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Community Urinalysis and Self-Report Project

Cross-Canada Report on the Use of Drugs from the Unregulated Supply, 2019-2021 Data

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Additional CUSP Partner Sites

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Conflict of Interest

The authors have no conflicts of interest to declare.

Executive Summary

Key Points

- Contents of drugs from the unregulated supply are unpredictable, which increases the risk of harm to people who use drugs (PWUD) from this supply. Standardized information about drug contents is urgently needed to identify potential risks and inform harm reduction efforts.
- Through the Community Urinalysis and Self-Report Project (CUSP), data were collected from PWUD about reported substance use (via a self-report survey) and detected drug contents (via urinalysis). CUSP was implemented between 2019 and 2021 in seven regions across Canada.
- Stimulants were used most often compared with opioids and benzodiazepines. Cocaine/crack and methamphetamine/amphetamine accounted for most of the stimulant use. Most use of these stimulants were expected by participants (i.e., reported used when detected).
- Fentanyl was detected most often in British Columbia and Thunder Bay, where participants also usually expected its use. In other regions where fentanyl was detected least often (e.g., Manitoba, Nova Scotia), use was almost always unexpected (i.e., not reported used when detected). These differences must be considered when addressing opioid-related harms, which are largely driven by fentanyl.
- Benzodiazepine use was unexpected among at least 1 in 3 participants across sites. This was consistent with other information showing an increase in benzodiazepines in the unregulated drug supply since the COVID-19 pandemic began.
- A spectrum of harm reduction tools and supportive policies and programs tailored to the needs of PWUD in different communities are needed to improve drug predictability and reduce harms. These efforts may be informed by expanding and harmonizing research, monitoring and surveillance activities that examine drug contents, and the diverse experiences of PWUD.

Background

Substances from the unregulated or illegal drug supply in Canada are increasingly unpredictable in type, potency and quality (Ali et al., 2021; Canadian Community Epidemiology Network on Drug Use, 2020a, 2020b). This increases the risk of accidental drug poisoning and other drug-related harms to people who use drugs (PWUD) from this supply. Contamination-related harms may be better understood and addressed by comparing the actual drug contents with what people using the drugs expect they are. However, this information is not widely available nor standardized. The Community Urinalysis and Self-Report Project (CUSP) is a low-barrier monitoring system developed to fill this need. Our report describes trends in reported and detected use of substances, and whether expected substance use aligns with actual substance contents. It is intended for those involved in harm reduction research, surveillance, service delivery and policy making, including PWUD.

Methods

The CUSP methodology was piloted in three regions in 2018 and 2019 (Biggar et al., 2021). The project was then scaled up to additional regions across Canada. To do this, the CUSP working group developed standardized data collection tools and partnered with harm reduction stakeholders from

different regions to lead the local implementation of CUSP. Individuals accessing harm reduction services were recruited to participate. Participants provided a urine sample and completed an anonymous self-report survey on the substances they expect to have used in the past three days. Urinalysis and survey results were linked to compare whether detected substances were expected or unexpected by the participant. Aggregate data were shared with CCSA for cross-Canada analysis and reporting.

Results

CUSP was implemented between spring 2019 and spring 2021 in British Columbia (multiple sites), Edmonton (Alberta), Manitoba (multiple sites), Thunder Bay (Ontario), Montreal and Laval (Quebec), and Halifax (Nova Scotia). Survey data and urine samples were collected from 1,526 participants at 49 harm reduction sites. Key trends in results included:

- Methamphetamine/amphetamine and cocaine/crack were used more often than any other stimulant, opioid or benzodiazepine. Methamphetamine/amphetamine were used most often in Western regions and cocaine/crack in Central and Eastern regions. In these regions, most use of these stimulants was expected by participants (i.e., reported used when detected).
- Fentanyl was detected least often in Manitoba and Halifax, and was not detected in Laval. In Manitoba and Halifax, all use was unexpected. In contrast, fentanyl was detected more often in B.C., Edmonton, and Thunder Bay, where less than 27% of use was unexpected. In Montreal, unexpected use decreased between 2019 and 2020 from 92.3% to 54.9% of participants.
- Benzodiazepine use was unexpected among 30% to 77% of participants across all sites.
- At most sites, half of all participants reported using both a stimulant and an opioid in the past three days. The reported use of both opioids and benzodiazepines was less common (less than 30%).

Conclusion and Implications

CUSP has provided standardized information about the use of drugs from the unregulated supply across Canada. The results further demonstrate its unpredictability and potential risks to PWUD. The following activities will further assist with assessing the unpredictability of the unregulated drug supply and reducing potential risks to PWUD:

- Increase access to programs that provide a pharmaceutical-grade supply of opioids and stimulants based on evaluation of existing safe supply programs and synthesis of lessons learned (Canadian Association of People Who Use Drugs, 2019; Fleming et al., 2020; Ranger et al., 2021).
- Provide access to a range of low-barrier harm reduction services in communities across Canada, including drug checking, supervised consumption or overdose prevention sites, overdose response education and take-home naloxone kits, and overdose prevention technologies. Barriers and gaps, such as access to services for those who use alone, should be addressed (Bardwell et al., 2019; McCrae et al., 2020).
- Advance a holistic approach to substance use and substance use harms by addressing the conditions in which people use drugs, access services and go about their lives. This may include integration of harm reduction and treatment services with low-barrier primary care and social

support services (Russell et al., 2021), exploring decriminalization of drug-related offences (Jesseman & Payer, 2018), and improved education around the *Good Samaritan Drug Overdose Act* (Mehta et al., 2021; Xavier et al., 2021).

- Expand research, monitoring and surveillance activities — including CUSP — to improve the availability, accessibility and harmonization of information about substance use (e.g., drug checking service data, public health alerts) and experiences of diverse groups of PWUD (e.g., by gender, housing status, race, ethnicity).

PWUD should be involved in the conception, implementation and evaluation of these activities and compensated fairly for providing their expertise at each of these stages (Canadian Centre on Substance Use and Addiction, 2021).

Background

Monitoring Harms Related to the Unregulated Drug Supply

Substances from the unregulated drug supply in Canada are increasingly unpredictable in type, potency and quality (Canadian Community Epidemiology Network on Drug Use [CCENDU],2020a, 2020b). This unpredictability places people who use drugs (PWUD) at increased risk of poisoning (overdose) and death. Opioid-related deaths have increased to record levels during the COVID-19 pandemic in many Canadian jurisdictions (Special Advisory Committee on the Epidemic of Opioid Overdoses, 2021). The resulting toll, burnout and grief experienced by PWUD, their families and their communities cannot be understated.

To identify and reduce potential harms related to the unregulated drug supply, it is necessary to understand which substances PWUD believe they are using and which they are actually consuming. However, this information is not widely available nor standardized in Canada (Biggar et al., 2021). For instance, recent coroner's data show that more than half of opioid-related poisoning deaths involve stimulants like methamphetamine (Special Advisory Committee on the Epidemic of Opioid Overdoses, 2021). Since the onset of the COVID-19 pandemic, opioid-related deaths have also often involved nonmedical benzodiazepines in some regions (CCENDU, 2021). However, it is not possible to determine whether the consumer expected these substances or whether they took the drugs together or one after the other. Drug checking services can help fill some of this information gap (Maghsoudi et al., 2021). Recent syntheses have shown actual drug contents to vary from consumer expectation (CCENDU, 2020a). However, differences in the type of drug checking tools and their availability across Canada make it difficult to examine a wide range of substances and compare the results across regions.

Equity-oriented monitoring must consider the identities of PWUD and the environments they live in to identify specific trends, needs and opportunities to reduce harms (Canadian Centre on Substance Use and Addiction [CCSA], 2020; Canadian Institute for Substance Use Research, n.d.). Gender identity, age, sexual orientation, housing security and numerous other factors impact drug use, preferences and potential harms (Baral et al., 2014; Collins et al., 2020; Ferguson et al., 2022; Harris et al., 2021; Public Health Agency of Canada, 2021). These factors should also be considered when examining the expected and actual use of drugs from the unregulated supply.

Community Urinalysis and Self-Report Project

The Community Urinalysis and Self-Report Project (CUSP) was developed to provide standardized information about the use of drugs from the unregulated supply. The project involves scaling up a monitoring system developed based on the work of the BC Centre for Disease Control (BCCDC) and Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l'Ile-de-Montréal (CCSMTL) (Biggar et al., 2021). CUSP is guided by a working group consisting of members from the BCCDC, CCSMTL, University of Alberta and CCSA. Implementation is led by local harm reduction stakeholders, who may include service providers, public health or health authority staff, researchers and PWUD. CCSA provides national-level coordination for project implementation and reporting.

CUSP aims to develop the capacity of harm reduction stakeholders to generate information on expected and actual drug use and related experiences of PWUD. Findings may help inform and evaluate local, provincial and national efforts to reduce harms related to the unregulated drug supply

and promote safer use among PWUD. Our report presents findings from partner sites that implemented CUSP between 2019 and 2021 by region and gender identity. It is intended for those involved in harm reduction research, surveillance, service delivery and policy making, including PWUD.

Methods

The CUSP methodology was initially piloted by three partner sites in 2018 and 2019 (Biggar et al., 2021). The pilot phase tools and processes were then standardized into a set of project toolkit materials that new sites used to implement CUSP. The survey tool used by all sites included core questions about self-reported use of substances in the past three days and participant demographics. Sites could include other optional questions about drug use and harm reduction services based on local relevance and informational need. All survey questions were reviewed by PWUD and harm reduction service providers to ensure relevancy and appropriateness.

Why test urine samples?

Urine toxicology screening:

- Can accurately detect more than 150 substances through liquid chromatography–mass spectrometry.
- Can be implemented with fewer legal and logistical challenges compared with directly testing illegal drugs.
- Does not require participants to give up any drugs for testing, where the cost of drugs can make sacrificing part of one's supply difficult.
- Is more reflective of substances being consumed locally compared with other data sources (e.g., analyses of drugs seized by police).

Partner sites implemented CUSP by obtaining local ethics review board approval, recruiting participants, collecting and analyzing data, and reporting findings. Participants were recruited from harm reduction sites, such as supply distribution sites or supervised consumption and overdose prevention sites. They were eligible if they were older than the age of majority in their region, reported using an illegal drug in the past six months and provided verbal informed consent to participate. Harm reduction site staff, including peers or people with lived or living experience of substance use employed at the site, led recruitment and data collection. Sites could use a paper-based or online survey. Participants were given a $15 to $30 cash honorarium depending on the year of recruitment and regional standards for compensating PWUD. In some regions, sites were compensated for each participant enrolled to offset staff time and resources required for data collection.

Urine samples were sent to LifeLabs Ontario (B.C., Edmonton, Manitoba, Thunder Bay and Halifax sites) or the Centre de toxicologie du Québec (Montreal and Laval sites) for broad spectrum urine toxicology screening through liquid chromatography–mass spectrometry. This screening method can reliably detect a range of substances, including stimulants, opioids, benzodiazepines, fentanyl and its analogs, and their metabolites (intermediate- or end-product of metabolism). Detected substances were grouped into the major substance categories reflected in the survey questions on self-reported substance use. (Information on the toxicology classification method is available upon request.) Urinalysis results were returned to each site to link with survey results via an anonymous identification code. This allowed a comparison of reported and detected substance use for each participant. Results from each partner site were shared locally (e.g., in reports, infographics or presentations at the site or sites of data collection). Refer to Appendix A for site-specific results published by partner sites. For cross-Canada reporting, aggregate data on key trends from each site were sent to CCSA for analysis.

Results

Site and Participant Characteristics

Seven regions implemented CUSP between spring 2019 and spring 2021. (See Appendix A for descriptions of each site.) Survey data and urine samples were collected from 1,526 participants in 49 harm reduction sites (Appendix B, Table 1). Regionally, most participants were from B.C. (37.0%) or Quebec (43.9%). Overall, 64.9% of participants identified as men, 29.6% as women and 5.6% as transgender men or women, nonbinary or gender nonconforming, preferred not to say or did not indicate an answer (Appendix B, Table 2). Most participants were ages 35 to 44 years (28.6%) and 45 to 54 years (24.6%). Overall, 85.3% of participants reported using substances (excluding alcohol, tobacco and cannabis) every day or a few times a week in the past month.

Reported and Detected Substance Use

Appendix B Table 3 presents the overall percentage of participants who reported using a substance in the past three days and the overall percentage that had been detected in their urine. Appendix B tables 4 and 5 present results from linked survey and urinalysis results comparing expected and actual substance use. Key results by substance type are described below.

Stimulants

Overall Past Three-Day Reported Use and Detection

Stimulants were the most reported and detected substances in all sites (Appendix B Table 3). This included cocaine/crack and methamphetamine/amphetamine. Cocaine/crack use was most common in Central and Eastern sites (71.4% to 80.4% reported and 76.2% to 80.0% detected). Methamphetamine/amphetamine use was most common in B.C. and Edmonton (58.3% to 73.8% reported and 70.8% to 80.5% detected). Speed, a substance that may contribute to the detection of methamphetamine or amphetamine, was reported used predominantly by participants in Montreal (23.6%) and Laval (47.6%).

Expected and Unexpected Use

More than 75% of cocaine/crack use was expected by participants in all sites except B.C. (58.6%) (Appendix B Table 4). More than 80% of methamphetamine/amphetamine use was expected by participants (reported use of methamphetamine or speed) in all sites except Halifax (0.0%).

Definitions

"Cocaine/crack": refers to cocaine, crack or both. These substances cannot be distinguished by urinalysis, so we combined survey responses to "cocaine (powder)" and "crack/freebase" to facilitate comparison.

"Methamphetamine/amphetamine": refers to methamphetamine, amphetamine or both. Methamphetamine use may lead to the presence of methamphetamine and amphetamine in urine. Reported use of methamphetamine/amphetamine refers to reported use of methamphetamine or speed.

"Heroin/morphine": refers to heroin, morphine or both. Detection of heroin and morphine use were combined because the direct metabolite of heroin (6-monoacetylmorphine) clears rapidly from urine, after which it is difficult to discern heroin from morphine use. Reported use of heroin and morphine were combined to facilitate comparison.

Stimulants that participants expected to consume were generally present (i.e., detected when participants reported use) (Appendix B Table 5). Exceptions include MDMA (ecstasy), which was not detected when expected by participants from most sites (52.9% to 100.0%) except for Halifax and Montreal (2020). Additionally, cocaine/crack was not detected among 44.5% to 54.6% of participants who reported its use in B.C. and Edmonton, respectively. The same was true for methamphetamine or speed in Thunder Bay (47.4%) and Halifax (100.0%).

Opioids

Overall Past Three-Day Reported Use and Detection

Heroin/morphine, fentanyl and methadone were generally the most reported and detected opioids used (Appendix B Table 3). Fentanyl use varied greatly. Its highest reported and detected use were in B.C. and Thunder Bay (41.2% to 44.3% reported and 46.4% to 54.3% detected). Fentanyl was virtually absent in Manitoba, Laval and Halifax (0.0% to 3.2% reported and 0.0% to 3.7% detected). In Montreal, reported fentanyl use increased four-fold (from 2.5% to 10.6%) and detected fentanyl use increased two-fold (from 9.9% to 20.1%) between 2019 and 2020.

Of the remaining opioids, methadone was reported used and detected most frequently overall (22.4% and 23.5%, respectively) followed by hydromorphone (16.6% and 16.5%, respectively) and buprenorphine (5.8% and 5.4%, respectively). Notably, hydromorphone was the most frequently detected opioid in two sites (52.1% in Edmonton and 20.4% in Manitoba).

Expected and Unexpected Use

All fentanyl use was unexpected in Manitoba and Halifax (Appendix B Table 4). In Montreal, unexpected fentanyl use decreased from 92.3% of participants in 2019 to 54.9% in 2020. In contrast, only 21.4% to 26.7% of fentanyl use was unexpected among participants in B.C., Edmonton and Thunder Bay.

Opioids that were not detected when reported used (i.e., a “bunk” drug containing some other substance) tended to be the opioids that were least detected at each site. For instance, oxycodone was not detected among 66.7% to 100.0% of participants who reported use (Appendix B Table 5). In Montreal, fentanyl was not detected when reported among 70.0% of participants in 2019 compared with 14.8% of participants in 2020.

Benzodiazepines

Overall Past Three-Day Reported Use and Detection

Benzodiazepine use[1] was highest in Halifax (31.2% reported and 37.6% detected) and Thunder Bay (25.8% and 59.8%, respectively) and lowest in Laval (0.0% for both) (Appendix B Table 3).

Expected and Unexpected Use

1 Starting in 2020, three non-medical benzodiazepines were added to the LifeLabs Ontario broad spectrum urine toxicology detection menu (flubromazolam, flualprazolam, etizolam). Therefore, overall detection and unexpected use of benzodiazepines in B.C. and Edmonton may be underestimated (Appendix B Table 3, Table 4). Similarly, the percentage of participants whose urine did not contain benzodiazepines among those who reported its use may be overestimated (Appendix B, Table 5).

Among all sites, between 28.6% and 76.9% of benzodiazepine use was unexpected (Appendix B Table 4). Unexpected use was highest in Manitoba (76.9%) and Thunder Bay (67.2%), lowest in Halifax (28.6%), and increased in Montreal between 2019 (34.0%) and 2020 (58.3%).

Polysubstance Use

On average, participants from each site reported using between 2.6 and 4.0 drugs. Reported use of at least one opioid and one stimulant in the previous three days was more common than reported use of at least one opioid and one benzodiazepine in all sites (Appendix B Table 6). Opioid-stimulant and opioid-benzodiazepine use were most frequent in Halifax and Thunder Bay.

Key Results by Gender Identity

Results were combined across all sites to compare reported and detected substance use by participants' gender identity (Refer to Appendix B Table 2 for a breakdown of participants' demographics by site). The following section summarizes select differences and similarities.

Stimulants

About twice as many participants who identified as a gender minority (i.e., nonbinary, gender nonconforming or transgender) or did not indicate a gender reported using speed (28.2%) compared with those who identified as men (14.6%) or women (9.3%). Reported use of methamphetamine (crystal meth) and cocaine/crack were similar among participants of different gender identities (42.1% to 43.5% for methamphetamine and 58.9% to 63.5% for cocaine/crack).

Opioids

Reported use of fentanyl or heroin was higher among men (21.6% for fentanyl and 25.1% for heroin) and women (26.4% and 36.0%, respectively) than among those who identified as a gender minority or did not indicate a gender (12.9% and 21.2%, respectively).

Unexpected fentanyl use was higher among those who identified as a gender minority or did not indicate a gender (47.1%) than among women (34.5%) or men (31.9%). Unexpected use of hydromorphone was higher among women (44.1%) than men (29.1%) and those who identified as a gender minority or did not indicate a gender (9.1%)

Benzodiazepines

Benzodiazepine use was similar among participants of different gender identities (14.4% to 16.4% reported and 13.1% to 22.4% detected). Unexpected benzodiazepine use was higher among women (57.6%) than men (45.8%) and those who identified as a gender minority or did not indicate a gender (42.1%).

Polysubstance Use

About twice as many participants who identified as a gender minority or did not indicate a gender reported using at least one opioid and one benzodiazepine in the previous three days (25.8%) compared with men (13.2%) and women (11.0%). The reported use of at least one opioid and one stimulant was similar among participants of different gender identities (51.6% to 56.0%).

Discussion

Stimulants were used most often, and their use was generally expected. Methamphetamine/amphetamine and cocaine/crack were reported or detected more often than any other stimulant, opioid or benzodiazepine. Methamphetamine/amphetamine were used most frequently in Western Canada, while cocaine/crack were used most frequently in Central and Eastern regions. This geographic distribution is consistent with recent data on police drug seizures (Health Canada, 2021). In the regions where each type of stimulant was detected most often, use was expected by more than 80% of participants. Stimulants that were detected less often (i.e., cocaine/crack in Western Canada, and methamphetamine/amphetamine in Central and Eastern regions) appeared to be less predictable. In these cases, it was more common for the detected substance to be unexpected or for the expected substance to not be detected (i.e., "bunk" drug containing some other substance).

Half of the survey participants reported using opioids and stimulants in the previous three days. In most sites, about half of participants reported using at least one stimulant and one opioid in the previous three days. PWUD may use both stimulants and opioids for a variety of reasons, including to counteract, balance or enhance effects; to manage pain; or due to perceptions that concurrent use can reduce overdose risks (Boileau-Falardeau et al., 2022; McNeil et al., 2020). Future research should explore whether opioids and stimulants are used at the same time or over a short time (e.g., within three days), in what order and why. Future analyses should also compare reported co-use of opioids and stimulants with detected co-use. An analysis of urinalysis results from B.C. in 2019 and a previous data collection cycle in 2018 found more than 80% of opioid-containing urine samples also contained methamphetamine or amphetamine (Liu et al., 2021).

There was great regional variation in expected and unexpected fentanyl use. In Manitoba and Halifax where fentanyl was detected less often, its use was always unexpected. In contrast, in B.C., Edmonton and Thunder Bay where fentanyl was detected more often, at least 75% of participants expected its use. In Montreal, fentanyl use — including overall detection and expected use — increased drastically between 2019 and 2020 after the onset of the COVID-19 pandemic. This is consistent with evidence showing global and domestic disruptions associated with the pandemic had changed the unregulated drug supply and the ways PWUD access it (CCENDU, 2020b; United Nations Office on Drugs and Crime, 2020).

Accidental opioid-related deaths in Canada are largely driven by fentanyl and its analogs (Special Advisory Committee on the Epidemic of Opioid Overdoses, 2021). Findings from this study and earlier iterations suggest PWUD across Canada have unique needs that may change — sometimes drastically — over time (Biggar et al., 2021). These needs must be considered when planning and evaluating regional programs and policies. Whether PWUD are seeking fentanyl or other opioids, programs and policies that provide PWUD with more certainty about the type and quantity of substances being used would be of benefit.

Unexpected benzodiazepine use occurred in every region. Benzodiazepine use was unexpected among at least 1 in 3 participants in all sites and reached as many as 2 in 3 participants in Manitoba and Thunder Bay. This corroborates other data that have detected nonmedical benzodiazepines (i.e., not approved for therapeutic use) more often in drugs from the unregulated supply and opioid-related poisoning deaths since the onset of the COVID-19 pandemic (CCENDU, 2021). Unexpected benzodiazepine use is particularly concerning because benzodiazepines increase the risk of poisoning when used with opioids, make poisoning difficult to reverse and may lead to tolerance and withdrawal (Purssell et al., 2021). Further, while benzodiazepine test strips are available in some

regions as part of drug checking services, they may not reliably detect nonmedical benzodiazepines emerging in the drug supply (e.g., etizolam) (Laing et al., 2021). Due to these factors, special consideration is needed to address the harms related to benzodiazepines in the unregulated drug supply (CCENDU, 2021).

Further research is needed at the intersection of substance use, gender and social determinants of health. Many trends in reported and detected substance use were similar across gender identities, though some variation existed. Our findings contrast some of the existing and limited literature on the topic. In our study, unexpected fentanyl use was similar among those who identified as men and women, and highest among those who identified as a gender minority or did not indicate a gender. A recent Canadian study found women were more likely to self-report unintentional fentanyl use (Mitra et al., 2020). To further contrast, 75% of opioid-related poisonings — which are largely driven by fentanyl — occur among males (reported by biological sex) (Special Advisory Committee on the Epidemic of Opioid Overdoses, 2021). Future survey research with larger sample sizes and qualitative methods (e.g., interviews with PWUD) may better explore how the experiences of PWUD intersect with gender identity and the conditions in which people are born and live. This is especially needed given the wide-ranging disruptions caused by the COVID-19 pandemic. Unprecedented levels of opioid-related harms have been disproportionally felt by marginalized groups, such as those who live in low-income neighbourhoods (Canadian Institute for Health Information, 2021) or are experiencing homelessness (Friesen et al., 2021; Gomes et al., 2021).

Limitations

The data collection period spanned fall 2019 to spring 2021. Public health measures related to the COVID-19 pandemic led to delays and longer data collection periods than initially planned. Comparisons between regions should be made with caution, and results from earlier data collection periods may not reflect later drug trends. For instance, benzodiazepines have become more common in the unregulated drug supply since 2020 (CCENDU, 2021). Additionally, detection and unexpected use of benzodiazepines in 2019 (B.C. and Edmonton sites) may be underestimated because three nonmedical benzodiazepines were added to the LifeLabs Ontario broad spectrum urine toxicology detection menu in 2020.

Data were collected from people who used drugs and accessed harm reduction services during the data collection period. Results may not represent the drug use or experiences of all PWUD in each region, especially for sites with small samples (e.g., less than 50 participants).

Few participants identified as gender nonconforming, nonbinary, transgender or did not indicate a gender. Results for these participants were collapsed into a gender minority category for this report, which may have affected the reported percentages for this group. This study also presented results by a single determinant of health (gender identity). As described previously, future research should examine the expected and actual use of drugs from the unregulated supply among different groups of PWUD.

Broad spectrum urine toxicology screening is among the most comprehensive drug testing methods. However, it cannot detect certain novel psychoactive substances. For instance, it cannot detect nitazene substances, an emerging class of potent opioids in the unregulated supply (Public Health Ontario, 2021). Similarly, substance categories like fentanyl include numerous substances (e.g., carfentanil), which may not be expected by consumers. For these reasons, results may underestimate the degree of unpredictability and toxicity of the unregulated drug supply.

Other limitations of the methodology have been described in depth previously (Biggar et al., 2021).

Conclusion and Implications

CUSP provides standardized information on substance use trends across Canada. Our study found expected and actual substance use varied by type of substance and region. This information is critical given the rapidly evolving drug supply, the complex nature of drug poisoning harms that often involves multiple substances (Konefal et al., 2022) and the continued burden of harms experienced by individuals and their communities. Our findings reiterate the need for a spectrum of harm reduction tools and supportive policies and programs that are tailored to the needs of PWUD in different jurisdictions.

Implications for Programs and Policies

Harms related to the unpredictability and toxicity of the unregulated drug supply should be addressed by the following programs and policies:

- Increase access to a pharmaceutical-grade supply of opioids and stimulants, through:
    - Continually evaluating existing efforts and creation of best practices to develop options that work in different contexts (Canadian Association of People Who Use Drugs, 2019; Fleming et al., 2020; Ranger et al., 2021)
    - Involving PWUD in service development and delivery to promote accessibility, acceptability and effectiveness for diverse groups of PWUD and their communities
- Provide access to a range of harm reduction services in urban and rural communities across Canada. These include:
    - Addressing barriers to accessing drug checking services (type and amount) for PWUD who use drugs alone or outside of observed consumption settings (Bardwell et al., 2019; McCrae et al., 2020).
    - Examining gaps in overdose prevention or supervised consumption sites (OPS/SCC). For instance, relatively few OPS/SCS allow clients to inhale (smoke) drugs. In some jurisdictions, inhalation has become the main method of opioid use (Parent et al., 2021) and is increasingly involved in opioid-related poisonings (Friesen et al., 2021).
- Updating overdose response education for PWUD and first responders (e.g., on responding to opioid overdoses that may involve benzodiazepines).
- Increasing universal access to take-home naloxone kits.
- Improving overdose prevention technologies, such as hotlines or smartphone applications (e.g., Lifeguard App, BeSafe App), to provide emergency overdose response to people who use drugs alone or outside of observed consumption settings.
- Advancing a holistic approach to substance use and substance use harms by addressing the conditions in which people use drugs, access services and go about their lives. This approach may include:
    - Integrating harm reduction and treatment services with low-barrier primary healthcare and social support services, such as mental health, housing and employment services (Russell et al., 2021).

- Decriminalizing personal possession of drugs and potentially other drug-related offences (Jesseman & Payer, 2018).
- Increasing education to improve PWUD's and law enforcement officers' understanding of the *Good Samaritan Drug Overdose Act* (Mehta et al., 2021; Xavier et al., 2021).
- Reviewing law enforcement policies and procedures that may deter PWUD from calling 911 during drug poisoning situations, such as police attendance at poisoning events (CCENDU, 2017).

Implications for Research, Monitoring and Surveillance

The following research, monitoring and surveillance activities would improve what is known about the contents of the unregulated drug supply, experiences of PWUD and how this knowledge is shared:

- Expand the collection of data on the contents of drugs from the unregulated supply. This may include expansion of CUSP and investments in complementary data collection activities, such as drug checking services. CUSP has shown that expected and actual drug use vary over time and between regions, suggesting that local responses should be informed by timely and locally collected data.
- Harmonize data available across jurisdictions and report the information in a centralized, accessible manner, such as a public database of drug alerts (CCENDU, 2020a).
- Investigate how information about contents of drugs from the unregulated supply (e.g., drug alerts) can be more effectively and equitably communicated with PWUD, the people who are most directly affected by its unpredictability. Key considerations include using meaningful language and providing access to those without access to the internet, cellphones or other devices (Soukup-Baljak et al., 2015).
- Collect information on experiences of diverse groups of PWUD (e.g., by gender identity, sexual orientation, age, ethnicity, housing status) through quantitative and qualitative research to identify gaps and opportunities to reduce harms and promote equity.

PWUD should be involved in the conception, implementation and evaluation of these activities and compensated fairly for providing their expertise at each of these stages (CCSA, 2021).

Learn More About the Project

To learn more about CUSP (e.g., the project toolkit materials), visit https://ccsa.ca/urinalysis-and-self-reporting or email cusp-pcua@ccsa.ca. To learn more about local results that have been published by individual sites, refer to Appendix A.

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Appendix A: Site Profiles

B.C., Edmonton and Montreal participated in the pilot phase of the project in 2019. New sites that participated in 2020 and 2021 were recruited through substance use surveillance and service provision networks (e.g., CCENDU). A description of each site is provided below.

From west to east:

British Columbia: BC Centre for Disease Control

Data were collected October to December 2019 from urban and rural harm reduction supply distribution sites in all regional health authorities.

Additional publications, reports and infographics with results from surveys and urinalysis conducted in B.C. are available (BC Centre for Disease Control, n.d.). Additional results on the contents of drugs detected in 2019 are also available (Liu et al., 2022).

Edmonton, Alberta: Streetworks and University of Alberta

Data were collected in March 2019 from an urban site that provides harm reduction supplies and supervised consumption services.

Manitoba: Manitoba Harm Reduction Network (MHRN)

Data were collected January to March 2020 from one urban and two rural harm reduction supply distribution sites. Peer Advisory Council members facilitated the implementation. These members are people who use drugs and inform the MHRN's work related to substance use, harm reduction, community-based research, social determinants of health and other issues on an ongoing volunteer basis.

Additional reports and infographics with results from surveys and urinalysis conducted in Manitoba are available (MHRN, 2020).

Thunder Bay, Ontario: Lakehead University and NorWest Community Health Centres

Data were collected April to June 2021 from harm reduction organizations in south-core Thunder Bay offering a continuum of harm reduction and treatment services for PWUD.

Montreal, Quebec: Direction régionale de santé publique, Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l'Île-de-Montréal

Data were collected August to September 2019 from eight urban sites and September to October 2020 from 11 urban sites. Three sites provided supervised consumption services and all other sites provided harm reduction supplies only.

Laval, Quebec: Centre intégré de santé et de services sociaux de Laval

Data were collected February to March 2020 from a harm reduction organization.

Halifax, Nova Scotia: Nova Scotia Health Authority and Mainline Needle Exchange

Data were collected in January 2021 from a harm reduction organization in Halifax offering a continuum of harm reduction and treatment services for PWUD.

Appendix B: Tables

Table 1. Data collection sites and participants by region and data collection period, *n* (%)

Sites and participants	British Columbia, 2019	Edmonton, 2019	Montreal, 2019	Manitoba, 2020	Montreal, 2020	Laval, 2020	Thunder Bay, 2021	Halifax, 2021	Overall
Data collection sites	22 (44.90)	1 (2.04)	11 (22.45)	3 (6.12)	8 (16.33)	1 (2.04)	2 (4.08)	1 (2.04)	49 (100.00)
Participants	564 (36.96)	48 (3.15)	395 (25.88)	54 (3.54)	254 (16.64)	21 (1.38)	97 (6.36)	93 (6.09)	1,526 (100.00)

Table 2. Participants' gender identity, age group and previous month frequency of drug use

Demographic	British Columbia, 2019	Edmonton, 2019	Montreal, 2019	Manitoba, 2020	Montreal, 2020	Laval, 2020	Thunder Bay, 2021	Halifax, 2021	Overall
Gender identity	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Man	353 (62.59)	36 (75.00)	267 (67.59)	24 (44.44)	177 (69.69)	14 (66.67)	52 (53.61)	67 (72.04)	990 (64.88)
Woman	196 (34.75)	11 (22.92)	90 (22.78)	25 (46.30)	61 (24.02)	7 (33.33)	38 (39.18)	23 (24.73)	451 (29.55)
Trans man, trans woman, nonbinary/ gender nonconforming, prefer not to say, no answer[a]	15 (2.66)	1 (2.08)	38 (9.62)	5 (9.26)	16 (6.30)	0 (0.00)	7 (7.22)	3 (3.23)	85 (5.57)
Age group	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
18–24 years	52 (9.22)	0 (0.00)	21 (5.32)	1 (1.85)	5 (1.97)	0 (0.00)	2 (2.06)	3 (3.23)	84 (5.50)
25–34 years	132 (23.40)	10 (20.83)	108 (27.34)	14 (25.93)	61 (24.02)	4 (19.05)	24 (24.74)	19 (20.43)	372 (24.38)
35–44 years	158 (28.01)	10 (20.83)	102 (25.82)	21 (38.89)	85 (33.46)	5 (23.81)	29 (29.90)	27 (29.03)	437 (28.64)
45–54 years	134 (23.76)	14 (29.17)	110 (27.85)	13 (24.07)	55 (21.65)	7 (33.33)	21 (21.65)	21 (22.58)	375 (24.57)
55–64 years	69 (12.23)	11 (22.92)	42 (10.63)	3 (5.56)	43 (16.93)	4 (19.05)	4 (4.12)	15 (16.13)	191 (12.52)
65 years and over	9 (1.60)	0 (0.00)	6 (1.52)	1 (1.85)	4 (1.57)	1 (4.76)	3 (3.09)	4 (4.30)	28 (1.83)
Prefer not to say/no answer[b]	10 (1.77)	3 (6.25)	6 (1.52)	1 (1.85)	1 (0.39)	0 (0.00)	14 (14.43)	4 (4.30)	39 (2.56)
Frequency of drug use[c]	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Every day	366 (64.89)	— (—)	233 (58.99)	22 (40.74)	162 (63.78)	6 (28.57)	59 (60.82)	60 (64.52)	908 (61.43)
Few times a week	107 (18.97)	— (—)	119 (30.13)	11 (20.37)	67 (26.38)	10 (47.62)	15 (15.46)	23 (24.73)	352 (23.82)
Few times a month	41 (7.27)	— (—)	39 (9.87)	14 (25.93)	21 (8.27)	5 (23.81)	12 (12.37)	8 (8.60)	140 (9.47)
Prefer not to say/no answer	50 (8.87)	— (—)	4 (1.01)	7 (12.96)	4 (1.57)	0 (0.00)	11 (11.34)	2 (2.15)	78 (5.28)

[a] Gender minority includes people who identified as transgender men, transgender women, nonbinary, gender nonconforming, preferred not to say or did not answer.

[b] Montreal data for 2019 and 2020 reflects only no answer.

[c] Seven of eight sites (*n* = 1,478) included the survey question "In the last month, how often did you use drugs by any mode (excluding cannabis, alcohol and tobacco)?" Edmonton did not.

Table 3 Overall percentage of past three-day reported substance use and substance detection among participants

Drug	British Columbia, 2019	Edmonton, 2019	Montreal, 2019	Manitoba, 2020	Montreal, 2020	Laval, 2020	Thunder Bay, 2021	Halifax. 2021	Overall
Stimulants	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected
Cocaine/Crack[a]	40.25, 38.12	45.83, 27.08	74.43, 80.00	40.74, 33.33	72.05, 79.13	71.43, 76.19	80.41, 78.35	78.49, 76.34	59.83, 60.68
Methamphetamine/ Amphetamine[b]	73.76, 80.50	58.33, 70.83	39.75, 54.43	48.15, 44.44	36.22, 59.84	47.62, 61.90	39.18, 24.74	11.83 4.30	50.98, 60.29
Methamphetamine (crystal meth)	73.58, —	58.33, —	20.51, —	48.15, —	21.26, —	0.00, —	34.02, —	6.45, —	42.14, —
Speed	0.18, —	0.00, —	29.11, —	0.00, —	23.62, —	47.62, —	16.49, —	8.60, —	13.76, —
MDMA (ecstasy)	4.43, 0.89	0.00, 0.00	4.30, 3.04	3.70, 0.00	2.76, 5.12	0.00, 0.00	6.19, 3.09	3.23, 2.15	3.93, 2.29
Other synthetic stimulants	7.27, 3.19	6.25, 6.25	5.57, 3.80	3.70, 1.85	5.12, 5.91	0.00, 0.00	22.68, 9.28	20.43, 17.20	7.99, 5.05

continued

Table 3 (continued)

Site region	British Columbia, 2019	Edmonton, 2019	Montreal, 2019	Manitoba, 2020	Montreal, 2020	Laval, 2020	Thunder Bay, 2021	Halifax. 2021	Overall
Opioids	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected
Buprenorphine/ Naloxone	4.08, 5.67	4.17, 2.08	3.54, 3.54	7.41, 9.26	3.54, 1.57	0.00, 0.00	21.65, 15.46	16.13, 12.90	5.77, 5.44
Fentanyl[c]	44.33, 54.26	29.17, 29.17	2.53, 9.87	0.00, 3.70	10.63, 20.08	0.00, 0.00	41.24, 46.39	3.23, 1.08	22.54, 30.01
Heroin/Morphine[d]	47.52, 39.89	45.83, 45.83	31.65, 22.78	20.37, 9.26	29.53, 31.10	0.00, 4.76	41.24, 31.96	18.28, 21.51	36.57, 31.00
Heroin	43.79, —	20.83, —	21.77, —	1.85, —	22.44, —	0.00, —	27.84, —	0.00, —	28.05, —
Morphine	11.70, —	35.42, —	15.44, —	18.52, —	14.96, —	0.00, —	24.74, —	18.28, —	15.27, —
Hydromorphone	2.66, 10.99	35.42, 52.08	26.08, 16.71	12.96, 20.37	28.74, 20.47	0.00, 0.00	12.37, 7.22	29.03, 30.11	16.64, 16.45
Methadone	22.34, 21.45	6.25, 6.25	23.04, 25.57	3.70, 5.56	18.11, 20.08	4.76, 4.76	36.08, 39.18	40.86, 43.01	22.41, 23.46
Oxycodone	1.24, 0.18	10.42, 2.08	1.52, 0.76	1.85, 3.70	0.39, 0.39	0.00, 0.00	18.56, 3.09	2.15, 0.00	2.62, 0.72
Other Depressants	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected	Reported, detected
Benzodiazepines	13.30, 4.61	22.92, 27.08	16.46, 13.42	11.11, 24.07	11.42, 18.90	0.00, 0.00	25.77, 59.79	31.18, 37.63	15.73, 16.12

Note. — = Urine toxicology screening cannot distinguish methamphetamine and speed, nor heroin and morphine.

[a] Cocaine and crack cannot be distinguished by urine toxicology screening. Survey responses to “cocaine (powder)” and “crack/freebase” were combined to facilitate comparison.

[b] Methamphetamine use may lead to the presence of both methamphetamine and amphetamine in urine. Speed is not associated with a specific toxicological profile, but it may contain methamphetamine or other amphetamines and contribute to their detection. Reported use of methamphetamine or speed have been combined to facilitate comparison.

[c] Detection of fentanyl includes fentanyl analogs (e.g., carfentanil).

[d] Detection of heroin and morphine use were combined because the direct metabolite of heroin (6-monoacetylmorphine) clears rapidly from urine, after which it is difficult to discern heroin from morphine use. Reported use of heroin and morphine were combined to facilitate comparison.

Table 4. Percentage of participants who did not report using the substances that were detected in their urine (i.e., unexpected use)

Drug	British Columbia, 2019	Edmonton, 2019	Montreal, 2019	Manitoba, 2020	Montreal, 2020	Laval, 2020	Thunder Bay, 2021	Halifax, 2021	Overall
Stimulants	%	%	%	%	%	%	%	%	%
Cocaine/Crack	41.40	23.08	11.71	11.11	13.93	6.25	9.21	8.45	18.68
Methamphetamine/ Amphetamine	11.89	17.65	35.81	12.50	44.08	23.08	16.67	100.00[a]	23.70
MDMA	40.00[a]	—	33.33	—	61.54	—	66.67[a]	0.00[a]	45.71
Other synthetic stimulants	33.33	66.67[a]	40.00	0.00[a]	46.67	—	44.44	31.25	38.96
Opioids	%	%	%	%	%	%	%	%	%
Buprenorphine/ Naloxone	40.63	100.00[a]	35.71	20.00[a]	0.00[a]	—	20.00	0.00	27.71
Fentanyl	23.20	21.43	92.31	100.00[a]	54.90	—	26.67	100.00[a]	33.41
Heroin/Morphine	16.89	27.27	6.67	40.00[a]	21.52	100.00[a]	48.39	35.00	19.45
Hydromorphone	91.94	36.00	3.03	36.36	1.92	—	57.14	14.29	32.27
Methadone	14.05	0.00[a]	11.88	66.67[a]	11.76	0.00[a]	7.89	5.00	11.73
Oxycodone	100.00[a]	0.00[a]	33.33[a]	100.00[a]	100.00[a]	—	100.00[a]	—	72.73
Other Depressants	%	%	%	%	%	%	%	%	%
Benzodiazepines	34.62	38.46	33.96	76.92	58.33	—	67.24	28.57	48.37

Note. Percentages represent the number of participants who did not report using the substance in the previous three days that was detected divided by the number of participants whose urine contained the substance. The percentage of participants who did report use of the substance detected (i.e., expected use) can be calculated by subtracting the values shown from 100. For instance, 58.60% of participants in British Columbia who had cocaine/crack detected in their urine reported its use.

— = Substance not detected.

[a] Substance detected among ≤5 participants overall; interpret with caution.

Table 5. Percentage of participants whose urine did not contain the substances they reported they used in previous three days

Drug	British Columbia, 209	Edmonton, 2019	Montreal, 2019	Manitoba, 2020	Montreal, 2020	Laval, 2020	Thunder Bay, 2021	Halifax, 2021	Overall
Stimulants	%	%	%	%	%	%	%	%	%
Cocaine/crack	44.49	54.55	5.10	27.27	5.46	0.00	11.54	10.96	17.61
Methamphetamine/ amphetamine	3.85	0.00	12.10	19.23	7.61	0.00	47.37	100.00	9.77
MDMA	88.00	—	52.94	100.00[a]	28.57	—	83.33	33.33[a]	68.33
Other synthetic stimulant	70.73	66.67[a]	59.09	50.00[a]	38.46	—	77.27	42.11	61.48
Opioids	%	%	%	%	%	%	%	%	%
Buprenorphine/ naloxone	17.39	100.00[a]	35.71	0.00[a]	55.56	—	42.86	20.00	31.82
Fentanyl	6.00	21.43	70.00	—	14.81	—	17.50	100.00[a]	11.34
Heroin/morphine	30.22	27.27	32.80	72.73	17.33	—	60.00	23.53	31.72
Hydromorphone	66.67	5.88	37.86	0.00	30.14	—	75.00	11.11	33.07
Methadone	17.46	0.00[a]	2.20	50.00[a]	2.17	0.00[a]	0.00	0.00	7.60
Oxycodone	100.00	80.00[a]	66.67	100.00[a]	100.00[a]	—	100.00	100.00[a]	92.50
Other depressants	%	%	%	%	%	%	%	%	%
Benzodiazepines	77.33	27.27	46.15	50.00	31.03	—	24.00	13.79	47.08

Note. Percentages represent the number of participants whose urine did not contain the substance they reported they used divided by the number of participants who reported using the substance in the previous three days. The percentage of participants whose urine did contain the substance they reported they used in the previous three days can be calculated by subtracting the values above from 100. For instance, cocaine/crack was detected among .55.51% of participants in B.C. who reported use.

— = Substance not reported used in the previous three days.

[a] Substance reported used by ≤5 participants overall; interpret with caution.

Table 6. Percentage of past three-day reported polysubstance use

Drugs	British Columbia, 2019	Edmonton, 2019	Manitoba, 2020	Laval, 2020	Thunder Bay, 2021	Halifax, 2021	Overall
Opioid and stimulant use[a]	55.32	47.92	24.07	4.76	72.16	63.44	54.50
Opioid and benzodiazepine use[b]	8.87	16.67	3.70	0.00	26.80	29.03	12.88

Note. Percentages represent the number of respondents divided by the sample size for each site. Data from Montreal for 2019 and 2020 were not available.

[a] At least one opioid and one stimulant, which includes any of: methamphetamine (crystal meth), speed, other synthetic stimulant, MDMA, cocaine, or crack/freebase.

[b] At least one benzodiazepine and one opioid, which includes any of: methadone, buprenorphine, morphine, hydromorphone, oxycodone, fentanyl, or heroin.