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Impact of migration from an illicit drug scene on hospital outcomes among people who use illicit drugs in Vancouver, Canada

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Abstract

Introduction and Aims—People who use illicit drugs (PWUD) are vulnerable to an array of negative health outcomes, and increased hospital services utilisation. PWUD are also a transient population which poses challenges to the provision of optimal health care. The objective of this study was to identify out-migration patterns from Vancouver's Downtown Eastside (DTES), a neighbourhood where services for PWUD are concentrated, and to estimate the impact of these patterns on hospitalisation events among PWUD.

Design and Methods—Data were collected through three prospective cohorts of PWUD in Vancouver, which were linked with health administrative data. Latent class growth analysis was used to define migration trajectory groups. Poisson regression was used to estimate the effect of migration patterns on hospitalisation events.

Results—A total of 1180 participants were included in the study. Four latent classes were identified: early migration out (243, 20.6%); frequent revisit (112, 9.5%); late migration out (219, 18.6%); and consistently living in the DTES (606, 51.4%). Compared with those who consistently

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Conflict of Interests

The authors have no conflicts of interest.

lived in the DTES, participants in the early migration out group had lower hospitalisation events (adjusted rate ratio = 0.65; 95% confidence interval: 0.48–0.90).

Discussion and Conclusion—We found that PWUD who migrated out of the DTES early had lower hospitalisation events compared to those who consistently lived in the DTES, which may be a function of lesser addiction severity among this trajectory group. These findings underscore a need to provide transitional health and social service supports for other trajectory groups in an effort to minimise hospitalisation for preventable causes.

Keywords

hospital outcomes; illicit drugs; migration patterns

INTRODUCTION

People who use drugs (PWUD) are vulnerable to an array of negative health outcomes (e.g. soft-tissue infections, psychiatric illness, pneumonia, cardiovascular complications, overdose) that often result in increased hospital service utilisation [1, 2]. A study involving 1216 street-involved youth who use drugs found that 373 (30.7%) participants were admitted to hospital in the previous 6 months at some point between January 2005 and May 2016, with mental illness being the top reported reason for admission (37.8%) [3]. Notably, in recent years, there has been a striking increase in hospital admissions for infective endocarditis, a potentially fatal consequence of injection drug use [4]. A nation-wide US-based study found that the number of hospitalisations for injection drug use-related infective endocarditis increased from 38% to 66% between 1996 and 2003, while the number of at-risk individuals (i.e. people who inject drugs, PWID) remained stable [5].

A pronounced challenge in providing optimal care for PWUD is that many are highly transient and mobile, often transcending regional, national and international borders [6]. For instance, a study involving 1056 PWID conducted in Tijuana, Mexico, found that 14.1% of PWID travelled to the USA in the past year [7]. An area with an open illicit drug scene known as ‘Needle Park’ that existed in Zurich, Switzerland from 1986 to 1995 was known for becoming a focus of attraction for PWUD around the world [8]. In 1992, it was found that only 21% of Needle Park residents originated from Zurich; this fell even further to 10% in 1993 [8]. Conducted in 2004, a Canadian nationwide survey suggested that approximately 25% of PWUD had lived elsewhere in the past 6 months [9]. PWUD may migrate to and/or remain in an area with an open illicit drug scene to access a wide variety of potent drugs and/or for income generation opportunities [10]. Moreover, illicit drug scenes tend to provide a high concentration of health and social services such as low rent single-room-occupancy hotel rooms, homeless shelters, drop-in health facilities, food banks, harm reduction programs (e.g. supervised injection facilities, drug checking machines), drug treatment programs and recovery houses [6, 11, 12].

To the best of our knowledge, a 10-year retrospective study involving 433 individuals experiencing chronic homelessness and serious mental illness in an open illicit drug scene in the Downtown Eastside (DTES) neighbourhood in Vancouver, Canada was the first to examine the impact of migration on hospital service use [6]. Situated a few blocks east of

the central business district, the DTES includes a high concentration of those experiencing homelessness, those living with a substance use disorder and/or mental illness in the province of British Columbia. Findings demonstrated substantial migration to the DTES during the study period, which coincided with a significant increase in hospital service use. However, the focus of this research was on migration between local areas, categorised as: DTES, other local areas in Vancouver, and all other local areas in the province of British Columbia. Furthermore, distinct patterns of migration (e.g. cyclic migration patterns) were not considered. Little is known about the impact of distinct migration patterns on hospital outcomes among PWUD populations. Building upon existing literature [13], the objective of our study was to assess the effect of out-migration patterns from the DTES on subsequent hospitalisation events among PWUD in Vancouver, Canada.

METHODS

Data for this study were derived from ongoing prospective cohort studies involving PWUD in Vancouver, Canada: the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), the Vancouver Injection Drug Users Study (VIDUS) and the At-Risk Youth Study (ARYS). These cohorts have been detailed elsewhere [14, 15]. The eligibility criteria for ACCESS includes: adults (≥ 18 years of age) who used an illicit drug in the past month and who are HIV-positive at baseline. The eligibility criteria for VIDUS: adults who injected drugs in the past month and who are HIV-negative at baseline. The eligibility criteria for ARYS: street-involved youth (14–26 years of age) who used an illicit drug in the month preceding enrolment. All participants provided written informed consent prior to participation. A harmonised questionnaire allows for comparison across the ACCESS, VIDUS and ARYS cohorts, individuals may also fluctuate between cohorts. Participation in any cohort involves completion of an interviewer-administered questionnaire at baseline, defined as the date of study enrolment (which can be at different times given that it is a rolling cohort), and semi-annually thereafter (i.e. follow up), which captures a wide variety of information (e.g. sociodemographic and behavioural characteristics, drug use patterns, access to health services). Upon completion of each questionnaire, a stipend (\$40 CAD) is offered to participants for their time. The ACCESS, VIDUS and ARYS cohorts have received ethics approval by the Providence Health Care/University of British Columbia Research Ethics Board.

For the present analysis, the sample was restricted to participants who: (i) resided in the DTES at baseline; and (ii) completed at least four study visits between December 2007 and November 2016. We included participants with a minimum of four study visits to be able to estimate linear, quadratic and cubic trajectories of migration. Once the sample had been restricted, cohort data were confidentially linked to Vancouver Coastal Health Authority's Discharge Abstract Database, which captures information on admissions and discharges from acute care hospitals in the region. Linkage was possible via participants' Personal Health Number, which is a unique number assigned to every identified person receiving health care in the province of British Columbia.

The primary outcome variable was a hospitalisation event, defined as any hospital admission using the Discharge Abstract Database, and measured as a count. Transfers between care

settings were counted as one event. Among those who were hospitalised, frequencies and proportions of total number of times a person was hospitalised during the entire study period were provided. Length of stay was determined by subtracting the admission date from the discharge date. Reasons for hospitalisation were also derived from the Discharge Abstract Database and categorised according to International Classification of Diseases, 10th edition groupings. The primary exposure variable was migration patterns, identified through a self-reported measure of having resided in the DTES in the last 6 months (yes vs. no). Those who reported residing in neighbouring areas (e.g. Downtown South, Vancouver, Grandview) outside of the 10-block radius that is defined as being the DTES were considered 'out' of the DTES. Trajectory patterns were not pre-defined to encourage the emergence of additional (non-hypothesised) patterns [13, 16]. A range of confounders that may be associated with migration patterns and hospitalisation events were also considered including: male sex; age; Indigenous ancestry; having a high school diploma or higher; licit employment, defined as having a regular job, temporary work or self-employed; receiving income assistance; hepatitis C virus-positive serostatus; HIV-positive serostatus; history of mental illness; homelessness; sex work; drug dealing; experienced violence; injection drug use; heroin use; non-medical use of prescription opioids; cocaine use; crack cocaine use; crystal methamphetamine use; engagement in addiction treatment or services including opioid agonist therapy; engagement in community health or social service; and having been stopped, searched or detained by police. With exception of the primary outcome variable (treated as a count), age (per 10-year increase), male sex (yes vs. no), Indigenous ancestry (yes vs. no) and high school education (yes vs. no), all variables referred to time-varying events (i.e. events in the last 6 months) unless otherwise stated.

As a first step, we defined the migration trajectory groups using latent class growth analysis [17–19]. We fit a series of models, comparing the results based on the Bayesian Information Criterion, the Akaike Information Criterion and the average posterior probabilities of groups (using a posterior probability minimum cut-off of 0.7) [20]. Furthermore, to ensure interpretability of the latent classes, sample size per latent class (those with a sample size per latent class $\geq 5\%$ were kept) as well as substantive importance of the trajectory groups were considered. Key demographic characteristics, including age at baseline, male sex and Indigenous ancestry, were considered in the latent class growth analysis models. To determine trajectory shapes, backward selection (of parameters representing time) was used.

Next, we used bivariable Poisson regression to estimate the relationship between hospitalisation events and migration trajectory groups, as well as all potential confounding variables. Then, we used a confounding model selection approach adapted from Maldonado and Greenland [21, 22]. In brief, through an iterative stepwise process, confounders corresponded to the smallest relative change in the main relationship (i.e. the impact of out-migration patterns on hospitalisation events) were dropped until the minimum change exceeded 5%. Remaining covariates were considered as confounders. To determine whether overdispersion was present, we assessed the deviance and conducted a goodness-of-fit test for our final multivariable model. Furthermore, we used robust standard errors for the parameter estimates to control for any potential mild overdispersion through the SAS PROC GENMOD procedure, which is recommended by Cameron and Trivedi [23]. As a final step, to address potential follow-up bias, sensitivity analysis was conducted on a subset of

individuals (i.e. those not lost to follow up) in the Poisson regression. All analyses were performed in SAS 9.4 (SAS, Cary, NC, USA), using PROC TRAJ procedure [18].

RESULTS

During the study period, 3118 participants were enrolled in the VIDUS, ACCESS and ARYS cohorts. Of the 1180 participants eligible for inclusion in this study, 607 (51.4%) were from VIDUS, 435 (36.9%) from ACCESS and 138 (11.7%) were from ARYS. Four hundred and thirty (36.4%) were female and the median age was 41.6years [quartile (Q) 1-Q3: 32.6–48.0]. Study sample characteristics stratified by hospitalisation event at baseline are presented in Table 1. The four-group migration trajectories of living in the DTES identified through latent class growth analysis were: early migration out (243, 20.6%); frequent revisit (112, 9.5%); late migration out (219, 18.6%); and consistently living in the DTES (606, 51.4%). For those in the early migration out group, the median migration time was 15.4 months (interquartile range 7.0–24.9). For those in the late migration out group, the median migration time was 48.8 months (interquartile range 29.0–66.8). A table summarising the selection of models is presented as a supplementary file. Of the 510 participants who were never hospitalised, 169 (33.1%) were female and the median age was 38.5 years (Q1–Q3: 29.0–46.6). Of the 670 participants who had at least one hospitalisation, 261 (39%) were female, the median age was 43.1years (Q1–Q3: 36.2–49.0), and the number of hospitalisations ranged from 1 to 37 times throughout the study period (median = 3 times; Q1–Q3: 1–5 times). The median length of hospital stay was relatively heterogenous over time, ranging from 1–22 days per year. The top three reasons for hospitalisation included mental and behavioural disorders (17.7%); certain infectious and parasitic diseases including HIV and hepatitis C virus (16.7%); and diseases of the respiratory system (9.6%). Additional details are presented as a supplementary file.

As presented in Table 2, in bivariable Poisson regression, we found that PWUD who migrated out of the DTES early had significantly lower hospitalisation events, as compared with those who consistently lived in the DTES (rate ratio 0.57; 95% confidence interval [CI] 0.40–0.79). This association remained statistically significant in multivariable analyses, after adjusting for various confounders (adjusted rate ratio 0.65; 95% CI 0.48–0.90). Compared to PWUD who consistently lived in the DTES, we failed to find a statistically significant association with the presence of other trajectory groups. The deviance/df was 0.886, and the goodness-of-fit test P-value was greater than 0.05.

During the study period, 221 participants were lost to follow up: frequent revisit (n = 19); early migration out (n = 49); late migration out (n = 33); and consistently living in DTES (n = 120). Presented in Table 3, results of the sensitivity analysis were consistent with the primary findings. We found that PWUD who migrated out of the DTES early had significantly lower hospitalisation events, as compared with those who consistently lived in the DTES (rate ratio 0.60; 95% CI 0.41–0.86). This association remained statistically significant in multivariable analyses (adjusted rate ratio 0.69; 95% CI 0.49–0.97). Compared to PWUD who consistently lived in the DTES, we failed to find a statistically significant association with the presence of other trajectory groups.

DISCUSSION

In the present study, we identified four migration trajectory groups of DTES residents: early migration out, frequent revisit, late migration out and consistently living in the DTES. We observed that the majority of hospitalisation events were for mental health and behavioural disorders. Our findings also demonstrated an independent relationship between migrating out of the DTES early and lower rates of hospitalisations compared to those who consistently lived in the DTES, after adjusting for a range of confounders.

We found that PWUD who migrated out of the DTES early had lower rates of hospitalisation compared to those who consistently lived in the DTES. Inversely, high hospitalisation events among those who consistently lived in the DTES may be a function of contextual exposures which are likely to exacerbate disease risk and burden [6, 24–27]. For instance, an area with an open drug scene in Sao Paulo, Brazil, has been characterised by unsanitary conditions, high rates of criminality causing bodily harm and high rates of infectious disease [28]. In a Canadian context, a study involving 1035 PWID in Vancouver found that DTES residence was an independent predictor of HIV infection [29]. DTES residence has also been found to independently predict initiation of injection drug use [30], and early hospital readmission among HIV-seropositive individuals with pneumonia [31]. These findings mark a need for transitional health and social service supports to be targeted toward trajectory groups other than early migration out. Interestingly, a recent study conducted in the DTES found that enrolment in non-pharmacological addiction treatment (e.g. detoxification) was positively associated with early migration out, compared to consistently living in the DTES [13]. Ensuring timely and adequate access to detoxification and other non-pharmacological addiction treatment could be a particularly important consideration when it comes to transitional health-care planning.

Another important consideration is that over three-quarters of participants fell within a trajectory group other than early migration out. To begin, many may not have the financial means to leave the DTES [32]. In many settings, the large majority of affordable, supportive or transitional housing including single-room-occupancy hotel rooms are typically located in and around areas with illicit drug scenes [33]. As mentioned in the introduction, PWUD may migrate to and remain in these neighbourhoods for a number of other reasons as well. For example, an ethnographic study conducted in an open drug scene in Norway found that socialisation was a key reason for migration into this setting [34]. In contrast, a study conducted in an area with an open drug scene in Sao Paulo reported escape from political persecution or imprisonment as key reasons for migration into this setting [35]. These multifaceted realities point to a need for novel contextual-level interventions (e.g. interventions designed to alter social institutions and environments) to modify the risk environment within areas with illicit drug scenes.

Our study had several limitations. First, the outcome variable was derived from health administrative data; therefore, it may be subject to potentially incomplete data and/or misclassification of hospital admissions and discharges. Second, we were unable to account for hospital admissions and discharges that may have occurred in regions outside of the Vancouver Coastal Health Authority catchment area. However, it is noteworthy that 70–99%

of the study participants were still within the Vancouver Coastal Health Authority catchment area at any given follow up, suggesting that it is likely that we captured most of the hospitalisation events. Third, with exception of HIV/hepatitis C virus serostatus and the outcome variable, our study was reliant on self-report data, which is susceptible to recall bias and social desirability bias. Fourth, due to the observational nature of the ACCESS, VIDUS and ARYS studies, we cannot exclude the possibility of residual and unmeasured confounding, nor are we able to draw conclusions regarding causality. Finally, the extent to which these results are generalisable beyond PWUD in this setting is unknown.

In sum, the present study found that PWUD who migrated out the DTES early had a lower number of hospitalisations events compared to those who consistently lived in the DTES. Our findings highlight a need to scale-up access to transitional health and social service supports, while integrating novel contextual-level interventions to modify the risk environment within illicit drug scenes. Taken together, these efforts are likely to minimise hospitalisations for preventable cause among PWUD in trajectory groups other than those who migrated out early.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Study sample characteristics, stratified by hospitalisation event at baseline

Characteristic	Hospitalisation event at baseline		
	Total <i>n</i> = 1180 (%)	Yes, <i>n</i> = 83 (%)	No, <i>n</i> = 1097 (%)
Main exposure			
<i>Migration trajectory groups</i>			
Early migration out	243 (20.6)	20 (24.1)	223 (20.3)
Frequent revisit	112 (9.5)	9 (10.8)	103 (9.4)
Late migration out	219 (18.6)	16 (19.3)	203 (18.5)
Consistently living in DTES	606 (51.4)	38 (45.8)	568 (51.8)
Covariates			
<i>Sex at birth</i>			
Male	750 (63.6)	53 (63.9)	697 (63.5)
Female	430 (36.4)	30 (36.1)	400 (36.5)
<i>Age (per 10-year increase)</i>			
Median	41.6	40.9	41.7
IQR	(32.6–48.0)	(31.4–48.7)	(32.6–47.9)
<i>Indigenous ancestry</i>			
Yes	449 (38.1)	29 (34.9)	420 (38.3)
No	731 (61.9)	54 (65.1)	677 (61.7)
<i>High school education</i>			
Yes	534 (45.3)	31 (37.3)	503 (45.9)
No	622 (52.7)	50 (60.2)	572 (52.1)
<i>Stable employment^[a]</i>			
Yes	275 (23.3)	15 (18.1)	260 (23.7)
No	905 (76.7)	68 (81.9)	837 (76.3)
<i>Income assistance^[a]</i>			
Yes	1085 (91.9)	81 (97.6)	1004 (91.5)
No	87 (7.4)	2 (2.4)	85 (7.7)
<i>HCV-positive serostatus</i>			
Yes	940 (79.7)	68 (81.9)	872 (79.5)
No	239 (20.3)	15 (18.1)	224 (20.4)
<i>HIV-positive serostatus</i>			
Yes	435 (36.9)	55 (66.3)	380 (34.6)
No	744 (63.1)	28 (33.7)	716 (65.3)
<i>History of mental illness</i>			
Yes	604 (51.2)	48 (57.8)	556 (50.7)
No	571 (48.4)	34 (41.0)	537 (49.0)
<i>Homelessness^[a]</i>			
Yes	523 (44.3)	40 (48.2)	483 (44.0)
No	651 (55.2)	42 (50.6)	609 (55.5)

Characteristic	Hospitalisation event at baseline		
	Total n = 1180 (%)	Yes, n = 83 (%)	No, n = 1097 (%)
<i>Sex work^[a]</i>			
Yes	192 (16.3)	17 (20.5)	175 (16.0)
No	984 (83.4)	64 (77.1)	920 (83.9)
<i>Drug dealing^[a]</i>			
Yes	405 (34.3)	30 (36.1)	375 (34.2)
No	775 (65.7)	53 (63.9)	722 (65.8)
<i>Experienced violence^[a]</i>			
Yes	293 (24.8)	24 (28.9)	269 (24.5)
No	871 (73.8)	55 (66.3)	816 (74.4)
<i>Injection drug use^[a]</i>			
Yes	882 (74.7)	65 (78.3)	817 (74.5)
No	294 (24.9)	18 (21.7)	276 (25.2)
<i>Heroin use^[a]</i>			
Yes	640 (54.2)	50 (60.2)	590 (53.8)
No	535 (45.3)	33 (39.8)	502 (45.8)
<i>Prescription opioid use^[a]</i>			
Yes	355 (30.1)	26 (31.3)	329 (30.0)
No	825 (69.9)	57 (68.7)	768 (70.0)
<i>Cocaine use^[a]</i>			
Yes	546 (46.3)	39 (47.0)	507 (46.2)
No	629 (53.3)	44 (53.0)	585 (53.3)
<i>Crack cocaine use^[a]</i>			
Yes	943 (79.9)	69 (83.1)	874 (79.7)
No	235 (19.9)	14 (16.9)	221 (20.1)
<i>Crystal methamphetamine use^[a]</i>			
Yes	340 (28.8)	28 (33.7)	312 (28.4)
No	835 (70.8)	55 (66.3)	780 (71.1)
<i>Drug/alcohol treatment^[a]</i>			
Yes	642 (54.4)	42 (50.6)	600 (54.7)
No	529 (44.8)	38 (45.8)	491 (44.8)
<i>Use of support services^[a]</i>			
Yes	1088 (92.2)	74 (89.2)	1014 (92.4)
No	92 (7.8)	9 (10.8)	83 (7.6)
<i>Stopped, searched or detained by police^[a]</i>			
Yes	285 (24.2)	22 (26.5)	263 (24.0)
No	887 (75.2)	60 (72.3)	827 (75.4)

^[a] Activities/behaviours in the 6 months prior to interview.

DTES, Downtown Eastside; HCV, hepatitis C virus; IQR, interquartile range.

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Table 2.

Bivariable and multivariable Poisson regression models of factors associated with hospitalisation events

Characteristic	Rate ratio (RR)	
	Unadjusted RR (95% CI)	Adjusted RR (95% CI)
<i>Main exposure</i>		
Migration trajectory groups		
Early migration out	0.57 (0.40–0.79)	0.65 (0.48–0.90)
Frequent revisit	0.77 (0.54–1.11)	0.87 (0.61–1.24)
Late migration out	0.83 (0.65–1.06)	0.87 (0.68–1.11)
Consistently living in DTES	Reference	Reference
<i>Covariates</i>		
Male sex	0.92 (0.75–1.13)	
Age (per 10-year increase)	1.23 (1.11–1.35)	1.18 (1.06–1.30)
Indigenous ancestry	1.05 (0.85–1.28)	
High school education	0.87 (0.70–1.07)	
Stable employment ^[a]	0.65 (0.53–0.79)	0.68 (0.56–0.82)
Income assistance ^[a]	2.12 (1.44–3.11)	
HCV-positive serostatus	1.03 (0.76–1.40)	
HIV-positive serostatus	1.77 (1.44–2.17)	1.72 (1.41–2.10)
History of mental illness	1.04 (0.85–1.27)	
Homelessness ^[a]	1.02 (0.84–1.22)	
Sex work ^[a]	1.05 (0.80–1.36)	
Drug dealing ^[a]	0.89 (0.74–1.07)	
Experienced violence ^[a]	1.25 (1.06–1.49)	1.32 (1.11–1.57)
Injection drug use ^[a]	1.19 (0.99–1.44)	1.16 (0.97–1.38)
Heroin use ^[a]	0.90 (0.76–1.06)	
Prescription opioid use ^[a]	0.95 (0.79–1.15)	
Cocaine use ^[a]	1.26 (1.06–1.49)	
Crack cocaine use ^[a]	1.03 (0.86–1.22)	
Crystal methamphetamine use ^[a]	0.99 (0.79–1.24)	
Drug/alcohol treatment ^[a]	0.90 (0.75–1.08)	
Use of support services ^[a]	1.18 (0.98–1.41)	
Stopped, searched or detained by police ^[a]	0.91 (0.74–1.13)	

^[a]Denotes activities/behaviours in the six months prior to interview.

CI, confidence interval; DTES, Downtown Eastside; HCV, hepatitis C virus.

Table 3.

Bivariable and multivariable Poisson regression models of factors associated with hospitalisation events, after the exclusion of those lost to follow-up (n = 221)

Characteristic	Rate ratio (RR)	
	Unadjusted RR (95% CI)	Adjusted RR (95% CI)
<i>Main exposure</i>		
Migration trajectory groups		
Early migration out	0.60 (0.41–0.86)	0.69 (0.49–0.97)
Frequent revisit	0.78 (0.53–1.14)	0.87 (0.60–1.27)
Late migration out	0.83 (0.64–1.09)	0.87 (0.67–1.14)
Consistently living in DTES	Reference	Reference
<i>Covariates</i>		
Male sex	0.89 (0.71–1.11)	
Age (per 10-year increase)	1.22 (1.09–1.36)	1.17 (1.04–1.31)
Indigenous ancestry	0.98 (0.78–1.23)	
High school education	0.84 (0.66–1.06)	
Stable employment ^[a]	0.61 (0.49–0.76)	0.63 (0.51–0.78)
Income assistance ^[a]	1.88 (1.25–2.83)	
HCV-positive serostatus	1.02 (0.74–1.42)	
HIV-positive serostatus	1.86 (1.48–2.33)	1.78 (1.43–2.23)
History of mental illness	1.12 (0.90–1.39)	
Homelessness ^[a]	1.08 (0.88–1.32)	
Sex work ^[a]	1.12 (0.86–1.47)	
Drug dealing ^[a]	0.90 (0.74–1.10)	
Experienced violence ^[a]	1.30 (1.09–1.56)	1.36 (1.13–1.63)
Injection drug use ^[a]	1.20 (0.98–1.48)	1.17 (0.97–1.42)
Heroin use ^[a]	0.90 (0.75–1.08)	
Prescription opioid use ^[a]	0.95 (0.78–1.17)	
Cocaine use ^[a]	1.31 (1.09–1.56)	
Crack cocaine use ^[a]	1.02 (0.84–1.23)	
Crystal methamphetamine use ^[a]	1.08 (0.85–1.36)	
Drug/alcohol treatment ^[a]	0.90 (0.74–1.10)	
Use of support services ^[a]	1.26 (1.03–1.53)	
Stopped, searched or detained by police ^[a]	0.90 (0.71–1.14)	

^[a] Denotes activities/behaviours in the 6 months prior to interview.

CI, confidence interval; DTES, Downtown Eastside; HCV, hepatitis C virus.