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## Inability to Access Addiction Treatment Among Street-Involved Youth in a Canadian Setting

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### Abstract

From Sept 2005 to May 2012, 1015 street-involved youth were enrolled into the At-Risk Youth Study (ARYS), a prospective cohort of youth aged 14–26 who use illicit drugs in Vancouver Canada. Data was collected through semiannual interviewer administered questionnaires. Generalized estimating equation (GEE) logistic regression was used to identify factors independently associated with being unable to access addiction treatment. The enclosed manuscript notes the implications and limitations of this study, as well as possible directions for future research. This study was funded by the US National Institutes of Health (NIH) and Canadian Institutes of Health (CIHR).

### Keywords

street-involved youth; addiction treatment; homelessness; Aboriginal ancestry; prospective cohort

## 1. Introduction

Illicit drug use is widespread among street-youth populations with 80 to 90 per cent of street-youth in many North American urban settings reporting recent drug use (Gleghorn, Marx, Vittinghoff, & Katz, 1998; Greene, Ennett, & Ringwalt, 1997; Public Health Agency of Canada, 2006). Young people who use drugs face numerous health-related harms including heightened risk of HIV and Hepatitis C (HCV) infection, and drug-related overdose (Gleghorn et al., 1998; E. Roy et al., 2001; E. Roy et al., 2003; Werb, Kerr, Lai, Montaner, & Wood, 2008). Drug using youth are also vulnerable to violence, incarceration and other negative aspects associated with drug market activity (Boivin, Roy, Haley, & Galbaud du Fort, 2005; Crawford, Whitbeck, & Hoyt, 2011; E. Roy et al., 2003). Reducing

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or preventing drug use and related harms among young people is a crucial public health priority. Alongside health promotion and harm reduction interventions, addiction treatment is a key strategy to address the harms of illicit drug use (Gossop, Marsden, Stewart, & Kidd, 2003; Wood et al., 2003). Through early intervention, addiction treatment can help reduce problematic drug use and prevent progression to higher intensity and high risk drug use, thereby reducing risk of blood borne disease transmission, drug overdose and other drug-related health and social harms (Fuller et al., 2002; Gibson, Flynn, & McCarthy, 1999; Hahn et al., 2002; Stewart, Gossop, & Marsden, 2002; Werb, Kerr, Li, Montaner, & Wood, 2008).

While there is a substantial evidence base indicating that addiction treatment is a critical intervention to reduce the harms of substance use disorders (McLellan et al., 1996; Wood et al., 2003), access to treatment can be a challenge particularly for some vulnerable populations (Farabee, Leukefeld, & Hays, 1998; Milloy et al., 2010; Wood et al., 2005). Among adult injection drug users in North America, commonly reported barriers to treatment include poor treatment availability (e.g., wait lists), cost of treatment, stringent admission requirements and stigma associated with illicit drug addiction (Appel, 2004; Farabee et al., 1998; Milloy et al., 2010).

While barriers to addiction treatment among adults who inject drugs have been well characterized, less is known about barriers to addiction treatment and those unable to access treatment among street-involved youth. Therefore, to better understand youth's experiences with efforts to access addiction treatment, we sought to longitudinally examine factors associated with seeking but being unable to access addiction treatment among street-involved youth in Vancouver, Canada.

## 2. Methods

### 2.1 Study Procedures

Data for this study were collected from the At-Risk Youth Study (ARYS), a prospective cohort of street-involved youth in Vancouver, Canada. Youth were eligible if they are between the ages of 14-26 at enrolment, have used illicit drugs other than marijuana in the past 30 days, provide written informed consent and were street-involved, defined as being absolutely or temporarily without stable housing, or having accessed street-based youth services in the past six months. Similar conditions have previously been used to define street-involvement among youth (Boivin et al., 2005; DeMatteo et al., 1999; Kerr et al., 2009). The study has been described in detail elsewhere (Wood, Stoltz, Montaner, & Kerr, 2006). In short, at baseline and subsequent semi-annual follow-up interviews, participants complete an interviewer-administered questionnaire which includes items on sociodemographic information, drug use patterns, sexual and drug-related risk behaviours, and engagement with the criminal justice system and health and social services, including experiences seeking and engaging in addiction treatment. At each study visit, participants receive a \$20 CAD monetary compensation. The ARYS cohort has been approved by the research ethics board of the University of British Columbia.

## 2.2 Study Sample

Data for this study were collected from September of 2005 to July of 2012. The main outcome examined was inability to access addiction treatment in the past six months. This was defined as responding “yes” to the question: “In the past 6 months, have you tried to access any treatment program but were unable?” The comparison group was youth who reported successfully accessing addiction treatment in the last six months. Types of addiction treatment available locally include inpatient and outpatient detoxification services; residential treatment and recovery houses; outpatient treatment through community clinics offering opioid agonist treatment with methadone or buprenorphine and addiction counseling; and Narcotics/Cocaine/Alcoholics Anonymous.

## 2.3 Study Variables

Based on the literature, we selected variables that we hypothesized might be associated with having difficulty accessing addiction treatment (DeBeck et al., 2011; Deck & Carlson, 2004; Milloy et al., 2010; Rapp et al., 2006). Explanatory variables of interest included socio-demographic data, including: age, operationalized as a continuous variable with the odds ratios reflecting the association between our outcome of interest and each additional year of age; gender (male vs. female); Aboriginal ancestry (yes vs. no); homelessness, defined as having been homeless at some point in the previous six months (yes vs. no); stable relationship, defined as being legally married, common law, or having a regular partner for three months or more (yes vs. no); and having dropped out of high school (yes vs. no). Drug-use variables refer to behaviours in the previous six months, and include: daily crystal methamphetamine use (yes vs. no); daily crack smoking (yes vs. no); daily cocaine use (yes vs. no); daily heroin use (yes vs. no); injection drug use (yes vs. no); binge alcohol use, defined as drinking five or more drinks on one occasion (yes vs. no); and binge drug use, defined as using injection or non-injection drugs more frequently than usual (yes vs. no). Other risk factors included: incarceration, defined as being in detention, prison, or jail overnight or longer in the previous six months (yes vs. no); and being a victim of violence, defined as having been attacked, assaulted, or suffered violence in the previous six months (yes vs. no).

## 2.4 Analysis

Since analyses of factors potentially associated with inability to access addiction treatment included serial measures for each participant, we used generalized estimating equation (GEE) logistic regression for binary outcomes with logit link for the analysis of correlated data to determine factors associated with inability to access addiction treatment throughout the six and a half year follow-up period. These methods provided standard errors adjusted by multiple observations per person using an exchangeable correlation structure. Therefore, data from every participant follow-up visit were considered in this analysis. Missing data were addressed through the GEE estimating mechanism which uses all available pairs method to encompass the missing data from dropouts or intermittent missing. All non-missing pairs of data are used in the estimators of the working correlation parameters. At first step, we used GEE bivariate analysis to determine factors associated with inability to access addiction treatment. In order to adjust for potential confounding, basic demographic

characteristics (age, gender, ethnicity) and all other 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 (Pan, 2001). All statistical analyses were performed using SAS software version 9.3 (SAS, Cary, NC). All p-values are two sided.

### 3. Results

Between September of 2005 and May of 2012, 1015 youth were enrolled in the study among whom a total of 537 (53%) reported attempting to access addiction treatment at some point during the study period. Among this sample, 179 (33%) were female, 152 (28%) were of Aboriginal ancestry and the median age was 21.9 years (interquartile range [IQR] = 20.2 – 23.7). The median number of follow-up visits was 3 (IQR= 1 - 5). This sample contributed a total of 1152 study site visits where attempting to access addiction treatment was reported. Among the 537 youth who reported having sought addiction treatment, 138 (26%) reported being unable to access treatment during study follow-up. Overall, 170 (15%) of all 1152 reported attempts to access addiction treatment were unsuccessful.

The baseline characteristics of all participants that sought addiction treatment at some point during the study period stratified by inability to access treatment are presented in Table 1. The results of the bivariate and multivariate GEE analyses of factors associated with reporting being unable to access addiction treatment are presented in Table 2. In multivariate GEE analysis, factors that remained independently associated with inability to access addiction treatment included: Aboriginal ancestry (adjusted odds ratio [AOR] = 1.79, 95% confidence interval [CI]: 1.19 – 2.69), being homeless (AOR = 2.01, 95% CI: 1.36 – 2.97) and being a victim of violence (AOR = 1.88, 95% CI: 1.32 – 2.68).

### 4. Discussion

In the present study, the majority of street-involved youth in our setting sought addiction treatment at some point during the study period. However, among this group, rates of inability to access addiction treatment were high and were associated with identifiable characteristics including Aboriginal ancestry, homelessness and being a recent victim of violence.

Similar rates of treatment-seeking behaviour have been described in other populations of street-involved youth in Canada (Brands, Leslie, Catz-Biro, & Li, 2005). Comparable rates of enrollment in addiction treatment have also been shown among older drug-using populations where approximately 50% of drug users reported being in addiction treatment (Wood et al., 2005). Interestingly, the frequency of reports of being unable to access addiction treatment was slightly lower among youth in this study compared with those found in Vancouver's adult injection drug-user population (Milloy et al., 2010).

Our finding that Aboriginal youth were more likely to experience barriers accessing addiction treatment has not been previously demonstrated. This is consistent with previous studies showing that among adult drug users, Aboriginal persons may be less likely to access

addiction treatment (DeBeck et al., 2011; Untalan, Woodruff, Hardy, Liao, & Krupitsky, 2004). The consistency of these findings demonstrates the need for collaborations between the Aboriginal community and addiction treatment providers to understand and address barriers to care. Understanding the perspectives and experiences of Aboriginal youth who use drugs will be critical for developing responses that are appropriate and effective.

The association between homelessness and inability to access addiction treatment is also consistent with existing literature and has been reported among adult injection drug user populations (Deck & Carlson, 2004; Wood et al., 2005). Homelessness has been associated with heavy drug use, injection drug use and mortality among street-involved youth (Baron, 1999; É. Roy, Haley, Leclerc, Boudreau, & Boivin, 2007; E. Roy et al., 2004). Consequently, the inability of homeless youth to access addiction treatment should be of particular concern. Personal barriers associated with homelessness, such as having no transportation, no phone and no consistent residence for reliable contact can hinder successful follow-up and entry into treatment (Farabee et al., 1998). These barriers may be especially problematic for individuals who are waitlisted for addiction services, where follow-up is essential before entry to treatment can be achieved (Carr et al., 2008). Our findings indicate the need for low threshold treatment and that addressing the housing needs of street-involved youth may help facilitate successful engagement with addiction treatment.

The association between youth reporting recent experiences of violence and inability to access treatment is difficult to interpret. It may be that youth who are victims of violence are more likely to seek treatment, but may have characteristics or patterns of behaviour that create barriers to treatment. Future studies are required to understand why youth experiencing violence were also at risk of being unable to access addiction treatment when they sought it.

In this study, we found no significant relationship between older age and inability to access addiction treatment. At baseline, however, youth reporting difficulty accessing addiction treatment did represent a slightly older median age (23 vs. 22,  $p$ -value = 0.003). Despite lack of statistical association between older age and difficulty accessing treatment in our multivariate analysis, age is a relevant factor in the provision of addiction treatment for youth and young adults (Battjes, Gordon, O'Grady, Kinlock, & Carswell, 2003; Dennis, Scott, Funk, & Foss, 2005). The majority of youth addiction treatment services in our study setting restrict participation to youth 18 years of age or younger ("Meeting the needs of youth struggling with addiction," 2013). This limits older street-involved youth to adult addiction treatment programs, which may not be well suited to their life experiences and situations. Further examination of the relationship between age and addiction treatment program engagement is warranted to determine which types of addiction treatment services are best suited to different age groups.

It should be noted that in response to concerns regarding youth drug use in North America, addiction services for youth have increased over the last decade (Erickson & Butters, 2005). Indeed, substantial increases in funding and provision of addiction treatment services in our study setting occurred just prior to and during our study period (Marsh & Fair, 2006). Presumably, rates of addiction treatment utilization within Vancouver's street-involved

youth increased with additional funding for addiction services. Yet despite these improvements to addiction services, our study suggests that access to treatment remains a concern among this vulnerable population. Although long waitlists have been the most commonly reported barrier to addiction treatment among both young and older illicit drug users, difficulty with accessing addiction services is often a complex product of personal, social, and structural barriers, and not simply a lack of provided services or inadequate funding (Hadland, Kerr, Li, Montaner, & Wood, 2009; Milloy et al., 2010). Further study is required to help assess how youth identify with current types of addiction treatment services and determine whether services could be redesigned and structured to better meet the unique needs of street-involved youth. As previously mentioned, it is particularly important to engage with Aboriginal youth who use drugs to better design culturally appropriate addiction treatment services.

This study has several limitations. First, as with all cohorts of drug using populations, the ARYS cohort is not a random sample and therefore may not generalize to other populations of street youth. Second, data collection was based on self report and thus could be subject to socially desirable responses which may have resulted in under reporting of illicit drug use and other stigmatized behaviours. As a result, the prevalence of some risk behaviours may have been underestimated in the present study. However, self reported risk behaviour has been shown to be largely accurate among adult drug-using populations (Darke, 1998) and also among various youth populations (Brener, Billy, & Grady, 2003). The authors declare no conflicts of interest.

In summary, despite available addiction treatments and the high prevalence of drug use among street-involved youth, over one quarter of youth who sought addiction treatment in this setting were unable to access it. This study identifies important disparities in access to addiction treatment among Aboriginal and homeless youth who use drugs, highlighting the need for targeted interventions for these distinct sub-populations.

## Glossary

<b>ARYS</b>	At-Risk Youth Study
<b>GEE</b>	Generalized Estimating Equations; a statistical method for estimating parameters of a regression model when data are correlated, and the outcome measure is discrete (difficulty accessing addiction treatment).
<b>Harm reduction</b>	a public health based approach which aims to minimize death, disease and injury from high risk activities (including illicit drug use).
<b>IQR</b>	inter-quartile range; a measure of statistical dispersion related to the mid-range.
<b>Multivariate analysis</b>	the incorporation of multiple variables in an analysis with the main outcome (inability to access addiction treatment).



<b>Prospective cohort</b>	a cohort that follows individuals over time with the interest of monitoring specific outcomes within that group.
<b>QIC</b>	Quasilikelihood under the Independence model Criterion
<b>Stigma</b>	social disapproval due to personal characteristics considered to be against social norms.
<b>Bivariate analysis</b>	analysis with a single variable and the main outcome measured (inability to access addiction treatment).

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**Table 1**

Characteristics<sup>\*</sup> of study sample at baseline stratified by seeking but being unable to access addiction treatment (n= 537).

Characteristic	Inability to access addiction treatment		OR (95% CI)	<i>p-value</i>
	Yes <i>n</i> = 138 <i>n</i> (%)	No <i>n</i> = 399 <i>n</i> (%)		
<b>Median age (IQR)</b>	23 (21- 24)	22 (20- 23)	1.13 (1.04 – 1.22)	0.003
<b>Gender</b>				
Female	49 (35.5)	130 (32.6)	1.14 (0.76 – 1.71)	0.530
Male	89 (64.5)	269 (67.4)		
<b>Aboriginal Ancestry</b>				
Yes	50 (36.2)	102 (25.6)	1.65 (1.09 – 2.50)	0.016
No	88 (63.8)	297 (74.4)		
<b>High school dropout</b>				
Yes	114 (82.6)	314 (78.7)	1.29 (0.78 – 2.12)	0.325
No	24 (17.4)	85 (21.3)		
<b>Stable relationship<sup>a</sup></b>				
Yes	37 (26.8)	108 (27.1)	0.99 (0.64 – 1.53)	0.953
No	101 (73.2)	291 (72.9)		
<b>Homeless<sup>a</sup></b>				
Yes	110 (79.7)	290 (72.7)	1.48 (0.92 – 2.36)	0.103
No	28 (20.3)	109 (27.3)		
<b>Daily crystal meth use<sup>a, b</sup></b>				
Yes	26 (18.8)	50 (12.5)	1.62 (0.96 – 2.72)	0.067
No	112 (81.2)	349 (87.5)		
<b>Daily crack smoking<sup>a</sup></b>				
Yes	36 (26.1)	81 (20.3)	1.39 (0.88 – 2.18)	0.156
No	102 (73.9)	318 (79.7)		
<b>Daily cocaine use<sup>a, b</sup></b>				
Yes	7 (5.1)	22 (5.5)	0.92 (0.38 – 2.19)	0.843
No	131 (94.9)	377 (94.5)		
<b>Daily heroin use<sup>a, b</sup></b>				
Yes	21 (15.2)	61 (15.3)	0.99 (0.58 – 1.70)	0.984
No	25 (25.0)	40 (40.0)		
<b>Injection drug use<sup>a</sup></b>				
Yes	47 (34.1)	137 (34.3)	0.99 (0.66 – 1.49)	0.953
No	91 (65.9)	262 (65.7)		
<b>Binge drug use<sup>a, b</sup></b>				
Yes	59 (42.8)	127 (31.8)	1.60 (1.07 – 2.38)	0.020
No	79 (57.2)	272 (68.2)		

<b>Inability to access addiction treatment</b>				
<b>Characteristic</b>	<b>Yes <i>n</i> = 138 <i>n</i> (%)</b>	<b>No <i>n</i> = 399 <i>n</i> (%)</b>	<b>OR (95% CI)</b>	<b><i>p</i>-value</b>
<b>Binge alcohol use<sup>a</sup></b>				
Yes	18 (13.0)	50 (12.7)	1.03 (0.58–1.84)	0.915
No	120 (87.0)	344 (87.3)		
<b>Incarceration<sup>a</sup></b>				
Yes	27 (19.6)	91 (22.8)	0.82 (0.51 – 1.33)	0.428
No	111 (80.4)	308 (77.2)		
<b>Victim of violence<sup>a</sup></b>				
Yes	79 (57.2)	172 (43.1)	1.77 (1.20 – 2.61)	0.004
No	59 (42.8)	227 (56.9)		

\* Characteristics for those who reported inability to access addiction treatment were measured at their first visit (during the study period: Sept 2005 to May 2012), which involved a report of inability to access addiction treatment. Characteristics for all other participants were measured from the first study visit that included a report of having accessed addiction treatment.

<sup>a</sup> Denotes activities in the previous six months

<sup>b</sup> Refers to any route of consumption (i.e., sniffing, snorting, smoking or injecting)

**Table 2**

Univariate and multivariate GEE analysis of factors associated with seeking but being unable to access addiction treatment among street-involved youth (n=537).

Characteristic	Unadjusted		Adjusted	
	OR (95% CI)	<i>p-value</i>	AOR (95% CI)	<i>p-value</i>
<b>Age</b>				
Per year older	1.02 (0.70 – 1.50)	0.308	1.06 (0.99 – 1.13)	0.113
<b>Gender</b>				
Female vs. male	1.02 (0.70 – 1.50)	0.900		
<b>Aboriginal Ancestry</b>				
Yes vs. No	1.64 (1.11 – 2.43)	0.013	1.79 (1.19 – 2.69)	0.005
<b>High school dropout</b>				
Yes vs. No	1.16 (0.71 – 1.88)	0.556		
<b>Stable relationship<sup>a</sup></b>				
Yes vs. No	0.78 (0.55 – 1.10)	0.154		
<b>Homeless<sup>a</sup></b>				
Yes vs. No	2.05 (1.43 – 2.95)	< 0.001	2.01 (1.36 – 2.97)	0.001
<b>Daily crystal meth use<sup>a,b</sup></b>				
Yes vs. No	1.54 (1.02 – 2.33)	0.040	1.44 (0.95 – 2.18)	0.083
<b>Daily crack smoking<sup>a</sup></b>				
Yes vs. No	0.17 (0.14 – 0.21)	0.060		
<b>Daily cocaine use<sup>a,b</sup></b>				
Yes vs. No	0.62 (0.26 – 1.51)	0.295		
<b>Daily heroin use<sup>a,b</sup></b>				
Yes vs. No	1.32 (0.86 – 2.03)	0.205		
<b>Injection drug use<sup>a</sup></b>				
Yes vs. No	1.15 (0.81 – 1.63)	0.427		
<b>Binge drug use<sup>a,b</sup></b>				
Yes vs. No	1.39 (0.99 – 1.94)	0.054		
<b>Binge alcohol use<sup>a</sup></b>				
Yes vs. No	0.89 (0.52–1.51)	0.666		
<b>Incarceration<sup>a</sup></b>				
Yes vs. No	1.22 (0.87 – 1.69)	0.249		
<b>Victim of violence<sup>a</sup></b>				
Yes vs. No	2.04 (1.46 – 2.85)	<0.001	1.88 (1.32 – 2.68)	<0.001

<sup>a</sup>Denotes activities in the previous six months

<sup>b</sup>Refers to any route of consumption (i.e., sniffing, snorting, smoking, or injecting)