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Implementing community drug checking in smaller urban communities: a qualitative study exploring contextual factors to consider

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Abstract

Background Impacts of the toxic unregulated drug supply are experienced across all geographic regions in Canada, with high rates of fatal and non-fatal overdoses nation-wide. In British Columbia, rates of overdose fatalities are often higher within smaller urban and rural communities than in larger urban cities. Community drug checking is increasingly explored as a harm reduction intervention; however, these services are typically limited to larger cities. In this study, we explored the contextual factors that service users and implementers consider to be important for context specific drug checking services within smaller communities.

Methods Data collection involved 39 semi-structured interviews with prospective drug checking service users and service implementers from six harm reduction services in four smaller communities on Vancouver Island, BC. Interviews explored perspectives on the contextual factors that may impact the implementation and accessibility of drug checking services within smaller communities. Through inductive thematic analysis, we developed themes that reflected the overarching contextual factors discussed by participants.

Results Participants described four overarching contextual factors important for accessing and implementing drug checking in smaller communities: community and political climate; close social groups and personal relationships; resource availability; and geographic profile. While many of the contextual factors are similar to those operating in larger urban contexts, they can manifest differently in smaller communities. For example, lack of anonymity and confidentiality are intensified in small and rural communities where "everybody knows everybody". Geographic distance to service and transportation were identified as barriers, with outreach and transportation to services suggested as potential mitigating strategies.

Conclusion As community drug checking services are established as a response to the toxic unregulated drug market, factors that support equitable access to services beyond inner-city and urban areas are critical. Factors identified as potential barriers offer targets for service adaptation and tailored implementation to enable greater access. With rural communities experiencing high rates of overdose, implementing drug checking services that are contextually relevant and equity-oriented is critical.

Keywords Drug checking, Overdose, Harm reduction, Health equity, Non-urban, Rural

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Background

In Canada, rates of unregulated opioid overdose fatalities began to rise around 2012 to 2014 as fentanyl entered the unregulated opioid supply [1, 2]. The number of overdose fatalities continues to grow, with a total of 50,928 opioid overdose deaths recorded in Canada between January 2016 and September 2024 [3]. The province of British Columbia (BC) has experienced high rates of opioid overdose in Canada, exceeding 40 deaths per 100,000 which is an average of 6.9 unregulated drug toxicity deaths daily in 2023 [4]. Within BC, overdose rates are elevated across larger urban cities, as well as smaller urban and rural regions, demonstrating that communities of all sizes are experiencing harmful effects of the toxic unregulated supply [5]. However, recent data has shown that rates of overdose fatalities are higher within smaller urban and rural areas of the province. For example, in 2022, Northern Health Authority - one of the largest but least densely populated health regions with many smaller urban and rural communities – experienced a rate of 61.5 drug toxicity deaths per 100 000 individuals [6]. During this same time, the average provincial rate across all health authorities in BC was 45.3 overdose deaths per 100 000 [3, 5].

People who use drugs navigate various intersecting social, environmental, political, and structural factors which can be experienced differently across geographic regions and impact access to health and harm reduction services, and resulting health outcomes [7–10]. A recent study found that in BC, the odds of fatality in the event of an overdose were 30% higher in rural regions when compared to larger urban centers, which the authors attributed to the inequitable distribution of harm reduction and life-saving resources to large urban centers [11]. The concentration of health and harm reduction resources in large urban centres has resulted in inequitable access to relevant services and disproportionate risk of adverse health outcomes among people who use drugs in smaller urban and rural communities [7–9, 12–14]. As rates of overdose continue to be elevated across Canada and the drug supply remains unregulated and criminalized, there are growing calls for the prioritization of harm reduction services that are researched, developed and implemented specifically for smaller urban and rural settings [15–18].

Drug checking services provide people with more information about the drugs that they consume by using analytic technologies to assess the contents and composition of a wide range of substances, to support practices rooted in harm reduction and individual agency [19, 20]. Community drug checking has increasingly been explored as a harm reduction intervention in response to the unregulated and changing supply [20–24]. Whereas nightlife or festival drug checking is designed to reach a single site or event like a music festival, community drug checking seeks to provide an ongoing service that reaches the general public. What may work in nightlife or festival drug checking may be less relevant when designing a service intending to reach the general public in a larger geographical area with a goal of overdose prevention. Emerging research is investigating how to implement community drug checking as an unregulated overdose response and how to overcome challenges related to costs, acceptability, legalities and more [24–26].

In our prior research [23], we identified the need for further investigation of perspectives and experiences around drug checking among people living in smaller and rural communities, as this population has yet to be represented within the literature. In this study, we explore the contextual factors that service users and service implementers consider to be important for accessing and implementing drug checking services within smaller urban and rural serving communities.

Methods

This study was part of a community-based research project (ongoing since 2018) evaluating the implementation and operation of drug checking services in Victoria, BC (a larger urban centre on Vancouver Island) that employs a multi-technology approach to drug checking, using a combination of Fourier-transform infrared spectroscopy (FTIR), paper spray-mass spectrometry (PS-MS), and immunoassay strips [23, 25, 27, 28]. In the winter of 2021, the project began to support harm reduction organizations in four smaller communities on Vancouver Island to implement and operate local, distributed drug checking services. The present study occurred alongside other pre-implementation activities, such as drug checking "pop-ups" and demonstration events within each community.

In this study we sought to explore the contextual factors that impact the implementation and accessibility of drug checking technologies and services within non-urban centers. The definition for contextual factors considered within this research is: the structural level factors that service users and implementers navigate, including elements of the social, cultural, policy, and physical environments in which one is located. This definition draws from frameworks used in prior research related to harm reduction service implementation and access [29–33] and shifts the focus of drug related harm from resulting individual behaviour to the larger context of the systemic, social, and physical environments that one interacts with day-to-day [32, 34]. With attention to the way that place and environment can inform health experiences, we consider how "enabling places" and "enabling resources" support health and wellbeing not because of the properties of the place or the resource, but because of how the spaces and resources respond to environment and context [35, 36]. The focus of this research is not to explore the utility of the material properties of drug checking for

the participating communities, but to focus on how individuals envision accessing and implementing drug checking services within the various intersecting elements of the smaller rural communities on Vancouver Island in which they are located.

The study used a community-based research approach [37, 38], with a goal to center community voices in service design and implementation [39]. This research was positioned within larger long-term collaborative relationships with the service providers within the participating communities, which included ongoing opportunities for mutual knowledge exchange, skill development through training with drug checking technologies, adapting programming to be responsive and context specific, resource sharing and inter organization networking. Partnering data collection with pre-implementation activities, including the on-site pop-up drug checking events provided an opportunity for prospective service users to engage with drug checking services and have their drugs checked using test-strips and FTIR spectrometer with later confirmatory checking using the PS-MS in the urban center (Victoria, BC). In addition, these pop-ups provided a chance for prospective drug checking service implementers to observe and participate in service delivery. The findings will be applied to the scale-up of drug checking services in the identified smaller urban and rural serving communities to support the development of regionally responsive and relevant services.

Setting

Interviews occurred as part of the early stages of expanding drug checking services to harm reduction organizations in Campbell River, Courtenay, Port Alberni, and Duncan. This data collection occurred prior to implementation of services, during on-site pop-up drug checking events at harm reduction organizations in each community between October 2021 – December 2021. These events were intended to support engagement as well as skill and knowledge sharing for those who would be accessing and supporting drug checking within the communities. To provide greater context, see Table 1 for a description of each participating community.

Sampling

Convenience and snowball sampling was used to recruit participants. Recruitment occurred during the planning stages of the pop-up events through the host harm reduction organization staff, and during the on-site

Table 1 Community profile

Characteristic	Campbell River (*n* = 12)	Courtenay (*n* = 4)	Port Alberni (= 13)	Duncan (*n* = 5)
Location	East coast of northern Vancouver Island	East coast of central Vancouver Island	West side of central Vancouver Island	Southern Vancouver Island
Population (2023)	Approximately 38,100 [40] A service, commercial, and employment hub for surrounding small and rural area, serving a total population of approximately 60,000 [41, 42]	Approximately 28,000 [40] A service, commercial, and employment hub for surrounding small and rural area, serving a total population of approximately 72,000 [43]	Approximately 20,700 [40] The largest city and commercial hub of the Alberni-Clayoquot Regional District, serving a total population of approximately 31,000 [44]	Approximately 5,000 [40] A service, transportation, and economic hub for the Cowichan region (population 44,00) [45]
Overdose	In 2023 experienced 93.8 unregulated drug overdose deaths per 100,000 individuals [46] In 2023, recorded 681 calls for paramedic response to overdose – an increase of 350% from 2016 [47]	In 2023 experienced 43.3 unregulated drug overdose deaths per 100,000 individuals [6] In 2023, recorded 659 calls for paramedic response to overdose – an increase of 600% from 2016 [47]	In 2023 experienced 102.8 unregulated drug overdose deaths per 100,000 individuals (the highest amongst all health service delivery areas on Vancouver Island) [6] In 2023, recorded 578 calls for paramedic response to overdose – an increase of 500% from 2016 [47]	In 2023, experienced 55.3 unregulated drug overdose deaths per 100,000 individuals [6] In 2023 recorded 819 calls for paramedic response to overdose – an increase of 400% from 2016 [47]
Miscellaneous	1/3 of the population is Indigenous, relative to 7.6% of the population of Vancouver Island [48, 49] In 2023 there are two harm reduction organizations, one of which operates an overdose prevention site.	In 2023 there are two service providers offering harm reduction services, including an overdose prevention site	In 2023 there is one harm reduction service provider offering supervised consumption, overdose reversal, and harm reduction supplies	11% of the population is Indigenous, relative to 7.6% of the population of Vancouver Island In 2023 harm reduction supports include an overdose prevention site and mobile health outreach with harm reduction supplies. The local First Nation Cowichan Tribes offers culturally grounded treatment, overdose prevention, harm reduction outreach, withdrawal management, and counselling for members.

drug checking events where poster and handbills were displayed. Participants were invited to spread the word within their social networks, supporting further recruitment. The recruitment and data collection aimed for saturation to support a richly descriptive and nuanced understanding of contextual factors [37, 50]. Logistically, recruitment was limited to the dates surrounding the pop-events in each region.

One-to-one interviews were conducted by three team members (a principal investigator and two research associates) in person, on-site with a small number completed over the phone after the pop-up events to accommodate participant schedules. Interview guides were developed to provide a general structure to facilitate discussion through open-ended questions with corresponding prompts. Questions focused on expected experiences related to implementing (for service implementers) and accessing (for service users) drug checking services within their smaller urban community. Interviews were audio recorded and transcribed for analysis. Length of interviews ranged from 19 min to 70 min with an average of 41 min. Approval for study activities was received from the Research Ethics Board at the Vancouver Island Health Authority (J2018-069).

Table 2 Characteristics of the sample *(N = 39)*

Characteristic	Number
Population	
Service user	24
Service implementer	9
Service user & service implementer	6
Gender	
Other (non-binary, gender queer)	2
Woman	16
Man	20
Age in Years	
19–24	2
25–29	6
30–44	18
45–60	11
> 60	1
Identify as indigenous (First nations, Métis, Inuk (Inuit))	
Yes	20
No	18
Location	
Campbell River	12
Courtenay	9
Port Alberni	13
Duncan	5

Participants

Eligible participants were those who anticipated accessing and/or implementing drug checking services within the smaller urban communities where scale-up activities occurred and were 19 or older. Participants provided written informed consent and received $25 cash for their participation.

Data analysis

Coding and analysis was conducted by one team member (AH) using NVivo (version 12). Thematic analysis followed Braun and Clarke's 6 phase approach: becoming familiar with the data; generating initial codes; searching for themes; reviewing potential themes; defining and naming themes; producing the report [51, 52]. Thematic analysis supports flexibility in analytical methods, which was practical for the needs of this study as analysis used a combination of inductive and deductive approaches [51, 52]. Contextual factors from implementation science research provided sensitizing concepts for the initial coding framework [53]. Analysis proceeded inductively to identify overarching themes relating to contextual factors, each with connecting subthemes that more specifically illustrated nuanced components of the overarching contextual factor themes and to capture nuanced and diverse experiences of participants [51]. The analysis does not seek to present the similarities and differences between larger cities and these smaller communities and rural regions. Rather, it seeks to examine how these factors were experienced within the participating smaller urban and rural serving communities.

Results

The sample ($n = 39$) includes 24 prospective service users, 9 prospective service implementers, and 6 individuals who were both a prospective service user and service implementer (Table 2). The majority ($n = 30$) were aged 30 or older. Over half ($n = 20$) identified as Indigenous (this includes First Nations, Métis, and Inuit). Geographic location of participants has been anonymized within the data set to protect anonymity and confidentiality of participants due to small sample size from each community and nature of smaller populations of harm reduction service providers and service users within smaller-urban settings. Four overarching contextual factors were described to be important for implementing and accessing drug checking services in the smaller urban and rural serving communities. These factors included: community and political climate; close social groups and personal relationships; resource availability; and geographic profile.

Community and political climate

There were varied perspectives on the social and political context in which their geographic community was positioned that could impact the roll-out of drug checking services. This included community-resistance to harm reduction services, lack of support from local government, criminalization, and experiences of grief and

loss within the community as possible influencing factors. Participants predicted that local responses to drug checking would range from welcoming and supportive to resistant and oppositional. Both service users and implementers, expected some resistance based on prior experiences of judgement associated with the introduction of other harm reduction measures:

> *I think there is going to be resistance to [drug checking]. It's going to be awhile before they even feel good about [the overdose prevention site] being here… I watch people's reactions a lot of the time. It's hard for people not to be judgmental. (Service user 2 from community 4)*

For some, expected resistance from community members reflected the values of local politics, leadership, and governing bodies – such as town councils and mayors. Implementers discussed the lack of local political support for harm reduction as a challenge or barrier to introducing and operating drug checking in their community. One implementer described this concern as being situated within the context of their previous experience stating:

> *The City is trying to implement a bylaw amendment so that [harm reduction] services can't expand. That's what city hall is like… For us, these are basic human rights. They're not even providing that here…. City Hall is purposely making it harder for us to work. Until that changes, our jobs will always be hard. People will continue to die. (Implementer 2 from community 2)*

Other participants discussed the impact that local leaders and policy makers could have in encouraging a broader acceptance of the new drug checking services if they themselves were in support of the services, and publicly advocated for them.

Though participants expected to encounter some resistance to drug checking services from community members and local government, this was not an unfamiliar experience. One implementer describes why this opposition would not necessarily present a barrier for implementing drug checking, as it is something that harm reduction service providers have grown accustomed to navigating:

> *I don't think it's going to be an easy sell to change the community attitudes. But everybody's been dealing with that situation for a long time now. So I'd say it's not a hurdle that we don't know about. (Implementer 1 from community 1)*

In some cases, participants attributed the anticipated limited support from the community to a general lack of interest or information. Drug checking has operated in different capacities across Canada and across BC, but at the time of data collection, had not yet operated within the participating communities. As a result, community members and those in local leadership positions may not be familiar with what drug checking offers within the context of high rates of overdose fatalities. However, this lack of interest or understanding was also framed by some participants to be a possible benefit in that it could present a more neutral stance for introducing drug checking. One implementer explains:

> *I don't think that [drug checking] would impact the community in any capacity due to the fact that… they probably wouldn't even know about it. Most of them kind of turn a blind eye towards organizations like this. They like to see them in the community but they don't like to admit that they like to see them in the community… I don't think that they would even invest the time to find out what the service was… (Implementer 2 from community 3).*

Others expected that drug checking services might be welcomed, on the basis that all participating communities had experienced significant and ongoing loss from overdose fatalities and were seen to be in need of additional resources to mitigate harms of the toxic unregulated drug supply. An Indigenous service user discussed how they expected the rural Indigenous community would welcome drug checking services despite strong opposition to substance use and harm reduction in the past. This anticipated shift in community attitude was attributed to the mounting losses the community has experienced:

> *The [Indigenous] community has lost quite a bit of community members… So I think they would be pretty accepting of [drug checking]. And, you know, it was a dry community before. Like, where no alcohol was allowed either. But I think they would be accepting of [drug checking] there. I think all the reservations down that way would be because a lot of families are tired of losing family members. (Service user 6 from community 1)*

In addition to navigating reactions to drug checking, the ongoing criminalization of substances and the way that this was experienced within their communities was a concern for participants. One service user commented on this, saying:

> *I think they'd probably feel afraid to have [drugs] on them because of the police… Seeing police officers…*

or even somebody walking behind them could be a police officer, so that might stop them from wanting to come to these places to get their drugs tested, or go anywhere for that matter. (Service user 3 from community 2)

A service implementer also reflected on the way that criminalization may be a deterrent for some people to access drug checking services, saying:

Drug use is criminalized. So if you have drugs, anything you're doing with it is criminalized… People can't lose their jobs. They can't lose their licenses. (Implementer 2 from community 2)

Close social groups and personal relationships

Complex social networks of acquaintances, friends, and family in smaller settings was expected to be a significant influencing factor for the accessibility and implementation of drug checking services. Lack of anonymity in smaller communities was the most common factor discussed. Participants, both service users and implementers, offered personal experiences of limited anonymity and reflected on the implications for future implementation of drug checking services. Again, these involved both expected challenges and possible benefits.

Participants had often grown up within their communities and, as a result, had expansive networks of acquaintances, friends and family. Those who had moved into the community, rather than growing up there, described being quickly identified as a newcomer and feeling surveilled. In either scenario, a lack of anonymity was a common experience for service users and an integral consideration for implementers. The phrase "everybody knows everybody" was frequently used to describe the social dynamics of living in a smaller community as one participant described:

Well in this town everybody knows everybody, right? … They know me personally. I grew up in this town since I was little. I know everyone. And so it's hard to be an addict in this town and hide it. You can't hide it. Because everybody knows everybody, right. (Service user 3 from community 1)

Participants in service implementer roles described having pre-existing familial or social relationships with service users which resulted in an intersection of personal and professional relationships – a scenario which was also expected as drug checking services were brought in to the community. One service implementer described this experience, saying,

It's unique in a difficult way for us here. It's very difficult for us to connect as harm reduction workers because a lot of the people we work with are our own family members. It's such a small community, everyone knows each other. I try and reach out to people all the time and they don't talk to people who work for [harm reduction organization] because we're all closely related here. (Implementer 1 from community 4)

The locations slated to host drug checking services in each community were described as being widely recognized within the town as harm reduction service points. This widespread recognition brought reluctance for people to be seen at the site for fear of breaching their desire for privacy and anonymity. In addition, service users feared stigmatization if publicly recognized to be accessing harm reduction and drug checking sites. Some service user concerns related to anonymity were described as follows:

Once you're seen here, people are judgmental. If they see you [drug checking]… I can guarantee you if I'm seen down the road later on somewhere or maybe they own a business… they treat you totally different than they treat the next person. (Service user 1 from community 2)

In addition to anticipated stigma and desire to maintain privacy, there were numerous reasons why anonymity was important for service users when accessing drug checking. Having personal substance use be more publicly known in a smaller community where "everyone knows everyone" could significantly threaten factors of daily life. Criminalization, housing insecurity, job insecurity, child apprehension and fragmented family and social relationships were all described as risks when anonymity is not assured. Both service users and implementers described these risks:

Anonymity is quite important. It can also affect their livelihood, right? If certain people were to find out that other people were using substances it could affect their ability to get hired onto a job, which affects their financial stability, which affects the possibility of them being able to rent or buy a home. All kinds of factors here, the stigma behind it can be quite detrimental to a person's wellbeing. So, anonymity is extremely important. (Service user 4 from community 1)

Discretion is important because people have their own jobs, or family. Maybe they're dealing with family issues like the [child protection services]. People who deal with [child protection services] and stuff

like that, like they don't want to come into our site because they're afraid. (Implementer 3 from community 2)

In contrast, possible benefits were seen to stem from the social environments of smaller communities being conducive to developing a tight-knight social circle and an extensive support network. Service users considered what these close personal relationships could mean for the implementation of drug checking services within their communities. Living in smaller communities supported building close personal relationships and tight-knit circles that provided social connection, support and community.

The limited availability of harm reduction supports within smaller communities was often discussed as having an unexpected effect of supporting social connection. Participants described running into the same people as they accessed harm reduction services, and how these regular encounters supported developing personal relationships and strengthened social networks.

I find you end up coming here and - this is so cliché - but you become a little family... I would just come here because I didn't really know where to go. When I first moved here, I didn't know anybody... but everyone totally helped with finding everything from drug testing [referring to drug checking], to clothes, to getting on welfare and all that kind of stuff. (Service user 1 from community 1)

Because harm reduction services facilitated relationship and connection, they were often described to function as social gathering spaces in addition to service provision locations. The tight-knit social groups in smaller communities were perceived to be a factor that could support access to drug checking services. Like other harm reduction services within their communities, drug checking services were recognized for their potential as sites to socialize, build community and strengthen social relationships. Some service users reflected on the ways in which their position within a social network had previously facilitated access to drug checking and harm reduction services - both for themselves and for others.

It would be easy to access [drug checking] here. A lot more, I would say, than a big city. Not everybody knows where to go in those big cities, right? Not everybody knows everybody. There has actually been quite a bit of new faces here, but they were warmly welcomed into the group. So they knew where to go and where not to go, kinda thing. (Service user 6 from community 1)

Resource availability

Both service users and service implementers reflected on potential barriers stemming from limited resources to support drug checking services in smaller settings where material support for harm reduction resources was less prioritized and already strained, limiting possibility for the expansion of and equitable access to drug checking services. These concerns were founded in past experiences with accessing and implementing harm reduction services. Participants discussed feeling like they and their peers were an afterthought or deprioritized in the development and implementation of harm reduction services, and as a result, were often not offered the same resources that larger urban centers receive. Innovations in harm reduction, including drug checking, were seen to begin in large urban centers and eventually make their way to smaller communities, if they made it at all. One service implementer described this, saying:

I think that our community members should be valued enough that a service like [drug checking] is offered to them. It's shitty that smaller communities are often not given that opportunity. We see the lack of support and how it affects a person over the years. And, if we can improve on that it's just a win, win – for the client and us as an agency... (Implementer 1 from community 3).

Service users described experiencing resource scarcity at their local harm reduction services and expected this would extend to drug checking. These experiences included sites operating at maximum capacity with limited service provider availability, and programs being scaled back over time. The most commonly cited concern was the limited hours of operation, which was anticipated to impact the availability and accessibility of drug checking services. Service providers also expressed concerns about implementing drug checking services in environments that are already navigating limited resources related to funding, physical space, and balancing numerous intersecting priorities. Additionally, numerous service implementers described personally operating at maximum capacity with teams that were overextended with little capacity for additional responsibilities. One participant offered insights on envisioning drug checking implementation while juggling numerous significant priorities, saying:

Drug checking is obviously very important, but... housing and COVID go higher than checking a sample of drugs. Right now, at least. Or, even how short everyone is for workers too. You want to balance it, but you also don't want to put more stress on one worker and potentially lose them, and then not be

> *able to hire another worker. Or, having more staff, who knows if you're going to get more staff If you put a job posting. Like it's really, really hard right now. (Service user/implementer 2 from community 1)*

Some participants also discussed the lack of programming specifically tailored to meet a diverse range of needs of communities that are systemically marginalized and equity-denied, such as Indigenous Peoples, racialized people, and 2SLGBTQIA + individuals. This was identified as a priority for implementing drug checking services to ensure equitable access. When discussing the lack of culturally safe programming for Indigenous service users at harm reduction sites, one Indigenous participant who was both a service user and implementer commented:

> *Especially the Indigenous specific stuff. A super huge amount of our clients are Indigenous and they're not getting any services of any kind… It's the same stuff as trauma informed services, really. But we're not informed. Nobody has skills to be doing the work here. How to make it more welcoming for us to use the drug testing [referring to drug checking]. (Service user/implementer 1 from community 1)*

The availability of Indigenous specific programming varied from community to community, and it was common that Indigenous harm reduction programming was limited or non-existent. Within these contexts, participants anticipated that drug checking services may, as a result, lack culturally specific elements of implementation. Participants offered possible strategies, such as outreach teams or a mobile service that can travel to rural and remote Indigenous communities these communities. These recommendations highlight that specific and intentional considerations in implementing and operating drug checking services should be made to support equitable access for diverse populations, particularly in settings where tailored programming is lacking.

Geographic profile

The geographic profile of the participating communities– such as geographic location, regional landscape, distance to travel to services, and availability of transportation – was often discussed as a consideration when implementing drug checking services within these regions. The location of the drug checking services in proximity to the surrounding areas and availability of transportation to and from the site was anticipated to be an important factor in ensuring equitable access for those in surrounding rural areas.

Participants described that harm reduction services, social supports and health services were often located within close proximity to each other in a central location in the town. Because drug checking was proposed to be co-located with existing harm reduction service organizations, drug checking services would also be within the concentrated service area. For some participants, the concentration of services in a central area facilitated access to services. However, for others, particularly for those who live far from the town core, it operated as a barrier. One service user described this, saying:

> *A small community doesn't necessarily mean less space. It could be widespread…in fields, and in the country. A six kilometer gravel road, for instance, is what I had to go for a harm reduction kit. And that was in forty-nine degrees this summer… It's hard sometimes. It's hard to access. (Service user 8 from community 1)*

The communities in which drug checking services were to be implemented were described as being situated within networks of surrounding rural and remote communities where populations were less densely concentrated and dispersed widely across geographic regions. An individual's rural and remote location presented limiting factors to accessing harm reduction services and was anticipated to also present limiting factors to access to drug checking. One service user described:

> *You're going to have to keep [drug checking] within the town limits, right? It wouldn't be available to a rural community then, you know? A lot of people aren't going to ride their mountain bike for let's say, six miles from [rural area] to here, just to test their stuff. (Service user 7 from community 1)*

Despite the distance and geographic barriers, the participating communities were described as service hubs to more rural and remote communities. It was common for individuals from surrounding regions to travel into town to access goods and services including harm reduction supplies and programming. Because a commute for services was a common factor of living in rural and remote regions, participants expected that, when possible, individuals would travel to access drug checking services as well. An Indigenous service user described their own experience travelling from a rural Indigenous community to a smaller town to access harm reduction services otherwise unavailable to them:

> *Because before here, I lived in [rural Indigenous community]. When I came to town, I still came to [harm reduction site] during weekends. So, it kind of sucked that there wasn't something like this at that reservation. It was kind of hard to reach a place like*

this because there wasn't any near home. (Service user 6 from community 1)

Individuals travelling from rural and remote communities would access harm reduction sites both for themselves and to distribute resources more widely amongst their community with less access to services. One service implementer described this scenario and what it could mean to extend the reach of drug checking:

We have a couple of [rural communities] where people come in from. They don't have access to harm reduction or any kind of testing, so they come in once a month, once every two months… and they do kind of a bulk pick up. They're kind of like secondary distributors for us actually. If they're in town and they're picking up a bunch of stuff, they can potentially have their substances checked while they're here getting supplies and they can bring that information back to wherever they're from. (Implementer 2 from community 3)

Though commuting to the harm reduction service hubs was a common factor of living in rural and remote communities, participants described challenges associated with limited options for personal and public transportation. Participants who lived close to the service site described having diverse options for transportation, including walking, biking, and sometimes public transportation. However, those who lived outside of the central service area experienced an intersection of greater geographic distance from the service site and fewer transportation resources. Outside of the central service hub, public transportation was less available, walking and biking was less feasible, and there was an increased reliance on car ownership and driving to access services. However, driving was often a limited option depending on one's possession of a driver's license and vehicle, or regular access to someone willing to give a ride. As a result, transportation was anticipated to be a barrier to accessing drug checking, inequitably experienced by those living in rural and remote areas surrounding the smaller urban communities. A service user described the anticipated challenges of transportation to access drug checking services:

[Smaller urban community] is spread out lots, right? And most of us don't… have a driver's license or a vehicle. It is a hefty walk. I've done it lots… because you don't really see many services over on the other side of town. (Service user 5 from community 2)

Service users described personal strategies for navigating transportation barriers, such as relying on their social and familial network to arrange transportation, although these arrangements were sometimes seen as unsustainable, unreliable or infrequently available.

Recognizing that geographic distance and limited transportation options may present barriers to accessing drug checking, participants identified strategies that could be integrated into the implementation of drug checking services to increase access and reach of services – some of which were already being implemented for other harm reduction services, as this participant describes:

Between the [two smaller urban communities] there is a number of smaller communities. We see people coming from those communities to access harm reduction services… [harm reduction organization] has outreach teams and I know that they also provide harm reduction in [rural and remote communities] as well. (Implementer 2 from community 3)

These strategies included both bringing service users to the physical drug checking site by coordinating methods of transportation or bringing drug checking to service users through outreach strategies. A strategic approach to addressing limitations of geographic distance and transportation was deemed necessary to facilitate greater reach of drug checking services within the rural and remote communities.

Discussion

Much of the research related to drug checking implementation and accessibility pertains to experiences within larger urban centers where drug checking resources are more often implemented, reflecting an overall trend of harm reduction research and services with limited relevancy for smaller urban and rural serving settings [54, 55]. This study explored the contextual factors that prospective service users and service implementers consider to be important for accessing and implementing drug checking services within smaller urban and rural serving communities. We identified four core contextual factors: community and political climate; close social groups and personal relationships; resource availability; and geographic profile. These factors reflect those identified in our prior research on drug checking in larger urban centres [23, 25, 27, 28]; however, findings of the present study demonstrate how the same factors can be uniquely experienced within smaller communities [56].

The social and political climate of a community was anticipated to be a primary factor in the sustainability and accessibility of drug checking services. Participants expected limited public and political acceptability of drug checking within their communities, resulting in resistance to, and stigmatization of the services. Additionally,

preservation of anonymity was a concern for some participants. While not unique to smaller communities [25, 28], protecting anonymity is further complicated in smaller communities where "everybody knows everybody" and participants described reluctance to use drug checking services for fear it could threaten factors of daily safety and security, such as housing, employment, child custody and personal relationships. This is consistent with previous research that describes reduced opportunity for harm reduction access and engagement in a smaller communities with harm reduction-adverse policy environment and challenges for maintaining anonymity [57–59]. Participants expected that the tight-knight social networks that develop through accessing harm reduction services in smaller settings would support access to drug checking, which aligns with earlier research where social networks were identified as a supporting factor for harm reduction service accessibility in smaller urban and rural communities [33].

Limited availability of resources was a common consideration by participants, where reduced hours of operation, lack of staffing, and lack of sustainable funding were realities at harm reduction sites within the small and rural serving communities and were expected to impact drug checking services. These restrictions further limited the availability of demographic specific services, such as tailored programming for Indigenous Peoples, racialized people, and 2SLGBTQIA + individuals. Research has previously identified resource scarcity to limit opportunities for people who use drugs to engage with harm reduction programming [12, 33], including drug checking [28]. These factors were further complicated by challenges related geographic location, with some participants needing to travel expansive geographic distances while navigating limited options for transportation.

Implementation science frameworks commonly position context as integral for understanding implementation outcomes [29]. Yet, the implementation of harm reduction programming in rural areas has been criticized for typically involving direct adoption of service models that were conceptualized and developed in large urban settings, without consideration of local contexts [58]. A lack of contextual relevancy can mean that people avoid or do not engage long-term in services [59–61]. Previous research has demonstrated that those with experiential knowledge of using substances, accessing services, and implementing services in smaller communities can support the development and adaptation of responsive harm reduction services and specialized strategies to support access [62, 63]. Consideration to external factors surrounding the implementation of drug checking services within smaller communities can support services that are relevant and responsive to service users.

The present study responds to calls for equity-oriented approaches for responding to the unregulated drug market [64, 65]. Though rates of overdose fatalities are proportionately similar across large and smaller urban and rural areas in the province, the risk of fatality in the event of an overdose increases with location in a smaller urban and rural region [6, 11]. Hu et al. [11] propose that a contributing factor of this is inequitable access to harm reduction support services in smaller centers. To address barriers to accessing drug checking services, proportionate universalism has been proposed as a guiding equity-oriented implementation framework within which models of service delivery are adapted to be responsive to the unique needs of diverse populations to support widespread access [64, 65]. As a route of mobilizing proportionate universalism, we highlight the contextual factors important to considerations of accessible and contextually relevant drug checking services within smaller urban and rural settings. It should be noted, however, that contextual factors inform one domain of an individual's experience, and equity-oriented approaches to implementing drug checking services should additionally be responsive to individual identities as they are experienced in smaller urban and rural locations.

Specific focus on the factors that influence drug checking accessibility and implementation is important as these services grow and expand to smaller urban and rural communities. In BC, drug checking has been expanding throughout rural regions as part of provincial overdose prevention strategies [66]. In just one year (2022), BC saw an increase of nearly 33% in the number of organizations offering drug checking services, with most of these new organizations located outside of large urban areas [66]. Indeed, the number of drug checking services across North America has grown in response to the continuing unregulated market and elevated rates of overdose fatalities [67]. While scale-up of drug checking services is necessary for equitable access, the inclusion of the service within public health strategies risks medicalization and institutionalization that various other community based harm reduction initiatives have experienced [68]. Research has identified how bureaucratic barriers related to the institutionalization of overdose prevention sites and supervised consumption sites resulted in operational challenges and limited capacity to offer programming that was dynamic and responsive to the diverse range of service user needs and experiences [18, 58, 69]. Duff [36] describes that the value of a harm reduction material resources, such as drug checking instruments, "is less a property of the resources themselves and more a function of the diverse ways such resources are used" (pp. 342). In relation to scale, Duff [36] suggests that elements of enabling environments are not fixed and that scaling of these spaces is a process that involves consideration to

contextual characteristics of environments. Drug checking services that are dynamic in response to contextual factors present in smaller urban environments shift focus beyond universal availability of drug checking technologies to the ways in which these technologies can be presented to support access to individuals with diverse experiences and needs across geographic regions.

With 20 of the 39 participants reporting Indigenous identity, concepts of service accessibility and implementation related to Indigenous identity in smaller communities was often discussed and is a significant consideration for equitable access to drug checking services in smaller communities. The availability of culturally appropriate, relevant, and accessible drug checking and other harm reduction services is significant because Indigenous populations are disproportionately impacted by the harms of existing drug policy, the unregulated criminalized drug market and criminalization of substances and substance use. While First Nations represent 3% of BCs population, 14.7% of all overdose fatalities in BC in 2020 occurred amongst First Nations individuals [70]. This set the overdose mortality rate among First Nations populations at 5.3 times the rate of non-First Nations populations in BC in 2020 [70]. Further, 64.5% of the Indigenous population of BC lives outside of a large urban population center [71]. A limitation of this research does not provide a specific analysis of Indigenous experiences within the participating communities. Further research should be done with a focus on the diverse experiences and needs of Indigenous populations outside of large urban centers to support culturally appropriate and equity-oriented approaches to drug checking.

There were other limitations of the study as well. Participants had limited pre-existing knowledge of and experience with drug checking because drug checking had yet to be implemented within their communities, which may have limited how experiences of implementation and accessibility were envisioned. Recruitment exclusively occurred at harm reduction sites, which restricted the scope of our recruitment to exclude those who do not or cannot access services at these sites. While a stated limitation of this research is that it does not provide a specific analysis of Indigenous experiences, it also does not further explore experiences of racialized people, and 2SLGBTQIA + individuals. To address this gap and further support equity-oriented drug checking services, additional research is recommended. This research occurred within a period of time with a specific policy and social context and may have limited relevancy to other contexts.

Conclusion

Drug checking services are increasingly being implemented as a harm reduction response to the unregulated market, both in larger cities and smaller communities and rural regions. As these services continue to expand in smaller communities, services should be adapted to be responsive to these settings to facilitate access and reduce barriers. We found that both service users and service implementers expect to navigate specific factors related to the context of smaller communities, including: community and political climate; close social groups and personal relationships; resource availability; and geographic profile. Consideration of these factors can guide contextually relevant and equity-oriented drug checking implementation within smaller urban settings. While drug checking is one important harm reduction measure to respond to the unregulated supply, there must be greater policy support for market regulation and diversified options for safe supply with emphasis on community led and operated models.

Author contributions

All authors have made primary contributions to conceptual development, drafting, and revising of this article. All authors have approved the submitted version of the article and have agreed both to be personally accountable for the author's own contributions.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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