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Incidence and predictors of mental health disorder diagnoses among people who inject drugs in a Canadian setting

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Abstract

Introduction and Aims—Limited attention has been given to the predictors of mental health diagnoses among people who inject drugs (PWID) in community settings. Therefore, we sought to longitudinally examine the prevalence, incidence and predictors of mental disorder diagnosis among a community-recruited cohort of PWID.

Design and Methods—Data were derived from two prospective cohort studies of PWID (VIDUS and ACCESS) in Vancouver, Canada between December 2005 and May 2015. We used multivariable extended Cox regression to identify factors independently associated with self-reported mental disorder diagnosis during follow-up among those without a history of such diagnoses at baseline.

Results—Among the 923 participants who did not report a mental disorder at baseline, 206 (22.3%) reported a first diagnosis of a mental disorder during follow-up for an incidence density of 4.29 (95% confidence interval [CI] 3.72, 4.91) per 100 person-years. In the multivariable analysis, female sex (adjusted hazards ratio [AHR] = 1.74, 95% CI 1.29, 2.33), experiencing non-fatal overdose (AHR=2.33, 95% CI 1.38, 3.94), accessing any drug or alcohol treatment (AHR=1.68, 95% CI 1.24, 2.27), accessing any community health or social services (AHR=1.53, 95% CI 1.02, 2.28) and experiencing violence (AHR=1.60, 95% CI 1.12, 2.29) were independently associated with a mental disorder diagnosis at follow-up.

Discussion and Conclusions—We observed a high prevalence and incidence of mental disorders among our community-recruited sample of PWID. The validity and implication of these diagnoses for key substance use and public health outcomes are an urgent priority.

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Keywords

mental disorders; depression; anxiety; injection drug abuse; prospective cohort study

Introduction

Systematic reviews and meta-analyses have demonstrated that the prevalence of mental health disorders is greater among people who use drugs than the general population [1,2]. A meta-analysis of 55 studies reported that 55% of people who inject drugs (PWID) studied had above average levels of depressive symptoms, and an estimated prevalence of depression among drug-using populations ranged from 25 to 81% [3–5]. Other studies have also demonstrated elevated rates of anxiety, schizophrenia and personality disorders among PWID [6,7].

PWID suffering from comorbid mental health disorders are at an elevated risk for a range of social and health-related harms [8]. Axis 1 and 2 comorbidity with substance use disorders has been shown to be associated with poverty, homelessness, violence, incarceration and HIV infection [8,9]. In fact, co-occurring opiate use and depression or anxiety disorders have been identified as predictors for premature mortality [10,11]. However, diagnoses of mental health conditions in the substance using context are also highly challenging given that acute substance use associated (e.g. psychosis) and withdrawal associated (e.g. anxiety) conditions can appear very similar to chronic mental health conditions [12]. Misdiagnosed mental health disorders can lead to unnecessary treatment and stigma associated with these conditions [13]. Further, adequately responding to this comorbidity is a challenge for health services and many interventions for common mental health conditions seen in the substance use context can be ineffective and harmful [14,15].

Despite the prevalence and harm associated with this comorbidity and major uncertainties associated with optimal management, the relationship between substance use and mental health disorders remains unclear. There is some existing evidence to suggest that the relationship is bi-directional for illnesses such as depression. Compared to the general population, PWID are more likely to develop major depression, while individuals with major depression are also more likely to develop substance use disorders [16,17]. Although there is a growing body of evidence reporting the comorbid presentation of mental health and substance use disorders, we know of no longitudinal studies investigating potential predictors of mental health diagnoses amongst PWID in community settings who had no previous history of such diagnoses. Therefore, this study sought to longitudinally examine the prevalence, incidence and predictors of being diagnosed with a mental health disorder among a community-recruited prospective cohort of PWID in Vancouver, Canada.

Methods

The data for this study were derived from two community-recruited open prospective cohort studies of people who use drugs from Vancouver, Canada: the Vancouver Injection Drug Users Study (VIDUS) and the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), which have previously been described in detail [18]. Briefly, participants of both

cohorts have been recruited through self-referral, snowball sampling and street outreach since May 1996. Individuals are eligible for inclusion in VIDUS if they have injected illicit drugs in the past month and tested seronegative for HIV at enrolment. Participation in ACCESS requires that individuals tested seropositive for HIV, and reported having used an illicit drug other than cannabis in the past month at enrolment. For both VIDUS and ACCESS, other eligibility criteria require participants to be 18 years, live in the Greater Vancouver region and provide written informed consent. VIDUS participants who seroconverted to HIV following recruitment have been transferred into the ACCESS study. The two studies employ harmonised data collection and follow-up procedures to allow for combined analyses. Specifically, at baseline and semi-annually thereafter, participants provide blood samples for HIV serologic analyses and disease monitoring as appropriate, and complete an interviewer-administered questionnaire. The questionnaire elicits a range of information, including demographic characteristics, drug use and other behavioural patterns, healthcare access and other social and structural exposures. Further, a complete HIV-related clinical profile, including exposure to antiretroviral agents, was obtained for all ACCESS participants through a confidential linkage with the provincial Drug Treatment Program [19]. At each study visit, participants receive an honorarium of CAD\$30. Ethical approval for VIDUS and ACCESS has been obtained on an annual basis from the Providence Health Care/University of British Columbia Research Ethics Board.

Study sample and measures

The present analyses were restricted to participants who completed their baseline visit between December 2005 and May 2015, and who reported having ever injected drugs at baseline. For the analyses of the incidence of mental health diagnoses, the sample was further restricted to those who had never been diagnosed with a mental health disorder at baseline and who completed at least one follow-up visit. By restricting the sample to participants without any previous mental health disorder diagnoses at baseline, we focused the analysis on predictors of incident mental health disorder diagnoses. Our primary outcome was self-report of having ever been diagnosed with any mental health disorder over follow-up. Participants were asked whether they had been diagnosed with any mental health disorder at both baseline and each semi-annual follow-up. For Cox regression analyses, the primary endpoint was the first report of any mental health diagnoses, which was defined as the midpoint between the date of the first interview during which a diagnosis was reported and the preceding interview in which the participant reported having never been diagnosed with a mental health disorder. Participants were also asked to specify what type of mental health disorder they had been diagnosed with (e.g. depression, anxiety, obsessive-compulsive disorder, post-traumatic stress disorder [PTSD], bipolar disorder, antisocial personality disorder, attention-deficit disorder, attention-deficit hyperactivity disorder, psychosis).

Based on the current literature, we selected a set of explanatory variables with potential to be associated with the incidence of being diagnosed with a mental health disorder [11,20]. Socio-demographic characteristics included: age (per 10 years older); sex (female vs. male); ethnicity/ancestry (white vs. others); residing in the Downtown Eastside neighbourhood of Vancouver which contains a high concentration of illicit drug use (yes vs. no); homelessness

(yes vs. no); relationship status (legally married, common law or regular partner vs. others). Drug use patterns included: years since first injection drug use (per 10 years longer); crack smoking (daily vs. < daily); injection heroin use (daily vs. < daily); injection cocaine use (daily vs. < daily); injection crystal methamphetamine use (daily vs. < daily); binge injection drug use, defined as a period of injecting drugs more often than usual (yes vs. no); no injection drug use (yes vs. no); injected drugs at a supervised injection facility (yes vs. no); and non-fatal overdose (yes vs. no). Health and social service utilisation included: any community health or social service use (yes vs. no); emergency room use (yes vs. no); and any alcohol or drug addiction treatment (yes vs. no). Other social and structural exposures included: incarceration (yes vs. no); involvement in drug dealing (yes vs. no); involvement in sex work (yes vs. no); experiencing physical or sexual violence (yes vs. no); and HIV status (positive vs. negative). All behavioural variables, including health and social service utilisation, were based on self-report, referred to the previous 6 months and variable definitions were consistent with previous studies [18].

Statistical analyses

First, we compared baseline sample characteristics between those with and without a history of mental health diagnoses at baseline, using Pearson's chi-square test for categorical variables and Wilcoxon rank sum test for continuous variables. Then, among those with no history of mental health diagnoses at baseline, we calculated the incidence density of the first self-report of a diagnosis of mental health disorders (for any disorders and each of the nine groups of mental health disorders, respectively) using person time methods.

Next, we used multivariable extended Cox regression to identify the set of variables that best predict the incidence of first reports of any mental health diagnoses. For this purpose, we used an *a priori*-defined backward model selection procedure based on examination of the Akaike information criterion and type III *P*-values to construct a multivariable model. In brief, we first included a full multivariable model with all explanatory variables that were significantly associated with first reports of any mental health diagnoses at the $P < 0.10$ level in the univariable analyses. After examining the Akaike information criterion value of the model, we removed the variable with the largest *P*-value and built a reduced model. We continued this iterative process and selected the multivariable model with the lowest Akaike information criterion value. This modelling procedure has been employed in previous studies [21]. We also conducted sub-analyses where we restricted the dependent variable to each of the three most commonly reported types of disorders over follow-up (i.e. depression, anxiety and PTSD). The modelling approach used for the sub-analyses was the same as the technique used for the main analyses. All statistical analyses were performed using RStudio, version 0.99.892 (R Foundation for Statistical Computing, Vienna, Austria). All *P*-values were two-sided.

RESULTS

In total, 1964 participants were eligible for the present analyses (1189, 60.5% from VIDUS). The median age at baseline was 41.6 years (interquartile range 34.8, 47.6), 668 (34.0%) were female and 1160 (59.1%) were white. At baseline, 945 (48.1%) had previously been

diagnosed with a mental health disorder. More specifically, the diagnoses were divided into the following disorders at baseline: 650 (68.8%) participants had depression, 336 (35.6%) had anxiety, 170 (18.0%) had bipolar disorder, 162 (17.1%) had PTSD, 125 (13.2%) had attention-deficit/hyperactivity disorder, 78 (8.3%) had schizophrenia, 46 (4.9%) had a personality disorder, 42 (4.4%) had obsessive-compulsive disorder and 11 (1.2%) had psychosis. Comparisons of baseline characteristics between those with and without a history of mental health diagnoses are summarised in Table 1. Compared to those without a history of mental health disorder diagnosis, those diagnosed were more likely to be female, white, binge drug users, daily methamphetamine injectors, have experienced a non-fatal overdose, been involved in sex work, accessed drug or alcohol addiction treatment, accessed any community health and social services, experienced violence and accessed an emergency room (all $P < 0.05$). However, participants with a history of mental health diagnosis were less likely to inject heroin daily, have been recently incarcerated or have been engaged in drug dealing in the past six months (all $P < 0.05$).

Of the 1019 participants without a history of mental health diagnoses at baseline, 923 (90.6%) completed at least one follow-up and were included in the subsequent analyses (586, 63.5% from VIDUS). These individuals were followed for a median of 63 (interquartile range 28–102) months and contributed a total of 4805 person-years. Incidence densities for mental health diagnoses during follow-up are presented in Table 2. In total, 206 (22.3%) first diagnoses of mental health disorders were reported over follow-up for an incidence density of 4.29 (95% confidence interval [CI] 3.72, 4.91) diagnoses per 100 person-years. The median number of months until the first mental health diagnoses was 35.5 (interquartile range 18–51) months. The three largest incidence densities over follow-up per 100 person-years for each specific disorder included 2.81 (95% CI 2.36, 3.33) for depression, 1.10 (95% CI 0.83, 1.44) for anxiety and 0.29 (95% CI 0.16, 0.49) for PTSD.

Unadjusted and adjusted hazard ratios of being diagnosed with a mental health disorder are shown in Table 3. Factors independently associated with being diagnosed with a mental health disorder in the final multivariable Cox regression model included female sex (adjusted hazard ratio [AHR] 1.74, 95% CI 1.29, 2.33), non-fatal overdose (AHR 2.33, 95% CI 1.38, 3.94), accessing any community health or social services (AHR 1.53, 95% CI 1.02, 2.28), any drug or alcohol addiction treatment (AHR 1.68, 95% CI 1.24, 2.27) and experiencing violence (AHR 1.60, 95% CI 1.12, 2.29).

The top five most frequently accessed community health or social services during a six month follow-up period immediately prior to the study visit where the first mental health diagnosis was reported included meal programs/food banks (98.3%), a supervised injection facility (60.0%), peer support services (e.g. drop in centres) (54.9%), outreach (e.g. street nurse, health van) (51.2%) and psychosocial addiction care services (e.g. alcoholics/narcotics/cocaine anonymous) (12.6%).

We also performed sub-analyses whereby the multivariable Cox regression procedure was repeated separately for depression, anxiety and PTSD. Factors independently associated with being diagnosed with depression over follow-up ($n=135$) included female sex (AHR 1.68, 95% CI 1.18, 2.38), non-fatal overdose (AHR 2.53, 95% CI 1.33, 4.79), accessing drug or

alcohol addiction treatment (AHR 1.92, 95% CI 1.31, 2.81) and experiencing violence (AHR 1.77, 95% CI 1.15, 2.72). Variables included in the final multivariable model that were not significantly associated with depression diagnosis included injecting drugs at a supervised injection facility and accessing any community health or social services (all $P > 0.05$). Female sex (AHR 2.07, 95% CI 1.20, 3.54) and experiencing violence (AHR 2.27, 95% CI 1.20, 4.32) were the only factors independently associated with being diagnosed with anxiety over follow-up ($n=53$). Accessing drug or alcohol addiction treatment, non-fatal overdose and relationship status were included in the final model but were not statistically significant (all $P > 0.05$). Factors independently associated with PTSD diagnosis over follow-up ($n=14$) included female sex (AHR 3.31, 95% CI 1.13, 9.71), non-fatal overdose (AHR 5.58, 95% CI 1.28, 24.31) and emergency room use (AHR 4.00, 95% CI 1.16, 13.79). Experiencing violence was also included in the final multivariable model but was not significantly associated with PTSD diagnosis ($P=0.131$).

Discussion

We observed a high prevalence and incidence of mental health disorders among our community-recruited sample of PWID. The three most common mental health disorders diagnosed over follow-up were depression, anxiety and PTSD. The high prevalence and incidence of depression and anxiety is congruent with existing cross-sectional studies of similar drug-using populations, and the high incidence of PTSD is consistent with lifespan distribution studies demonstrating that it is more likely for trauma disorders to have their first onset after the age of 40 years [3,20,22,23]. In the multivariable analyses, independent predictors of first mental health disorder diagnosis included female sex, recent non-fatal overdose, accessing addiction treatment, accessing community health or social services, and experiencing physical or sexual violence. Sub-analyses revealed that females were more likely to be diagnosed with all three common mental health disorders over follow-up.

The increased prevalence and incidence of mental health diagnosis among women, specifically depression and anxiety, is consistent with existing evidence [20,24]. Previous studies found that compared to men, women were more likely to both seek help for psychological symptoms and disclose mental health problems to physicians [25,26]. In addition, physicians were more likely to diagnose depression among women than men even when they had similar scores on standardised depression measures and presented with identical symptoms [25]. Female sex has also been identified as a predictor of being prescribed potentially harmful mood-altering psychotropic drugs [25]. Despite these trends, studies of sex differences among those with comorbid mental health and substance use disorders have been equivocal. Some studies have demonstrated that women were more likely to present with this comorbidity [22,27], while others report the contrary [28]. Of note, research has also demonstrated that male drug users living with mental health disorders were more likely than their female counterparts to experience adverse health-related outcomes such as social impairment, withdrawal and death [10]. These findings suggest that more research is required to determine what factors influence the diagnoses of these comorbidities, and there is a clear need to define optimal treatment approaches tailored to the needs of both genders.

Importantly, we found that recent experience of an overdose was the strongest independent predictor of a mental health disorder diagnosis, including depression. There is evidence to suggest that individuals with mood and anxiety disorders engage in drug use to self-medicate or as a mechanism to cope with their disorder [29]. It is also possible that individuals recently experiencing an overdose are more likely to come in contact with health services that could facilitate the diagnosis of a mental health disorder. Another explanation for this association is that chronic intense drug use creates neurobiological changes in stress and reward pathways that eventually manifest as psychiatric symptoms [30]. Consistent with our findings, a previous study found that PWID who report depressive symptoms were significantly more likely to have experienced an overdose [31]. Experts have suggested that PWID suffering from mental health disorders may exhibit poor self-esteem and hopelessness, which creates a careless attitude about their well-being and may lead to an accidental overdose [32]. Depressed individuals are also less likely to engage in self-maintenance behaviours such as adaptive emotion regulation, and therefore may not take the proper precautions to prevent overdosing [33]. Our findings indicate a need for early identification of PWID who are at risk of developing depression before experiencing an overdose.

Consistent with past studies, our findings identified an independent association between experiencing violence and being diagnosed with a mental health disorder [34, 35]. These results are particularly significant in view of the previous research showing that any type of historical violence including psychological, physical, sexual or a combination of violence increases the likelihood that an individual will subsequently be diagnosed with a mental health disorder [34,35]. Since PWID have a high likelihood of experiencing violence [36], there is a need for mental health intervention programs that are prepared to respond to victims of violence. Somewhat counter intuitively, experience of violence did not independently predict a diagnosis of PTSD in our study. However, the significant comorbidity between PTSD and other anxiety disorders, and the challenge of distinguishing these disorders, raise the possibility that many cases of PTSD were undiagnosed in this sample [37].

We also found that accessing alcohol or drug addiction treatment or community health or social services were independent predictors of mental health diagnoses. This result can be interpreted in multiple ways. Addiction treatment and community health/social service may be functioning effectively to refer participants to mental health services thereby facilitating more diagnoses. Alternatively, PWID who were more involved in these services may represent a higher-risk sub-group and be more likely to be living with a co-morbid mental health disorder. Successfully treating patients with comorbid mental health disorders and substance use is challenging given the burden of these conditions. However, previous research has demonstrated that addiction treatment can produce clinically significant improvements in measures of depression, anxiety, paranoid ideation and psychoticism among illicit substance users. These effects occurred rapidly (after one month) and were sustained over a six-month follow-up period. This suggests that substance use care plays an important role in improving mental health outcomes among patients with this comorbidity [38].

Our study has several limitations. First, our participants were not randomly recruited and therefore our results may not be generalisable to local PWID or in other settings. Second, the sub-analyses of anxiety and PTSD may have been underpowered due to the small number of incident cases over follow-up. Third, self-reported data may have been influenced by reporting bias including recall bias and socially desirable reporting. Assessing mental health disorder diagnosis through self-report may have introduced a source of error and threatened the validity of this measurement. However, it is noteworthy that other studies have demonstrated that self-report methods generally provide reliable and valid measurements among PWID [39]. In addition, we acknowledge that we did not perform a complete psychiatric assessment and were unable to identify undiagnosed mental health disorders in the study sample, and self-reports of mental diagnosis were not confirmed through linkage to health care records. It is also common for patients to experience a delay between the onset of mental health disorders and formal diagnosis. As a result, some of the incident cases over follow-up may have already been living with a mental health disorder at baseline yet were undiagnosed. These patients may represent a high-risk subgroup of the sample that were less likely to contact health and social services than those with established diagnosis at baseline. Nevertheless, we note that a strength of the present study is that it is the first to report incidence and predictors of mental health diagnoses among PWID in community settings. The ability of health care systems to accurately diagnose and effectively treat mental disorders among PWID is an important area of future research.

In summary, this study identified a number of predictors of mental health disorder diagnosis among a community-recruited sample of PWID. Female sex, recently experiencing an overdose, accessing addiction treatment, accessing community health or social service, and experiencing violence were all independently and positively associated with mental health disorder diagnosis over follow-up. Given that accessing alcohol or drug addiction treatment or community health or social services were independent predictors of mental health diagnoses, more research is needed to determine if these services are facilitating mental health diagnosis or highlighting deficient mental health diagnosis in existing healthcare systems. Finally, given the known limitations and potential harms of mental health diagnoses and treatment in this population, improved strategies for mental health care for this population is urgently needed.

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Table 1

Baseline sample characteristics stratified by a history of mental health diagnoses at baseline (N=1964)

Characteristic	Yes N=945 (48%)	No N=1019 (52%)	OR (95% CI)	P-value
<i>Age</i>				
Median (IQR)	40.9 (34.1–47.3)	42.4 (35.4–47.9)	-	0.026
<i>Sex</i>				
Female	377 (39.9)	291 (28.6)	1.66 (1.38 – 2.00)	<0.001
Male	568 (60.1)	728 (71.4)		
<i>Ethnicity /ancestry</i>				
White	590 (62.4)	570 (55.9)	1.31 (1.09 – 1.57)	0.003
Other	355 (37.6)	449 (44.1)		
<i>DTES residence^A</i>				
Yes	651 (68.9)	703 (69.0)	1.00 (0.82 – 1.21)	0.962
No	294 (31.1)	316 (31.0)		
<i>Homeless^A</i>				
Yes	341 (36.1)	364 (35.7)	1.02 (0.85 – 1.23)	0.798
No	599 (63.4)	655 (64.3)		
<i>In a stable relationship^A</i>				
Legally married/common law/regular partner	274 (29.0)	299 (29.3)	0.99 (0.81 – 1.20)	0.899
Others	658 (69.6)	709 (69.6)		
<i>Years since first injection drug use</i>				
Median (IQR)	18.4 (10.8–26.7)	19.1 (11.4–28.7)	-	0.037
<i>Dealing drugs^A</i>				
Yes	292 (30.9)	359 (35.2)	0.82 (0.68 – 0.99)	0.042
No	653 (69.1)	660 (64.8)		
<i>Non-injection crack use^A</i>				
daily	338 (35.8)	401 (39.4)	0.86 (0.72 – 1.03)	0.105
< daily	606 (64.1)	618 (60.6)		
<i>Not injecting drugs^A</i>				
Yes	105 (11.1)	96 (9.4)	1.20 (0.90 – 1.61)	0.213
No	837 (88.6)	921 (90.4)		
<i>Injection heroin use^A</i>				
daily	213 (22.5)	303 (29.7)	0.69 (0.56 – 0.84)	<0.001
< daily	729 (77.1)	714 (70.1)		
<i>Injection cocaine use^A</i>				
daily	81 (8.6)	96 (9.4)	0.90 (0.66 – 1.23)	0.521
< daily	860 (91.0)	921 (90.4)		
<i>Injection methamphetamine use^A</i>				
daily	55 (5.8)	36 (3.5)	1.69 (1.10 – 2.60)	0.016
< daily	886 (93.8)	980 (96.2)		

Characteristic	Yes N=945 (48%)	No N=1019 (52%)	OR (95% CI)	P-value
<i>Binge drug use^A</i>				
Yes	232 (24.6)	201 (19.7)	1.35 (1.09 – 1.67)	0.006
No	698 (73.9)	815 (80.0)		
<i>Injection at a supervised injection facility^A</i>				
Yes	455 (48.2)	514 (50.4)	0.92 (0.77 – 1.10)	0.371
No	480 (50.8)	500 (49.1)		
<i>Non-fatal overdose^A</i>				
Yes	88 (9.3)	58 (5.7)	1.70 (1.21 – 2.40)	0.002
No	851 (90.1)	955 (93.7)		
<i>Community health/social service use^A</i>				
Yes	853 (90.3)	865 (84.9)	1.65 (1.25 – 2.17)	<0.001
No	92 (9.7)	154 (15.1)		
<i>Emergency room use^A</i>				
Yes	245 (25.9)	126 (12.4)	2.48 (1.96 – 3.14)	<0.001
No	700 (74.1)	893 (87.6)		
<i>Drug or alcohol addiction treatment^A</i>				
Yes	512 (54.2)	483 (47.4)	1.31 (1.09 – 1.56)	0.003
No	424 (44.8)	523 (51.3)		
<i>Incarceration^A</i>				
Yes	138 (14.6)	189 (18.6)	0.75 (0.59 – 0.95)	0.017
No	800 (84.7)	818 (80.3)		
<i>Sex work involvement^A</i>				
Yes	176 (18.6)	127 (12.5)	1.59 (1.24 – 2.04)	<0.001
No	762 (80.6)	876 (86.0)		
<i>Experience of violence^A</i>				
Yes	268 (28.4)	192 (18.8)	1.53 (1.22 – 1.92)	<0.001
No	447 (47.3)	490 (48.1)		
<i>HIV status</i>				
HIV–	392 (41.5)	383 (37.6)	-	-
HIV+	553 (58.5)	636 (62.4)	1.78 (0.98 – 1.41)	0.078

^ARefers to the 6-month period before the interview. CI, confidence interval; DTES, Downtown Eastside; IQR, interquartile range, OR, odds ratio.

Table 2

Incidence density of first mental health diagnoses during follow-up (N=923)

Diagnoses	n	Incidence density	95% CI
Any mental disorder	206	4.29	3.72–4.91
Depression	135	2.81	2.36–3.33
Anxiety	53	1.10	0.83–1.44
Post-traumatic stress disorder	14	0.29	0.16–0.49
Bipolar disorder	9	0.19	0.09–0.36
Schizophrenia	7	0.15	0.06–0.30
Attention-deficit/hyperactivity disorder	7	0.15	0.06–0.30
Antisocial personality disorder	6	0.12	0.05–0.27
Psychosis	3	0.06	0.01–0.18
Obsessive compulsive disorder	0	-	-

CI, confidence interval.

Table 3

Bivariable and multivariable Cox regression analyses of factors associated with mental disorder diagnosis (restricted to participants without a history of mental disorders at baseline, N=923)

Characteristic	Unadjusted		Adjusted	
	Hazard ratio (95% CI)	P-value	Hazard ratio (95% CI)	P-value
Age (per 10 years older)	0.90 (0.77 – 1.04)	0.145	-	
Sex (female vs. male)	1.76 (1.33 – 2.33)	0.001	1.74 (1.29 – 2.33)	<0.001
Ethnicity/ancestry (White vs. others)	1.23 (0.93 – 1.62)	0.152	-	
Lived in the DTES ^A (yes vs. no)	0.92 (0.69 – 1.23)	0.576	-	
Homeless ^A (yes vs. no)	1.07 (0.77 – 1.48)	0.690	-	
In a stable relationship ^A (legally married/common law/regular partner vs. others)	0.99 (0.73 – 1.34)	0.948	-	
Years fixed (per 10 years older)	0.89 (0.78 – 1.01)	0.069	1.00 (1.00 – 1.00)	0.477
Dealing drugs ^A (yes vs. no)	1.01 (0.73 – 1.39)	0.969	-	
Non-injection crack use ^A (daily vs. < daily)	0.94 (0.69 – 1.28)	0.705	-	
Not injecting drugs ^A (yes vs. no)	0.85 (0.63 – 1.44)	0.279	-	
Injection heroin use ^A (daily vs. < daily)	0.81 (0.56 – 1.18)	0.270	-	
Injection cocaine use ^A (daily vs. < daily)	0.89 (0.53 – 1.51)	0.678	-	
Injection methamphetamine use ^A (daily vs. < daily)	0.72 (0.31 – 1.70)	0.452	-	
Binge drug use ^A (yes vs. no)	1.16 (0.82 – 1.64)	0.410	-	
Injecting at supervised injection facility ^A (yes vs. no)	1.17 (0.88 – 1.56)	0.279	-	
Non-fatal overdose ^A (yes vs. no)	2.72 (1.64 – 4.52)	<0.001	2.33 (1.38 – 3.94)	0.002
Community health/social service use ^A (yes vs. no)	1.69 (1.13 – 2.53)	0.011	1.53 (1.02 – 2.28)	0.038
Emergency room use ^A (yes vs. no)	1.29 (0.94 – 1.78)	0.113	-	
Drug or alcohol addiction treatment ^A (yes vs. no)	1.76 (1.30 – 2.37)	<0.001	1.68 (1.24 – 2.27)	0.001
Incarceration ^A (yes vs. no)	1.49 (1.02 – 2.18)	0.040	1.36 (0.93 – 2.01)	0.115
Sex work involvement ^A (yes vs. no)	1.34 (0.82 – 2.18)	0.245	-	
Experience of violence ^A (yes vs. no)	1.75 (1.24 – 2.48)	0.002	1.60 (1.12 – 2.29)	0.011
Cohort (VIDUS vs. ACCESS)	0.88 (0.66 – 1.17)	0.375	-	
HIVserostatus (positive vs. negative)	1.14 (0.86 – 1.51)	0.375	-	

^A Refers to the 6-month period before the interview. ACCESS, AIDS Care Cohort to evaluate Exposure to Survival Services; CI, confidence interval; DTES, Downtown Eastside; VIDUS, Vancouver Injection Drug Users Study.