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## ORIGINAL RESEARCH

# Use of Cannabis as a Harm Reduction Strategy Among People Who Use Drugs: A Cohort Study

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### Abstract

**Introduction:** While substance use contributes to a substantial burden of disease, access to evidence-based harm reduction interventions remains limited or inaccessible. Preliminary research suggests that some individuals use cannabis to reduce the harms associated with their use of other substances, including opioids and stimulants. This study examines factors associated with the self-reported use of cannabis for harm reduction among people who use drugs (PWUD).

**Methods:** We drew data from three prospective, community-recruited cohorts of PWUD in Vancouver, Canada, between June 2016 and May 2018. Multivariable generalized linear mixed-effects modeling was used to examine factors associated with the primary outcome of “use of cannabis for harm reduction,” defined as self-reported use of cannabis to substitute for other substances, treat withdrawal, or come down off other drugs.

**Results:** One thousand nine hundred thirty-six participants contributed 5706 observations. In adjusted analyses, daily methamphetamine use (adjusted odds ratio [AOR] = 1.43, 95% confidence interval [CI]: 1.09–1.89), experiencing barriers to accessing addiction treatment (AOR = 1.92, 95% CI: 1.21–3.03), and enrollment in addiction treatment modalities other than opioid agonist therapy (AOR = 1.64, 95% CI: 1.17–2.29) were positively associated with using cannabis for harm reduction. Older age was negatively associated (AOR = 0.97, 95% CI: 0.95–0.98). Among 1281 (66.2%) participants who use cannabis, daily cannabis use and obtaining cannabis from unregulated dispensaries were also independent correlates of using cannabis for harm reduction.

**Discussion and Conclusions:** Individuals who were more likely to use cannabis for harm reduction reported difficulty accessing addiction treatment or used substances, such as methamphetamines, where effective treatments are limited. These findings highlight the need to better understand the potential harm-reducing impacts of cannabis among PWUD in these scenarios.

**Keywords:** harm reduction; substance use; opioids; cannabis; stimulants; people who use drugs

### Introduction

Substance use is a source of significant morbidity and mortality and contributes to the global burden of disease. In 2019, an estimated 275 million people across the world used psychoactive drugs and 36.3 million people lived with a substance use disorder (SUD).<sup>1</sup>

Mortality related to substance use is substantial, with almost 500,000 deaths directly or indirectly the result of substance use in 2019.<sup>1</sup>

There is a growing body of literature describing evidence-based harm reduction interventions. There is strong evidence for interventions such as sterile needle

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distribution and supervised consumption facilities,<sup>2,3</sup> although these remain controversial in some settings and thus have limited coverage.<sup>4,5</sup> Likewise, while opioid agonist therapies (OAT), including methadone and buprenorphine/naloxone, have been found to be effective in decreasing unregulated opioid use and overdose risk among people with opioid use disorder (OUD),<sup>6,7</sup> implementation of these evidence-based interventions remains insufficient, with substantial geographical variation.<sup>8</sup> For other substances, such as stimulants, there is some evidence for the use of psychosocial treatments, such as cognitive behavioral therapy and contingency management, although the duration of effects may be limited.<sup>9–11</sup>

While a number of potential pharmacotherapies have been tested, most trials found these to be of low to no effectiveness.<sup>11,12</sup> Accordingly, there remains an urgent need to scale-up and facilitate access to evidence-based interventions for people who use drugs (PWUD), prioritizing identification of novel strategies for SUDs where few effective treatments exist.<sup>13</sup>

Recently, new research findings have prompted interest into the use of cannabis as a form of harm reduction, including its use to decrease, substitute for, or eliminate use of other psychoactive substances.<sup>14,15</sup> For example, individuals who use medical cannabis have reported using cannabis to substitute for alcohol, prescription opioids, and unregulated substances.<sup>14</sup> Along the same lines, a pilot clinical trial demonstrated that cannabidiol (CBD) decreased opioid cravings and drug-related anxiety in opioid-dependent individuals.<sup>15</sup> On a population level, U.S. and Canadian studies have found that jurisdictions with access to legal medical or recreational cannabis had lower rates of opioid-related deaths and opioid prescribing.<sup>16–19</sup>

However, a more recent study found a reversal of these effects over time.<sup>20</sup> Collectively, this emerging but mixed and limited body of data illustrate the need for further research in this area. Thus, the present study aimed to investigate the factors associated with using cannabis for harm reduction (e.g., to help individuals manage their substance use) among PWUD in Vancouver, Canada.

## Materials and Methods

### Study design and sample

The data for this study were derived from three ongoing prospective cohort studies of PWUD with harmonized procedures: the Vancouver Injection Drug Users Study (VIDUS); the AIDS Care Cohort to Eval-

uate exposure to Survival Services (ACCESS); and the At-Risk Youth Study (ARYS).<sup>21</sup> The studies are based in Vancouver, Canada, and involve individuals from Vancouver's Downtown Eastside (DTES) and Downtown South, areas with extensive substance use (including polysubstance use), as well as marginalization and criminalization. Individuals are recruited using community-based methods, including posters, snowball sampling, and active outreach. The VIDUS includes HIV-negative adults aged 18 years and older who injected drugs in the month before enrollment.

ACCESS consists of adults living with HIV who have used unregulated drugs (other than cannabis, which was illegal for nonmedical use during the study period) in the month before enrollment, and ARYS includes youth aged 14–26 who were street-involved and used unregulated drugs (other than cannabis) in the month before enrollment. Detailed study procedures and recruitment methods have previously been described.<sup>22,23</sup>

After provision of written informed consent, participants are examined by a nurse (including HIV and HCV serostatus and HIV clinical monitoring, as appropriate) and then complete interviewer-administered questionnaires at the baseline visit and every 6 months thereafter. The questionnaire surveys participants about demographics, patterns of substance use, utilization of health care and social services, and other relevant exposures and outcomes. The procedures of all three studies are conducted in the same way to allow for analysis of merged data. Participants receive a \$40 honorarium at each study visit. All three studies are approved by the University of British Columbia/Providence Health Care Research Ethics Board.

As questions about specific uses of cannabis were added in June 2016, we restricted the study sample to participants with at least one follow-up interview between this date and May 30, 2018.

### Measures

Our primary outcome was the use of cannabis for harm reduction, defined by self-reported use of cannabis for any of the following reasons: substituting cannabis for illicit or unregulated substances such as heroin or other opioids, cocaine, methamphetamine, alcohol; treating withdrawal; or coming down off other drugs. Participants who reported cannabis use in the past 6 months were asked to specify their reasons for its use, including the options described above, as well as intoxication; pain relief; stress management; treatment of nausea or loss of appetite; and an open-ended option.

Participants were able to list multiple reasons. All free-text responses were analyzed for possible recategorization. Investigators worked in consultation with study participants and frontline research staff to create, test, and refine this measure, as detailed in a recent study.<sup>24</sup>

Participants who reported no use of cannabis in the prior 6 months to the study visit were categorized as not having used cannabis for harm reduction for that period. Due to the limitations of our questionnaires, we could not determine the amount used, specific frequency, and the proportions of tetrahydrocannabinol (THC) and CBD that participants used.

We selected explanatory variables that were hypothesized to be associated with the use of cannabis for harm reduction. Sociodemographic variables included age, sex, race (white vs. black, indigenous, and other people of color), and highest level of education. Pain severity and interference were assessed using the Brief Pain Inventory.<sup>25</sup> We also considered substance use-related factors (at least daily heroin injection, cocaine injection, noninjection crack, methamphetamine use via any route, nonmedical use of prescription opioids via any route, or high-risk drinking defined as consumption greater than Canada's low-risk drinking guidelines),<sup>26</sup> and addiction care variables including barriers to accessing addiction treatment and enrollment in addiction care.

Type of addiction care was categorized into (1) none, (2) OAT (e.g., methadone or buprenorphine/naloxone), or (3) addiction treatment modalities other than OAT (e.g., detox, psychosocial treatment, and residential treatment). Participants who received both OAT and other treatments were classified within the OAT category. Social-structural exposures were also considered, including homelessness and incarceration. All variables, excluding the fixed sociodemographic variables (i.e., sex, race, and education), were time-updated at each semiannual follow-up, and refer to the 6-month period before the date of the interview, unless otherwise indicated.

### Analyses

We used descriptive statistics to characterize the analytic sample, stratified by use of cannabis for harm reduction at participants' first interview on or after June 2016. Next, we estimated the longitudinal relationship between each explanatory variable and the outcome of interest, using generalized linear mixed-effects modeling to account for repeated measures of the same participant over time with a logit-link func-

tion for the binary outcome. Finally, to determine the correlates of cannabis use for harm reduction, we constructed a multivariable model that included all variables that were associated with the outcome in bivariable analysis at  $p$ -value  $< 0.1$ . In addition, we added a variable representing cohort designation into the multivariable model to account for the possible heterogeneity of effects across cohorts.

In a subanalysis, we investigated correlates of using cannabis for harm reduction restricted to participants who reported use of cannabis within the last 6 months. We followed a similar procedure as described above, with the addition of the following variables: frequency of cannabis use, dichotomized at less than or at least daily use; and primary source where participants obtained their cannabis, dichotomized as unregulated dispensaries (i.e., retail storefronts selling unregulated cannabis) versus others (including social contacts, dealers, private growers, and licensed producers [private firms licensed by the federal government to sell cannabis to individuals with an authorization from a health care provider]). At the time of data collection, there was no access to legal cannabis in our setting, and thus, the category of "unregulated dispensaries" acted as a proxy for dispensaries overall. Analyses were conducted using SAS software version 9.4 (SAS, Cary, NC), and all  $p$ -values were two sided.

### Results

Between June 2016 and May 2018, 1936 participants completed at least one study visit and were included in these analyses. These participants contributed 5706 observations (median per participant = 3, interquartile range [IQR] = 2–4). Baseline characteristics of the analytic sample are presented in Table 1. The median age was 42 (IQR = 29–53) years, 1201 of participants (62.0%) reported male sex, and 945 (48.8%) reported their race as white. Daily use of unregulated substances varied, with the most common being heroin injection at 20.9% ( $n = 404$ ), followed by methamphetamine use (any route of administration) at 17.1% ( $n = 331$ ). High-risk drinking was reported by 16.5% ( $n = 319$ ) of the sample. At baseline, 43.3% ( $n = 838$ ) were not enrolled in any form of addiction treatment.

Over the study period, 425 participants (22.0% of the total sample and 33% of the 1281 participants who used cannabis) reporting using cannabis for harm reduction. There were 551 interviews reporting cannabis for harm reduction, representing 9.7% of all interviews and 17.4% of the 3161 observations restricted

**Table 1. Baseline Characteristics of 1936 People Who Use Drugs Stratified by Self-Report of Using Cannabis for Harm Reduction at the First Study Visit, Vancouver, Canada, 2016–2018**

	Total (N=1936), n (%)	Used cannabis for harm reduction, n (%)		p
		Yes (n=224, 11.6%)	No (n=1712, 88.4%)	
<b>Sociodemographic characteristics</b>				
Age, median (IQR)	42 (29–53)	32 (24–47)	43 (30–53)	<0.001 <sup>a</sup>
Male sex	1201 (62.0)	146 (65.2)	1055 (61.6)	0.297
White race	945 (48.8)	117 (52.2)	828 (48.4)	0.333
High school education or higher	901 (46.5)	94 (42.0)	807 (47.1)	0.107
<b>Comorbidities</b>				
Pain severity, median (IQR) <sup>b</sup>	0 (0–5.3)	1 (0–5.3)	0 (0–5.3)	0.929
Pain interference, median (IQR) <sup>c</sup>	0 (0–4.5)	0 (0–4.9)	0 (0–4.3)	0.421
<b>Substance use-related factors<sup>d</sup></b>				
≥ Daily heroin injection	404 (20.9)	37 (16.5)	367 (21.4)	0.088
≥ Daily cocaine injection	63 (3.3)	7 (3.1)	56 (3.3)	0.908
≥ Daily noninjection crack use	136 (7.0)	17 (7.6)	119 (7.0)	0.725
≥ Daily methamphetamine use	331 (17.1)	56 (25.0)	275 (16.1)	<0.001
≥ Daily nonmedical use of prescription opioids	71 (3.7)	14 (6.3)	57 (3.3)	0.029
High-risk drinking	319 (16.5)	40 (17.9)	279 (16.3)	0.559
<b>Health care-related factors<sup>d</sup></b>				
Enrollment in addiction treatment				
None (reference)				
OAT	838 (43.3)	97 (43.3)	741 (43.3)	
Other modalities (e.g., detox, psychosocial, residential treatment)	897 (46.3)	85 (37.9)	812 (47.4)	0.155
Experiencing barriers to accessing addiction treatment	196 (10.1)	42 (18.8)	154 (9.0)	<0.001
<b>Social-structural factors<sup>d</sup></b>				
Homelessness	97 (5.0)	23 (10.3)	74 (4.3)	<0.001
Incarceration	527 (27.2)	91 (40.6)	436 (25.5)	<0.001
	157 (8.1)	20 (8.9)	137 (8.0)	0.646

<sup>a</sup>Wilcoxon-rank test.

<sup>b</sup>In the week before questionnaire administration.

<sup>c</sup>In the 24 h before questionnaire administration.

<sup>d</sup>In the 6-month period before the baseline interview.

IQR, interquartile range; OAT, opioid agonist therapy.

to people who use cannabis. In the unadjusted analysis (Table 2), factors positively associated with reporting cannabis use for harm reduction included daily methamphetamine use (odds ratio [OR]=1.90, 95% confidence interval [CI]: 1.45–2.49), recent homelessness (OR=1.68, 95% CI: 1.31–2.15), experiencing barriers to accessing addiction treatment (OR=2.88, 95% CI: 1.83–4.54), and enrollment in non-OAT addiction treatment (OR=1.91, 95% CI: 1.37–2.66).

Conversely, older participants (OR=0.96 per year, 95% CI: 0.95–0.97) and those enrolled in OAT programs (OR=0.74, 95% CI: 0.58–0.94) had decreased odds of reporting use of cannabis for harm reduction.

After adjustment (Table 2), daily methamphetamine use (adjusted odds ratio [AOR]=1.43, 95% CI: 1.09–1.89), experiencing barriers to accessing addiction treatment (AOR=1.92, 95% CI: 1.21–3.03), and enrollment in non-OAT addiction treatment modalities (AOR=1.64, 95% CI: 1.17–2.29) remained independently and positively associated with reporting canna-

bis use for harm reduction. Older age remained negatively associated (AOR=0.97 per year, 95% CI: 0.95–0.98).

Our subanalysis (Table 3), restricted to 1281 participants reporting use of cannabis at some point during the study period, found that the independent correlates of reporting cannabis use for harm reduction were similar to our main analysis. In addition, at least daily cannabis use (AOR=1.42, 95% CI: 1.14–1.78) and obtaining cannabis primarily from unregulated dispensaries (AOR=1.41, 95% CI: 1.10–1.81) were also associated with the reported use of cannabis for harm reduction. There was significant overlap between the use of cannabis for harm reduction and other reasons. Of the 551 interviews describing cannabis use for harm reduction, 49.7% also reported using cannabis for recreational purposes, while 41.4%, 32.5%, and 29.0% reported using cannabis to manage stress, pain, or nausea, respectively.

Notably, individuals using cannabis for therapeutic reasons were more likely to report concomitant use

**Table 2. Unadjusted and Adjusted Generalized Linear Mixed-Effects Modeling Logistic Regression of Factors Associated with Cannabis Use for Harm Reduction Among 1936 People Who Use Drugs (5706 Observations), Vancouver Canada, 2016–2018**

Characteristics	Unadjusted		Adjusted <sup>a</sup>	
	Odds ratio (95% CI)	<i>p</i>	Odds ratio (95% CI)	<i>p</i>
Sociodemographic characteristics				
Age (per year older)	0.96 (0.95–0.97)	<0.001	0.97 (0.95–0.98)	<0.001
Male sex	1.20 (0.93–1.55)	0.155		
White race	1.07 (0.84–1.37)	0.567		
High school education or higher	0.87 (0.68–1.12)	0.282		
Comorbidities				
Pain severity <sup>b</sup> (0–10 scale, 10 being most severe)	1.01 (0.97–1.05)	0.612		
Pain interference <sup>c</sup> (0–10 scale, 10 being most interference)	1.00 (0.96–1.04)	0.947		
Substance-use related factors <sup>d</sup>				
≥Daily heroin injection	0.86 (0.65–1.16)	0.328		
≥Daily cocaine injection	0.99 (0.52–1.86)	0.969		
≥Daily noninjection crack use	1.09 (0.71–1.66)	0.700		
≥Daily methamphetamine use	1.90 (1.45–2.49)	<0.001	1.43 (1.09–1.89)	0.010
≥Daily nonmedical use of prescription opioids	1.74 (0.98–3.09)	0.061	1.71 (0.97–3.04)	0.065
High-risk drinking	1.10 (0.82–1.48)	0.510		
Health care-related factors <sup>d</sup>				
Enrollment in addiction care (ref: none)				
OAT	0.74 (0.58–0.94)	0.016	0.85 (0.67–1.09)	0.207
Other modalities (e.g., detox, psychosocial, residential treatment)	1.91 (1.37–2.66)	<0.001	1.64 (1.17–2.29)	0.004
Experiencing barriers to accessing addiction treatment	2.88 (1.83–4.54)	<0.001	1.92 (1.21–3.03)	0.006
Social-structural factors <sup>d</sup>				
Homelessness	1.68 (1.31–2.15)	<0.001	1.03 (0.79–1.34)	0.845
Incarceration	1.15 (0.77–1.72)	0.504		

<sup>a</sup>Also adjusted for cohort designation.

<sup>b</sup>In the week before questionnaire administration.

<sup>c</sup>In the 24 h before questionnaire administration.

<sup>d</sup>In the 6-month period before the baseline interview.

CI, confidence interval.

for harm reduction (i.e., all OR > 1), as opposed to those using it for recreational purposes (OR = 0.69, 95% CI: 0.57–0.83).

## Discussion

This study found that approximately one-quarter of PWUD in our cohorts reported cannabis use for harm reduction. In particular, younger PWUD, participants using methamphetamines daily, those experiencing barriers to accessing addiction treatment, and those enrolled in non-OAT-based forms of addiction treatment were more likely to report this strategy. Among participants using cannabis, those who reported using it for harm reduction were also more likely to use cannabis daily and obtain their cannabis from unregulated dispensaries. These findings suggest that when there are limited effective treatments (e.g., for stimulant use disorder) or even when evidence-based treatments exist but are not easily available (e.g., experiencing barriers to accessing treatment), PWUD may use cannabis to manage their substance use.

Stimulant use disorders are contributors to preventable mortality, and deaths have sharply increased in recent years.<sup>27,28</sup> In British Columbia, Canada, where this study was conducted, cocaine was the second-most common drug involved in overdose deaths (49%), while amphetamines were the third-most common (35%) between 2017 and 2020.<sup>29</sup> Unfortunately, clinical options for addressing stimulant use disorders—in particular, methamphetamine use disorders—are limited. Trial pharmacotherapies have been shown to be of low efficacy<sup>30,31</sup> and findings from studies examining psychosocial interventions are heterogeneous and have found limited evidence regarding enduring effects.<sup>11,32</sup> The lack of treatment options may partially explain why high-intensity (i.e., at least daily) methamphetamine users in our study are using cannabis as a harm reduction strategy, a phenomenon previously described in qualitative studies in our setting<sup>33</sup> and also in other groups of marginalized stimulant users.<sup>21,34,35</sup>

To our knowledge, there are no published reports of cannabinoids as a biomedical treatment for methamphetamine use disorder, with the majority of literature

**Table 3. Unadjusted and Adjusted Generalized Linear Mixed-Effects Modeling Logistic Regression of Factors Associated with Cannabis Use for Harm Reduction Among 1281 People Who Use Cannabis (3161 Observations), Vancouver Canada, 2016–2018**

Characteristics	Unadjusted		Adjusted <sup>a</sup>	
	Odds ratio (95% CI)	<i>p</i>	Odds ratio (95% CI)	<i>p</i>
Sociodemographic characteristics				
Age (per year older)	0.98 (0.97–0.98)	<0.001	0.98 (0.96–0.99)	0.001
Male sex	0.82 (0.65–1.03)	0.092	0.85 (0.67–1.07)	0.165
White race	1.03 (0.83–1.28)	0.804		
High school education or higher	0.88 (0.71–1.10)	0.274		
Comorbidities				
Pain severity <sup>b</sup>	1.01 (0.97–1.05)	0.555		
Pain interference <sup>c</sup>	1.00 (0.97–1.04)	0.903		
Substance-use related factors <sup>d</sup>				
≥Daily heroin injection	1.11 (0.84–1.46)	0.479		
≥Daily cocaine injection	0.99 (0.54–1.81)	0.972		
≥Daily noninjection crack use	1.30 (0.86–1.97)	0.213		
≥Daily methamphetamine use	1.58 (1.23–2.04)	<0.001	1.39 (1.07–1.81)	0.015
≥Daily nonmedical use of prescription opioids	1.51 (0.87–2.64)	0.146		
High-risk drinking	0.84 (0.64–1.11)	0.218		
Cannabis-use related factors <sup>a</sup>				
≥Daily cannabis use	1.49 (1.21–1.84)	<0.001	1.42 (1.14–1.78)	0.002
Unregulated dispensary as primary source of cannabis	1.58 (1.25–1.99)	<0.001	1.41 (1.10–1.81)	0.007
Health care-related factors <sup>d</sup>				
Enrollment in addiction care (ref: none)				
OAT	0.98 (0.78–1.23)	0.851	1.01 (0.80–1.28)	0.914
Other modalities (e.g., detox, psychosocial, residential treatment)	1.91 (1.39–2.63)	<0.001	1.65 (1.20–2.29)	0.002
Experiencing barriers to accessing addiction treatment	2.34 (1.52–3.62)	<0.001	2.02 (1.30–3.14)	0.002
Social-structural factors <sup>d</sup>				
Homelessness	1.28 (1.02–1.61)	0.037	0.94 (0.73–1.21)	0.623
Incarceration	0.94 (0.64–1.37)	0.738		

<sup>a</sup>Also adjusted for cohort designation.

<sup>b</sup>In the week before questionnaire administration.

<sup>c</sup>In the 24 h before questionnaire administration.

<sup>d</sup>In the 6-month period before the baseline interview.

on the therapeutic potential of cannabinoids for substance use focusing on OUD.<sup>16,17,20</sup> However, recent animal studies found that CBD decreased rats' desire to self-administer methamphetamine and may reduce risk of relapse.<sup>36,37</sup> Although the mechanisms underlying cannabis' interaction with the neurological pathways of dependence are not completely understood, it is hypothesized that the endocannabinoid system may alter the reward pathways of drugs, thus effecting craving and relapse.<sup>38,39</sup> Along these lines, a recent observational study of PWUD in our setting found that a period of intentional cannabis use aimed at decreasing crack cocaine use was associated with a subsequent reduction in the frequency of crack use.<sup>21</sup> While a similar effect may occur with methamphetamine, experimental research is needed to evaluate this hypothesis.

Experiencing barriers to accessing treatment for substance use was positively associated with reported use of cannabis for harm reduction. It may be the case that individuals who are unable to access treatment

turned to other methods, such as cannabis, to manage their substance use. In addition, and somewhat surprisingly, individuals enrolled in only non-OAT addiction treatment were also more likely to use cannabis for harm reduction. Although we are unable to determine whether this non-OAT treatment was for treatment of OUD or for another SUD (e.g., alcohol, stimulants, nicotine), a possible explanation for this finding is that individuals enrolled in these programs may be using cannabis as a self-prescribed harm reduction technique to cope with their substance use. Indeed, the efficacy of psychosocial interventions and residential treatment for most SUDs is limited, particularly in the context of OUD.<sup>40</sup>

Collectively, these results indicate a need to understand why people are choosing to use cannabis during non-OAT-based SUD treatment modalities, and to discern the target substance of their non-OAT treatment. Furthermore, these findings call for more support of OAT as a known effective treatment, including the removal of barriers that PWUD encounter when seeking OAT.

Younger PWUD in our sample were also more likely to report use of cannabis for harm reduction. This relationship may simply reflect age-related cannabis usage patterns, given the higher prevalence of cannabis use among younger people.<sup>41</sup> For instance, a recent qualitative study in our setting found that young PWUD believed that cannabis was a “healthier” and more effective alternative to other drugs, including illicit substances, psychopharmaceuticals, and OAT.<sup>33</sup> Alternatively, youth may experience greater challenges in accessing SUD treatments, such as wait lists and age restrictions,<sup>42</sup> which may explain the use of cannabis for harm reduction. Further qualitative research may be helpful in characterizing the relationship between age and cannabis use for harm reduction.

Finally, our subanalysis revealed that, among the subpopulation of participants using cannabis, those reporting its use for harm reduction purposes were more likely to use cannabis daily and primarily obtained their cannabis from unregulated dispensaries rather than other sources. Our findings may imply that those who report cannabis use for harm reduction adhere to a regular regimen and are not *ad hoc* users of cannabis; they therefore are more likely to obtain their cannabis from more formal reliable sources compared with social contacts or dealers.<sup>24</sup> Alternatively, the daily use of cannabis among those reporting use of cannabis for harm reduction could indicate a concurrent cannabis use disorder, which could negatively impact access and adherence to effective treatment for concurrent SUDs.

However, our analysis indicated that people using cannabis for recreational purposes were less likely to concomitantly use it for harm reduction, compared with those using it for other therapeutic reasons. Regardless, harm reduction strategies applied to cannabis use, as recommended by Canada’s lower-risk cannabis use guidelines (e.g., using products with high CBD to THC ratios, avoiding frequent or intensive use),<sup>43</sup> could help mitigate some of these potential risks.

Findings from this study should be interpreted in the context of several limitations. First, these cohorts of PWUD in Vancouver, Canada, may not be representative of all PWUD in Vancouver or PWUD in other settings. PWUD in our setting also use cannabis for a variety of other reasons; importantly, this use is dynamic, with the main reason for use changing over time.<sup>24</sup> Second, the data collected are based on

self-report, and thus may be prone to some report biases. In particular, the survey collects data on unregulated drug use and participants may be reluctant to disclose their usage. However, previous studies have demonstrated that reports from PWUD are reliable<sup>44</sup> and it is unlikely that those using cannabis for harm reduction would be differentially affected by response bias.

Third, our outcome (i.e., use of cannabis for harm reduction) did not specify what substance individuals were actually intending to substitute with cannabis, limiting conclusions about use of cannabis for reducing the harm of specific substances. Our survey also did not solicit details about the cannabis use, including the type, dose, or relative concentrations of THC and CBD. As such, our data do not allow to draw conclusions on the actual effectiveness of cannabis (or specific cannabinoids) as a harm reduction strategy, which will require further study in a more controlled way. Finally, future studies should investigate the possible risks of cannabis use among this population, for example, exacerbation of mental health conditions, dependence, or delay in seeking effective substance use treatments due to heavy cannabis use. This information would help inform risks and possible benefits of using cannabis for harm reduction.

### Conclusions

Results from the present study suggest that self-reported use of cannabis by PWUD to substitute or decrease usage of other substances may indicate that the availability and accessibility of evidence-based treatments for some SUD, such as methamphetamine use disorders, are insufficient. For others, evidence-based interventions may exist, but barriers to these treatments appear to lead PWUD seek other harm reduction techniques. This study, in examining cannabis usage for harm reduction, highlights the gaps in implementation and accessibility of evidence-based treatments for SUD while also indicating a promising avenue for harm reduction research.

### Authors’ Contributions

M.E.S. and M.J.-M. conceptualized the study. J.M. contributed to the study design, interpretation of the analysis, and writing of the first draft of the article, with supervision from M.E.S. C.G. performed the statistical analyses. M.J.-M., S.L., K.H., K.D., and T.K. contributed to the interpretation of the analysis and provided key revisions for the article.



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#### Abbreviations Used

ACCESS = AIDS Care Cohort to Evaluate exposure to Survival Services  
 AOR = adjusted odds ratio  
 ARYS = At-Risk Youth Study  
 CBD = cannabidiol  
 CI = confidence interval  
 DTES = Downtown Eastside  
 IQR = interquartile range  
 OAT = opioid agonist therapies  
 OR = odds ratio  
 OUD = opioid use disorder  
 PWUD = people who use drugs  
 SUD = substance use disorder  
 THC = tetrahydrocannabinol  
 VIDUS = Vancouver Injection Drug Users Study