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## TRANSITIONS INTO AND OUT OF HOMELESSNESS AMONG STREET-INVOLVED YOUTH IN A CANADIAN SETTING

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### Abstract

The impact of transitions in housing status among street youth have not been well explored. This study uses a generalized linear mixed effects model to identify factors associated with transitions into and out of homelessness among a prospective cohort of 685 drug-using street-involved youth aged 14–26. In multivariate analysis, high intensity substance use, difficulty accessing addiction treatment, incarceration, sex work, and difficulty accessing housing (all  $p < 0.05$ ) either significantly facilitated or hindered housing transitions. Findings highlight the importance of external structural factors in shaping youth's housing status and point to opportunities to improve the housing stability of vulnerable youth.

### Keywords

Homelessness; drug use; street-youth; addiction treatment; risk behavior; incarceration

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Authors declare no competing interests.

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## INTRODUCTION

Homelessness is an enduring concern among street-involved youth and is associated with a range of health and social harms (Marshall et al., 2009, Weber et al., 2002, Weir et al., 2007, Feng et al., 2012). Specifically, homeless youth have been found to be at greater risk of injection drug use (Feng et al., 2012, Roy et al., 2003), and high rates of HIV risk behavior (Lloyd-Smith et al., 2008), including sex-work (Weber et al., 2002) and engaging in unprotected sex (Marshall et al., 2009). Conversely, residential stability has been identified as protecting against these and other health and social harms (Roy et al., 2011).

Because homeless youth are a hidden population, there is no generally accepted estimate for the prevalence of youth homelessness around the world or in North America. In the United States, a 1999 survey estimated that 1.6 million youth had experienced an episode of homelessness (Hammer et al., 2002), and the number of homeless youth in Canada is reported to range from 150,000 to 300,000 (Evenson and Barr, 2009). However, beyond describing harms of homelessness, to implement effective policy responses to this growing problem, a better understanding of how youth become homeless and how they transition out of homelessness is required. Therefore, this study sought to identify factors associated with transitions into and out of homelessness among a cohort of street-involved youth in Vancouver during the period of September 2005 to May 2012.

## METHODS

### Study design

Data for this study was obtained from the At-Risk Youth Study (ARYS), a prospective cohort study of street-involved youth in Vancouver, Canada. The cohort began in 2005 and has been described in detail previously (Wood et al., 2006). In brief, snowball sampling and extensive street-based outreach methods were employed. To be eligible, participants at recruitment had to be aged 14–26 years, use illicit drugs other than marijuana in the past 30 days, and provide written informed consent. At enrollment, and on a bi-annual basis, participants completed an interviewer-administered questionnaire that included questions related to demographic information and drug use patterns. Participants also meet with a study nurse and provided a blood sample for serologic testing. At each study visit, participants are provided with a stipend (\$20 CDN) for their time. The University of British Columbia's Research Ethics Board has approved the study.

For the present analyses, ARYS participants were eligible if they completed a baseline survey and had at least one follow-up study visit between September 2005 and May 2012. Transitions in housing status were identified based on reported homelessness (e.g., no fixed address, sleeping on the street, couch surfing, or staying in a shelter or hostel) (yes vs. no) in the last six months. The following four categories for housing status based on two consecutive study follow-up visits were constructed: consistently homeless, consistently housed, homeless to housed, and housed to homeless. The “consistently homeless” category included reports where participants indicated that they had been homeless in two consecutive study visits, and the “consistently housed” category included reports where participants indicated that they had not been homeless in two consecutive study visits. Reports where participants indicated that they had been homeless in one study visit and not homeless in the subsequent visit, were grouped in the “homeless to housed” category and represented a transition out of homelessness. Reports where participants indicated that they had been housed in one study visit and homeless in the subsequent visit were grouped in the “housed to homeless” category and represented a transition into homelessness.

## Variables of interest

To identify factors associated with transitions into and out of homelessness, we considered a number of explanatory variables of interest including the following socio-demographic factors: gender (female vs. male); age (per year older); ethnicity (Caucasian vs. other); being in a stable relationship, defined as being legally married, common law, or having a regular partner (yes vs. no); and regular employment, defined as having at least one source of income from a regular job (distinguished from temporary, casual, and non-legal forms of income generation by separate response options) (yes vs. no). Drug use variables included: frequent alcohol use, defined as having more than four drinks per day (yes vs. no); binge drug use, defined as a period of using drugs more often than usual (yes vs. no); daily injection or non-injection heroin use (yes vs. no); daily injection or non-injection cocaine use (yes vs. no); daily injection or non-injection crystal methamphetamine use (yes vs. no); and daily crack cocaine smoking (yes vs. no). Other variables considered included: sex work, defined as exchanging sex for money, drugs, or gifts (yes vs. no); participation in drug dealing (yes vs. no); having difficulty accessing addiction treatment, based on the question: “In the past 6 months, have you ever tried to access any treatment program but were unable?” (yes vs. no); incarceration, defined as being in detention, prison, or jail overnight or longer (yes vs. no); and difficulty accessing housing services, defined as needing housing services but being unable to access them, was included as a marker of housing availability in Vancouver (yes vs. no). All drug use and behavioral variables refer to activities in the past six months.

## Statistical analysis

We used generalized linear mixed effects methods (GLMM) to model transitions into homelessness (housed to homeless), and out of homelessness (homeless to housed). The “consistently housed” and “consistently homeless” groups were used as a comparison for these two outcome levels, respectively. The GLMM method was used in order to model group and individual differences simultaneously (Krueger and Tian, 2004), and describe the change in individual trajectories over time (Finucane et al., 2007). We used GLMM univariate analysis to determine factors associated with transitions into and out of homelessness in unadjusted analyses. To adjust for potential confounding and identify factors that were independently associated with our outcomes of interest, all variables were entered in a multivariate logistic GLMM model. All statistical analyses were performed using SAS software version 9.2 (SAS, Cary, NC). All p-values are two sided.

## RESULTS

During the study period, 996 participants were recruited into ARYS among whom 685 participants were eligible for this analysis, including 219 (32.0%) women, and 447 (65.2%) persons of Caucasian ethnicity. The median age of participants in the study sample was 22 years (inter quartile range [IQR] = 20–24). This sample contributed a total of 2,997 observations. The median number of follow-up visits was 4 (IQR = 3–5), and the median number of months between study visits was 6.5 (IQR = 5.8–8.9). Participants were under study follow-up for a median of 25.4 months. A baseline comparison of those who were and were not excluded revealed no statistically detectable differences with respect to baseline age, gender, and homelessness ( $p > 0.05$ ); however, those included in the study were more likely to be Caucasian ( $p = 0.016$ ). An analysis of differences in drug use between these two groups found that those included in the study were more likely to use crystal methamphetamine daily ( $p = 0.038$ ).

Among our sample of 685 participants, over study follow up there were 864 observations of “consistently homeless” ( $n = 405$ , 59.1% of sample), 735 observations of “consistently

housed” (n = 320, 46.7% of sample), 461 observations of transitions out of homelessness (“homeless to housed”) (n = 386, 56.3% of sample), and 252 observations of transitions into homelessness (“housed to homeless”) (n = 213, 31.1% of sample). The characteristics of the study sample at baseline stratified by homelessness (last six months) are presented in Table 1. The univariate GLMM analyses of socio-demographic, behavioral, and other risk variables associated with transitions into and out of homelessness are presented in Table 2.

The results of the multivariate GLMM analysis are shown in Table 3. Factors that remained independently associated with transitioning into homelessness included: Caucasian ethnicity (adjusted odds ratio [AOR] = 1.48, 95% confidence interval [CI]: 1.07–2.04), frequent alcohol use (AOR = 2.53, 95%CI: 1.55–4.14), daily crack cocaine smoking (AOR = 2.33, 95%CI: 1.43–3.79), recent incarceration (AOR = 1.97, 95%CI: 1.29–3.01), and difficulty accessing housing (AOR = 7.22, 95%CI: 4.40–11.84). Factors negatively associated with transitioning into homelessness include: older age (AOR = 0.94, 95%CI: 0.88–0.99), female gender (AOR = 0.62, 95%CI: 0.43–0.90) and being in a stable relationship (AOR = 0.70, 95%CI: 0.50–0.97). Factors that were positively associated with transitioning out of homelessness included: being in a stable relationship (AOR = 1.42, 95%CI: 1.11–1.83) and involvement in sex work (AOR = 1.70, 95%CI: 1.03–2.79), and factors that were negatively associated with transitioning out of homelessness included: daily heroin use (AOR = 0.64, 95%CI: 0.43–0.95), daily crystal methamphetamine use (AOR = 0.67, 95%CI: 0.46–0.97), difficulty accessing addiction treatment (AOR = 0.65, 95%CI: 0.42–0.99), recent incarceration (AOR = 0.72, 95%CI: 0.53–0.99) and difficulty accessing housing (AOR = 0.20, 95%CI: 0.13–0.30).

## DISCUSSION

In the present study, we observed a high rate of transitioning in and out of homelessness, with 213 (31%) participants making at least one transition into homelessness, and 386 (56%) making at least one transition out of homelessness over the study period. Recent incarceration and difficulty accessing housing were both positively associated with transitions into homelessness and negatively associated with transitions out of homelessness. Conversely, being in a stable relationship was negatively associated with transitioning into homelessness and positively associated with transitioning out of homelessness. Other factors that were positively associated with transitioning into homelessness included Caucasian ethnicity, frequent alcohol use, and daily crack smoking, while older age and female gender were negatively associated with this transition. Daily heroin use, daily crystal meth use, and difficulty accessing addiction treatment were all negatively associated with transitions out of homelessness, while involvement in sex work was positively associated with this transition.

The associations between high intensity drug use and housing transitions found in our study is consistent with existing literature. Indeed, the relationship between housing instability and substance use is well established (Milburn et al., 2006, Roy et al., 2003, Corneil et al., 2006), and residential stability has been linked with decreased alcohol and polydrug consumption among street-youth in other settings (Roy et al., 2011).

Given the relationship between substance use and homelessness, and the potential for addiction treatment to reduce problematic drug use, it was particularly concerning that youth who successfully transitioned out of homelessness were significantly less likely to report difficulty accessing treatment. While individual motivation to enter or comply with addiction treatment can influence access, a prior study found that the most common barrier to addiction treatment reported by youth is long wait lists (Wong et al., 2009). Other reported barriers include strict behavioral requirements, prohibitive fees, and inconvenient or problematic locations (Hadland et al., 2009). Our findings suggest that increasing access

and reducing barriers to evidence-based forms of addiction treatment likely has considerable potential to reduce the health and social harms associated with homelessness by supporting transitions out of homelessness.

While our findings suggest that substance use appears to be an important factor in housing transitions, difficulty accessing housing was the factor that was most strongly associated with both transitions into and out of homelessness indicating that housing availability is a key driver of youth homelessness, rather than individual behavior. The success of the “Housing First” model has demonstrated that improved health outcomes and well-being can be achieved through the provision of well-managed fully supported housing, regardless of whether individuals continue to engage in drug and alcohol use (Padgett et al., 2011, Gulcur et al., 2003, Gurstein and Small, 2005). Although moving street-involved persons to private indoor locations may have unintended consequences (e.g. illicit drug dealing, drug overdose) (Erickson, 2001), structural interventions to increase access to and availability of carefully supervised supportive housing for youth will likely have a greater impact than addressing substance use.

The finding that exposure to the criminal justice system was associated with transitions into homelessness and negatively associated with transitions out of homelessness among youth further highlights the influence of structural factors in shaping youths’ housing status and also suggests that there are gaps in current services for this vulnerable population. These findings also underscore the challenges associated with using the criminal justice system to respond to problematic substance use. Incarceration among people with illicit drug addiction has been shown to predict syringe sharing (Milloy et al., 2008) and HIV incidence (J rgens et al., 2009), and has been negatively associated with injection drug cessation (DeBeck et al., 2009). The unintended negative consequences of incarceration have led to repeated calls for addiction to be addressed as a public health and not a criminal justice issue (Wood et al., 2010). Our findings support the importance of a public health approach to addiction and indicate that reducing exposure to the criminal justice system among young people who use illicit drugs may promote housing stability among this vulnerable population and reduce health related harms. Although some interventions to provide alternative corrections measures for youth have been introduced in our study setting (e.g. the Youth Offenders Act, 1984 and the Youth Criminal Justice Act, 2003), observers suggest that these initiatives have not achieved their stated objectives (Maclure et al., 2003). Our analysis suggests that additional and decisive action to intervene early with youth and provide health and social supports to reduce non-violent youth’s exposure to the criminal justice system should be a public policy priority.

The results from this study also point to three protective factors that merit attention. Firstly, older youth were less likely to transition into homelessness, which may be due to a greater ability to navigate social services and a readiness to leave street life (Karabanow, 2008). Secondly, those in a stable relationship were less likely to transition into and more likely to transition out of homelessness. While stable relationships appear to be a positive influence in relation to housing, it is important to note that prior studies have found that intimate partnerships among street-involved youth can also be a source of risk and have been associated with increased violence and transitions into injection drug use particularly among female youth (Small et al., 2009, Fast et al., 2010, Crofts et al., 1996, van Ameijden et al., 1994). Further study is required to better understand the complex dimensions and impacts of intimate partnerships among street-involved youth. Thirdly, involvement in sex work was associated with transitioning out of homelessness, which may reflect the lack of economic opportunities for youth (Sauvé, 2003) and provides additional evidence for investing in job-related skills training and job-seeking services for youth (Sonenstein et al., 2011).

Overall, these findings underscore the importance of addressing structural factors, specifically housing availability, exposure to the criminal justice system, and employment opportunities to ensure that youth are prevented from entering homelessness and are fully supported in their transition to stable housing. This is consistent with previous research that emphasizes the importance of structural factors for a range of public health concerns (Des Jarlais, 2000, Heimer et al., 2002, Blankenship et al., 2000). The results from this study also converge with previous research on exiting homelessness, which found that recently homeless individuals were able to consistently exit homelessness if they were connected with minimum wage employment and at least one stably housed friend or family member (Marr, 2012).

It is also of note that movement through institutions such as shelters, criminal justice settings, and addiction treatment (for those able to access it) may represent a form of “institutional cycling”, perpetuated by a lack of housing and other structural factors noted above. Previous research among adults has identified institutional cycling as a calculated survival practice, where marginally housed individuals rotate through different institutions as a means to meet their basic needs (DeVerteuil, 2003). Consequently, those who transition into and out of homelessness may be seen as a larger group of “institutional cyclers” rather than two distinct groups. This issue remains to be explored among marginally housed youth, although breaking this pattern of institutional cycling should be a priority for governments, as youth may develop routines based on services’ availability, rather than make efforts to disengage from service use (DeVerteuil, 2003).

### Limitations

There are several limitations to this study. First, as with other prospective cohorts of street-involved youth, ARYS participants were not recruited using randomized sampling, and therefore these findings may not generalize to other drug-using youth populations in Vancouver or other settings. However, extensive street-based outreach was used, and the demographic profile of our participants is similar to other street-youth samples in Vancouver (Miller et al., 2006, Ochnio et al., 2001). Secondly, although we used multivariate analysis to address the issue of potential confounders, our results may be influenced by variables not examined in this study including detailed assessments of mental health issues. Thirdly, the measures used in this study rely on self-report, and are therefore vulnerable to recall and social desirability bias.

### Conclusion

In summary, our study indicates that drug use behaviors and key structural factors including access to addiction treatment services, housing availability, exposure to the criminal justice system, and employment opportunities are associated with transitions into and out of homelessness. Increasing structural supports, especially supportive housing and providing youth with economic empowerment, may have the greatest impact on reducing youth homelessness and associated harms.

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## References

- Blankenship KM, Bray SJ, Merson MH. Structural interventions in public health. *AIDS*. 2000;14.
- Cornell TA, Kuyper LM, Shoveller J, Hogg RS, Li K, Spittal PM, Schechter MT, Wood E. Unstable housing, associated risk behaviour, and increased risk for HIV infection among injection drug users. *Health & place*. 2006; 12:79–85. [PubMed: 16243682]
- Crofts N, Louie R, Rosenthal D, Jolley D. The first hit: circumstances surrounding initiation into injecting. *Addiction*. 1996; 91:1187–96. [PubMed: 8828246]
- Debeck K, Kerr T, Li K, Milloy MJ, Montaner J, Wood E. Incarceration and drug use patterns among a cohort of injection drug users. *Addiction*. 2009; 104:69–76. [PubMed: 19133890]
- Des Jarlais DC. Structural interventions to reduce HIV transmission among injecting drug users. *AIDS*. 2000; 14:S41–S46. [PubMed: 10981473]
- Deverteuil G. Homeless mobility, institutional settings, and the new poverty management. *Environment and Planning A*. 2003; 35:361–379.
- Erickson, P. Drugs, violence and public health: what does harm reduction approach have to offer?. In: Basham, P., editor. *Sensible Solutions to the Urban Drug Problem*. Vancouver, BC: The Fraser Institute; 2001.
- Evenson, J.; Barr, C. *Youth Homelessness in Canada: The Road to Solutions*. Toronto, ON, Canada: Raising the Roof; 2009.
- Fast D, Shoveller J, Shannon K, Kerr T. Safety and danger in downtown Vancouver: understandings of place among young people entrenched in an urban drug scene. *Health & place*. 2010; 16:51–60. [PubMed: 19733496]
- Feng C, Debeck K, Kerr T, Mathias S, Montaner JS, Wood E. Homelessness independently predicts injection drug use initiation among street-involved youth in a Canadian setting. *Journal of Adolescent Health*. 2012
- Finucane MM, Samet JH, Horton NJ. Translational methods in biostatistics: linear mixed effect regression models of alcohol consumption and HIV disease progression over time. *Epidemiologic perspectives & innovations: EP+I*. 2007; 4:8. [PubMed: 17880699]
- Gulcur L, Stefancic A, Shinn M, Tsemberis S, Fischer SN. Housing, hospitalization, and cost outcomes for homeless individuals with psychiatric disabilities participating in continuum of care and housing first programmes. *Journal of Community & Applied Social Psychology*. 2003; 13:171–186.
- Gurstein P, Small D. From Housing to Home: Reflexive Management for those Deemed Hard to House. *Housing Studies*. 2005; 20:717–735.
- Hadland SE, Kerr T, Li K, Montaner JS, Wood E. Access to drug and alcohol treatment among a cohort of street-involved youth. *Drug and alcohol dependence*. 2009; 101:1–7. [PubMed: 19081203]
- Hammer, H.; Finkelhor, D.; Sedlak, A. *National Incidence Studies of Missing, Abducted, Runaway, and Thrownaway Children (NISMArt)*. Washington, DC: Office of Juvenile Justice and Delinquency Prevention; 2002. *Runaway/Thrownaway children: national estimates and characteristics*.
- Heimer R, Bray S, Burris S, Khoshnood K, Blankenship KM. Structural interventions to improve opiate maintenance. *International Journal of Drug Policy*. 2002; 13:103–111.
- J rgens R, Ball A, Verster A. Interventions to reduce HIV transmission related to injecting drug use in prison. *The Lancet Infectious Diseases*. 2009; 9:57–66. [PubMed: 19095196]

- Karabanow J. Getting off the Street: Exploring the Processes of Young People's Street Exits. *American Behavioral Scientist*. 2008; 51:772–788.
- Krueger C, Tian L. A comparison of the general linear mixed model and repeated measures ANOVA using a dataset with multiple missing data points. *Biological research for nursing*. 2004; 6:151–7. [PubMed: 15388912]
- Lloyd-Smith E, Kerr T, Zhang R, Montaner JSG, Wood E. High prevalence of syringe sharing among street involved youth. *Addiction Research & Theory*. 2008; 16:353–358.
- Maclure R, Campbell K, Dufresne M. Young offender diversion in Canada: tensions and contradictions of social policy appropriation. *Policy Studies*. 2003; 24:135–150.
- Marr MD. Pathways out of Homelessness in Los Angeles and Tokyo: Multilevel Contexts of Limited Mobility amid Advanced Urban Marginality. *International Journal of Urban and Regional Research*. 2012:36.5.
- Marshall BD, Kerr T, Shoveller JA, Patterson TL, Buxton JA, Wood E. Homelessness and unstable housing associated with an increased risk of HIV and STI transmission among street-involved youth. *Health & place*. 2009; 15:753–60. [PubMed: 19201642]
- Milburn NG, Rotheram-Borus MJ, Rice E, Mallet S, Rosenthal D. Cross-national variations in behavioral profiles among homeless youth. *American journal of community psychology*. 2006; 37:63–76. [PubMed: 16680537]
- Miller CL, Strathdee SA, Kerr T, Li K, Wood E. Factors associated with early adolescent initiation into injection drug use: implications for intervention programs. *The Journal of adolescent health: official publication of the Society for Adolescent Medicine*. 2006; 38:462–4. [PubMed: 16549314]
- Milloy MJ, Wood E, Small W, Tyndall M, Lai C, Montaner J, Kerr T. Incarceration experiences in a cohort of active injection drug users. *Drug and Alcohol Review*. 2008; 27:693–699. [PubMed: 19378451]
- Ochnio JJ, Patrick D, Ho M, Talling DN, Dobson SR. Past infection with hepatitis A virus among Vancouver street youth, injection drug users and men who have sex with men: implications for vaccination programs. *Canadian Medical Association Journal*. 2001; 165:293–297. [PubMed: 11517645]
- Padgett DK, Stanhope V, Henwood BF, Stefancic A. Substance use outcomes among homeless clients with serious mental illness: comparing Housing First with Treatment First programs. *Community Ment Health J*. 2011; 47:227–32. [PubMed: 20063061]
- Roy É, Haley N, Leclerc P, Cédras L, Blais L, Boivin JF. Drug injection among street youths in montreal: Predictors of initiation. *Journal of Urban Health*. 2003; 80:92–105. [PubMed: 12612099]
- Roy É, Robert M, Vaillancourt É, Boivin JF, Vandermeersch J, Martin I. Residential Trajectory and HIV High-Risk Behaviors among Montréal Street Youth—A Reciprocal Relationship. *Journal of Urban Health*. 2011; 88:767–778. [PubMed: 21494896]
- Sauvé S. Changing Paradigms for Working with Street Youth: The Experience of Street Kids International. *Children, Youth and Environments*. 2003; 13:314–333.
- Small W, Fast D, Krusi A, Wood E, Kerr T. Social influences upon injection initiation among street-involved youth in Vancouver, Canada: a qualitative study. *Substance abuse treatment, prevention, and policy*. 2009; 4:8.
- Sonenstein FL, Marshall BD, Tandon SD. Employment and training programs: a context for reaching out of school youth with mental health and other health programs. *Adolesc Med State Art Rev*. 2011; 22:441–57. x–xi. [PubMed: 22423459]
- Van Ameijden EJC, Van Den Hoek JaR, Hartgers C, Coutinho RA. Risk Factors for the Transition from Noninjection to Injection Drug Use and Accompanying AIDS Risk Behavior in a Cohort of Drug Users. *American Journal of Epidemiology*. 1994; 139:1153–1163. [PubMed: 8209874]
- Weber A, Boivin JF, Blais L, Haley N, Roy É. HIV risk profile and prostitution among female street youths. *Journal of Urban Health*. 2002; 79:525–535. [PubMed: 12468672]
- Weir BW, Bard RS, O'brien K, Casciato CJ, Stark MJ. Uncovering patterns of HIV risk through multiple housing measures. *AIDS and behavior*. 2007; 11:31–44. [PubMed: 17828588]
- Wong J, Marshall BDL, Kerr T, Lai C, Wood E. Addiction Treatment Experience among a Cohort of Street-Involved Youths and Young Adults. *Journal of Child & Adolescent Substance Abuse*. 2009; 18:398–409.



- Wood E, Stoltz JA, Montaner JS, Kerr T. Evaluating methamphetamine use and risks of injection initiation among street youth: the ARYS study. *Harm reduction journal*. 2006; 3:18. [PubMed: 16723029]
- Wood E, Werb D, Kazatchkine M, Kerr T, Hankins C, Gorna R, Nutt D, Des Jarlais D, Barre-Sinoussi F, Montaner J. Vienna Declaration: a call for evidence-based drug policies. *Lancet*. 2010; 376:310–2. [PubMed: 20650517]

**Table 1**

Characteristics of street-involved youth at baseline (n=685).

Characteristic	Total (%) (n =685)	Homeless <sup>†</sup>		p - value
		Yes (%) (n =493)	No (%) (n =192)	
Older age				
Median (IQR)	22 (20–24)	22 (20–24)	22 (19–24)	0.057
Gender				
(Female vs. male)	219 (32.0)	146 (29.6)	73 (38.0)	0.034
Caucasian ethnicity				
(Yes vs. no)	447 (65.2)	337 (68.4)	110 (57.3)	0.006
Stable relationship (currently)				
(Yes vs. no)	199 (29.0)	127 (25.8)	72 (37.5)	0.002
Regular employment <sup>†</sup>				
(Yes vs. no)	386 (56.4)	283 (57.4)	103 (53.6)	0.373
Frequent alcohol use (>4 drinks/day) <sup>†</sup>				
(Yes vs. no)	403 (58.8)	64 (13.0)	17 (9.0)	0.994
Binge drug use <sup>*†</sup>				
(Yes vs. no)	194 (28.3)	159 (32.3)	35 (18.2)	<0.001
Daily heroin use <sup>*†</sup>				
(Yes vs. no)	80 (11.7)	56 (11.4)	24 (12.5)	0.676
Daily cocaine use <sup>*†</sup>				
(Yes vs. no)	27 (3.9)	25 (5.1)	2 (1.0)	0.015
Daily crystal meth use <sup>*†</sup>				
(Yes vs. no)	99 (14.5)	80 (16.2)	19 (9.9)	0.034
Daily crack smoking <sup>†</sup>				
(Yes vs. no)	115 (16.8)	94 (19.1)	21 (10.9)	0.011
Difficulty accessing addiction treatment <sup>†</sup>				
(Yes vs. no)	78 (11.4)	67 (13.6)	11 (5.7)	0.004
Incarceration <sup>†</sup>				
(Yes vs. no)	134 (19.6)	114 (23.1)	20 (10.4)	<0.001
Drug dealing <sup>†</sup>				
(Yes vs. no)	368 (53.7)	284 (57.6)	84 (43.8)	<0.001
Sex work <sup>†</sup>				
(Yes vs. no)	69 (10.1)	56 (11.4)	13 (6.8)	0.073
Difficulty accessing housing <sup>†</sup>				
(Yes vs. no)	165 (24.1)	152 (30.8)	13 (6.8)	<0.001

\* Injection or non-injection use

<sup>†</sup> Refers to activities in the past six months

**Table 2**

Univariate generalized linear mixed-effects analyses of factors associated with transitioning into and out of homelessness among street-involved youth in Vancouver (n=685).

Characteristic	<u>Housed to Homeless vs. Consistently Housed</u>		<u>Homeless to Housed vs. Consistently Homeless</u>	
	Odds Ratio (95% CI)	p - value	Odds Ratio (95% CI)	p - value
Older age				
(Per year older)	0.96 (0.91 – 1.01)	0.106	1.01 (0.97 – 1.06)	0.528
Gender				
(Female vs. male)	<b>0.55 (0.40 – 0.76)</b>	<b>&lt;0.001</b>	1.09 (0.85 – 1.39)	0.507
Caucasian ethnicity				
(Yes vs. no)	<b>1.38 (1.03 – 1.86)</b>	<b>0.034</b>	0.86 (0.68 – 1.10)	0.236
Stable relationship (currently)				
(Yes vs. no)	<b>0.60 (0.45 – 0.82)</b>	<b>0.001</b>	<b>1.46 (1.16 – 1.85)</b>	<b>0.002</b>
Regular employment <sup>†</sup>				
(Yes vs. no)	0.96 (0.72 – 1.29)	0.790	<b>1.34 (1.07 – 1.69)</b>	<b>0.012</b>
Frequent alcohol use (>4 drinks/day) <sup>†</sup>				
(Yes vs. no)	<b>2.10 (1.56 – 2.81)</b>	<b>&lt;0.001</b>	0.87 (0.69 – 1.09)	0.230
Binge drug use <sup>*†</sup>				
(Yes vs. no)	<b>1.96 (1.42 – 2.71)</b>	<b>&lt;0.001</b>	<b>0.66 (0.51 – 0.85)</b>	<b>0.001</b>
Daily heroin use <sup>*†</sup>				
(Yes vs. no)	<b>1.66 (1.11 – 2.49)</b>	<b>0.015</b>	<b>0.64 (0.45 – 0.92)</b>	<b>0.016</b>
Daily cocaine use <sup>*†</sup>				
(Yes vs. no)	1.30 (0.40 – 4.29)	0.664	0.52 (0.22 – 1.21)	0.128
Daily crystal meth use <sup>*†</sup>				
(Yes vs. no)	1.12 (0.70 – 1.80)	0.630	<b>0.60 (0.42 – 0.84)</b>	<b>0.003</b>
Daily crack smoking <sup>†</sup>				
(Yes vs. no)	<b>2.54 (1.67 – 3.87)</b>	<b>&lt;0.001</b>	0.85 (0.61 – 1.18)	0.316
Difficulty accessing addiction treatment <sup>†</sup>				
(Yes vs. no)	<b>2.00 (1.19 – 3.36)</b>	<b>0.009</b>	<b>0.46 (0.31 – 0.69)</b>	<b>&lt;0.001</b>
Incarceration <sup>†</sup>				
(Yes vs. no)	<b>2.76 (1.87 – 4.07)</b>	<b>&lt;0.001</b>	<b>0.57 (0.43 – 0.77)</b>	<b>&lt;0.001</b>
Drug dealing <sup>†</sup>				
(Yes vs. no)	<b>2.26 (1.65 – 3.11)</b>	<b>&lt;0.001</b>	<b>0.69 (0.53 – 0.89)</b>	<b>0.004</b>
Sex work <sup>†</sup>				
(Yes vs. no)	1.06 (0.60 – 1.89)	0.845	1.20 (0.76 – 1.90)	0.421
Difficulty accessing housing <sup>†</sup>				
(Yes vs. no)	<b>7.89 (4.89 – 12.73)</b>	<b>&lt;0.001</b>	<b>0.18 (0.12 – 0.27)</b>	<b>&lt;0.001</b>

\* Injection or non-injection use

<sup>†</sup> Refers to activities in the past six months

**Table 3**

Multivariate generalized linear mixed-effects analyses of factors associated with transitioning into and out of homelessness among street youth in Vancouver (n=685).

Characteristic	<u>Housed to Homeless vs. Consistently Housed</u>		<u>Homeless to Housed vs. Consistently Homeless</u>	
	Adjusted Odds Ratio (95% CI)	p - value	Adjusted Odds Ratio (95% CI)	p - value
Older age				
(Per year older)	<b>0.94 (0.88 – 0.99)</b>	<b>0.030</b>	1.02 (0.97 – 1.07)	0.387
Gender				
(Female vs. male)	<b>0.62 (0.43 – 0.90)</b>	<b>0.011</b>	1.01 (0.76 – 1.33)	0.968
Caucasian ethnicity				
(Yes vs. no)	<b>1.48 (1.07 – 2.04)</b>	<b>0.018</b>	0.87 (0.68 – 1.13)	0.301
Stable relationship (currently)				
(Yes vs. no)	<b>0.70 (0.50 – 0.97)</b>	<b>0.030</b>	<b>1.42 (1.11 – 1.83)</b>	<b>0.007</b>
Regular employment <sup>†</sup>				
(Yes vs. no)	0.96 (0.70 – 1.33)	0.823	1.27 (0.99 – 1.63)	0.065
Frequent alcohol use (>4 drinks/day) <sup>†</sup>				
(Yes vs. no)	<b>2.53 (1.55 – 4.14)</b>	<b>&lt;0.001</b>	0.68 (0.46 – 1.02)	0.062
Binge drug use <sup>*†</sup>				
(Yes vs. no)	1.39 (0.97 – 1.99)	0.073	0.78 (0.59 – 1.03)	0.081
Daily heroin use <sup>*†</sup>				
(Yes vs. no)	1.46 (0.93 – 2.31)	0.102	<b>0.64 (0.43 – 0.95)</b>	<b>0.028</b>
Daily cocaine use <sup>*†</sup>				
(Yes vs. no)	0.65 (0.18 – 2.31)	0.501	0.71 (0.29 – 1.75)	0.454
Daily crystal meth use <sup>*†</sup>				
(Yes vs. no)	1.03 (0.61 – 1.73)	0.915	<b>0.67 (0.46 – 0.97)</b>	<b>0.034</b>
Daily crack smoking <sup>†</sup>				
(Yes vs. no)	<b>2.33 (1.43 – 3.79)</b>	<b>0.001</b>	0.92 (0.63 – 1.34)	0.660
Difficulty accessing addiction treatment <sup>†</sup>				
(Yes vs. no)	1.60 (0.91 – 2.81)	0.103	<b>0.65 (0.42 – 0.99)</b>	<b>0.044</b>
Incarceration <sup>†</sup>				
(Yes vs. no)	<b>1.97 (1.29 – 3.01)</b>	<b>0.002</b>	<b>0.72 (0.53 – 0.99)</b>	<b>0.041</b>
Drug dealing <sup>†</sup>				
(Yes vs. no)	1.42 (0.99 – 2.04)	0.060	0.95 (0.72 – 1.27)	0.728
Sex work <sup>†</sup>				
(Yes vs. no)	0.83 (0.44 – 1.57)	0.566	<b>1.70 (1.03 – 2.79)</b>	<b>0.039</b>
Difficulty accessing housing <sup>†</sup>				
(Yes vs. no)	<b>7.22 (4.40 – 11.84)</b>	<b>&lt;0.001</b>	<b>0.20 (0.13 – 0.30)</b>	<b>&lt;0.001</b>

\* Injection or non-injection use

<sup>†</sup> Refers to activities in the past six months