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"We don't got that kind of time, man. We're trying to get high!": Exploring Potential Use of Drug Checking Technologies among Structurally Vulnerable People Who Use Drugs

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Abstract

Background: Novel public health interventions are being considered to address the opioid overdose epidemic, including drug checking technologies. We examined the willingness to use various drug checking technologies among structurally-vulnerable people who use drugs (PWUD).

Methods: We conducted one-to-one qualitative semi-structured interviews with 20 PWUD in Vancouver, Canada's Downtown Eastside. Participants were purposively recruited from ongoing cohort studies of PWUD.

Results: Overall willingness to use drug checking technologies was low among participants. A range of factors undermined potential use of various drug checking technologies including: having to give up a drug sample; time dedication; discrepancies regarding measurements and accuracy; recourse following positive fentanyl results; ambivalence to overdose risk; and availability and accessibility of drug checking technologies.

Conclusions: Participants discussed numerous factors that undermined potential willingness to use drug checking technologies. These factors underscore the structural vulnerabilities experienced by PWUD and how they may constrain uptake of drug checking technologies. Future drug checking programming should consider these influencing factors prior to the implementation of drug checking technologies to ensure that drug checking interventions are appropriate and meeting the needs of target populations.

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Conflict of Interest Statement

We have no conflicts to declare

Keywords

drug checking technologies; willingness; people who use drugs; fentanyl; overdose; structural vulnerability

INTRODUCTION

An opioid overdose epidemic continues to impact communities across North America, increasingly due to the proliferation of illicitly-manufactured fentanyl and its analogues (BC Coroners Service, 2017; Bode, Singh, Andrews, Kapur, & Baez, 2017; Centers for Disease Control and Prevention, 2017; National Drug Early Warning System Coordinating Center, 2016; Sagan, 2015). In the Canadian province of British Columbia (BC), a public health emergency was declared in 2016 in an effort to address this epidemic. In 2017, there were 30.1 overdose deaths per 100,000 individuals in BC (British Columbia Coroners Service, 2018b).

Despite the scale-up of a variety of overdose-focused interventions – including peer-led overdose response programs, naloxone training and distribution, and supervised drug consumption services (SCS) in various settings (e.g., housing, emergency shelters, hospitals, mobile, public spaces) – BC experienced one of its deadliest months in March of 2018 with 161 opioid-related fatal overdoses: the second highest since the declaration of the public health crisis (British Columbia Coroners Service, 2018a).

Drug checking technologies (DCT) are now being introduced at select locations as a novel public health intervention aimed at addressing the overdose crisis (Vancouver Coastal Health, 2017a, 2017b). DCTs vary in terms of their accuracy, usability, and costs (Harper, Powell, & Pijl, 2017; Kerr & Tupper, 2017). The intention of DCTs is to identify the contents of illicit drugs and provide people who use drugs (PWUD) with information to make informed decisions about their drug use. Despite growing enthusiasm about DCTs (Government of British Columbia Ministry of Mental Health and Addictions, 2017), to date, very little is known about their effectiveness in addressing the overdose epidemic (Bardwell & Kerr, 2018), leading some to emphasize the need for qualitative research investigating the acceptability and potential of drug checking as a public health intervention (McGowan, Harris, Platt, Hope, & Rhodes, 2018).

There is some research on the use of DCTs in nightlife and dance music scenes (Harper et al., 2017; Hungerbuehler, Buecheli, & Schaub, 2011; Kerr & Tupper, 2017; Murray Rebecca et al., 2012; Schneider, Galettis, Williams, Lucas, & Martin, 2016; Winstock Adam, Wolff, & Ramsey, 2002), but less involving people who use opioids, and particularly, structurally-vulnerable (SV) PWUD. For the purpose of this paper, structural vulnerability refers to the vulnerability experienced by certain groups of PWUD (e.g., people who inject illicit drugs, impoverished and homeless individuals, sexual minorities, Indigenous peoples) due to their marginalized positions within social hierarchies. Social and structural forces (e.g., stigma, discrimination, poverty, criminalization) intensify vulnerabilities of marginalized groups, which can lead to a variety of negative health consequences (Quesada, Hart, & Bourgois, 2011; Rhodes et al., 2012). In the context of Vancouver's Downtown Eastside (DTES)

neighborhood, multiple studies have described the ways in which social, structural, and environmental contexts negatively impact PWUD, exacerbate their structural vulnerabilities, and constrain their ability to enact harm reduction practices (Bardwell, Anderson, et al., 2018; Ciccarone & Bourgois, 2016; Kerr, Small, Moore, & Wood, 2007; Knight et al., 2014; Lazarus, Chettiar, Deering, Nabess, & Shannon, 2011; McNeil, Kerr, et al., 2015; McNeil, Small, Lampkin, Shannon, & Kerr, 2014; Shannon, Ishida, Lai, & Tyndall, 2006; Small, Rhodes, Wood, & Kerr, 2007). For this article, this is a useful concept in differentiating between those who use substances socially and/or may have a higher level of socio-structural stability versus PWUD with greater rates of substance use, a higher frequency of drug use, and increased vulnerabilities (e.g., socially and economically marginalized) that impact their risks of drug-related harm such as overdose.

A minimal number of quantitative studies have described willingness to use DCTs among people who inject drugs (PWID). The results of feasibility studies across multiple settings suggests that willingness to use DCTs varies significantly, ranging from 33% to 90% of study participants (Kennedy et al., 2018; Krieger et al., 2018; Sande & Šabić, 2018; Sherman et al., 2019). In part, this may be due to the type of DCT offered. For example, preliminary results from a drug checking program utilizing fentanyl immunoassay test strips at a SCS in Vancouver, BC in 2016 concluded that only 1% of clients use them (British Columbia Coroners Service, 2018c). However, a subsequent program in the same setting in 2017 and 2018 that added a more robust technology (Fourier-Transform Infrared Spectrometry [FTIR]) found an increased uptake of DCT (Tupper, McCrae, Garber, Lysyshyn, & Wood, 2018). Therefore, there appears to be major discrepancies between expressed willingness to use DCTs and actual use of DCTs. To our knowledge, there are currently no qualitative studies on potential use DCTs by SV-PWUD nor qualitative studies that seek to address potential use of DCTs. This qualitative study investigates the perspectives and factors that affect potential uptake and willingness to use various DCTs among SV-PWUD in Vancouver, BC.

METHODS

Study participants were recruited from two ongoing cohort studies: the Vancouver Injection Drug Users Study (VIDUS) and the AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS), which include more than 2000 current and former PWUD. These cohorts have been described in greater detail elsewhere (Strathdee et al., 1997; Wood et al., 2003). Qualitative semi-structured one-to-one interviews were conducted between December 2017 and February 2018. The study received ethical approval from the University of British Columbia / Providence Health Care Research Ethics Board.

We purposively recruited 20 participants and used a recruitment checklist to ensure demographic diversity (e.g., gender, ethnicity, types of drugs used, overdose experience). Eligibility criteria to participate in an interview included: (1) being a current drug user; and (2) currently using stimulants, opioids, or both. Interviews were conducted by the lead author in the cohort study office located in the DTES. Study participants provided informed consent and received $30 (CAD) cash honoraria for their time. A guide was used to facilitate the interviews, including in-depth descriptions of each of six technologies that can be used

for drug checking (e.g., method of operation, run times, detection sensitivity, and accuracy – see Table 2). In order to minimize answers influenced by social desirability (Fisher, 1993; Krumpal, 2013), the lead author asked indirect and generalizable questions about perceived actions and preferences of PWUD in the DTES (e.g., "do you think PWUD would use this DCT?") then more specific and individualized questions (e.g., "would you use this DCT?") and probed discrepancies between the answers accordingly.

All interviews were audio-recorded, transcribed verbatim by a professional transcription service, and checked for accuracy by the lead author. The lead author also developed the data coding framework using *a priori* themes and emerging thematic categories from the interview dataset. An inductive and iterative process was utilized during data coding (Corbin & Strauss, 2015). NVivo 11, a qualitative data management software, was used to code the data into themes and subthemes for analysis.

RESULTS

Twenty participants were interviewed regarding use of DCTs (see Table 1 for sample characteristics) and six models of DCTs were discussed (see Table 2 for details). At the time of this study, two DCTs had recently become available via various harm reduction programs. A FTIR machine was operated by trained technicians at two SCS in the DTES and fentanyl immunoassay test strips were more widely available. In total, only three participants had any experience with these DCTs, with two of these individuals reporting having used the DCTs only once. We found no differences in perspectives on the various DCTs among those with and without experience using existing DCTs. Many participants expressed an unwillingness to use DCTs due to a range of considerations, while some said that they would use some forms of DCTs, but only under specific conditions. However, multiple factors were described as affecting uptake. These are discussed under the following themes: (1) giving up a drug sample; (2) time dedication; (3) measurements and accuracy; (4) positive fentanyl results; (5) ambivalence to overdose risk; and (6) availability, accessibility, and feasibility of drug checking technologies.

Giving up a drug sample

All DCTs discussed in this study require individuals to provide a small sample of their drugs, and all but one (viz. FTIR), destroy the sample. Given this fact, several participants indicated that this was a barrier for using drug checking services for SV-PWUD. Participants primarily discussed poverty and how SV-PWUD have to "hustle" for their drugs, which they described as potentially leading to a reluctance to give up a sample. For example:

> *"A lot of people don't want to give up anything because they can't afford it, right? Because I've wanted to do it before, and I haven't been able to because I can't afford to give up part of half a 10-paper when all I have is a 10-paper, right?"* (Participant 16)

> *"People work hard – low income – for their drugs. They don't want to part with it, even a little amount, for the test."* (Participant 7)

Participants also suggested that in the DTES, in particular, SV-PWUD are not only living in poverty, but that they are also deeply entrenched in their drug use:

> "[Interviewer: Do you think people would give up a small amount of their drugs to do a test?] *Hmm, not many people would, I can't see that.* [Interviewer: Why is that?] *In the Downtown Eastside…maybe outside of the Downtown Eastside they would because I don't think people are as big into their addiction. Like I think when people have come down here, they've hit the bottom. That's consistent with the Downtown Eastside. They're not gonna give up drugs kind of thing."* (Participant 14)

Given these realities of SV-PWUD, participants only indicated that people would give up a sample if they got the whole sample back or if they had a large quantity of drugs, as seen in the following excerpts:

> *"I'm pretty greedy, right? And if it's gonna take some of my drugs…I'm not down for that. As long as they got the drug back. All of it, like, you know, because it makes a difference. Every bit makes a difference. It could be that one grain that gets you high, right?"* (Participant 4)

> *"Like if you only buy ten dollars of each then there's not very much there, right? On the street, they don't give you very much. But if you're buying like grams at a time, then maybe."* (Participant 17)

As evident in the interview data, providing a drug sample for the purposes of drug checking was widely regarded as a disadvantage of DCTs for SV-PWUD.

Time dedication

The durations to run a drug sample for the DCTs included in this study range from 2 to 30 minutes (as seen in Table 2). Participants were asked about their perspectives on wait times to get results from each of these DCTs. Some participants said they would wait to use some DCTs. However, wait times were often described as barriers to the uptake of DCTs for SV-PWUD. For example:

> *"If it's a 20-minute inconvenience, they're not going to go out of their way to go… they're just going to fix…They're not going to go to that [DCT] first. It's just drugs, the whole drug thing mandates how people react and [drug checking is] not going to be part of it, believe me. They might go there once or twice, a novelty, right, you know, to check their dope.* (Participant 10)

This interview excerpt describes the inconvenience of taking additional steps that are regarded as onerous in the day-to-day lives of SV-PWUD. As reflected in the previous section, participants described how SV-PWUD in the DTES were so entrenched in their drug use that taking additional steps like using DCTs did not seem not realistic. The following excerpt further describes how such realities of SV-PWUD in the DTES may constrain uptake of DCTs:

> *"A lot of people downtown, they're a little bit hard. Like they're really hard because they grew up that way…the wrong way. It's not like they're asking, they*

> *just don't care. As long as they get some heroin and it makes them feel good and edgy, they say yeah. But to go through all that work and be like scientific and get to know it, they don't give a fuck man…You know, even two minutes they wouldn't wait."* (Participant 15)

Some participants also suggested that SV-PWUD may access DCTs after they use their drugs or check back another date for their results, but that waiting for results before drug use was not realistic for most SV-PWUD. Some participants drew comparison to wait times at other harm reduction services (e.g., supervised injection sites): "*When I go there, there's usually a lineup and I don't like waiting in line. If there's like three or four people sure, I'll wait. But after like eight or nine people, it's like, yeah, I can go in the back lane and do it faster. I can do it faster than that"* (Participant 17). In addition, almost all participants indicated that SV-PWUD who were in withdrawal (i.e., "dope-sick") would be unlikely to either use DCTs or wait for results. For example, when asked if 3 to 6 minutes was a reasonable wait time, one participant explained, "*It could be a bit long for somebody that was sick maybe…Because they're too anxious. They just want to get better – you know, all things go out the window*" (Participant 1). Participants indicated that wait times for DCTs could be a major drawback, especially for dope-sick PWUD, given that they created an additional step for drug use and delayed "getting well."

Measurements and accuracy

While wait times were discussed as barriers to using DCTs, participants were more favourable towards some DCTs than others. High Performance Liquid Chromatography (HPLC) with Mass Spectrometer (MS) detection provides the most information and accuracy regarding drug samples (as reflected in Table 2). Unsurprisingly, participants indicated that HPLC was the best option for SV-PWUD among the other options. As described by one participant: *"That's the best one then because it shows the quantity. It shows how much. That's the most accurate one" (*Participant 6). In contrast, participants suggested that other DCTs (e.g., Capillary Electrophoresis [CE]) were inferior given the fact that they do not quantify results. For example: *"What good does it do if they can't even tell you the percentage? That's the most important thing. So [CE] is not really a viable option and I bet very few people would use it"* (Participant 7). When probed about why percentages were advantageous, participants discussed how knowing a substance's breakdown could impact how they use the drug. For example:

> *"I think people want to know the percentage so they know, like say it's got caffeine and fentanyl in it…a person who's got a lower tolerance to fentanyl will want to find out the percentage so they're not gonna overdose on it."* (Participant 14)

Not only were most DCTs in this study unable to quantify results, but some were unable to detect low concentrations of drugs or adulterants (e.g., FTIR, which has a limit of detection of about 5%, meaning amounts of a substance present below that concentration may not be detected). Similarly, according to some participants, knowing these drug details could impact their use. For example: *"You want to know exactly what's in there, because say you're allergic to morphine or something"* (Participant 18). Some participants also discussed how knowledge of a low concentration of an opioid (e.g., fentanyl) in a stimulant (e.g., cocaine) would impact their use and they questioned the usefulness of DCTs that were

unreliable in detecting fentanyl such as thin layer chromatography (TLC): *"This is the fentanyl overdose crisis. We're not dealing with fuckin' heroin, we're not dealing with cocaine, we're dealing with fentanyl. And that one's useless. I don't like that one at all"* (Participant 6). Participants indicated that DCTs that quantified and provided accuracy were preferred over other methods. However, despite this preference, wait times and giving up drug samples were still identified as significant barriers for use of DCTs by SV-PWUD.

Positive fentanyl results

While some participants indicated that DCTs that did not detect fentanyl were inadequate, when participants were questioned about outcomes of a positive fentanyl result, responses were mixed. For example, when asked if they would dispose of their drugs if it tested positive for fentanyl, answers by some participants varied according to drug preferences (e.g., stimulants versus opioids): *No…Well I'm only thinking of the heroin users. But if it was a jib* (i.e., crystal methamphetamine) *user and there was down* (i.e., opiates) *in it, they would have to throw it away. My boyfriend has to be so careful when he gets his dope"* (Participant 2). When other participants were probed about what they would do with their drugs, some said they would take it back to their dealer. However, a few participants indicated risks associated with this, as seen in the following excerpt: *"I think they'd take it back. Some people might get mad and the dealer might lash out and try to beat them up. Like there could be physical consequences for it"* (Participant 6). Others suggested that they would use less: *"I don't think I would throw it out. I'd probably do it, but just like dilute it… I'd just do it in smaller doses"* (Participant 13). However, other participants indicated the opposite when asked about if a positive test would change the quantity of drugs used as indicated by the following quote: *"I don't know anybody who has a problem with fentanyl. Everybody I know likes it. It increases the strength and gives you a good high*" (Participant 12). When participants were probed about why opioid-using PWUD like fentanyl, they discussed its superior strength compared to other opioids. For example:

> *"Everybody's looking for the fentanyl. They don't want the heroin anymore because the heroin is not getting them high enough…They're hooked on the fentanyl…And every time that somebody overdoses, they ask, 'Where did he get his drugs from?'[Laughter]"* (Participant 18).

The saturation of fentanyl in drug markets in Vancouver, according to participants, has led to an increase in the willing use of, and preference for fentanyl, and consequently, reservations about the effects of DCTs as a viable overdose prevention intervention. According to one participant: *"[health officials] are just scurrying around the issue and the real answers (e.g., decriminalization, regulated drug supply) because they know this isn't going to stop deaths"* (Participant 7).

Ambivalence towards overdose risk

Some participants discussed an ambivalence regarding potential results from DCTs or potential negative risks of drug use on their lives (e.g., overdose, death). This is evident in the follow excerpts: *"People don't care if it's fentanyl. They don't care about fuck all. They don't care about life…my girlfriend is a good example"* (Participant 5).

> *"There's people that will shoot anything. Like, will pick up fuckin' anything off the ground just to get high and mix it and cook it up into the rig. And those are the people that just don't care about themselves, right? Like they couldn't care if they live or die."* (Participant 6)

This ambivalence about living and a disregard for what types of drugs they are using demonstrate that regardless of the purpose or results of DCTs, some SV-PWUD in the DTES faced with extreme destitution struggle with severe hopelessness and thus may lack concern about any risks associated with their drug use. Waiting at a machine was seen by some as futile given their ambivalence toward overdose risk. For example:

> *"They've got better things to do with their time than line up on some machine. They just want to get fixed, you know? And most of them don't really care. Most of them are in some kind of state where, quite frankly, if they died they wouldn't really care anyway. Or the thought of it doesn't really scare them anymore, you know what I mean?"* (Participant 10)

According to another participant: *It's not so much out of fear of any death. It's more out of just curiosity if they're getting beat* [i.e., scammed by their dealer] *or not. Other than that, they don't really care too much about that stuff"* (Participant 10). This interview excerpt describes how SV-PWUD can be perceived as more concerned about getting ripped off by their dealers than fear of overdose risk or death. The above excerpts not only illustrate the ambivalence and realities of SV-PWUD in the DTES, but they demonstrate that other factors related to structural vulnerability may offset the potential benefits DCTs may have to offer.

Availability and accessibility of DCTs

Some participants said they would be willing to try DCTs out of curiosity, but that DCTs would create significant barriers for most SV-PWUD. Willingness to use DCTs was also discussed alongside other factors that may impede uptake of such services. Participants questioned the availability and accessibility of DCTs, including whether these would be available 24 hours per day and where they were located. Location was discussed in terms of the proximity of DCTs to where many SV-PWUD live and congregate and how far they would have to travel. Parallel to the wait time barriers for SV-PWUD (as discussed earlier), participants were concerned about how much time it would take to travel to use DCTs, often discussing how they would not go *"too far out of their way"* or *"walk more than a couple blocks."* Thus, centrality of DCTs was critical to perspectives on the feasibility of uptake.

DISCUSSION

In summary, we found that many participants expressed a skepticism about and thus unwillingness to use DCTs, and this unwillingness was shaped by a variety of factors, in particular those factors associated with their structural vulnerability (e.g., due to poverty and drug prohibition). These included: giving up drug samples; time dedication; discrepancies in measurements and accuracy; recourse following positive fentanyl results; ambivalence to overdose risk; and the availability and accessibility of DCTs. Some participants suggested they would be willing to use some DCTs under certain circumstances. However, while some

DCTs were considered better than others, those identified as most useful also involve longer run times, another factor that might make participants less likely to use them.

Previous quantitative feasibility studies among PWUD, including PWID, have found a high willingness among participants to use DCTs. One study involving PWID in a mid-sized Canadian city found that 43% of participants would be willing to frequently use DCTs and 75% saw DCTs as an important service integrated within SCS (Kennedy et al., 2018). Another study among young adults who use drugs in Rhode Island, United States found that more than 90% of respondents reported wanting to know if their drugs were contaminated with fentanyl and were willing to use fentanyl drug testing strips (Krieger et al., 2018). However, in contrast to these studies, a Slovenian study of high-risk PWID found that while participants perceived DCTs as a useful harm reduction measure, only 33% of respondents agreed that it was important to know details about the substances they use (Sande & Šabić, 2018), though this population may not have been affected by contaminants and synthetic opioids to the same extent as those in our study setting. Additionally, preliminary findings from drug checking programs at a SCS in our research setting concluded that only a very small proportion of clients utilized the program when it was offered to them (less than 2 %) (Tupper et al., 2018). There are significant discrepancies between these feasibility studies and the latter preliminary findings. These discrepancies may be the result of social desirability responding in research (Fisher, 1993; Krumpal, 2013), or may reflect the shortcomings of using simple yes/no questions unaccompanied by in-depth information about the technologies involved. Qualitative semi-structured interviewing techniques may provide more enhanced opportunities to unpack and probe willingness research than traditional quantitative surveys provide (Galletta, 2013). Indeed, the results from our qualitative study provide more insights into why PWUD may not be willing to use DCTs. This may reflect, in part, our inclusion of detailed descriptions of different technologies, as well as our qualitative approach, which involved first probing about perceptions of others' willingness to use DCTs.

Recent results from a follow-up mixed methods study among young adults who use drugs in Rhode Island (n=93) suggest that positive fentanyl results via fentanyl test strips appeared to have altered the drug-using behaviour of some participants, including disposal of their drugs (Goldman et al., 2019). Research in other settings (i.e., music festivals) also found that the results of drug checking (via FTIR, colorimetric reagent testing, and mass loss analysis) led some individuals to dispose of their drugs (Measham, 2019). However, context and population are important to consider. For instance, in comparison to uptake in nightlife or music festival settings, drug checking programs in our setting operate in distinct risk environments (Rhodes, 2009), shaped by unique social and structural conditions whereby SV-PWUD routinely experience the negative effects of policing, stigma, and discrimination (Bardwell, Boyd, Kerr, & McNeil, 2018; Goodman et al., 2017; McNeil, Cooper, Small, & Kerr, 2015). Thus, the socio-structural stability of study populations is important to consider (e.g., income level, frequency of drug use), as these frame the day-to-day experiences of PWUD, whereby discarding drugs based on test results may not be a viable option for those living in poverty. In addition, drug checking may be more useful in settings where illicit drug markets are not as saturated with fentanyl as in our study setting. For example, some study participants identified preferences for fentanyl over other opioids based on its strength,

so drug checking for these individuals may be less of a priority compared to PWUD in settings where fentanyl is not sought out.

Our findings suggest that there are many structural vulnerabilities that particularly affect the day-to-day lives of PWUD in the DTES, including poverty and criminalization, and in turn shape willingness to use DCTs. Numerous studies have identified multiple environmental and contextual factors that increase these vulnerabilities and risks associated with drug use (Boyd, Cunningham, Anderson, & Kerr, 2016; Briggs et al., 2009; Ciccarone & Bourgois, 2016; Duff, Deering, Gibson, Tyndall, & Shannon, 2011; Fast, Shoveller, Shannon, & Kerr, 2010; Hembree et al., 2005; Hien, Giang, Binh, & Wolffers, 2000; Krusi, Fast, Small, Wood, & Kerr, 2010; Lazarus et al., 2011; McNeil, Cooper, et al., 2015; Parkin, 2016; Philbin et al., 2008; Ramos et al., 2009; Rhodes et al., 2006; Rhodes et al., 2012; Shannon et al., 2006; Small et al., 2007; Tempalski & McQuie, 2009). For example, poverty was highlighted by multiple participants as a factor that impacted participants' willingness to give up a drug sample. Poverty also limited options in terms of recourse if their sample tested positive for fentanyl. For the latter, especially for those who are not seeking fentanyl, given the unregulated street drug market, there are no consumer protections in place and people cannot simply return a defective purchase to the seller without any consequences. Though, as demonstrated elsewhere, engaging drug dealers in drug checking programs may be a strategy to provide more knowledge of drug contents to PWUD (Bardwell, Boyd, Arredondo, McNeil, & Kerr, 2019). Additionally, participants overwhelmingly suggested that they would not throw out their contaminated drugs, given the fact that they "hustled" to get them.

Other structural factors, such as drug criminalization and policies constraining access to pure pharmaceutical-grade opioids and a range of opioid agonist treatment medications, create additional barriers and negative outcomes for SV-PWUD, including overdose, violence, and HIV transmission (Aitken, Moore, Higgs, Kelsall, & Kerger, 2002; Bluthenthal, Lorvick, Kral, Erringer, & Kahn, 1999; DeBeck et al., 2017; Werb et al., 2011). Prohibition inflates the cost of drugs (Miron, 2003), requiring SV-PWUD to obtain greater sums of money to acquire their drugs and sustain their use (Mateu-Gelabert et al., 2017). Given these realities, it is not surprising that participants identified giving up a drug sample as a barrier to using DCTs. Additionally, the ever-shifting availability of, or ability to acquire, drugs creates overdose and withdrawal risks among PWUD (Mateu-Gelabert et al., 2017). Research has shown how withdrawal symptoms increase vulnerabilities to drug-related harms (e.g., HIV transmission) (Wagner et al., 2012) and undermine the willingness of PWUD to utilize safer injection practices (Mateu-Gelabert, Friedman, Sandoval, Wendel, & Meylakhs, 2010). Consistent with past research on SCS (Hedrich, 2004; Kemmesies, 1999; Petrar et al., 2007; Small, Ainsworth, Wood, & Kerr, 2011; van der Poel, Barendregt, & van de Mheen, 2003), our results also show how long wait times are a significant barrier for SV-PWUD in accessing services and enacting harm reducing practices, particularly among those experiencing frequent withdrawal symptoms. Though future technological improvements that provides more detailed results in a shorter timeframe may increase uptake and benefits of drug checking, particularly for the most favorable DCT from this study (i.e., HPLC with MS detection).

Lastly, some participants discussed an ambivalence toward overdose risk and death. Previous research undertaken in Australia and Canada has pointed to how such ambivalence can override overdose prevention messaging from public health bodies (Kerr, Small, Hyshka, Maher, & Shannon, 2013; Moore, 2004). Likewise, participants in our study described how many local SV-PWUD live with a sense of hopelessness, and by consequence would not be motivated to use DCTs for the purpose of reducing overdose risk. Given the multiple structural vulnerabilities experienced by PWUD, the lack of prioritization of drug checking among SV-PWUD is therefore unsurprising.

There are limitations to our study. First, while we recruited a diversity of participants, their views may not be applicable to all SV-PWUD in our research setting, let alone the broader set of PWUD who do not face the same kinds of structural vulnerabilities. Second, given the limited deployment of FTIR in our study setting (i.e., available only at two SCS), this may affect potential wait times, accessibility, and familiarity with DCTs and could influence opinions regarding these technologies. Third, all participants were over the age of 30, so these results may not be applicable to youth in Vancouver. Fourth, the factors discussed herein may not operate in the same manner in other jurisdictions or other drug use settings where PWUD may experience fewer structural vulnerabilities (e.g., music festivals). Fifth, for DCTs that do not provide quantitative analyses (e.g., fentanyl immunoassay test strips, colorimetric reagent testing), there is a potential for a true positive fentanyl result to represent sub-clinical, incidental contamination (i.e., not representing a fentanyl overdose risk), and therefore warrants further investigation in terms of the usefulness of these non-quantitative DCTs. Last, our study was based on hypothetical rather than actual use of DCTs, and evidence drawn from settings with fully operational DCTs—using a range of different technologies, including fentanyl immunoassay test strips—will be helpful in shedding further light on the potential of this intervention, such as determining the usefulness of each technology, identifying their use across varying implementation contexts, and examining uptake difference across multiple demographics (e.g., age, gender, socio-economic status, drug preferences).

In conclusion, this study highlights numerous factors that affected willingness or perceived willingness to use a variety of drug checking technologies, including features of DCTs themselves. Further, our findings underscore the structural vulnerabilities experienced by PWUD in Vancouver's Downtown Eastside and how they may impact uptake of DCTs and potentially other public health interventions. Future drug checking programming should consider these factors prior to the implementation of DCTs to ensure that such interventions are meeting the needs of target populations.

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Table 1.

Sample characteristics

Sample Characteristics (n=20)	
Age Range	30–65
Gender Women Men Two-spirit	9 10 1
Ethnicity White Racialized/Indigenous	14 6
Preferred drug[*] Cocaine Crack cocaine Crystal methamphetamine Heroin Cannabis	5 3 3 10 1
Overdosed in last year Yes No	8 12

[*] All participants were poly-substance users

Table 2.

Comparative summary of DCT specifications (Kerr & Tupper, 2017)

Technology	Detect a wide variety of compounds	Ability to detect fentanyl and other opioids	Ability to detect multiple compounds at once	Specificity	Sensitivity	Quantitative analysis	Identify unknown compounds	Speed per sample
Colorimetric Reagent Testing	Moderate	Low	Low	Low	Low	No	No	<6 min
Fourier-Transform Infrared Spectroscopy (FTIR)	High	Moderate	High	High	High	Low	No	<2 min
Thin Layer Chromatography (TLC)	Moderate	Weak	Moderate	Moderate	Moderate	Low	No	30 min
Capillary Electrophoresis with UV detection	High	Moderate	Moderate	Moderate	Moderate	Moderate	No	<2 min *
High Performance Liquid Chromatography with UV detection	High	High	High	High	High	High	No	15 min
High Performance Liquid Chromatography with MS detection	Highest	Very high	Very high	Very high	Highest	Highest	Yes	7.5 min *

* These durations are estimates based on machine-specific run times alone, and do not include collection, preparation, report generation, or consultation1