 0.65)	< 0.001
Aboriginal ethnicity (yes vs. no)	0.99 (0.78 – 1.25)	0.914	–	–
Unstable housing† (yes vs. no)	2.93 (2.29 – 3.75)	< 0.001	1.92 (1.43 – 2.56)	< 0.001
Sex trade involvement† (yes vs. no)	0.93 (0.72 – 1.20)	0.567	–	–
DTES residence† (yes vs. no)	1.88 (1.51 – 2.33)	< 0.001	1.42 (1.09 – 1.85)	0.009
Current methadone use (yes vs. no)	0.62 (0.50 – 0.75)	< 0.001	0.75 (0.60 – 0.93)	0.009
Frequent heroin use† (yes vs. no)	1.91 (1.59 – 2.31)	< 0.001	1.32 (1.07 – 1.63)	0.010
Frequent cocaine use† (yes vs. no)	1.23 (0.99 – 1.52)	0.057	–	–
Frequent crack use† (yes vs. no)	1.88 (1.30 – 2.71)	< 0.001	1.30 (0.88 – 1.91)	0.190
Frequent crystal meth use† (yes vs. no)	1.07 (0.64 – 1.78)	0.806	–	–
Public injecting† (yes vs. no)	2.49 (2.05 – 3.01)	< 0.001	1.63 (1.30 – 2.03)	< 0.001
Non-fatal overdose† (yes vs. no)	1.51 (1.12 – 2.02)	0.006	1.14 (0.82 – 1.58)	0.428
Syringe sharing† (yes vs. no)	2.01 (1.52 – 2.66)	< 0.001	1.40 (1.03 – 1.89)	0.029
Drug dealing† (yes vs. no)	2.22 (1.84 – 2.69)	< 0.001	1.61 (1.30 – 1.99)	< 0.001
Condoms with regular partners† (yes vs. no)	0.96 (0.71 – 1.29)	0.776	–	–
Condoms with casual partners† (yes vs. no)	1.55 (1.21 – 1.98)	< 0.001	1.24 (0.95 – 1.62)	0.111

*GEE = generalized estimating equation; ‡CI = confidence interval; †denotes activities/events in the previous 6 months.

injection sites in the community in our setting, especially given the growing body evidence indicating their positive impact on rates of syringe sharing [48]. In this instance, the lack of a medical service for incarcerated individuals that is available in the community appears to contravene both a United Nations General Assembly resolution [49] and the Canadian federal law governing the operation of the prison system [50].

Our findings have clear policy implications. Numerous Canadian governmental and non-governmental organisations have called on the CSC to establish a pilot prison-based needle exchange programme [51 – 57]. It has refused consistently [26,29,30], despite evidence from Switzerland that its prison-based NEP was not associated with a single violent incident nor any case of seroconversion to HIV or HCV [58]. In 2006, the Public Health Agency of Canada reviewed the evidence from prison-based needle exchange programmes and concluded they do not lead to increased injection drug use or the use of needles as weapons, but do decrease injection-related harms [59]. The CSC responded to the report by again refusing to initiate a pilot programme, stating instead they 'prefer to educate inmates about the dangers of drug use in prison' [31]. The CSC has also stated its 'primary focus' is to reduce the supply of illicit drugs within its institutions [30]. Given the quantitative and qualitative findings regarding syringe sharing and injection while incarcerated [13,60]; the high prevalence of blood-borne pathogens in Canadian jails [22,26,46,47]; the consistent association between incarceration and infection with HIV and HCV [61]; and the CSC's continued failure to stem the flow of drugs into its institutions [13,51,55], it is clear that additional harm reduction measures are needed urgently in prisons. In particular, although the

introduction of prison-based NEPs has been challenging in some cases due to the concerns of prison guards, in most settings these challenges have been overcome by utilising various methods of syringe distribution, including peer-based syringe delivery [57]. Given what is known about the impact of community-based NEPs on HIV risk behaviour and HIV incidence, it is clear that such programmes are likely to reduce the transmission of blood-borne diseases in prisons similarly.

This study has several limitations. First, GEE analyses cannot resolve the temporality between exposure and outcome; as well, in this cohort in any 6-month period the correlate could precede, follow or coincide with an incarceration event. Thus, this model cannot determine whether incarceration is a result of some factors, for example higher-intensity drug use, or if the effect of incarceration predisposes individuals to these behaviours. It is conceivable that the elevated likelihood of some of the identified correlates is a result of selection bias for higher-risk individuals [60], although it should be noted that we did adjust for a variety of high-risk behaviours. It is also plausible that incarceration disrupts customary networks and patterns of drug use, forcing newly released individuals to rely on higher-risk means to support their addictions. Further work is needed to identify potential causal relationships between incarceration and risk behaviours and environments. Secondly, previous studies have observed that socially undesirable behaviours may be under-reported by IDU [62]. We know of no reason why risk factors would be reported differentially by IDU reporting or not reporting recent incarceration in this cohort. Finally, in this study incarceration events are not distinguished by type, length or location of incarceration. Future studies should aim to address the effect these modifiers might have on active IDU and risk behaviours.

In summary, the level of recent incarceration in this community-recruited sample is high, and an alarmingly high proportion of active IDU reported injecting while incarcerated. Recent incarceration was associated independently with syringe sharing and a history of incarceration was associated independently with both HIV and HCV infection. These findings indicate the urgent need for alternative justice interventions for addicted individuals, including those who prioritise addiction treatment over incarceration and harm reduction programming in prisons, as well as the need for the federal government to respect the conclusions of the Public Health Agency of Canada [59].

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