



## Research paper

# Incarceration among street-involved youth in a Canadian study: Implications for health and policy interventions



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## ABSTRACT

**Background:** Risk factors for incarceration have been well described among adult drug using populations; however, less is known about incarceration among at-risk youth. This study examines the prevalence and correlates of incarceration among street-involved youth in a Canadian setting.

**Methods:** From September 2005 to May 2012, data were collected from the At-Risk Youth Study, a prospective cohort of street-involved youth aged 14–26 who use illicit drugs. Generalized estimating equation (GEE) logistic regression was used to identify factors associated with recent incarceration defined as incarceration in the previous six months.

**Results:** Among 1019 participants, 362 (36%) reported having been recently incarcerated during the study period. In multivariate GEE analysis, homelessness (adjusted odds ratio [AOR] = 1.60), daily crystal methamphetamine use (AOR = 1.56), public injecting (AOR = 1.33), drug dealing (AOR = 1.48) and being a victim of violence (AOR = 1.68) were independently associated with incarceration (all  $p < 0.05$ ). Conversely, female gender (AOR = 0.48), lesbian, gay, bisexual, transgender or two-spirited (LGBT) identification (AOR = 0.47) and increasing age of first hard drug use (AOR = 0.96) were negatively associated with incarceration (all  $p < 0.05$ ).

**Conclusion:** Incarceration was common among our study sample. Youth who were homeless, used crystal methamphetamine, and engaged in risky behaviors including public injection and drug dealing were significantly more likely to have been recently incarcerated. Structural interventions including expanding addiction treatment and supportive housing for at-risk youth may help reduce criminal justice involvement among this population and associated health, social and fiscal costs.

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## Introduction

Incarceration is a well established risk factor for various negative outcomes among illicit drug using populations including: blood-borne infections such as HIV and hepatitis C (HCV) (Massoglia, 2008); relapse and persistent drug use (DeBeck et al., 2009; Galea & Vlahov, 2002); and unemployment (Western, 2002). Although incarceration has not been demonstrated to effectively reduce problematic drug use (DeBeck et al., 2009), people who use drugs continue to be incarcerated at a staggering rate (Milloy et al., 2008). This is of particular concern as it pertains to youth as evidence suggests that placing high-risk adolescents in close proximity such as in prison facilities may inadvertently reinforce problem behavior and elevate risk for various adverse health

outcomes (Dishion, McCord, & Poulin, 1999). In light of these facts, policy makers in the United States have begun to recognize the importance of preventing the unnecessary and inappropriate incarceration of youth (U.S. House of Representatives Committee on Government Reform – Minority Staff Special Investigations Division, 2004).

Despite this awareness, the prevalence of youth incarceration in North America remains high. In 2010, the United States (US) federal juvenile justice system incarcerated approximately 70,000 youth (Sickmund, Sladky, Kang, & Puzzanchera, 2011). In Canada, on any given day between 2010 and 2011 approximately 14,800 youth were housed in the correctional system (aged 12–17 years at the time of offence), representing a rate of 79 youth per 10,000 youth population (Munch, 2011). For street-involved youth specifically, survey data from a cohort study of street youth in Vancouver found that 80.5% reported having ever being incarcerated overnight or longer (Milloy, Kerr, Buxton, Montaner, & Wood, 2009). Marginalized ethnic minority groups are also overrepresented amongst incarcerated youth. In the US, 69% of incarcerated youth are black or

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Hispanic (Sickmund et al., 2011) and in Canada 26% are of Aboriginal ancestry (Munch, 2011).

While the negative impact of incarceration on street youth is increasingly understood, risk factors for youth incarceration remain poorly studied. To date, much research on this topic has focused on offending or delinquent behaviors (Baron & Hartnagel, 1998; Heinze, Toro, & Urberg, 2004). Analyses that identify such behaviors in homeless and incarcerated youth are useful in demonstrating that risky behaviors appear to increase once a youth becomes immersed in street life (Thompson, Bender, Windsor, Cook, & Williams, 2010). However, they fail to capture the broader social, behavioral and environmental context in which youth incarceration occurs. Furthermore, studies that do address these more distal factors tend to be limited by recall bias and cross-sectional designs. To better understand risk factors for incarceration amongst at-risk youth, we sought to longitudinally examine the prevalence and correlates of incarceration among a prospective cohort of street-involved youth in Vancouver, Canada.

## Methods

Data for this study was collected from the At-Risk Youth Study (ARYS), a prospective cohort of street-involved youth in Vancouver, Canada. The study has previously been described in detail (Wood, Stoltz, Montaner, & Kerr, 2006). Eligibility criteria include youth between the ages of 14–26 at enrolment, who have used illicit drugs in the past 30 days and provide written informed consent. In summary, interviews are conducted at baseline and semi-annually for follow-up. Participants complete an interviewer-administered questionnaire and provide blood samples for HIV and HCV serology. The survey includes items on sociodemographic information, drug use patterns, sexual and drug-related risk behaviours, and engagement with the criminal justice system. Participants receive a \$20 CAD monetary compensation at each study visit. The ARYS cohort has been approved by the research ethics board of Providence Health Care and the University of British Columbia.

Data for this study was collected from September 2005 to May 2012. The primary outcome was reported incarceration in the past six months. This was defined as responding “yes” to the question “Have you been in detention, prison or jail in the last 6 months?” The comparison group was youth who reported no incarceration in the last six months.

Explanatory variables of interest included socio-demographic data including: age (per year older); gender (male vs. female); sexual orientation (lesbian, gay, bisexual, transgender, two-spirit (LGBT) vs. heterosexual); Caucasian ethnicity (yes vs. no); homelessness, defined as having no fixed address, sleeping on the street, couch surfing, or staying in a shelter or hostel at some point in the previous six months (yes vs. no); and residence in Vancouver's drug use epicenter at some point in the previous six months, which is a well-described and defined area of the city referred to as the “Downtown Eastside” (DTES) (yes vs. no). Substance use variables referring to behaviours in the previous six months included: daily crystal methamphetamine use, injection or non-injection (yes vs. no); daily crack cocaine smoking (yes vs. no); daily cocaine use, injection or non-injection (yes vs. no); daily heroin use, injection or non-injection (yes vs. no); any injection drug use (yes vs. no); daily cannabis use (yes vs. no); and heavy alcohol use, defined for females as  $\geq$  four drinks in one day in the last week or  $\geq$  seven drinks containing alcohol per week and for males as  $\geq$  five drinks in one day in the last week or  $\geq$  fourteen drinks containing alcohol per week (yes vs. no). Risk factors referring to behaviours in the previous six months included: public injection, defined as injecting drugs in public environments including streets, public lavatories, alleys, parks, parking lots, abandoned buildings, and other public

settings (any vs. never); syringe sharing, defined as having lent a used rig to someone else or fixed with a syringe that had already been used by someone else (yes vs. no); unprotected sex, defined as vaginal or anal sex without using a condom (yes vs. no); sex work, defined as having received money, gifts, food, shelter, clothing or drugs in exchange for sex (yes vs. no); drug dealing, defined as selling drugs as a source of income (yes vs. no); and victim of violence, defined as having been attacked, assaulted, or suffered violence (yes vs. no). Other factors include: age of first hard drug use (per year older) which included crack cocaine, cocaine (sniffed or snorted), heroin (sniffed, snorted or smoked) or crystal methamphetamine (smoked or snorted); and methadone program use, defined as ever participating in a methadone program (yes vs. no).

Since analyses of factors potentially associated with incarceration included serial measures for each subject, we used generalized estimating equations (GEE) for binary outcomes with logit link for the analysis of correlated data. These methods determine factors associated with incarceration throughout the six year and nine month follow-up period and provide standard errors adjusted by multiple observations per person using an exchangeable correlation structure. Therefore, this analysis considered data from every participant follow-up visit. Missing data was addressed through the GEE estimating mechanism which uses all available pairs method for missing data from dropouts or intermittent missing. All non-missing pairs of data are used in the estimators of the working correlation parameters. First, we used GEE bivariate analysis to determine factors associated with incarceration. To adjust for potential confounding, all variables that were  $p < 0.10$  in GEE bivariate analyses were considered in a full model. Quasilikelihood under the Independence model Criterion (QIC) statistic with a backward model selection procedure was used to screen all possible combinations of candidate variables and identify the model with the best overall fit as indicated by the lowest QIC value. Statistical analyses were performed using SAS software version 9.3 (SAS, Cary, NC). All reported  $p$ -values are two-sided and considered significant at  $p < .05$ .

## Results

A total of 1019 street-involved youth were enrolled in the study between September 2005 and May 2012. Among this sample, 320 (31%) were female, 686 (67%) were of Caucasian ethnicity, and the median age was 21 years at baseline (interquartile range [IQR] = 19–23). This sample contributed a total of 3347 observations. The median number of follow-up visits was 3 (IQR = 1–5). The number of youth who reported having ever been incarcerated at baseline was 638 (63%) and 189 (19%) reported having recently been incarcerated at baseline. Over the study period, 362 (35%) participants reported having been recently incarcerated and overall, a total of 610 (18%) observations included a report of incarceration.

The baseline characteristics of all participants stratified by self-reported incarceration in the previous six months are presented in Table 1. The results of the bivariate and multivariate GEE analyses are presented in Table 2. In multivariate GEE analysis, factors that remained independently associated with incarceration included: homelessness (adjusted odds ratio [AOR] = 1.60, 95% Confidence Interval [CI]: 1.28–1.99), daily crystal methamphetamine use (AOR = 1.56, 95% CI: 1.18–2.08), public injecting (AOR = 1.33, 95% CI: 1.04–1.72), drug dealing (AOR = 1.48, 95% CI: 1.20–1.84) and being a victim of violence (AOR = 1.68, 95% CI: 1.38–2.06). Conversely, female gender (AOR = 0.48, 95% CI: 0.36–0.65), LGBT identification (AOR = 0.47, 95% CI: 0.30–0.72) and increasing age of first hard drug use (AOR = 0.96, 95% CI: 0.92–0.99) were negatively associated with incarceration.

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