Substance Drug Checking

Annual Review 2022

Substance Drug Checking delivers drug checking services in Campbell River, the Comox Valley, Duncan, Port Alberni, and Victoria, BC. Our service has been operating in partnership with SOLID Outreach, AVI Health and Community Services, Port Alberni Shelter Society, Vancouver Island Mental Health Society, Duncan Lookout Housing and Health Society, Vancouver Island University, and the Island Health Authority. This free and confidential service provides information on substance composition and harm reduction information.

6239

Samples Tested
Jan 1-Dec 31 2022

Highlighted findings:

- Fentanyl continues to be the most common opioid found within the opioid–down supply with 92% of down samples containing fentanyl across all service locations on Vancouver Island. The median fentanyl concentration found in down samples checked across all service locations was 11.0%.
- 2022 saw an increase in the prevalence of fluorofentanyl. 4% of down samples contained fluorofentanyl in January and 62% of down samples containing fluorofentanyl by December. The median fluoroentanyl concentration found in down samples checked across all service locations was 2.7%.
- Benzodiazepines and/or etizolam were detected in 48% of down samples. Bromazolam replaced etizolam as the most common benzodiazepine found within the down supply by the end of 2022.
- The prevalence of xylazine in down samples peaked in June, when 18% of down samples contained xylazine. By the end of the year, xylazine was found in only 3% of down samples. The median xylazine concentration found in opioid–down samples checked across all service locations was 0.6%.
- Outside of opioid–down samples, unexpected opioids were found most frequently in samples expected to be oxycodone (20%), benzodiazepines (10%), and methamphetamine (5%). Unexpected opioids were only detected in 1(0.1%) MDMA sample and in 1 (0.3%) ketamine sample. No unexpected opioids were detected in samples expected to contain psychedelics or prescription stimulants.
- Samples expected to be benzodiazepines showed the highest level of misrepresentation, with 68% of benzo samples containing an unexpected benzo. No unexpected active drugs were detected in 90% of dissociatives, 83% of methamphetamine, 80% of cocaine, and 78% of MDMA/MDA samples.

Substance Drug Checking

Annual Review 2022

Land Acknowledgment

Our project works on Indigenous land. We provide drug checking, harm reduction education and support across many territories on what is colonially known as 'Vancouver Island.' We also act as a resource for these services across the province colonially known as 'British Columbia.' We honour and offer respect to many nations for their stewardship, care and leadership on these lands.

Our project originated on the territories of the lək̓ʷəŋən speaking peoples, including the Songhees and Xwsepsum (Esquimalt) Nations, and the W̱SÁNEĆ (Saanich) Nations on whose land the University of Victoria is located. Some of the territories we are honoured to work across specifically include: Halalt, Lyackson, Meluxulh (Malahat), Puneluxutth', Quw'utsun, Stz-uminus, and Ts'uubaa-asatx; Hupačasath and Tseshaht; K'ómoks; and Laich-kwil-tach.

We acknowledge the inextricable links between research, colonization and racism against Indigenous peoples, which continue to this date. Ending the violence faced by people who use drugs cannot be achieved without actively working on decolonization. We also recognize that as the majority of our staff are not Indigenous there is much more work for us to do to challenge the settler lens and colonial framework. This includes learning and growing relationships in order to take an anti-colonial and inclusive approach to the work we do.

This map was sourced from https://sogdatacentre.ca/wp-content/uploads/BC-Aboriginal-Group-around-Strait-of-Georgia.gif

Substance Drug Checking

Annual Review 2022

Narrative Report

Substance Drug Checking, formerly known as the Vancouver Island Drug Checking Project, has made the shift from pilot status to a well-established community resource that continues to grow and engage with communities across Vancouver Island and beyond. As the crisis of toxic drug deaths continues unabated, drug checking remains a critical, community-level response, enabling the timely circulation of life-saving information, and fostering innovation in science and harm reduction practice. Beyond the crisis, we continue to envision and work towards a world where drugs and their use are revered for the healing, creative, expansive possibilities they offer to us as autonomous beings-in-community.

Our central hub in the North Park neighbourhood of Victoria remains a vibrant and busy place. Here, we welcome people to access in-person drug checking and information, including comprehensive drug sample analytics using a variety of technologies. We also receive samples that arrive by mail and through outreach conducted by Substance staff and partner organizations. Increasingly, we receive samples for confirmatory analysis from our growing network of distributed sites across Vancouver Island. In June 2022, our Substance hub checked a record number of 610 samples in one month and then topped that in September 2022 with 678 samples.

- 6239 total samples checked - a 244% increase in the number of samples checked in 2021, and more than half of the total samples checked since the beginning of the project in 2018
- 415 envelopes opened from distributed sites, mail-in and outreach, containing a total of 723 samples

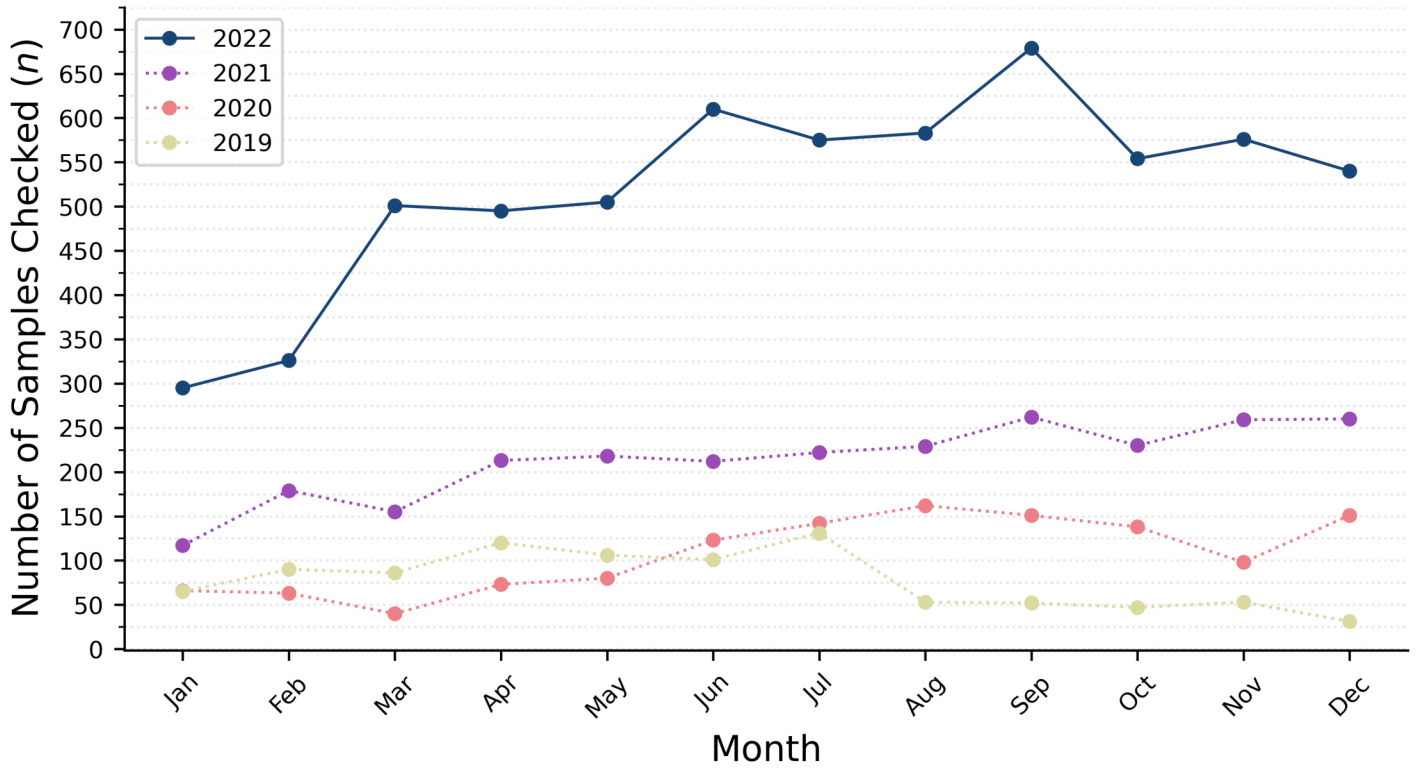

Figure 1. Number of samples checked by month between 2019 and 2022, across all service locations.

Substance Drug Checking

Annual Review 2022

This year, we took the opportunity to lengthen the spokes of our Substance hub in Victoria and significantly expand drug checking capacity across the Island. Utilizing the BC Ministry of Health's authorization to operate Urgent Public Health Need Sites (UPHNS), we've established drug checking services within UPHNS and other harm reduction services in four additional Vancouver Island communities. Staff at these sites receive training and ongoing support to provide drug checking using immunoassay test strips and infrared absorption spectroscopy, and Substance technicians in Victoria use our paper spray mass spectrometer (PS-MS) to generate more comprehensive and confirmatory information on each sample to send back to service users at the originating sites. We are thrilled to partner with Overdose Prevention Sites operated by the Port Alberni Shelter Society, the Vancouver Island Mental Health Society in Campbell River, and Lookout Housing and Health Society in the Cowichan Valley, as well as AVI Health and Community Services in the Comox Valley, to mitigate risk through drug checking and to report on regional drug supply trends. 34 people across the distributed sites completed the full training required to collect samples and operate the FTIR spectrometer, and were able to provide drug checking services in their communities. We continue to seek new partnerships to expand and provide these critical harm reduction services.

Service Model / Location	Number of Samples Checked in 2022	Number of Samples Checked in 2021
Campbell River	**75**	14
Comox Valley	**61**	15
Duncan	**22**	21
Port Alberni	**134**	35
Outreach	**980**	133
Substance	**4967**	2338
Total samples checked	**6239**	2556

Table 1. Number of samples checked by service location in 2022 and 2021.

UPHNS sanctioning has also allowed us to continuing offering pop-up drug checking in other communities through pop-up drug checking and at festivals:

Event Name	Event Date(s)	Event Location	Service Users	Samples Checked
Weekend at Lampress	April 23, 2022	Lake Cowichan, BC	14	21
Otherworld	June 16 - 19, 2022	Lake Cowichan, BC	45	65
Phillips Backyard - Implosion Explosion	August 13 - 14, 2022	Victoria, BC	9	9
Plants 'N Animals	August 19, 2022	Lake Cowichan, BC	2	2
Cumberland Wild	August 19 - 20, 2022	Cumberland, BC	11	18
Summer Social	August 27, 2022	Lake Cowichan, BC	11	19
Rifflandia	September 15 - 18, 2022	Victoria, BC	43	56
		Total	**135**	**190**

Table 2. Number of samples checked at festivals and events in 2022. These samples are included in Outreach samples throughout the remainder of this document.

When conducting a sample intake, we collect information on whether or not a service user has accessed any drug checking service before, whether that is our service or any other drug checking service. For most events we attended in 2022, a majority of the service users had not accessed a drug checking service before, and across all events, 60% (79/131) of service users who responded to the intake survey were new to drug checking. Compared to the data collected at our storefront in 2022, only 25% (676/2750) of those service users were new to drug checking. These data suggest that offering drug checking at events is a viable method to expand the reach and accessibility of drug checking, especially to new service users.

Our thanks to the Sooke Shelter Society, the Nanaimo Area Network of Drug Users, NARSF Programs and Island Health for partnering with us on pop-up drug checking events this year and we are eager for the future collaborations to come.

We are acutely aware of the need to stay current and be as proactive as possible when it comes to reporting drug trends within the unregulated, toxic drug market. We are thankful to have our PS-MS serving a broader number of communities as its versatility allows us to add new compounds as they emerge. In Spring 2022, we added four new benzodiazepines to our targeted method on the PS-MS. Benzodiazepines continue to be inextricably entwined with the opioid/down supply and we know that this has shown to be deadly and cause overdose response to be much more complicated.

We have also noted the increasing frequency of Xylazine, sometimes referred to as 'tranq,' showing up in opioid/down samples. Criminalization and stigma suppress access to accurate information and as is often the case when an unfamiliar drug starts to appear with more frequency, there is some confusion, misinformation, and fear about Xylazine in the community. Harm reduction practice is to respond to fear with honest, factual information, and in September we published a bulletin about Xylazine in addition to our usual monthly report.

The harmful and deadly impacts of prohibition, criminalization and the unregulated market continue. We continue to mourn the loss of our friends, family and community members. At Substance, we know broad access to a full range of safer supply options would save lives. Many people who use drugs face interconnected social inequities and this means that earning trust as harm reduction service providers is something we aim to practice with care and consistency. We do this by being honest about drugs and about the strengths and limitations of various drug checking technologies and analyses. We talk about our own experiences with drugs and we share information about risks and benefits of drugs and drug taking. We don't engage in fear tactics or moral judgements; rather we share the facts, science, and experience rooted in our shared commitment to social justice, community care, and health equity. In all of our communications, whether they be in-person while awaiting a test strip result, through our academic publications, or in our social media posts, we aim to build trust and share accurate information so that we may each make informed and educated choices for ourselves. We also share our joy, our inspiration, our creativity and our solidarity, and we thank you for being in community with us.

What were people bringing to be checked?

Service users bring us a wide variety of substances that can be grouped into different drug classes. The donut chart below aggregates the total number of samples we checked by their *expected* substance (i.e. the drug category reported by the service user), inclusive of all service locations. The consistent access of multiple drug categories through the entire year and across the island demonstrates the continued need for both universal and population-targeted approaches to drug checking services and the accessibility of services.

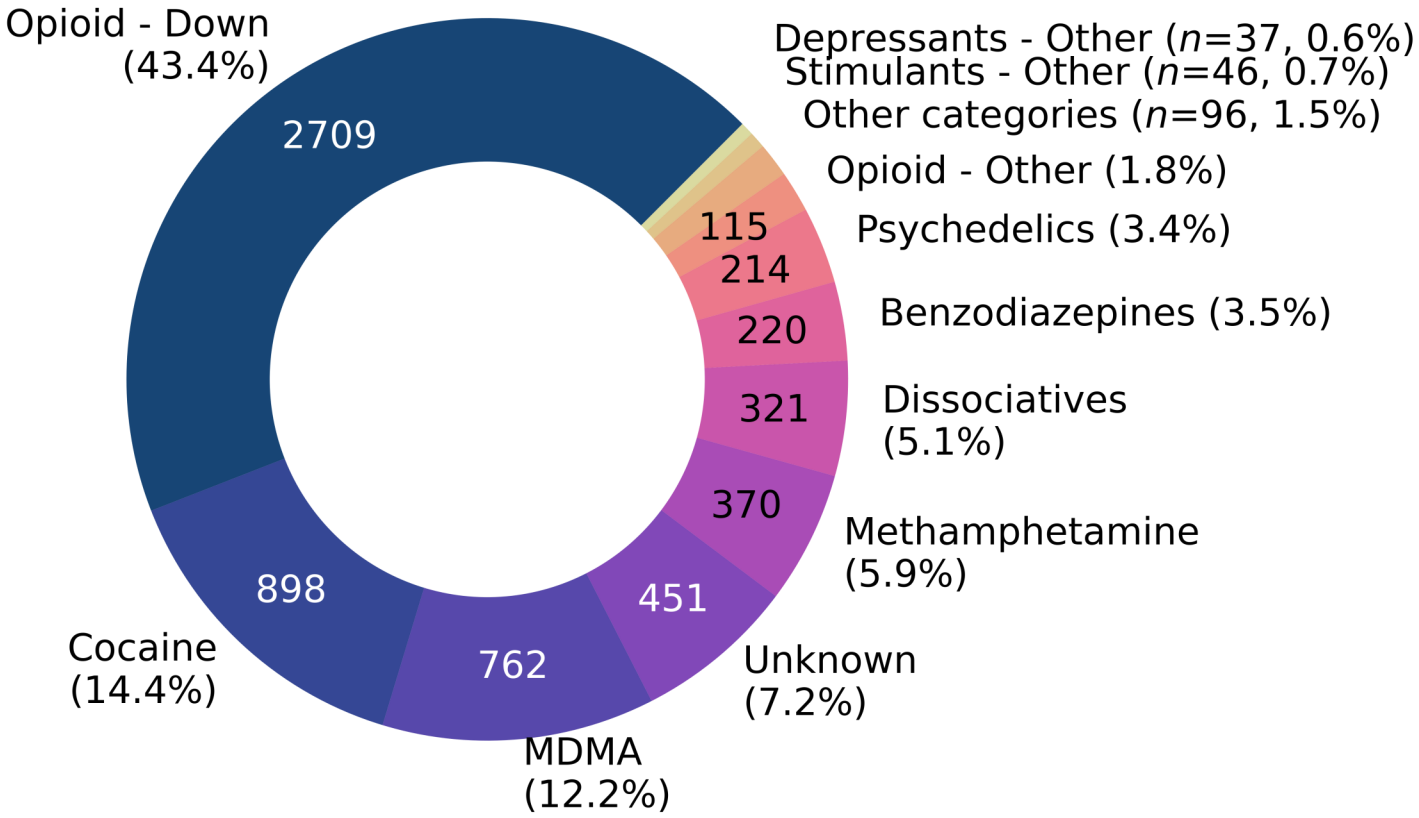

Figure 2. Number and proportion of samples checked by expected drug class, across all service locations.

Some example[1] drugs within each class are as follows: **Opioid- Down**: fentanyl, fluorofentanyl, other fentanyl analogues, heroin. **Cocaine:** cocaine HCl (powder/soft), cocaine base (crack/hard/rock). **MDMA:** MDMA, MDA. **Dissociative**: ketamine, novel dissociatives like DMXE. **Benzodiazepine**: alprazolam (Xanax), bromazolam, diazepam (Valium), etizolam. **Psychedelics:** 2C-B, DMT, LSD. **Opioid-Other:** hydromorphone (Dilaudid), oxycodone. **Stimulant–other:** 3-MMC, Adderall, methylphenidate (Ritalin). **Depressant-Other:** GHB. **Other categories:** cannabis products, steroids, novel "designer drugs." **Unknown:** samples where the expected drug was not known by the service user.

[1]*This list is not comprehensive to every expected drug within each sub-category.*

What were people getting checked by location?

The expected substance data presented on previous page can be separated by sample collection location/method. Each site shows its own unique proportion of the types of samples checked, and these differences are based partially on the type of site that is offering drug checking (OPS vs. storefront), on community engagement with the service, and on the regional markets overall. Regardless of the type of service offering drug checking, drugs representing the full suite of drug classes are seen across Vancouver Island.

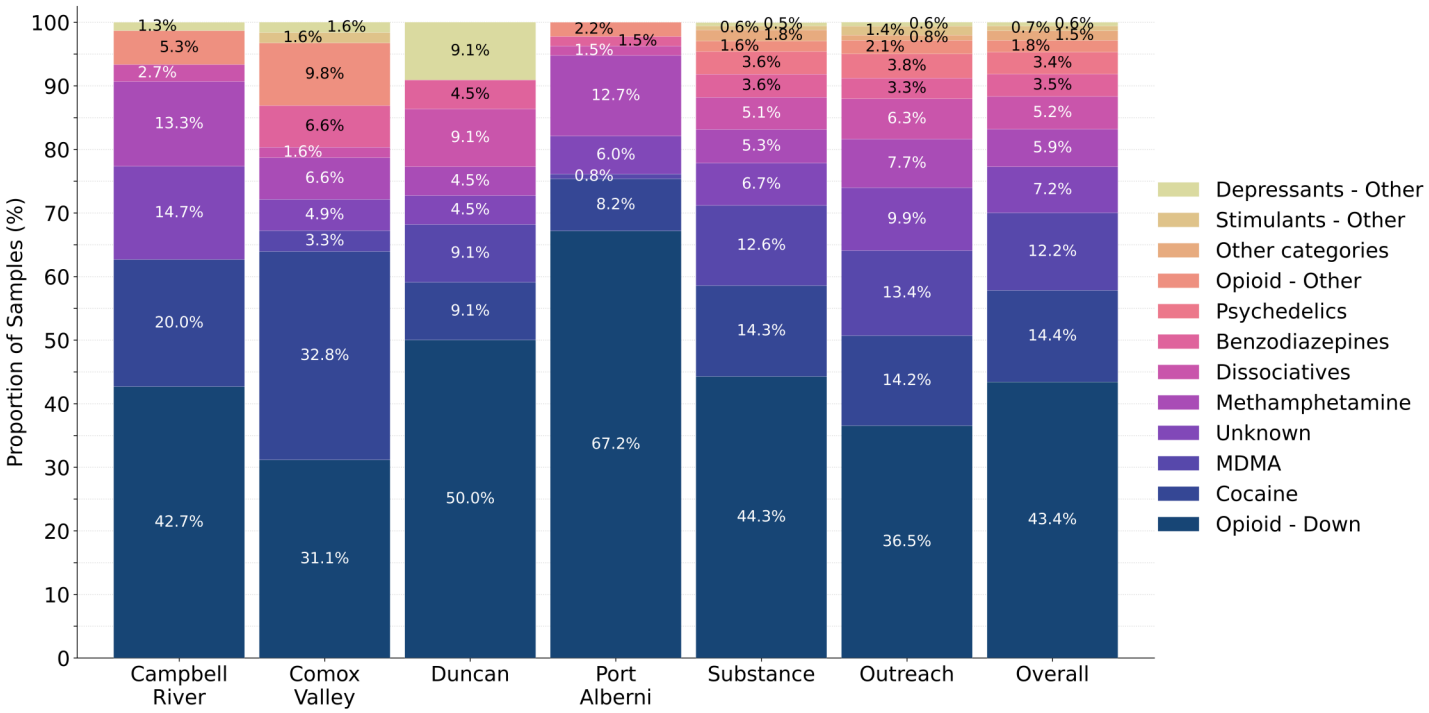

Figure 3 / Table 3. Proportion and number of samples checked by expected drug class and service location.

Expected Substance	Campbell River	Comox Valley	Duncan	Port Alberni	Substance	Outreach	Overall
Opioid–down	32	19	11	90	2199	358	2709
Cocaine (HCl or Base)	15	20	2	11	711	139	898
MDMA		2	2	1	626	131	762
Methamphetamine	10	4	1	17	263	75	370
Dissociatives	2	1	2	2	252	62	321
Benzodiazepines		4	1	2	181	32	220
Psychedelics					177	37	214
Opioid - Other	4	6		3	81	21	115
Stimulants - Other		1			31	14	46
Depressants - Other	1	1	2		27	6	37
Other					88	8	96
Unknown/Missing	11	3	1	8	331	97	451
Total samples checked	75	61	22	134	4967	980	6239

Definitions of Composition Classes

All samples, regardless of expected substance or service location, are checked using all[1] analytical techniques to determine what active ingredients, adulterants, and cutting agents were present. Samples are then grouped into the following categories based on the composition we found in relation to the expected substance:

- ***"Expected Active Only":*** samples that were as expected with no other notable[2] compounds detected[3]
    - Example: An expected MDMA sample that was found to be MDMA with no cuts or adulterants detected
- ***"Expected + Unexpected Actives":*** samples that contained the expected drug *and* unexpected active compounds
    - Example: An expected cocaine sample that was found to contain cocaine and levamisole
- ***"Unexpected Active Only"*** are samples that contained an unexpected active but the expected drug was not found
    - Example: An expected alprazolam (Xanax) sample that was found to be flualprazolam instead
- ***"No actives found"*** are the samples where no active compounds were detected[3]
    - Example: An expected hydromorphone (Dilaudid) tablet that was found to be a sugar pill

[1]Some samples are too sparse to run all tests, in which case the instrument best suited for the analysis of that particular drug class is prioritized.

[2]"Active" or "notable" compounds are those which produce a psychoactive effect or are pharmacologically relevant (may have the potential for unexpected effects). While psychoactive/pharmacologically relevant, caffeine is an exception that is considered an "inactive cut" in our reporting.

[3]See limitations below

Limitations

There are limitations to a drug checking result based on the technologies used, the analysis methods implemented, and the nature of the sample itself. The immunoassay strip tests used to detect fentanyl analogues and benzodiazepines are remarkably sensitive, but they are not tailored to detect all known analogues, nor are the concentration cut-offs consistent between different analogues. For example, etizolam, while often included with benzodiazepines is in fact a thienodiazepine derivative and has limited reactivity with benzodiazepine strip tests. Some compounds like benzodiazepines, cocaine base, and fluorofentanyl base also have poor water solubility which affects the reliability of strip test results when examining these samples.

FTIR has four primary limitations in the context of our service: a relatively high limit of detection, incomplete spectral reference libraries, challenges when analyzing mixtures, and non-quantitative results. The limit of detection for FTIR is around 5% (weight/weight) meaning low concentration compounds in a sample may not be detected on FTIR. Compound identification on FTIR relies on reference libraries - databases of FTIR spectra for drugs. Our spectral libraries are not exhaustive, especially for new/novel compounds and some pharmaceuticals. Samples containing multiple components present a challenge for FTIR as the mixture signal becomes increasingly difficult to interpret; we often limit our FTIR mixture analysis to 3-5 compounds and FTIR does not produce validated concentration estimates of compounds in a mixture. Finally, organic samples like cannabis and mushrooms are not suited for analysis on FTIR as the complex signal from organic material obfuscates the spectrum.

Continued on next page.

Limitations - *continued*

Paper spray mass spectrometry (PS-MS) is used to alleviate some of the aforementioned hurdles, but comes with limitations of its own. We primarily operate the PS-MS in using a targeted method meaning we scan every sample for a specific list of compounds. The current targeted method contains 105 different drugs spanning a wide range of drug classes. The list of compounds included in our targeted method can be found here:

PS-MS Targeted Compounds: https://substance.uvic.ca/paperspray

The sensitivity in detecting compounds on this list (the limit of detection) varies by compound, but most compounds can be detected in samples down to 0.1% (weight/weight). In addition to being able to *detect* compounds at low concentration, the targeted method allows us to *quantify* these compounds in a sample as well. The targeted method is calibrated over a large range of concentrations spanning around 0.1% to 80% (weight/weight) for most compounds, though some drugs like etizolam have an upper limit of quantitation set to 25%. If a sample contains a higher concentration of a compound than the PS-MS limits of quantitation, then only the upper limit will be reported. For example, the upper limit of quantitation for fentanyl on the PS-MS is 80% - any sample containing more than 80% fentanyl will be flagged as “>80%”. Compounds not on the list can usually be identified through untargeted analysis by their precursor and/or product ions However, PS-MS cannot elucidate chemical structure and compounds that are isobaric (have the same mass) or are structurally similar to other compounds are difficult to differentiate. Concentrations cannot be provided for compounds detected through this untargeted analysis . Some drugs like GHB, steroids, sugars, and oils do not ionize consistently on PS-MS meaning we cannot analyze these samples to identify the compound.

Purity analysis is outside of the scope of our service and is beyond the capabilities of our instruments. “No cuts detected” certainly does not mean “pure”. Purity, in a chemical sense, could be defined as the lack of impurities. Impurities could exist from the synthesis process where there are unintentional byproducts, leftover alkaloids, and residual precursors and solvents, could arise as breakdown products from storage and handling conditions, and could be intentionally added cutting agents or adulterants. Considering many possible sources of impurities, there is a massive list of compounds that could be present in sample but many of these compounds may be present in such trace levels that we are unable to detect them on our instruments. Even with PS-MS, where detection could be possible, the list of possible impurities to screen for is massive and the process to identify and quantify them would require extensive method development beyond the objectives/capabilities of our point-of-care service.

Results

Opioid–down

Opioid–down or just "down" describes samples that are expected to be fentanyl, fentanyl analogues, and/or heroin. Given the ongoing high prevalence of benzodiazepines within the down supply, "benzo-down" is an increasingly reported sub-category of down, describing samples that are expected to contain both an opioid and a benzodiazepine. The rapidly changing nature of the down supply, the ubiquity of low concentration, potent synthetic compounds, and the frequency of unexpected polysubstance mixtures means that a majority of service users with down samples are seeking both trace compound *detection* and *quantification.* Opioid–down is the most prevalent expected substance class that we check across all locations and makes up around 30%-70% of the samples that we check, depending on service location (see Fig. 3 on page 7).

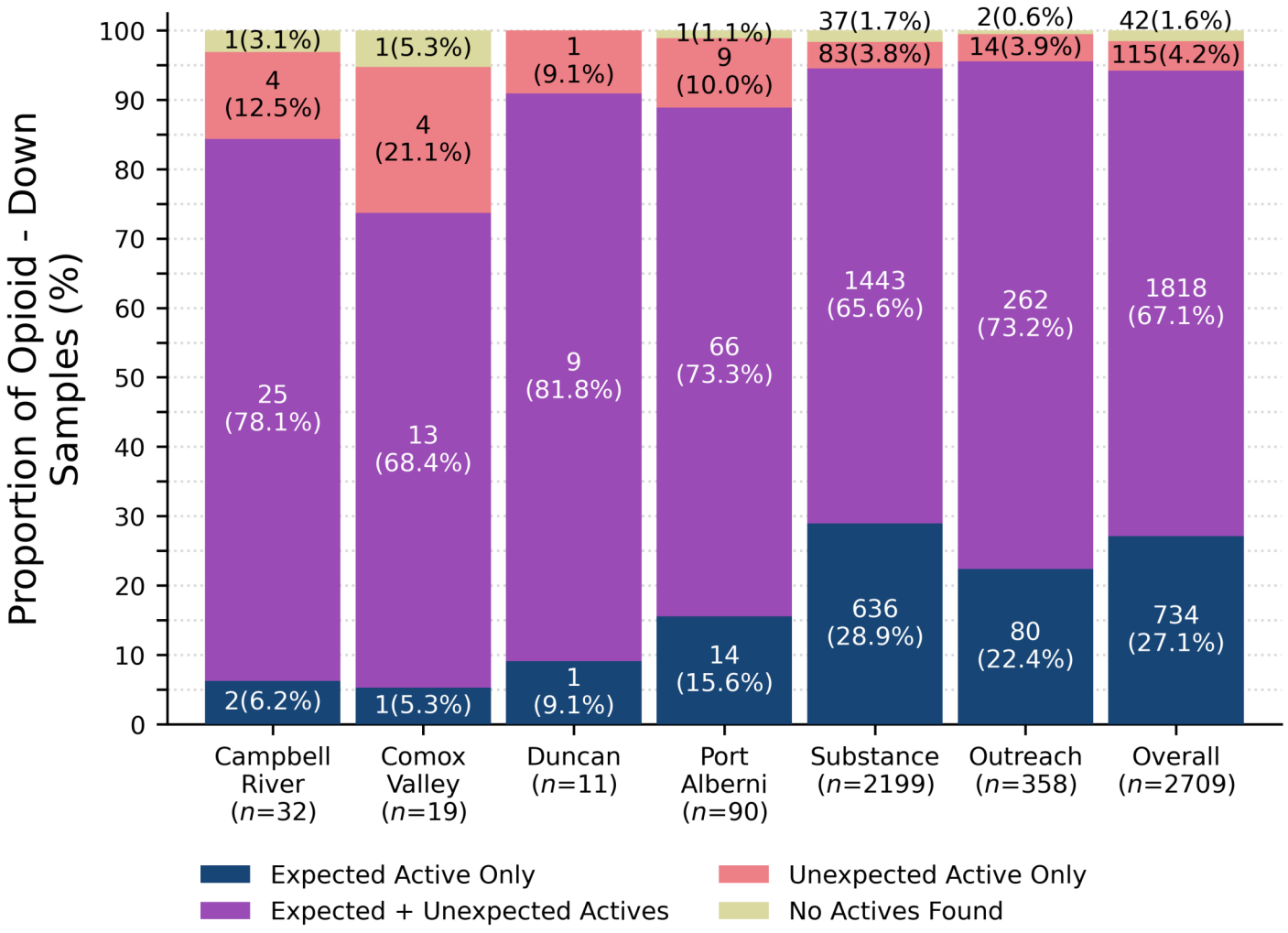

Figure 4. Proportion and number of opioid -down samples checked by service locations, grouped by composition class (see page 9 for definitions).

Opioid–down: Benzodiazepines, Fentanyl Analogues, and Xylazine

The unregulated opioid–down supply shows the highest level of adulteration compared to the other drug classes that we check. 67% of down samples contained the expected active (fentanyl or heroin) *in addition* to other unexpected actives. 4.2% of down samples did not contain the expected active and were found to contain other drugs instead. Three primary categories of drugs that constituted the majority of unexpected actives that found within the down supply: benzodiazepines, fentanyl analogues (most notably fluorofentanyl), and xylazine.

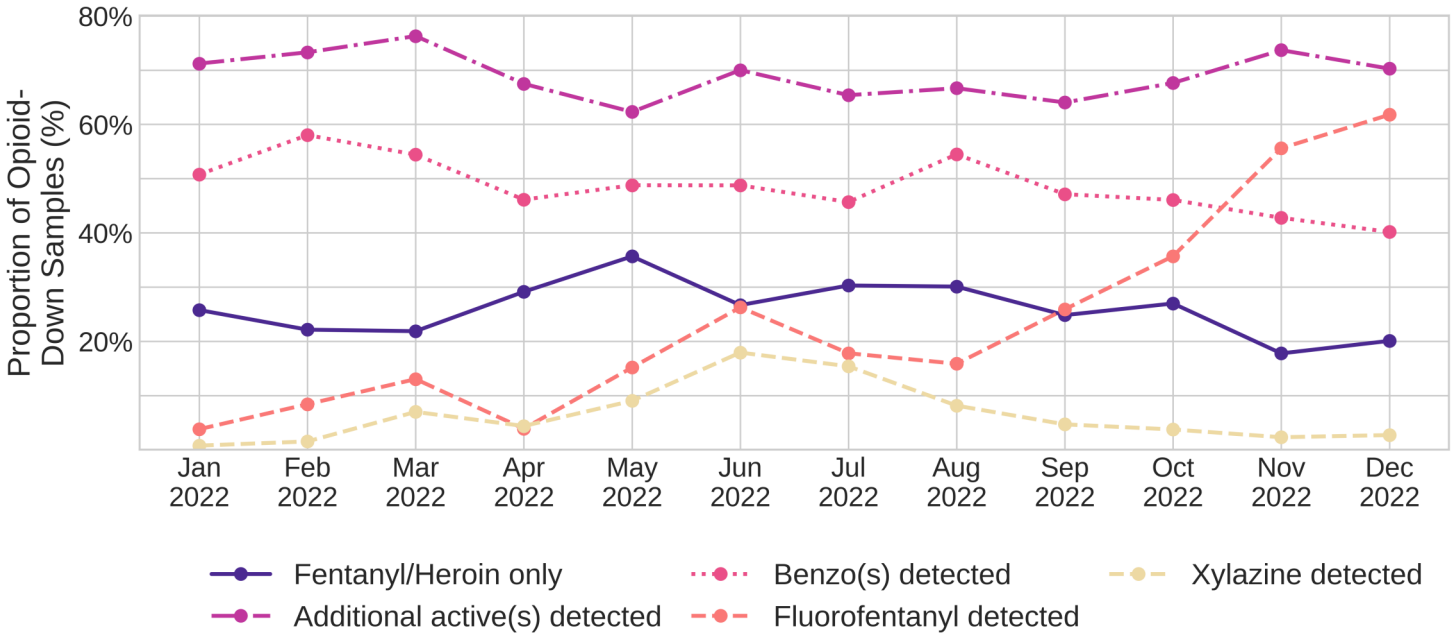

Figure 5. The percentage of expected opioid–down samples checked in 2022 that contained fentanyl/heroin as the only detected actives (solid dark purple), opioid–down samples with an additional active detected (dot-dashed magenta), opioid–down samples that contained benzodiazepine-related drugs (dotted pink), opioid–down samples that contained fluorofentanyl (dashed salmon), and opioid–down samples that contained xylazine (dashed yellow). Data are inclusive of all service locations.

Fluorofentanyl was the most common fentanyl analogue detected within the opioid–down supply in 2022 found in 27% of down samples. Fluorofentanyl exists as three different isomers: *ortho*-, *meta*-, and *para*-fluorofentanyl. While the PS -MS is not selective for the different isomers, based on the FTIR spectra of high concentration fluorofentanyl samples, we reason that a majority, if not all, of the fluorofentanyl detected is the *para*-fluorofentanyl isomer. Service users report that samples containing fluorofentanyl feel as strong, if not stronger, than fentanyl, while literature regarding the strength of fluorofentanyl is limited and variable, with studies reporting *para*-fluorofentanyl to be slightly weaker to as strong as fentanyl[1,2,3]

Xylazine (“tranq”) is a veterinary tranquilizer. There is little research on the effects of xylazine in humans but it is believed to have synergistic effects regarding respiratory depression when used with opioids and benzos, contributing to complex overdoses. The highest prevalence of xylazine in down was seen in June 2022 where 18% of down samples contained xylazine. The prevalence of xylazine decreased throughout the year, settling around 3% by December.

[1] ***In vitro pharmacology of fentanyl analogs at the human mu opioid receptor and their spectroscopic analysis.*** *Hassanien et al., Drug Test Anal. 2020; 12: 1212–1221. https://doi.org/10.1002/dta.2822*

[2] ***Toxicological Analysis of Fluorofentanyl Isomers in Postmortem Blood.*** *Truver, MT, et al., Journal of Analytical Toxicology. 2020; 46: 8: 835–843. https://doi.org/10.1093/jat/bkac014*

[3] ***Fentanyl analog structure-activity relationships demonstrate determinants of diverging potencies for antinociception and respiratory depression.*** *Varshneya et al., Pharmacol Biochem Behav. 2023; 226: 173572. https://doi.org/10.1016/j.pbb.2023.173572*

Opioid–down: Benzodiazepines

"Benzo-down" is not new to 2022 and the prevalence of benzodiazepines in the down supply remained high throughout the year: 48.4% of all opioid–down samples checked in 2022 contained a benzodiazepines, averaged across all locations. This is a 9% decrease in the prevalence of "benzo-down" compared to 2021. August showed the highest prevalence of benzodiazepines (66.4%) while December had the lowest proportion of benzo-positive down samples (41.3%). By region, Campbell River showed the highest level of benzodiazepine adulteration with 91% (29/32) of opioid–down samples containing benzodiazepines; samples checked at Substance showed the lowest degree of benzodiazepine positivity with 46% (1010/2199) of down samples containing benzodiazepines.

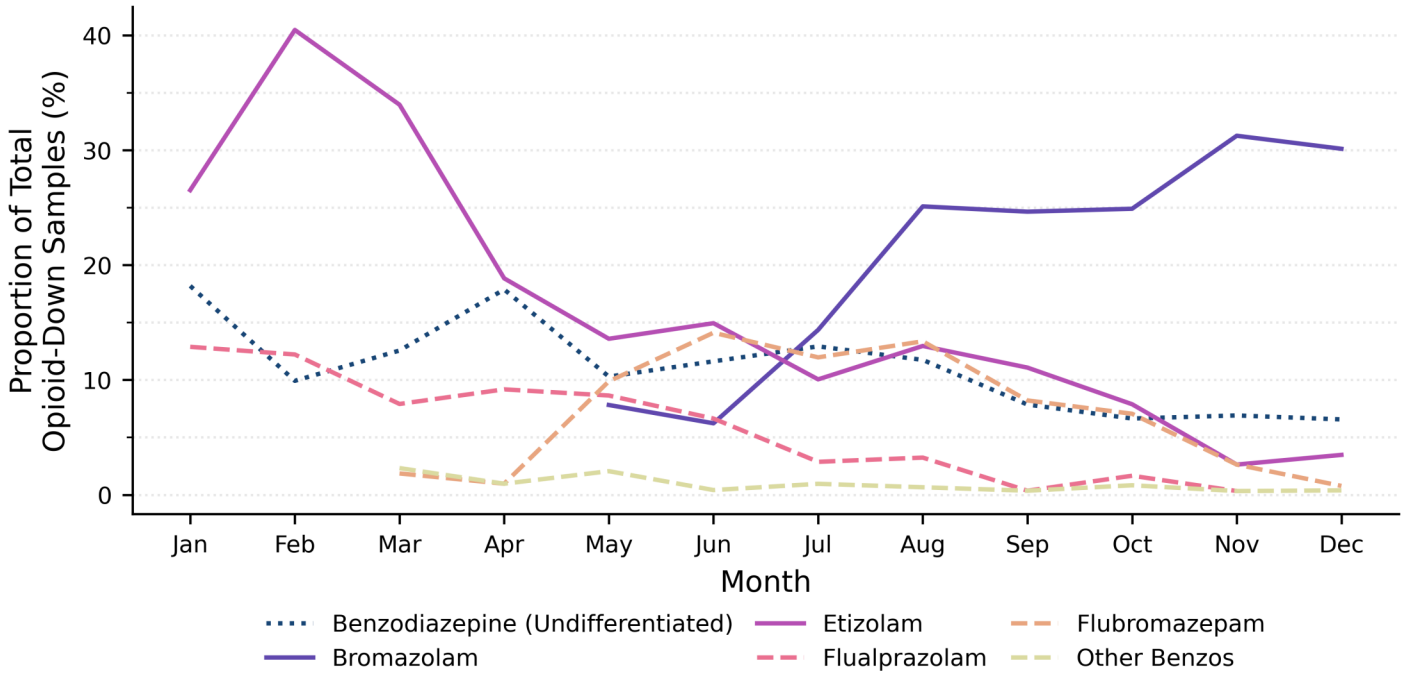

Figure 6. Prevalence of benzodiazepines detected in opioid–down samples in 2022. "Benzodiazepine (Undifferentiated) describes samples that tested positive for benzodiazepines via immunoassay strip test but the identity of the benzo(s) could not be determined via FTIR or PS-MS analysis. "Other Benzos" includes alprazolam, clonazepam, flubromazolam, lorazepam, and meclonazepam.

Despite the consistently high prevalence of benzodiazepines in the down supply, the types of benzodiazepines found was variable throughout the year. In 2021, etizolam was the most common benzodiazepine-like drug detected in down samples where 44% of all down samples contained etizolam and 77% of *benzo-positive down samples* contained etizolam. Examining Figure 8, we can see that the prevalence of etizolam in down samples decreased from a maximum of 40% in February 2022 to a minimum of 3% in November and December. In turn, the prevalence of bromazolam steadily increased throughout the year with 31% of down samples containing bromazolam by November and December 2022. Bromazolam was not in our target compound list for paper spray mass spectrometry prior to May 2022 therefore data prior to this time are limited.

Opioid–down: What did we find?

Table 4 below (and on the following pages) aggregates all active compounds detected in the opioid–down supply in 2022, across all service locations. The number of detections, and the prevalence with respect to all opioid–down samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 5 on page 16 aggregates all cutting agents detected in opioid -down samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all down samples)
Expected Active Only	***734 (27.1%)***
Etodesnitazene	1 (<0.1%)
Fentanyl	730 (26.9%)
Heroin	3 (0.1%)
Sufentanil	1 (<0.1%)
Expected* + Unexpected Active(s)	***1818 (67.1%)***
Fentanyl*	1758 (64.9%)
Heroin*	103 (3.8%)
5F-ADB	1 (<0.1%)
Acetaminophen (Tylenol)	3 (0.1%)
Acetylcodeine	79 (2.9%)
Acetylfentanyl	75 (2.8%)
Acetylmorphine (MAM)	75 (2.8%)
Alprazolam (Xanax)	9 (0.3%)
Benzocaine	11 (0.4%)
Benzodiazepine (Undifferentiated)	276 (10.2%)
Bromazolam	413 (15.2%)
Buprenorphine	3 (0.1%)
Carfentanil	63 (2.3%)
Clonazepam (Klonopin)	1 (<0.1%)
Cocaine Base (crack, rock, hard)	5 (0.2%)
Cocaine HCl (powder)	14 (0.5%)

Table 4. Active compounds detected in opioid–down samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Opioid–down: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all down samples)
Expected* + Unexpected Active(s)	***1818 (67.1%)***
Codeine	1 (<0.1%)
DMT	1 (<0.1%)
Etizolam	382 (14.1%)
Flualprazolam	124 (4.6%)
Flubromazepam	167 (6.2%)
Flubromazolam	6 (0.2%)
Fluorofentanyl	674 (24.9%)
Furanyl UF-17	2 (0.1%)
Hydromorphone (Dilaudid, Dillies)	19 (0.7%)
Isotodesnitazene	1 (<0.1%)
Isotonitazene	3 (0.1%)
Levamisole	3 (0.1%)
Lidocaine	58 (2.1%)
Lorazepam (Ativan)	2 (0.1%)
MDMA	1 (<0.1%)
Meclonazepam	2 (0.1%)
Methadone	1 (<0.1%)
Methamphetamine	20 (0.7%)
Metonitazene	3 (0.1%)
Morphine	26 (1.0%)
Nitazene (Undifferentiated)	1 (<0.1%)
Norfentanyl	5 (0.2%)
Noscapine	3 (0.1%)
Oxycodone (Oxycontin)	3 (0.1%)
Phenacetin	19 (0.7%)
Procaine	3 (0.1%)

Table 4 (*Continued from previous page*). Active compounds detected in opioid–down samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Opioid–down: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all down samples)
Expected* + Unexpected Active(s)	***1818 (67.1%)***
THC	1 (<0.1%)
Xylazine	182 (6.7%)
Unexpected Active(s) Only	***115 (4.2%)***
Acetaminophen (Tylenol)	1 (<0.1%)
Acetylcodeine	1 (<0.1%)
Acetylfentanyl	1 (<0.1%)
Acetylmorphine (MAM)	2 (0.1%)
Benzocaine	1 (<0.1%)
Benzodiazepine (Undifferentiated)	10 (0.4%)
Bromazolam	15 (0.6%)
Cannabidiol (CBD)	1 (<0.1%)
Carfentanil	5 (0.2%)
Cocaine Base (crack, rock, hard)	1 (<0.1%)
Cocaine HCl (powder)	5 (0.2%)
Etizolam	7 (0.3%)
Fentanyl	3 (0.1%)
Fentanyl or analogue	20 (0.7%)
Flualprazolam	2 (0.1%)
Flubromazepam	5 (0.2%)
Fluorofentanyl	54 (2.0%)
Heroin	2 (0.1%)
Hydromorphone (Dilaudid, Dillies)	6 (0.2%)
MDMA	1 (<0.1%)
Methadone	2 (0.1%)
Methamphetamine	6 (0.2%)
Morphine	3 (0.1%)

Table 4 (*continued from previous page*). Active compounds detected in opioid–down samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Opioid–down: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all down samples)
Unexpected Active(s) Only	***115 (4.2%)***
Opium	1 (<0.1%)
Sufentanil	3 (0.1%)
THC	1 (<0.1%)
Xylazine	1 (<0.1%)

Table 4 (*Continued from previous page*). Active compounds detected in opioid–down samples checked in 2022, inclusive of all service locations.

Opioid–down: Cutting Agents

Compound	Number of Samples (% of all down samples)
Caffeine	2292 (84.6%)
Calcium carbonate (Chalk)	5 (0.2%)
Carbohydrate (Undifferentiated)	22 (0.8%)
Citric acid	2 (0.1%)
Dimethyl sulfone (MSM)	5 (0.2%)
Erythritol	655 (24.2%)
Flour	2 (0.1%)
Fructose	1 (<0.1%)
Inositol	5 (0.2%)
Lactose	8 (0.3%)
Mannitol	185 (6.8%)
Microcrystalline cellulose	10 (0.4%)
Potassium bitartrate	1 (<0.1%)
Sodium bicarbonate (Baking powder)	3 (0.1%)
Sorbitol	2 (0.1%)
Starch	7 (0.3%)
Sucrose	9 (0.3%)
Wax	1 (<0.1%)
Xylitol	54 (2.0%)

Table 5. Cutting agents detected in opioid–down samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.

Opioid–down: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in opioid–down samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 6 below may not match those listed in Table 4. Table 6 aggregates the results from all *expected* opioid–down samples checked in 2022 across all service locations. Refer to Table 7 on page 19 for a subset of these data separated by service location. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
5F-ADB	1			0.4%	
Acetylcodeine	80	3.3%	0.3%	19.4%	1.4% - 5.0%
Acetylfentanyl	76	0.4%	<0.1%	11.0%	0.3% - 0.6%
Acetylmorphine (MAM)	77	1.8%	1.0%	31.6%	1.3% - 3.4%
Alprazolam	9	1.5%	0.7%	24.0%	1.2% - 1.8%
Benzocaine	11	10.2%	7.2%	75.9%	7.9% - 15.6%
Bromazolam	422	1.8%	<0.1%	>80%	0.7% - 4.2%
Buprenorphine	3	2.4%	0.2%	4.2%	
Carfentanil	68	0.38%	<0.01%	2.95%	0.14% - 0.60%
Clonazepam	1			0.7%	
Cocaine Base	1			29.3%	
Cocaine HCl	17	12.5%	4.3%	>80%	6.4% - 26.7%
Etizolam	377	3.2%	<0.1%	>25%	0.6% - 11.8%
Fentanyl	2373	11.0%	<0.1%	>80%	5.1% - 19.1%
Flualprazolam	125	0.5%	<0.1%	7.7%	0.2% - 1.4%
Flubromazepam	168	1.6%	<0.1%	>25%	0.6% - 3.5%
Flubromazolam	5	1.0%	0.2%	7.3%	1.0% - 1.1%
Fluorofentanyl	721	2.7%	<0.1%	>80%	0.5% - 9.8%
Furanyl UF-17	2		0.2%	0.3%	

Table 6. PS-MS quantification of targeted active compounds detected in *expected* opioid–down samples, inclusive of all service locations. *Continued on the next page.*

Opioid–down: Quantification - *continued*

Compound	# Quant.	Median	Min	Max	IQR
Heroin	82	>80%	10.1%	>80%	24.3% - >80%
Hydromorphone	25	0.8%	0.3%	9.3%	0.7% - 2.0%
Isotodesnitazene	1			0.3%	
Isotonitazene	3	0.9%	0.3%	2.0%	
Levamisole	3	0.4%	0.1%	1.1%	
Lidocaine	58	0.8%	<0.1%	23.6%	0.3% - 2.2%
Lorazepam	2		<0.1%	0.8%	
Meclonazepam	2		0.3%	0.6%	
Methamphetamine	11	32.5%	<0.1%	>80%	17.4% - 52.9%
Metonitazene	3	1.3%	0.2%	2.0%	
Morphine	29	2.3%	1.1%	17.1%	1.5% - 3.4%
Oxycodone	3	0.6%	0.5%	1.1%	
Phenacetin	17	4.0%	1.1%	>80%	2.0% - 30.9%
Procaine	3	0.1%	0.1%	0.1%	
Xylazine	181	0.6%	<0.1%	>80%	0.1% - 2.8%

Table 6 (*continued from previous page*). PS-MS quantification of targeted active compounds detected in *expected* opioid –down samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Opioid–down: Quantification by Service Location

In Table 7 below we expand upon Table 4 to examine the regional variability in the unregulated opioid market, focusing on select actives quantified within *expected opioid–down samples*, separated by service location averaged over the full year.

Service Model	Compound	# Quant.	Median	Min	Max	IQR
Campbell River *32 total down samples* *91% (29/32) benzo-positive*	Bromazolam	7	9.6%	0.6%	12.6%	5.6% - 11.7%
	Carfentanil	8	0.72%	0.01%	1.81%	0.27% - 1.07%
	Etizolam	10	0.7%	0.1%	>25%	0.3% - 11.8%
	Fentanyl	14	16.2%	0.1%	31.1%	2.1% - 23.6%
	Xylazine	4	12.4%	0.1%	41.6%	2.1% - 26.9%
Comox Valley *19 total down samples* *74% (14/19) benzo-positive*	Bromazolam	4	5.0%	0.2%	25.3%	1.4% - 12.4%
	Fentanyl	4	5.1%	3.0%	18.5%	4.0% - 9.0%
	Fluorofentanyl	2	0.6%	0.4%	0.8%	
Duncan *11 total down samples* *73% (8/11) benzo-positive*	Bromazolam	5	2.3%	0.4%	3.8%	1.6% - 2.5%
	Fentanyl	7	9.8%	3.8%	18.4%	6.8% - 12.0%
	Fluorofentanyl	4	6.0%	0.9%	11.7%	4.4% - 7.7%
Port Alberni *90 total down samples* *73% (66/90) benzo-positive*	Bromazolam	11	3.5%	0.1%	16.7%	2.8% - 7.8%
	Carfentanil	16	0.27%	0.06%	0.90%	0.19% - 0.44%
	Etizolam	10	0.8%	0.1%	23.3%	0.4% - 3.7%
	Fentanyl	67	9.6%	0.1%	>80%	4.3% - 17.6%
	Fluorofentanyl	15	2.3%	0.1%	20.5%	0.2% - 6.7%
	Xylazine	4	1.4%	0.1%	2.9%	0.2% - 2.7%
Substance *2199 total down samples* *46% (1010/2199) benzo-positive*	Bromazolam	324	1.6%	0.1%	>80%	0.6% - 4.0%
	Carfentanil	17	0.50%	0.01%	1.80%	0.37% - 0.64%
	Etizolam	292	2.6%	0.1%	>25%	0.6% - 9.4%
	Fentanyl	1968	11.3%	0.1%	>80%	5.5% - 19.5%
	Fluorofentanyl	625	2.7%	0.1%	>80%	0.6% - 9.7%
	Xylazine	146	0.5%	0.1%	32.1%	0.1% - 2.1%
Outreach *358 total down samples* *51% (184/358) benzo-positive*	Bromazolam	71	2.8%	0.1%	>80%	1.2% - 4.4%
	Carfentanil	27	0.19%	0.01%	2.95%	0.10% - 0.53%
	Etizolam	63	11.2%	0.1%	>25%	2.9% - 22.1%
	Fentanyl	313	9.8%	0.1%	>80%	4.3% - 17.5%
	Fluorofentanyl	75	2.8%	0.1%	>80%	0.4% - 12.2%
	Xylazine	25	1.7%	0.1%	18.1%	0.4% - 4.8%

Opioid–down: Quantification by Time

Here we examine the variability of the concentration of fentanyl, fluorofentanyl, etizolam, and bromazolam as a function of time in 2022. Not only does the median concentration of these compounds fluctuate throughout the year, but the volatility, shown here by the *interquartile range* (the concentration range that contains half of the quantified samples), also remains high every month. We assert that this "consistently inconsistent" nature of the opioid–down supply, i.e. the persistently high variability in composition and concentration, is a greater risk to people who use opioids than the compounds themselves. Data shown here and on the following page are inclusive of all service locations.

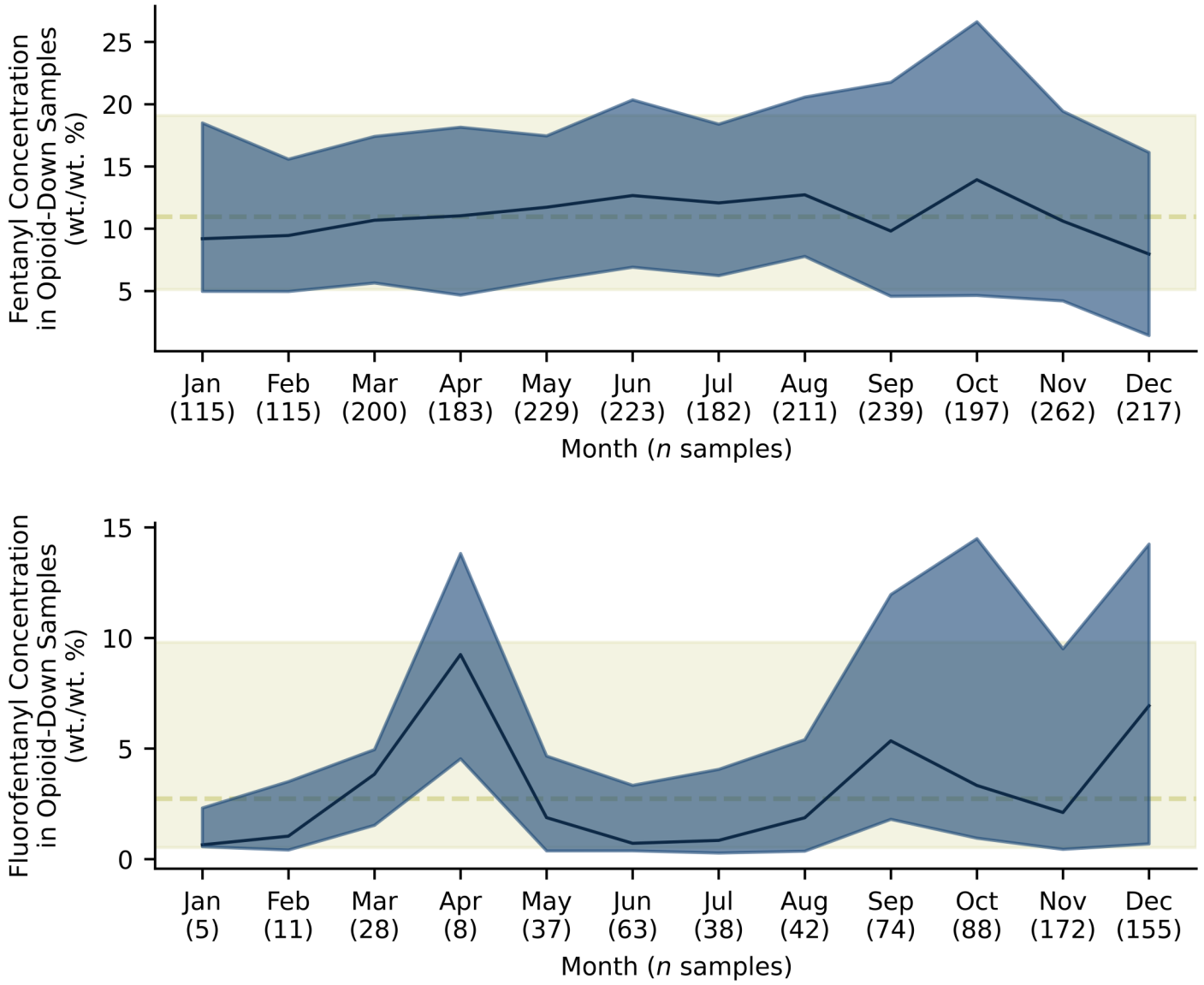

Figure 7. Monthly variability of the concentration of fentanyl (top) and fluorofentanyl (bottom) quantified in opioid–down samples checked in 2022 across all service locations. The number of samples quantified each month is shown in parentheses. The solid line represents the median concentration each month, while the dark shaded region bounds the monthly interquartile range. The dashed line in the background of each panel displays the annual median concentration and the light shaded region bounds the annual interquartile range. Weight/weight percentage is shown, as determined via PS-MS.

Opioid–down: Quantification by Time - *continued*

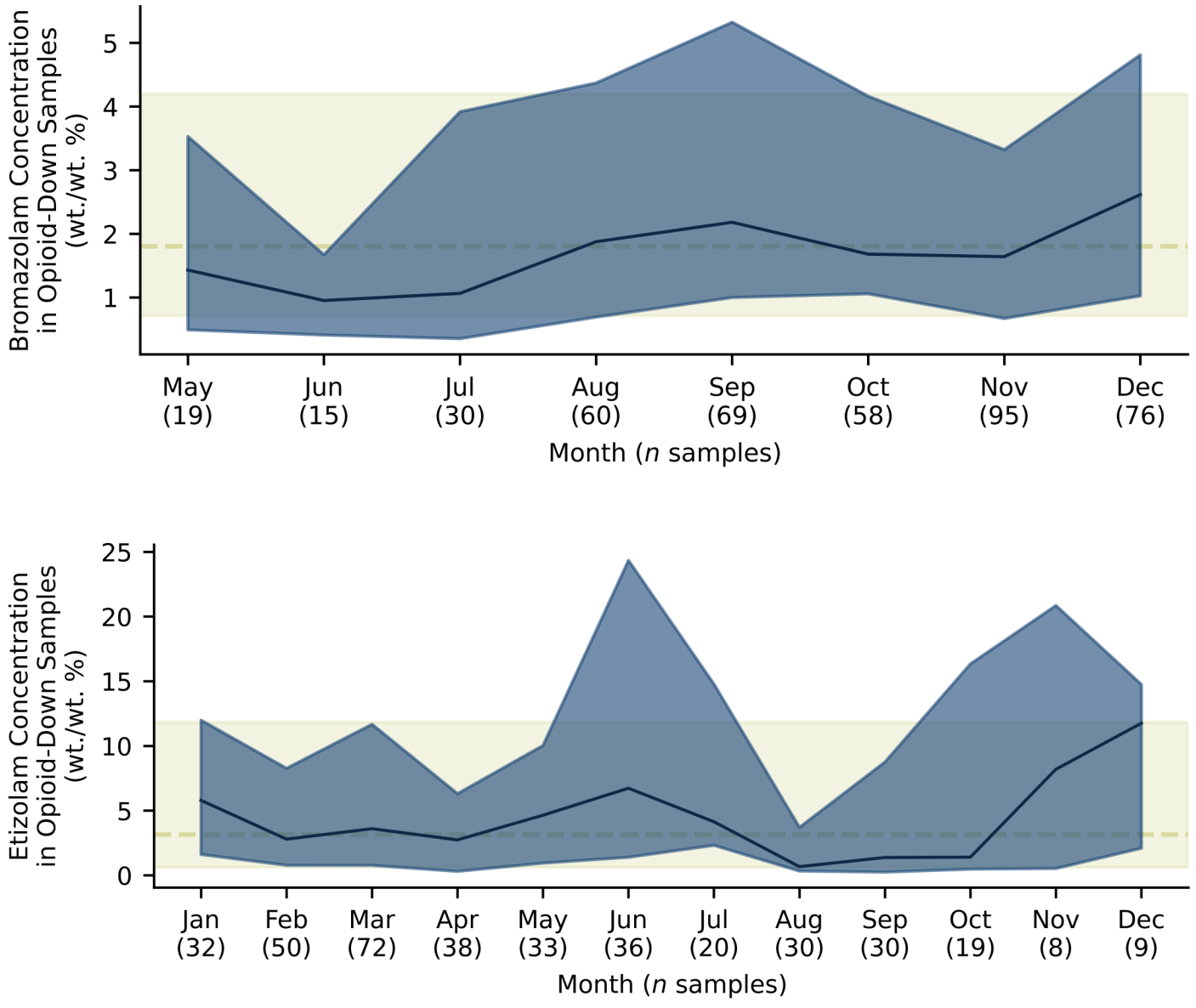

Figure 8. Monthly variability of the concentration of bromazolam (top) and etizolam (bottom) quantified in opioid–down samples checked in 2022 across all service locations. The number of samples quantified each month is shown in parentheses. The solid line represents the median concentration each month, while the dark shaded region bounds the monthly interquartile range. The dashed line in the background of each panel displays the annual median concentration and the light shaded region bounds the annual interquartile range. Weight / weight percentage is shown, as determined via PS-MS. Quantitative concentrations of bromazolam are not available prior to May 2022.

Cocaine

"Cocaine" includes samples that are expected to be cocaine HCl (soft/powder) and cocaine base (hard/rock/crack). We receive many questions regarding the purity cocaine and what we mean when a sample was *"found to be cocaine with no cuts or adulterants detected." "No cuts detected"* certainly does not mean "pure" and should not be interpreted as such. Please refer to our Limitations on page 9 and 10 for a more detailed discussion around purity analysis. Despite our inability to comment on purity, we check every sample for the most common active cuts found in cocaine: benzocaine, levamisole, lidocaine, phenacetin, and procaine, with quantification possible down to approximately 0.1% by weight using PS-MS. Table 10 on the page 25 aggregates the quantitative data for select actives detected within cocaine samples across all service locations and a summary of the inactive cuts found in cocaine can be found on page 23 in Table 9.

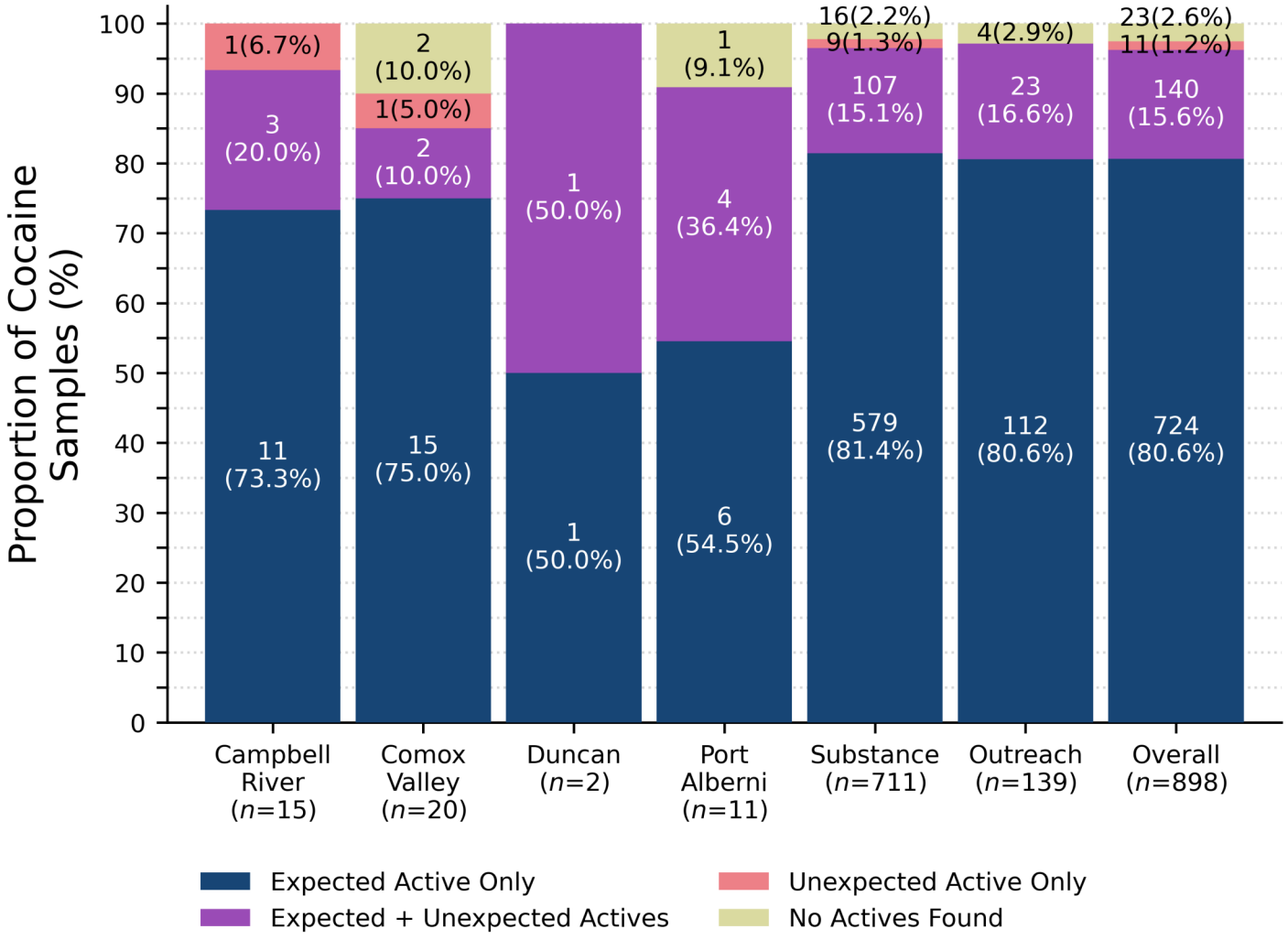

Figure 8. Proportion and number of cocaine samples checked by service locations, grouped by composition class (see page 9 for definitions).

Cocaine: What did we find?

Table 8 below (and on the following page) aggregates all active compounds detected in cocaine samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all cocaine samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 9 on page 24 aggregates all cutting agents detected in cocaine samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all cocaine samples)
Expected Active Only	***724 (80.6%)***
Cocaine Base (crack, rock, hard)	91 (10.1%)
Cocaine HCl (powder)	634 (70.6%)
Expected* + Unexpected Active(s)	***140 (15.6%)***
Cocaine Base* (crack, rock, hard)	36 (4.0%)
Cocaine HCl* (powder)	104 (11.6%)
2C-H	1 (0.1%)
Acetaminophen (Tylenol)	2 (0.2%)
Amphetamine	1 (0.1%)
Benzocaine	17 (1.9%)
Etizolam	2 (0.2%)
Fentanyl	9 (1.0%)
Fentanyl or analogue	4 (0.4%)
Ketamine	1 (0.1%)
Levamisole	74 (8.2%)
Lidocaine	3 (0.3%)
MDA	1 (0.1%)
MDMA	1 (0.1%)
Methamphetamine	2 (0.2%)
Phenacetin	39 (4.3%)
Procaine	3 (0.3%)
Scopolamine	1 (0.1%)

Table 8. Active compounds detected in cocaine samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Cocaine: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all cocaine samples)	Detected Compounds	Number of Samples (% of all cocaine samples)
Unexpected Active(s) Only	***11 (1.2%)***		
3-BMC	1 (0.1%)	Heroin	1 (0.1%)
Amphetamine	1 (0.1%)	MDA	2 (0.2%)
Bromazolam	1 (0.1%)	Methamphetamine	3 (0.3%)
Etizolam	1 (0.1%)	Oxycodone (Oxycontin)	1 (0.1%)
Fentanyl	5 (0.6%)	Xylazine	1 (0.1%)
Fluorofentanyl	2 (0.2%)		

Table 8 (*Continued from previous page*). Active compounds detected in cocaine samples checked in 2022, inclusive of all service locations.

Cocaine: Cutting Agents

Compound	Number of Samples (proportion of all cocaine samples)
Ascorbic acid (Vitamin C)	1 (0.1%)
Bisphenol A (BPA)	2 (0.2%)
Caffeine	13 (1.4%)
Carbohydrate (Undifferentiated)	1 (0.1%)
Creatine	4 (0.4%)
Erythritol	1 (0.1%)
Fat	1 (0.1%)
Flour	2 (0.2%)
Glass	1 (0.1%)
Glutamine	1 (0.1%)
Inositol	4 (0.4%)
Microcrystalline cellulose	1 (0.1%)
Sodium bicarbonate (Baking powder)	7 (0.8%)
Sorbitol	1 (0.1%)
Starch	2 (0.2%)
Talc	3 (0.3%)
Wax	1 (0.1%)

Table 9. Cutting agents detected in cocaine samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.

Cocaine: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in cocaine samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 10 below may not match those listed in Table 8. Table 10 aggregates the results from all *expected* cocaine samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
2C-H	1			24.5%	
Amphetamine	2		2.1%	3.2%	
Benzocaine	9	21.2%	7.8%	>80%	9.5% - 34.9%
Bromazolam	1			4.3%	
Cocaine Base	14	67.8%	<0.1%	>80%	40.9% - >80%
Cocaine HCl	130	>80%	<0.1%	>80%	>80%
Etizolam	3	0.5%	0.2%	0.5%	
Fentanyl	13	1.1%	0.1%	>80%	0.2% - 4.4%
Fluorofentanyl	2		0.2%	0.5%	
Heroin	1			15.5%	
Levamisole	71	1.9%	0.1%	41.0%	0.4% - 8.9%
Lidocaine	2		8.9%	14.9%	
MDA	2		1.9%	>80%	
MDMA	1			3.1%	
Oxycodone	1			4.1%	
Phenacetin	29	22.5%	1.0%	>80%	14.1% - 38.8%
Procaine	3	0.4%	0.1%	8.2%	
Xylazine	1			1.0%	

Table 10. PS-MS quantification of targeted active compounds detected in *expected* cocaine samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

MDMA

"MDMA" groups samples that are expected to be either MDMA or MDA. In 2022, 78% of expected MDMA/MDA samples were confirmed to be MDMA/MDA with no other active compounds detected. 34 samples (4% of all expected MDMA/MDA samples) came in the form of pressed pills, and inactive cutting agents were found in an additional 43 samples (6% of all expected MDMA/MDA). Dimethyl sulfone (MSM) and caffeine were the most common cuts detected in non-pressed pill . Similar to the story with cocaine, *"no cuts detected"* certainly does not mean these samples were pure, but instead these samples likely contain impurities below the limits of detection for FTIR and/or compounds outside of our targeted method for PS-MS. The MDMA-MDA mix-up represents a majority of samples that had an unexpected composition, with 86% of unexpected MDMA or MDA samples instead containing MDA or MDMA (or a combination of both).

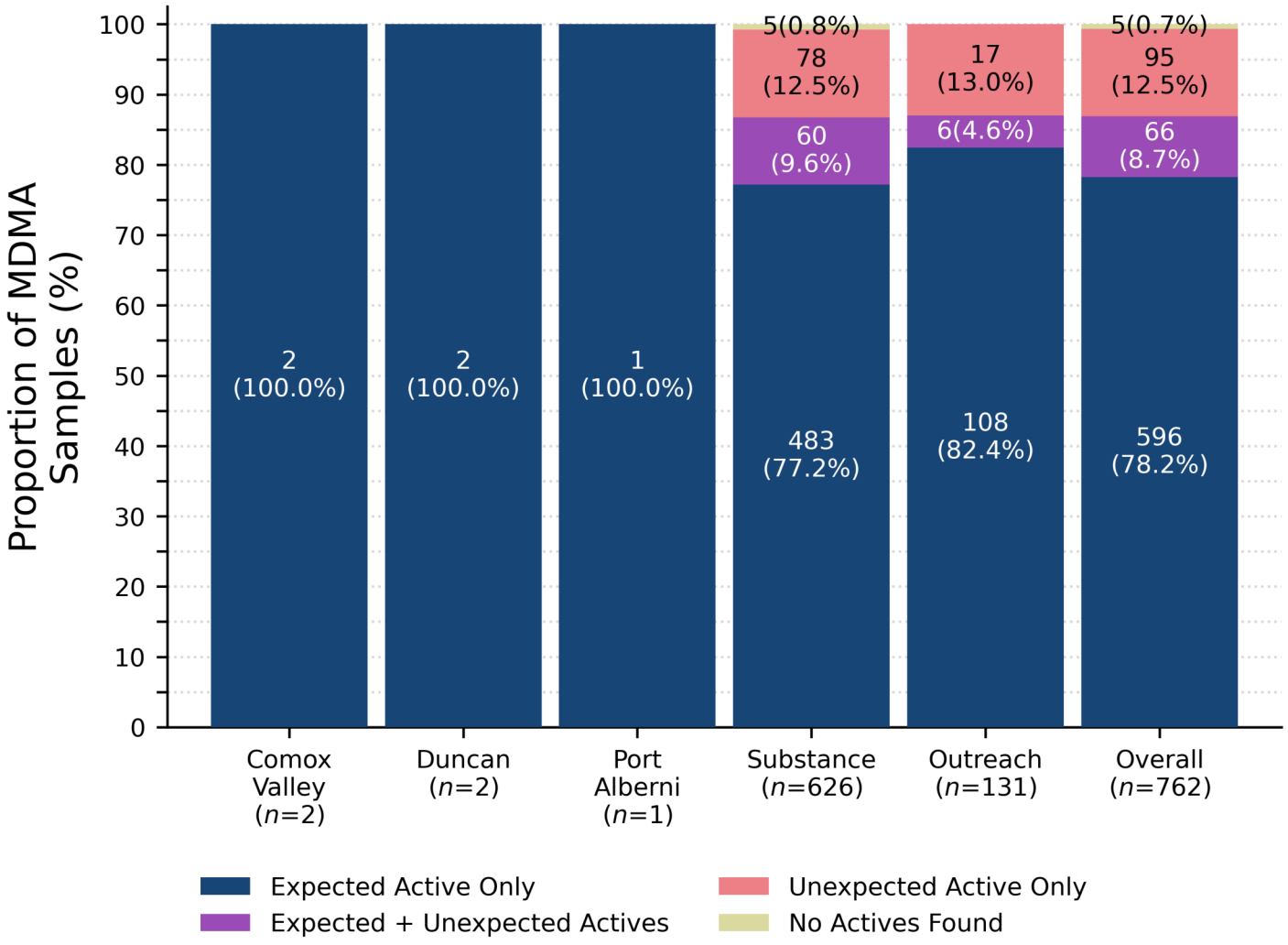

Figure 10. Proportion and number of MDMA samples checked by service locations, grouped by composition class (see page 9 for definitions).

MDMA: What did we find?

Table 11 below (and on the following page) aggregates all active compounds detected in MDMA/MDA samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all MDMA/MDA samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 12 on page 28 aggregates all cutting agents detected in MDMA, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all MDMA / MDA samples)
Expected Active Only	***596 (78.2%)***
MDA	37 (4.9%)
MDMA	560 (73.5%)
Expected* + Unexpected Active(s)	***66 (8.7%)***
MDMA*	6 (0.8%)
MDA* + MDMA	5 (0.7%)
MDMA* + MDA	54 (7.1%)
MDA* + Cocaine	1 (0.1%)
Ethylone	1 (0.1%)
Fentanyl	1 (0.1%)
Ketamine	2 (0.3%)
Levamisole	1 (0.1%)
Methamphetamine	1 (0.1%)
Unexpected Active(s) Only	***95 (12.5%)***
3-BMC	1 (0.1%)
Cannabidiol (CBD)	2 (0.3%)
Cathinone (Undifferentiated)	1 (0.1%)
Cocaine HCl (powder)	1 (0.1%)
Diphenhydramine (Benadryl)	1 (0.1%)
Ketamine	4 (0.5%)
Levamisole	1 (0.1%)
MDA *(MDMA expected)*	75 (9.8%)

Table 11. Active compounds detected in MDMA/MDA samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

MDMA: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all MDMA / MDA samples)
Unexpected Active(s) Only	***95 (12.5%)***
MDEA	1 (0.1%)
MDMA *(MDA expected)*	10 (1.3%)
Methamphetamine	1 (0.1%)
Procaine	1 (0.1%)

Table 11 (*Continued from previous page*). Active compounds detected in MDMA/MDA samples checked in 2022, inclusive of all service locations.

MDMA: Cutting Agents

Compound	Number of Samples (% of all MDMA/MDA samples)
Caffeine	9 (1.2%)
Carbohydrate (Undifferentiated)	3 (0.4%)
Dimethyl sulfone (MSM)	13 (1.7%)
Flour	1 (0.1%)
Glutamine	1 (0.1%)
Inositol	1 (0.1%)
Lactose	1 (0.1%)
Magnesium sulfate	1 (0.1%)
Mannitol	3 (0.4%)
Microcrystalline cellulose	27 (3.5%)
Sorbitol	2 (0.3%)
Starch	1 (0.1%)
Sucrose	7 (0.9%)
Tryptophan	1 (0.1%)
Xylitol	1 (0.1%)

Table 12. Cutting agents detected in MDMA/MDA samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.

MDMA: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in MDMA samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 13 below may not match those listed in Table 11. Table 13 aggregates the results from all *expected* MDMA samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the inter-quartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
Cocaine HCl	3	13.3%	12.9%	>80%	
Fentanyl	1			<0.1%	
Ketamine	2		<0.1%	39.0%	
Levamisole	2		1.5%	13.3%	
MDA	96	22.9%	1.5%	>80%	8.0% - >80%
MDEA	1			1.1%	
MDMA	192	75.6%	2.4%	>80%	58.3% - >80%
Methamphetamine	1			8.5%	
Procaine	1			7.6%	

Table 13. PS-MS quantification of targeted active compounds detected in *expected* MDMA samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Methamphetamine

83% of the methamphetamine samples checked in 2022 were confirmed to contain methamphetamine with no other active compounds detected. Cutting agents were found in 9% (32/370) of methamphetamine samples. Dimethyl sulfone (MSM), the most common cut found in methamphetamine, was detected 3% (12/370) of samples and caffeine was found in 2% (9/370) samples. Despite a majority of meth being "as expected" from a chemical lens, many service users still report unexpected or adverse effects from samples that were found to be "*meth with no cuts or adulterants detected*". We suspect this can be attributed to the purity of the meth, the relative ratios of the *d*- and *l*- isomers of meth in any given sample, and the set and setting in which the drug was consumed. Unfortunately we are unable to address these first two speculations given the limitations of our instrumentation, but fortunately practices around safer meth use can help minimize the possible harms introduced through set and setting. Starting "low and slow", using clean supplies, staying hydrated, staying cool, eating food, getting some sleep, and (when possible) consuming in safer places with people you trust are some recipes for success.

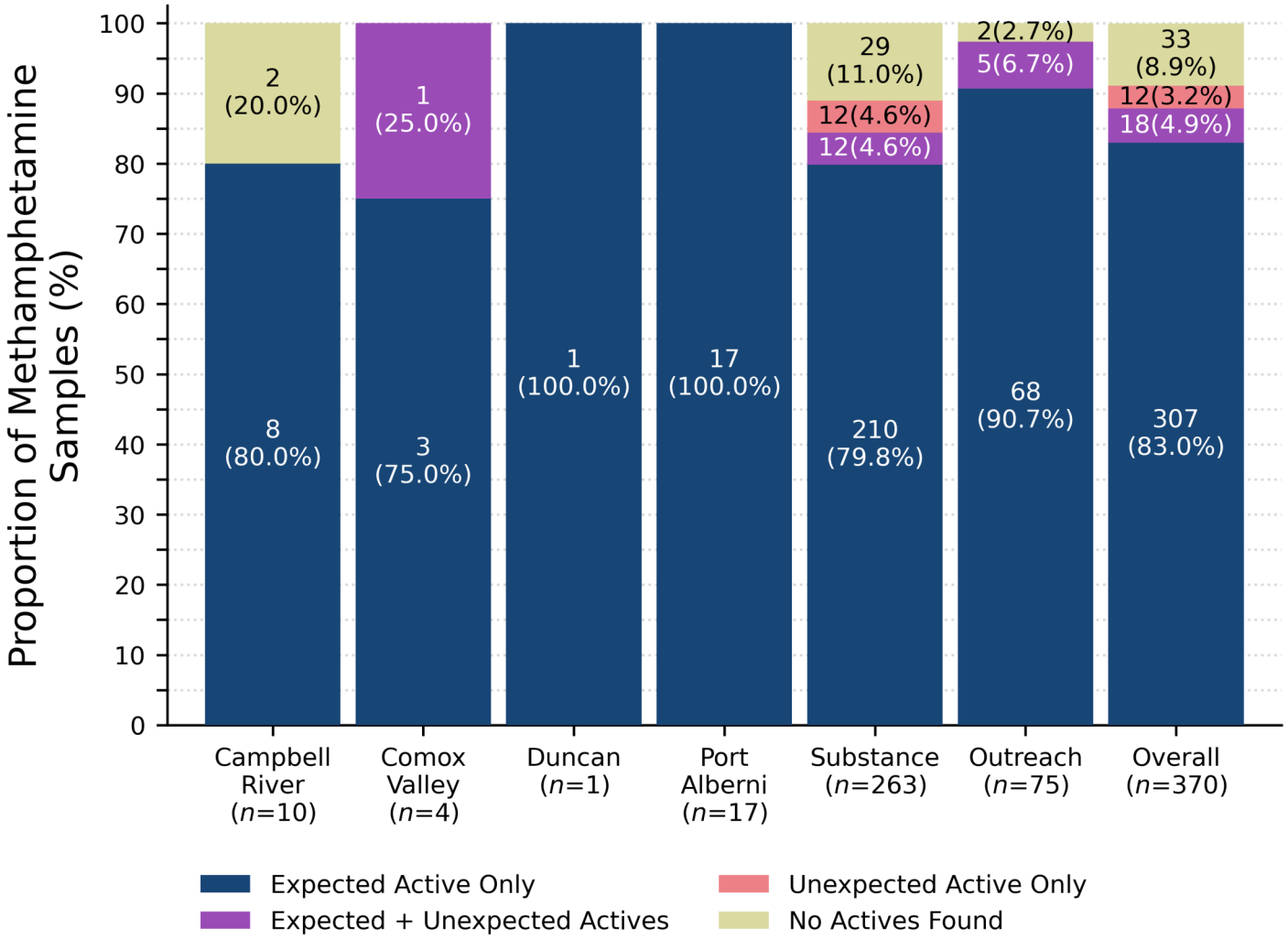

Figure 11. Proportion and number of methamphetamine samples checked by service locations, grouped by composition class (see page 9 for definitions).

Methamphetamine: What did we find?

Table 14 below aggregates all active compounds detected in methamphetamine samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all methamphetamine samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 15 aggregates all cutting agents detected in meth, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all meth samples)
Expected Active Only	***307 (83.0%)***
Methamphetamine	307 (83.0%)
Expected* + Unexpected Active(s)	***18 (4.9%)***
Methamphetamine*	18 (4.9%)
Amphetamine	1 (0.3%)
Bromazolam	2 (0.5%)
Cocaine HCl (powder)	2 (0.5%)
Etizolam	1 (0.3%)
Fentanyl	8 (2.2%)
Fentanyl or analogue	4 (1.1%)
Fluorofentanyl	2 (0.5%)
MDA	1 (0.3%)
Unexpected Active(s) Only	***12 (3.2%)***
Acetaminophen (Tylenol)	1 (0.3%)
Cocaine Base (crack, rock, hard)	1 (0.3%)
Cocaine HCl (powder)	2 (0.5%)
Fentanyl	3 (0.8%)
Fentanyl or analogue	2 (0.5%)
Flubromazepam	1 (0.3%)
Fluorofentanyl	1 (0.3%)
Ketamine	1 (0.3%)
Lidocaine	1 (0.3%)
MDMA	1 (0.3%)

Table 14 (left). Active compounds detected in methamphetamine samples checked in 2022, inclusive of all service locations.

Methamphetamine: Cutting Agents

Compound	Number of Samples (% of all meth samples)
Caffeine	9 (2.4%)
Citric acid	1 (0.3%)
Dimethyl sulfone (MSM)	12 (3.2%)
Erythritol	1 (0.3%)
Isopropyl benzylamine	1 (0.3%)
Microcrystalline cellulose	3 (0.8%)
Sodium bicarbonate (Baking powder)	1 (0.3%)
Sucrose	3 (0.8%)
Zinc sulphate	1 (0.3%)

Table 15 (above). Cutting agents detected in meth samples across all service locations. *Quantitative concentrations are not available for these compounds.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Methamphetamine: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in methamphetamine samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 16 below may not match those listed in Table 14. Table 16 aggregates the results from all *expected* meth samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
Amphetamine	1			3.3%	
Bromazolam	2		<0.1%	0.3%	
Cocaine HCl	2		5.8%	>80%	
Etizolam	1			0.7%	
Fentanyl	11	0.5%	<0.1%	>80%	0.2% - 1.0%
Flubromazepam	1			<0.1%	
Fluorofentanyl	3	<0.1%	<0.1%	0.3%	
Lidocaine	1			0.9%	
MDA	1			57.0%	
Methamphetamine	43	>80%	<0.1%	>80%	66.6% - >80%

Table 16. PS-MS quantification of targeted active compounds detected in *expected* methamphetamine samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Dissociatives

The dissociative class is largely represented by ketamine, with expected ketamine samples making up 95% (306/322) of the dissociative samples checked in 2022. We occasionally see novel dissociatives such as 3-HO-PCP and O-PCE as well. The dissociative class shows the lowest levels of adulteration or misrepresentation out of all of the drug classes that we check: 90% of dissociative samples checked in 2022 were "as expected" and cutting agents were detected in only 7% of expected dissociative samples. Despite the apparent "quality" of the dissociatives, we still caution service users that "no cuts detected" does not reflect compound purity, that we cannot differentiate the *r*- and *s*-ketamine isomers with our current methods, and that cuts or adulterants may still be present in these samples below the limits of detection of our instruments.

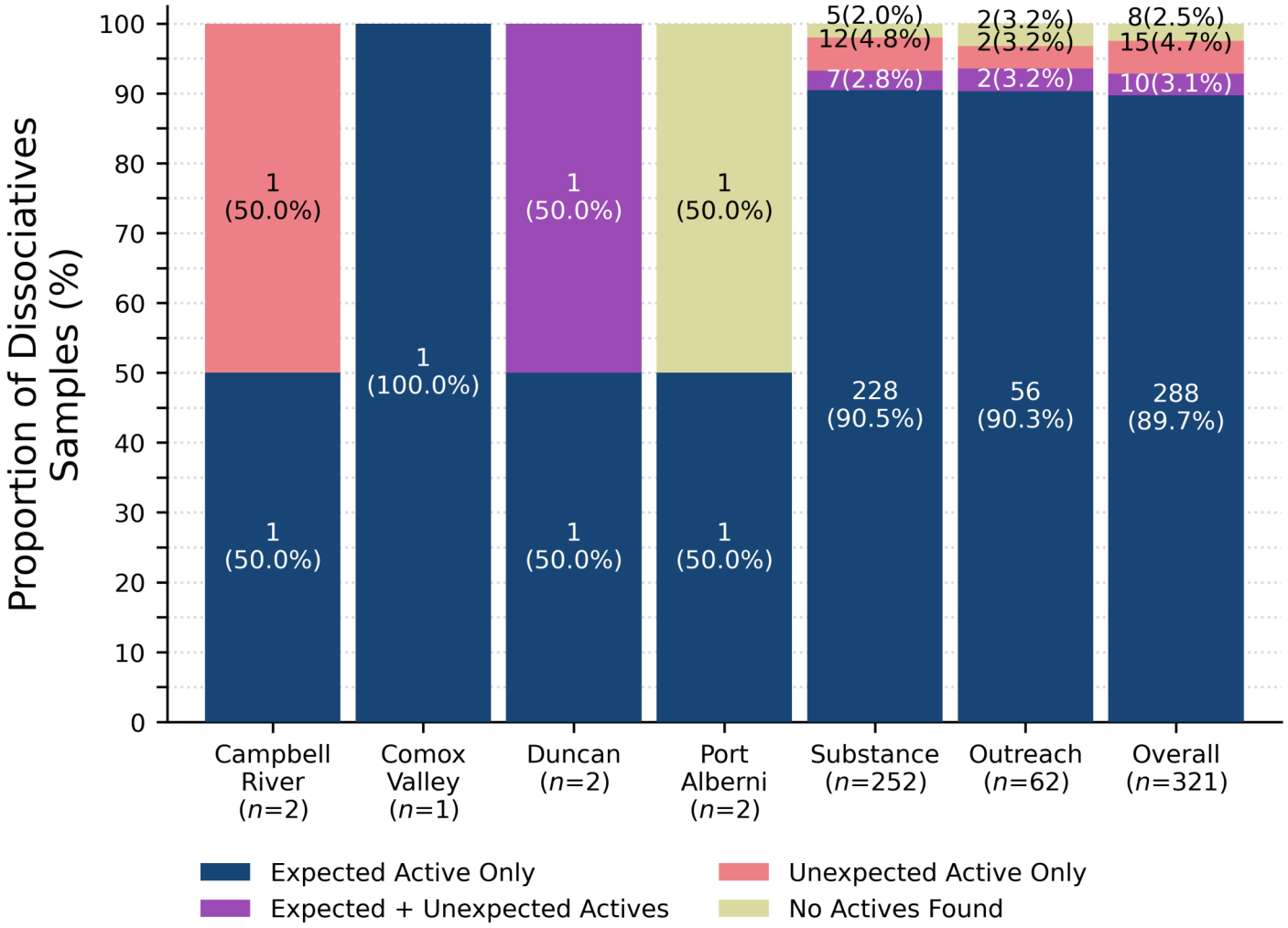

Figure 12. Proportion and number of dissociative samples checked by service locations, grouped by composition class (see page 9 for definitions).

Dissociatives: What did we find?

Table 17 below aggregates all active compounds detected in dissociative samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all dissociative samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 18 on page 35 aggregates all cutting agents detected in dissociative samples across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all dissociative samples)
Expected Active Only	***288 (89.7%)***
3-HO-PCP	1 (0.3%)
DMXE (Deoxymethoxetamine)	1 (0.3%)
DXM (Dextromethorphan)	1 (0.3%)
Ketamine	284 (88.5%)
O-PCE (Deschloro-N-ethyl-ketamine)	1 (0.3%)
Expected* + Unexpected Active(s)	***10 (3.1%)***
Ketamine*	10 (3.1%)
Dimethylpentylone	1 (0.3%)
Fluorodeschloroketamine	1 (0.3%)
MDA	2 (0.6%)
MDMA	1 (0.3%)
Methamphetamine	1 (0.3%)
Phenacetin	4 (1.2%)
Unexpected Active(s) Only	***15 (4.7%)***
3-HO-PCP *(PCP expected)*	1 (0.3%)
Amphetamine *(Ketamine expected)*	1 (0.3%)
Cocaine HCl *(Ketamine expected)*	2 (0.6%)
Fentanyl *(Ketamine expected)*	1 (0.3%)
Fluorodeschloroketamine *(O-PCM expected)*	1 (0.3%)
MDA *(Ketamine expected)*	1 (0.3%)
MDMA *(Ketamine expected)*	5 (1.6%)
Methamphetamine *(Ketamine expected)*	3 (0.9%)
Diazepam + Rolicyclidine (PCPy) *(PCP*	1 (0.3%)

Table 17. Active compounds detected in dissociative samples checked in 2022, inclusive of all service locations.

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.
**Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Dissociatives: Cutting Agents

Compound	Number of Samples (% of all dissociative samples)
Caffeine	2 (0.6%)
Carbohydrate (Undifferentiated)	1 (0.3%)
Dimethyl sulfone (MSM)	7 (2.2%)
Flour	1 (0.3%)
Inositol	2 (0.6%)
Isopropyl benzylamine	2 (0.6%)
Monosodium glutamate (MSG)	2 (0.6%)
Sodium bicarbonate (Baking powder)	1 (0.3%)
Sucrose	4 (1.2%)
Xylitol	1 (0.3%)

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.

Table 18. Cutting agents detected in dissociative samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Dissociatives: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in dissociative samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 19 below may not match those listed in Table 17. Table 19 aggregates the results from all *expected* dissociative samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
Amphetamine	1			7.8%	
Cocaine HCl	2		70.0%	>80%	
Diazepam	1			4.1%	
Ketamine	32	>80%	<0.1%	>80%	>80%
MDA	1			3.1%	
MDMA	2		2.1%	2.8%	
Phenacetin	3	3.4%	3.0%	3.8%	

Table 19. PS-MS quantification of targeted active compounds detected in *expected* dissociative samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Benzodiazepines

When checking benzodiazepines, we see a suite of both prescribed benzo samples and non-medical benzos in illicitly manufactured pressed pills. The benzodiazepine supply also has close relations to the opioid -down supply and we also check benzodiazepine powders for suppliers who are performing quality control prior to preparing "benzo-down". The most common benzo samples that we check are expected alprazolam tablets (63% of benzo samples) which often present similar to 2mg Xanax bars. Though alprazolam is expected, alprazolam is only detected in 21% of expected alprazolam tablets. Instead, non-medical benzos/benzo analogues like etizolam (found in 33% of expected alprazolam) and flualprazolam (found in 22% of expected alprazolam) are more frequently seen in illicit "Xanax". Despite "unexpected actives" showing up, these results were not unexpected to a majority of the service users who brought in these samples as many service users suspect other benzos based on their experiential knowledge of the drugs they use and the markets from which they come.

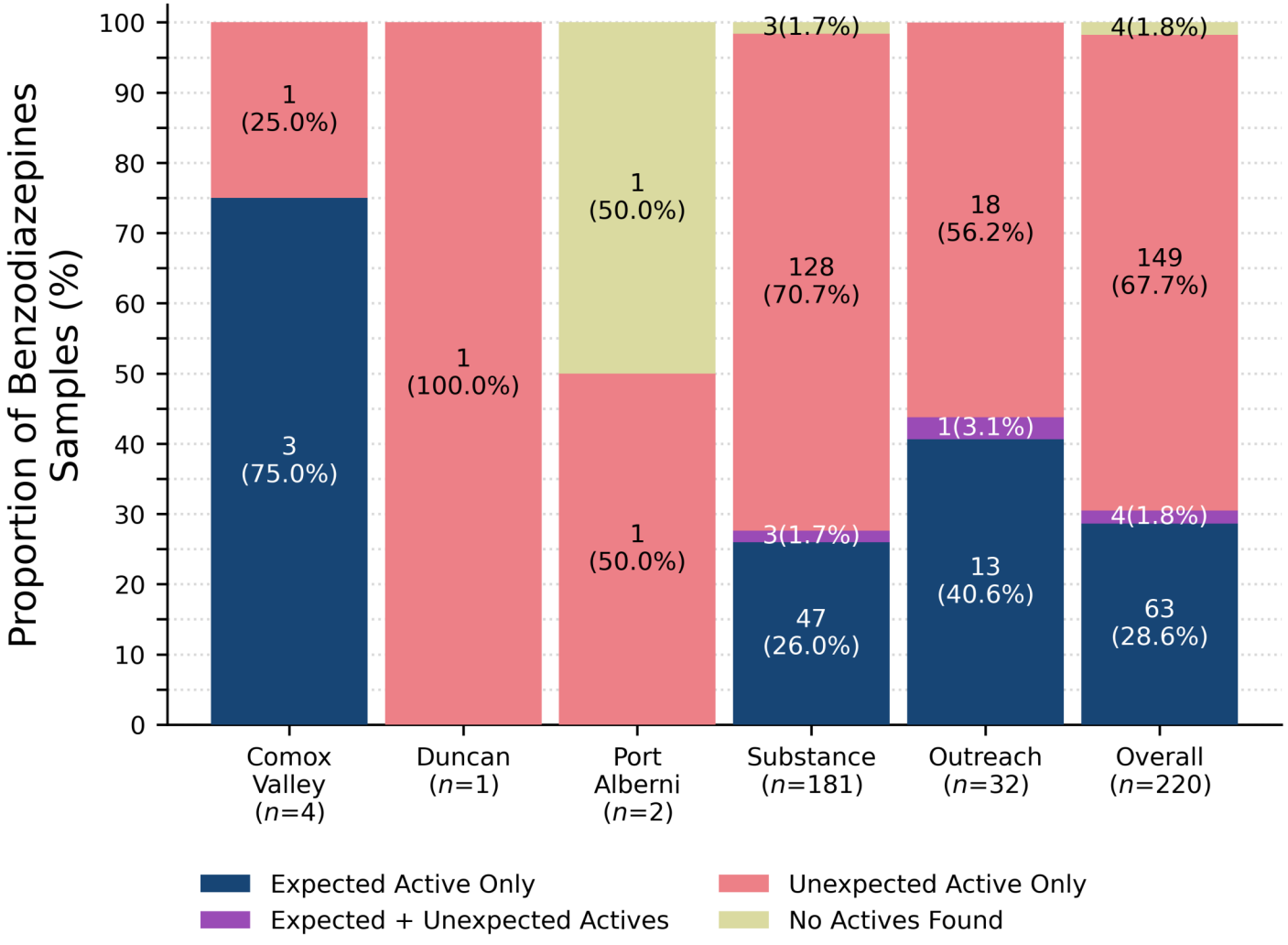

Figure 13. Proportion and number of benzodiazepine samples checked by service locations, grouped by composition class (see page 9 for definitions).

Benzodiazepines: What did we find?

Table 20 below (and on the following page) aggregates all active compounds detected in benzodiazepine samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all benzodiazepine samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 21 on page 38 aggregates all cutting agents detected in benzodiazepines, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all benzo samples)
Expected Active Only	***63 (28.6%)***
Alprazolam (Xanax)	27 (12.3%)
Bromazolam	2 (0.9%)
Diazepam (Valium)	4 (1.8%)
Diclazepam	1 (0.5%)
Etizolam	8 (3.6%)
Flualprazolam	16 (7.3%)
Lorazepam (Ativan)	4 (1.8%)
Nitrazolam	1 (0.5%)
Expected* + Unexpected Active(s)	***4 (1.8%)***
Alprazolam (Xanax)*	2 (0.9%)
Bromazolam	1 (0.5%)
Etizolam*	3 (1.4%)
Fentanyl	1 (0.5%)
Flualprazolam	1 (0.5%)
Flubromazepam	1 (0.5%)
Fluorofentanyl	1 (0.5%)
Unexpected Active(s) Only	***149 (67.7%)***
Acetaminophen (Tylenol)	2 (0.9%)
Acetylmorphine (MAM)	1 (0.5%)
Adinazolam	1 (0.5%)
Alprazolam (Xanax)	1 (0.5%)

Table 20. Active compounds detected in benzodiazepine samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Benzodiazepines: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all benzo samples)
Unexpected Active(s) Only	***149 (67.7%)***
Benzocaine	8 (3.6%)
Benzodiazepine (Undifferentiated)	8 (3.6%)
Bromazolam	14 (6.4%)
Carfentanil	1 (0.5%)
Cyclobenzaprine (Flexeril)	1 (0.5%)
Diclazepam	1 (0.5%)
Etizolam	56 (25.5%)
Fentanyl	18 (8.2%)
Fentanyl or analogue	1 (0.5%)
Flualprazolam	35 (15.9%)
Flubromazepam	9 (4.1%)
Flubromazolam	6 (2.7%)
Fluorofentanyl	2 (0.9%)
Lidocaine	4 (1.8%)
Lorazepam (Ativan)	8 (3.6%)
MDA	2 (0.9%)
Nitrazolam	1 (0.5%)
Tetrazepam	1 (0.5%)
Xylazine	3 (1.4%)
Zolpidem (Ambien)	1 (0.5%)

Table 20 (Left, *Continued from previous page).* Active compounds detected in benzodiazepine samples checked in 2022, inclusive of all service locations.

Benzodiazepines: Cutting Agents

Compound	Number of Samples (% of all benzo samples)
Caffeine	9 (4.1%)
Carbohydrate (Undifferentiated)	7 (3.2%)
Creatine	1 (0.5%)
Dimethyl sulfone (MSM)	1 (0.5%)
Lactose	23 (10.5%)
Magnesium stearate	2 (0.9%)
Mannitol	1 (0.5%)
Microcrystalline cellulose	139 (63.2%)
Polyvinylpyrrolidone (Kollidon)	2 (0.9%)
Starch	1 (0.5%)
Sucrose	1 (0.5%)

Table 21 (above) Cutting agents detected in benzodiazepine samples across all service locations. *Quantitative concentrations are not available for these compounds.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Benzodiazepine: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in benzodiazepine samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 22 below may not match those listed in Table 20. Table 22 aggregates the results from all *expected* benzodiazepine samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
Acetylmorphine (MAM)	1			2.2%	
Adinazolam	1			1.0%	
Alprazolam	28	3.0%	0.1%	14.0%	0.8% - 5.0%
Benzocaine	7	>80%	27.6%	>80%	63.1% - >80%
Bromazolam	15	1.3%	<0.1%	>80%	0.6% - 53.0%
Carfentanil	1			0.06%	
Diazepam	4	5.0%	1.0%	8.1%	3.6% - 6.1%
Diclazepam	2		<0.1%	<0.1%	
Etizolam	63	1.5%	0.2%	>25%	0.8% - 4.0%
Fentanyl	19	0.5%	0.1%	>80%	0.3% - 5.2%
Flualprazolam	50	0.5%	0.1%	>80%	0.3% - 0.7%
Flubromazepam	9	4.0%	0.2%	>25%	2.1% - >25%
Flubromazolam	5	0.1%	<0.1%	1.1%	0.1% - 0.9%
Fluorofentanyl	3	0.7%	0.5%	>80%	
Lidocaine	4	0.8%	0.1%	1.7%	0.3% - 1.5%
Lorazepam	9	<0.1%	<0.1%	3.2%	<0.1% - 0.4%
MDA	2		1.9%	5.8%	
Nitrazolam	1			<0.1%	
Tetrazepam	1			<0.1%	
Xylazine	3	0.2%	0.1%	34.9%	0.1% - 17.6%
Zolpidem	1			10.8%	

Table 22. PS-MS quantification of targeted active compounds detected in *expected* benzodiazepine samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Psychedelics

The psychedelics class includes drugs such as lysergamides (LSD), substituted tryptamines (DMT, 5-MeO-MiPT, etc.), some substituted phenethylamines (mescaline, 2C-X), and others (DOM, ibogaine). Our project does not include MDMA/MDA, nor ketamine, into the psychedelics class. While a majority (66%) of psychedelic samples were "as expected", we still see misrepresentations quite regularly. The naming convention of many psychedelics lends itself to confusion: 5-MeO-DiPT vs. 5-MeO-MiPT; 5-MeO-DMT vs. DMT; 1P-LSD vs. LSD; 2C-B vs. "Tucibi" (a polysubstance mixture also known as "Tusi" or "pink cocaine"; often a mixture of cocaine, MDMA, and ketamine) - the list goes on. 56% (25/45) of psychedelic samples that contained unexpected actives were found to contain an analogue of the expected compound. "Tucibi" vs. 2C-B represented 20% (9/45) of psychedelic samples with an unexpected composition. Despite the similar names and structural similarities of many psychedelics, dosage and effect can be vastly different between compounds. We hope that drug checking can aide people in informing dose and in understanding experience.

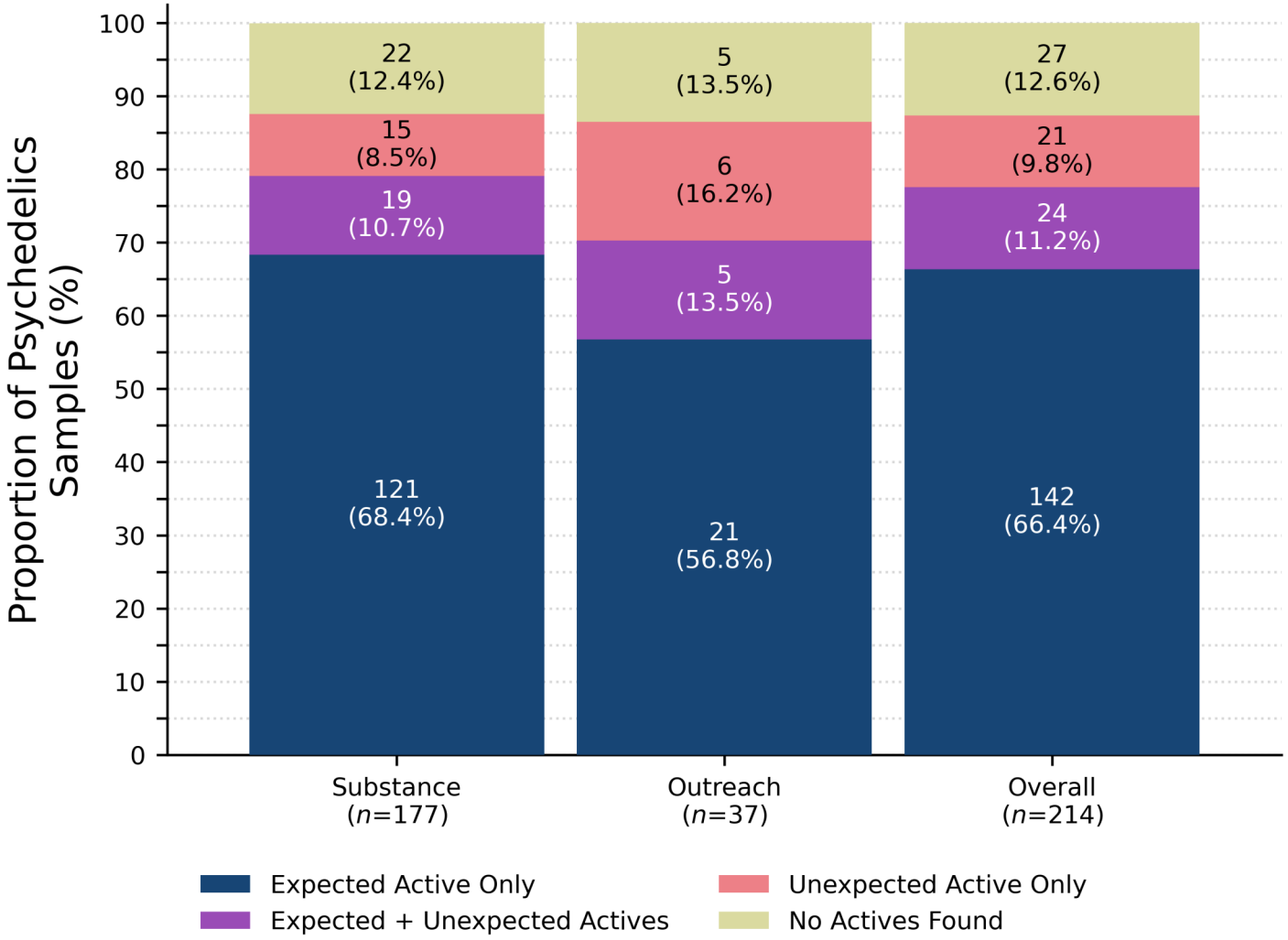

Figure 23. Proportion and number of psychedelic samples checked by service locations, grouped by composition class (see page 9 for definitions).

Psychedelics: What did we find?

Table 23 below (and on the following page) aggregates all active compounds detected in psychedelic samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all psychedelic samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 24 on page 43 aggregates all cutting agents detected in psychedelics, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all psychedelic samples)
Expected Active Only	***142 (66.4%)***
2C-B	18 (8.4%)
2C-T-7	1 (0.5%)
4-AcO-DMT	2 (0.9%)
4-HO-DET	1 (0.5%)
4-HO-MET	4 (1.9%)
5-MeO-DMT	2 (0.9%)
5-MeO-DiPT (Foxy)	1 (0.5%)
5-MeO-MiPT (Moxy)	2 (0.9%)
DMT	21 (9.8%)
DOB	1 (0.5%)
Escaline	1 (0.5%)
Ibogaine	2 (0.9%)
LSD	76 (35.5%)
Mescaline	3 (1.4%)
Methallylescaline	1 (0.5%)
Psilocybin (mushrooms)	3 (1.4%)
Salvinorin A (Salvia)	1 (0.5%)
Expected* + Unexpected Active(s)	***24 (11.2%)***
2C-B* + 2C-H	9 (4.2%)
2C-B* + Cocaine HCl + Phenacetin	5 (2.3%)
2C-B* + Cocaine + Ketamine + MDMA + Phenacetin	1 (0.5%)

Table 23. Active compounds detected in psychedelic samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Psychedelics: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all psychedelic samples)
Expected* + Unexpected Active(s)	***24 (11.2%)***
2C-B* + Ketamine + MDMA + Phenacetin	2 (0.9%)
4-HO-DET* + 4-HO-DiPT	1 (0.5%)
5-MeO-DMT* + DMT	2 (0.9%)
DMT* + 5-MeO-DMT	1 (0.5%)
DMT* + Tryptamine (Undifferentiated)	2 (0.9%)
LSD* + THC	1 (0.5%)
Unexpected Active(s) Only	***21 (9.8%)***
2C-B *(2C-D expected)*	1 (0.5%)
4-AcO-MiPT *(4-HO-MiPT expected)*	1 (0.5%)
4-HO-MET *(4-MeO-DMT expected)*	1 (0.5%)
5-MeO-MALT *(5-MeO-DMT expected)*	2 (0.9%)
5-MeO-MiPT *(4-AcO-DMT and 5-MeO-DMT expected)*	2 (0.9%)
Albuterol sulfate + Cocaine + MDA *(2C-B expected)*	1 (0.5%)
Amphetamine *(LSD expected)*	1 (0.5%)
Cocaine HCl *(Methallylescaline expected)*	2 (0.9%)
Cocaine + Ketamine + MDMA *(2C-B expected)*	1 (0.5%)
Etizolam *(AMT expected)*	1 (0.5%)
Lysergamide (Undifferentiated) *(LSD expected)*	1 (0.5%)
MDMA *(2C-B expected)*	3 (1.4%)
Methamphetamine *(DMT expected)*	1 (0.5%)
Psilocin *(DMT expected)*	2 (0.9%)
THC *(Psilocin expected)*	1 (0.5%)

Table 23 (*Continued from previous page).* Active compounds detected in psychedelic samples checked in 2022, inclusive of all service locations.

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Psychedelics: Cutting Agents

Compound	Number of Samples (% of all psychedelic samples)	Compound	N Samples
Caffeine	3 (1.4%)	Mannitol	1 (0.5%)
Carbohydrate (Undifferentiated)	6 (2.8%)	Microcrystalline cellulose	7 (3.3%)
Dextrose	1 (0.5%)	Polyethylene glycol (PEG)	1 (0.5%)
Fumaric acid	1 (0.5%)	Sucrose	1 (0.5%)
Lactose	4 (1.9%)		

Table 24. Cutting agents detected in psychedelic samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Psychedelics: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in psychedelic samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 25 below may not match those listed in Table 23. Table 25 aggregates the results from all *expected* psychedelic samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
2C-B	23	55.1%	<0.1%	>80%	7.1% - >80%
2C-H	8	1.1%	0.5%	1.4%	1.1% - 1.3%
2C-T-7	1			>80%	
5-MeO-DMT	5	39.6%	13.6%	>80%	32.3% - >80%
5-MeO-MiPT	2		2.6%	2.6%	
Cocaine HCl	7	6.1%	5.0%	16.8%	5.4% - 9.0%
DMT	5	41.3%	<0.1%	>80%	9.7% - >80%
Etizolam	1			0.3%	
MDA	1			2.0%	
MDMA	4	15.9%	9.4%	25.8%	9.8% - 22.7%
Methamphetamine	1			>80%	
Phenacetin	6	47.6%	8.0%	>80%	13.0% - >80%

Table 25. PS-MS quantification of targeted active compounds detected in *expected* psychedelic samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Opioid–Other

We group prescription opioids like hydromorphone (Dilaudid), oxycodone (Oxycontin and Percocet), morphine (Kadian), and their illicitly manufactured look-alikes into the opioid–other category. Samples expected to contain oxycodone were the most common other opioids checked and also displayed the highest prevalence of unexpected compounds. 46% (53/115) of opioid–other samples were expected to contain oxycodone, either as oxycodone alone or as Percocet (oxycodone + acetaminophen) however, only 47% (25/53) of these samples were "as expected". Within expected oxycodone samples that contained unexpected compounds, 11 samples (20% of expected oxycodone) contained fentanyl or fentanyl analogues, two samples contained nitazenes instead (metonitazene and isotonitazene), two were found to be hydromorphone, and heroin was found in one sample. No active compounds were detected in the remaining 23% (12/53) of expected oxycodone samples. In comparison, 37 samples were expected to be hydromorphone; 92% (34/37) were as expected, fentanyl or fentanyl analogues were detected in two samples (5% of expected hydromorphone), and diphenhydramine (Benadryl) was detected in one sample.

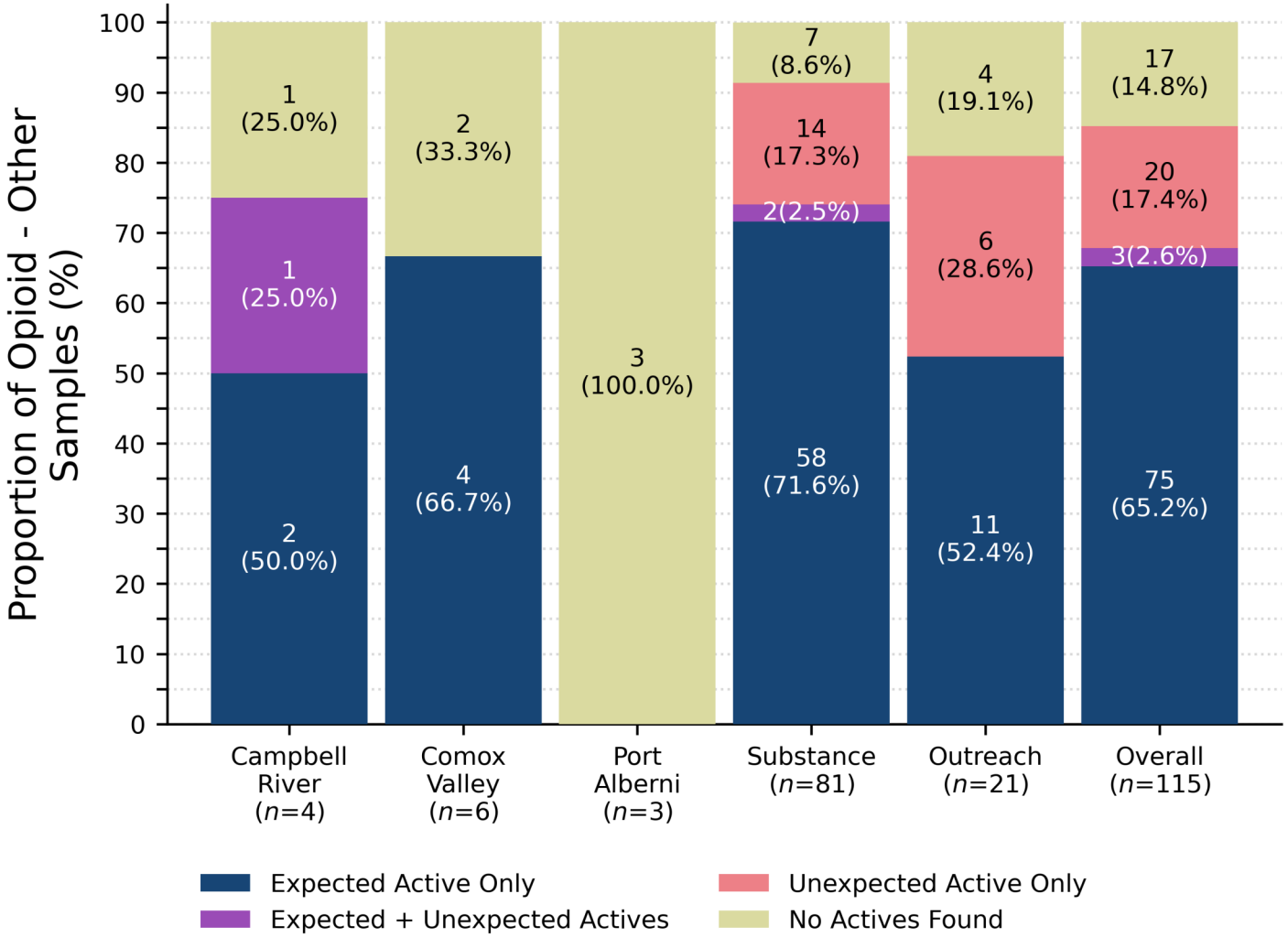

Figure 15. Proportion and number of opioid–other samples checked by service locations, grouped by composition class (see page 9 for definitions).

Opioid–Other: What did we find?

Table 26 below aggregates all active compounds detected in opioid–other samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all opioid–other samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 27 on page 46 aggregates all cutting agents detected in opioid–other samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all opioid–other samples)
Expected Active Only	***75 (65.2%)***
Hydrocodone	1 (0.9%)
Hydromorphone (Dilaudid, Dillies)	34 (30.4%)
Morphine	10 (8.7%)
Opium	5 (4.3%)
Oxycodone (Oxycontin)	15 (13.0%)
Percocet (Oxycodone + Acetaminophen)	10 (8.7%)
Expected* + Unexpected Active(s)	***3 (2.6%)***
Hydromorphone* + Fentanyl	1 (0.9%)
Hydromorphone* + Fentanyl or analogue	1 (0.9%)
Oxycodone* + Hydromorphone	1 (0.9%)
Unexpected Active(s) Only	***20 (17.4%)***
Acetaminophen (Tylenol)	2 (1.7%)
Acetylcodeine	1 (0.9%)
Acetylmorphine (MAM)	1 (0.9%)
Amphetamine	1 (0.9%)
Benzodiazepine (Undifferentiated)	1 (0.9%)
Diphenhydramine (Benadryl)	1 (0.9%)
Fentanyl	9 (7.8%)
Fentanyl or analogue	2 (1.7%)
Heroin	1 (0.9%)
Hydromorphone (Dilaudid, Dillies)	1 (0.9%)
Isotonitazene	1 (0.9%)
Lidocaine	1 (0.9%)
Methadone	1 (0.9%)
Metonitazene	1 (0.9%)
N-desethyl isotonitazene	1 (0.9%)

Table 26. Active compounds detected in opioid –other samples checked in 2022, inclusive of all service locations.

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Opioid–Other: Cutting Agents

Compound	Number of Samples (% of all opioid-other samples)	Compound	N Samples
Caffeine	11 (9.6%)	Mannitol	1 (0.9%)
Calcium carbonate (Chalk)	1 (0.9%)	Microcrystalline cellulose	54 (47.0%)
Calcium phosphate	3 (2.6%)	Polyethylene glycol (PEG)	1 (0.9%)
Carbohydrate (Undifferentiated)	5 (4.3%)	Polyvinylpyrrolidone (Kollidon)	2 (1.7%)
Flour	1 (0.9%)	Starch	1 (0.9%)
Lactose	25 (21.7%)	Sucrose	4 (3.5%)
Magnesium stearate	2 (1.7%)	Talc	1 (0.9%)

Table 27. Cutting agents detected in opioid–other samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Opioid–Other: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in opioid other samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 28 below may not match those listed in Table 26. Table 28 aggregates the results from all *expected* opioid–other samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
Acetylcodeine	1			0.8%	
Acetylmorphine	2		<0.1%	4.5%	
Amphetamine	1			5.6%	
Fentanyl	10	1.0%	<0.1%	22.4%	0.5% - 1.6%
Heroin	1			17.8%	
Hydromorphone	37	4.4%	0.8%	18.0%	2.4% - 5.7%
Isotonitazene	1			1.4%	
Lidocaine	1			20.9%	
Metonitazene	1			11.7%	
Morphine	10	2.5%	1.0%	14.6%	1.6% - 3.2%
N-desethyl isotonitazene	1			0.4%	
Oxycodone	16	3.5%	0.7%	6.5%	1.2% - 4.4%

Table 28. PS-MS quantification of targeted active compounds detected in *expected* opioid–other samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Stimulants–Other

The "stimulants–other" class includes all stimulant samples outside of cocaine, methamphetamine, and MDMA/MDA and includes drugs like prescription amphetamines (Adderall and Dexedrine), methylphenidate (Ritalin/Concerta), and stimulating substituted cathinones like 3-MMC and 4-MMC. The most common misrepresentation that we see within the simulants are methamphetamine pressed pills that are expected to be Adderall or Dexedrine. 21 samples checked in 2022 were expected to contain amphetamine (either as Dexedrine or Adderall). Of these, 52% (11/21) were confirmed to contain amphetamine while 43% (9/21) were found to contain methamphetamine instead (one sample also contained MDA). The remaining expected amphetamine sample was found to be a caffeine pressed pill. 11 samples were expected to contain the substituted cathinone 3-MMC. 54% (6/11) were confirmed to contain 3-MMC, while the other five samples were found to contain 3-BMC, 3-CMC, MDA (x2), and methamphetamine.

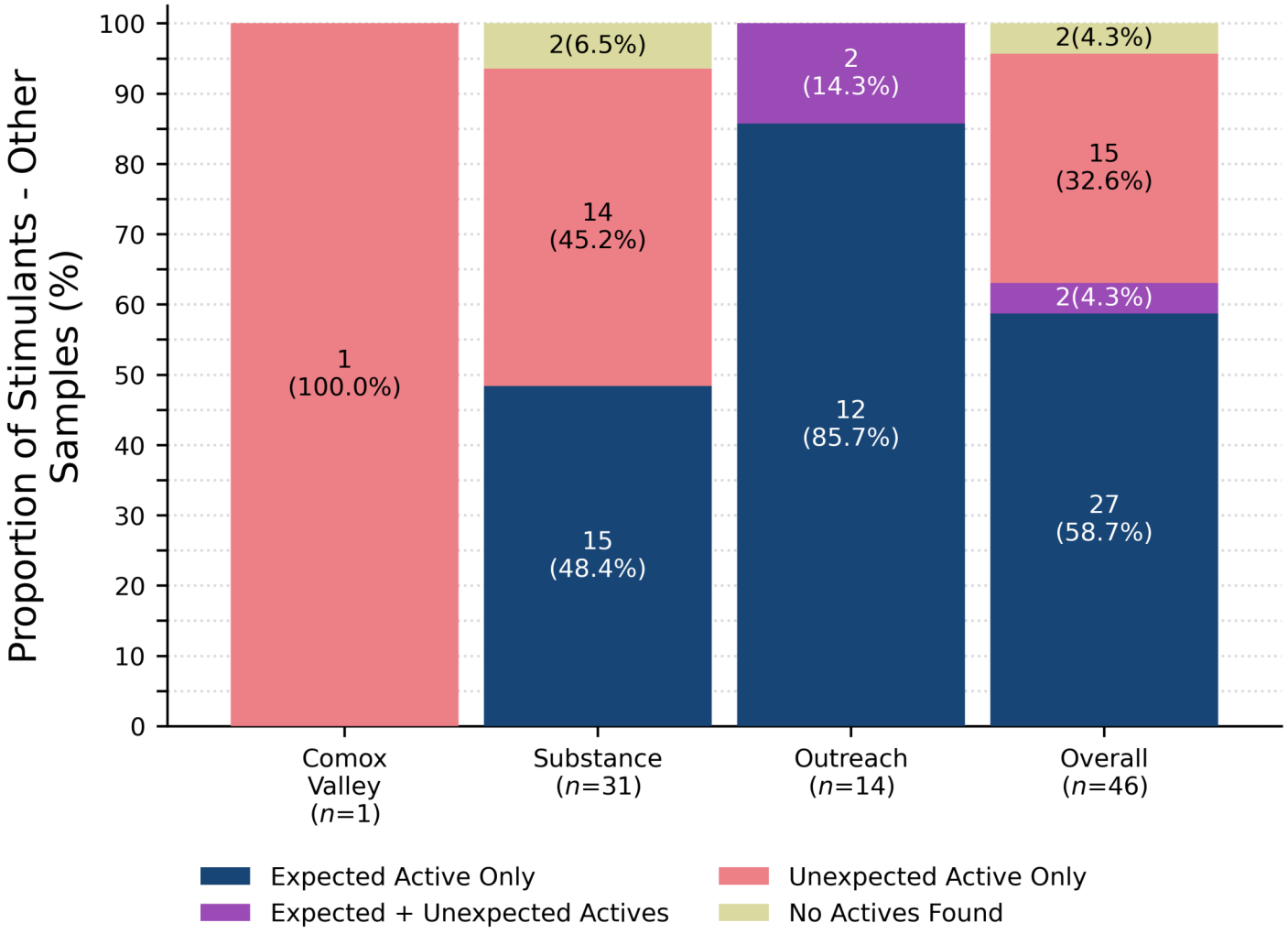

Figure 16. Proportion and number of stimulant–other samples checked by service locations, grouped by composition class (see page 9 for definitions).

Stimulants–Other: What did we find?

Table 29 below aggregates all active compounds detected in stimulant–other samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all stimulant–other samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 29 aggregates all cutting agents detected in stimulant–other samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all stimulant samples)
Expected Active Only	***27 (58.7%)***
2-FMA	1 (2.2%)
3-FPM	1 (2.2%)
3-MMC (Metaphedrone)	6 (13.0%)
4-MMC (Mephedrone)	2 (4.3%)
5-MAPB	4 (8.7%)
6-APB	1 (2.2%)
Amphetamine	11 (23.9%)
MDPV	1 (2.2%)
Expected* + Unexpected Active(s)	***2 (4.3%)***
5-MAPB* + 2-FMA	1 (2.2%)
6-APB* + 4-APB	1 (2.2%)
Unexpected Active(s) Only	***15 (32.6%)***
3-BMC *(3-MMC expected)*	1 (2.2%)
3-CMC *(3-MMC expected)*	1 (2.2%)
Dimethylpentylone *(Eutylone expected)*	1 (2.2%)
MDA *(3-MMC expected)*	2 (4.3%)
MDA + Methamphetamine *(amphetamine expected)*	1 (2.2%)
Methamphetamine *(3-MMC expected)*	1 (2.2%)
Methamphetamine *(amphetamine expected)*	8 (17.4%)

Table 29 (left). Active compounds detected in stimulant–other samples checked in 2022, inclusive of all service locations.

Stimulants–Other: Cutting Agents

Compound	Number of Samples (% of all stimulant samples)
Caffeine	11 (23.9%)
Carbohydrate (Undifferentiated)	1 (2.2%)
Lactose	1 (2.2%)
Microcrystalline cellulose	9 (19.6%)
Polyethylene glycol (PEG)	1 (2.2%)
Sucrose	2 (4.3%)

Table 30 (above). Cutting agents detected in stimulant–other samples across all service locations. *Quantitative concentrations are not available for these compounds.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Depressants–Other

"Depressants–Other" describe samples that are non-opioid and non-benzodiazepine depressants like GHB, GBL, gabapentin, and the "Z-drugs" (zopiclone and zolpidem). Expected GHB samples make up a majority of these samples, representing 81% (30/37) of "depressant–other" samples checked. Inactive samples represent 50% of the "unexpected" depressants, where we commonly only find water in expected GHB samples: 5/6 "inactive" samples were expected to contain GHB but water the only compound detected. It remains possible that GHB or GBL is present in these "inactive" samples, but at concentrations below the detection limits of FTIR. GHB and GBL are not in our targeted method for PS-MS.

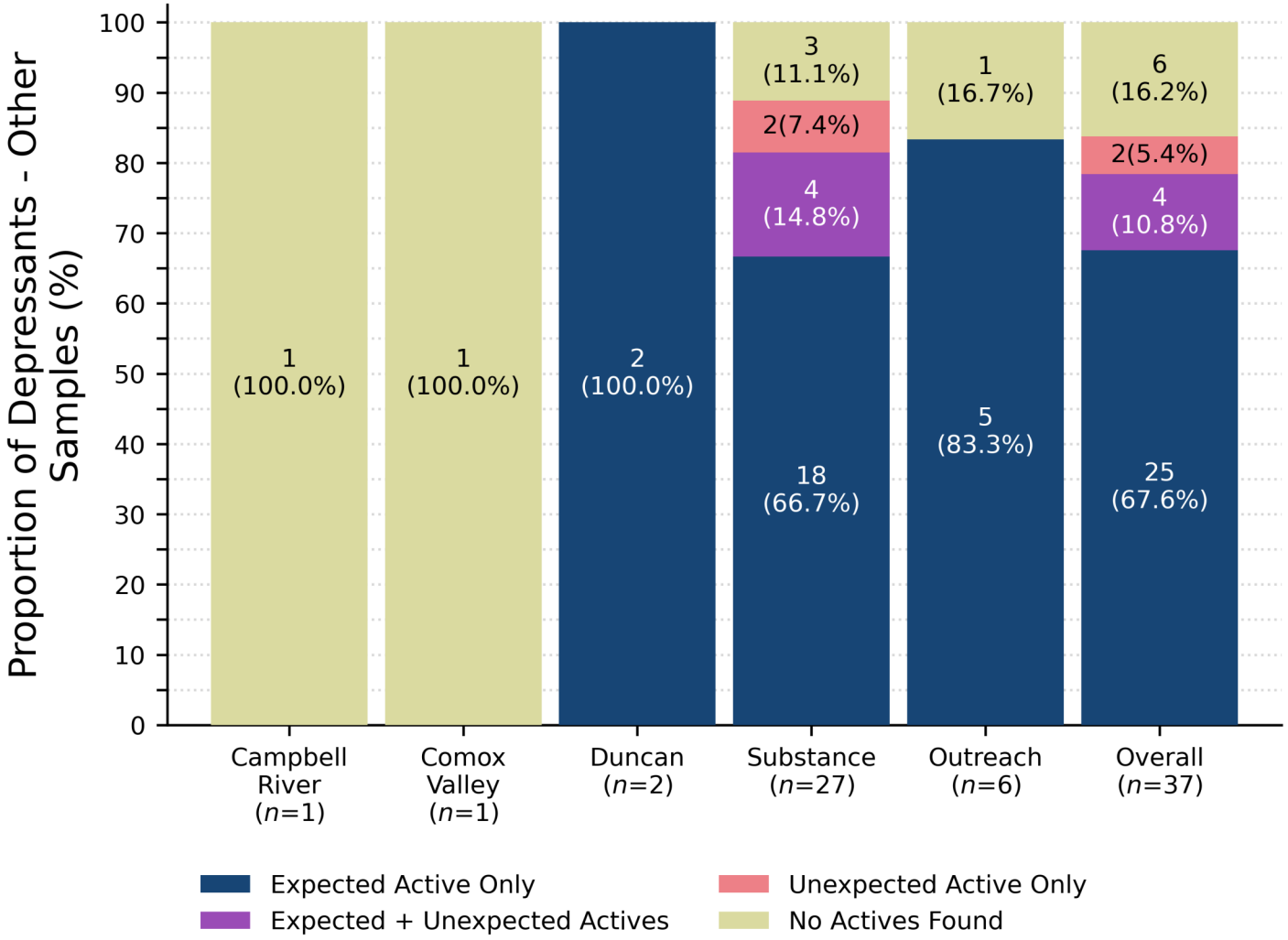

Figure 17. Proportion and number of depressant-other samples checked by service locations, grouped by composition class (see page 9 for definitions).

Depressants–Other: What did we find?

Table 31 below aggregates all active compounds detected in depressant-other samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all depressant–other samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 32 aggregates all cutting agents detected in depressant-other samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all depressant samples)
Expected Active Only	***25 (67.6%)***
Gabapentin	1 (2.7%)
GHB	21 (56.8%)
Methaqualone (Quaaludes)	1 (2.7%)
Pregabalin	1 (2.7%)
Zopiclone	1 (2.7%)
Expected* + Unexpected Active(s)	***4 (10.8%)***
GHB* + Etizolam	1 (2.7%)
GHB* + Fentanyl or analogue + Benzodiazepine (Undifferentiated)	1 (2.7%)
GHB* + GBL	1 (2.7%)
Gabapentin* + Albuterol sulfate	1 (2.7%)
Unexpected Active(s) Only	***2 (5.4%)***
MDMA *(GHB expected)*	1 (2.7%)
Meprobamate (*Methaqualone expected)*	1 (2.7%)

Table 31 (above). Active compounds detected in depressant-other samples checked in 2022, inclusive of all service locations.

Depressants–Other: Cutting Agents

Compound	Number of Samples (%of all depressant samples)
Carbohydrate (Undifferentiated)	2 (5.4%)
Microcrystalline cellulose	1 (2.7%)
Water	5 (13.5%)

Table 32 (left). Cutting agents detected in depressant -other samples across all service locations. *Quantitative concentrations are not available for these compounds.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Stimulants–Other and Depressants–Other: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in stimulant and depressant samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in tables below may not match those listed in Tables 29 and 31. Tables 33 and 34 aggregates the results from all *expected* stimulant–other and depressant–other samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Stimulants–Other: Quantification

Compound	# Quant.	Median	Min	Max	IQR
Amphetamine	5	54.5%	5.8%	>80%	8.4% - >80%
MDA	2		1.4%	66.8%	
Methamphetamine	2		0.1%	>80%	

Table 33. PS-MS quantification of targeted active compounds detected in *expected* stimulant–other samples, inclusive of all service locations.

Depressants–Other: Quantification

Compound	# Quant.	Median	Min	Max	IQR
Etizolam	1			2.3%	
MDMA	1			4.0%	

Table 34. PS-MS quantification of targeted active compounds detected in *expected* depressant–other samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Other categories

All other drugs that do not fit into the aforementioned categories are classified as “Other”. This includes samples like cannabis (and extracts), steroids, and various pharmaceuticals. The complexity of plant material presents a challenge when examining cannabis on FTIR. While we are often able to confirm the presence of THC and/or CBD in cannabis products, we do not have the methodology to determine concentrations of THC or CBD. THC and CBD present a unique challenge with PS-MS as well since both compounds are isobaric and are structurally quite similar; differentiating these compounds with PS-MS is beyond our current methodology. At best, we screen cannabis samples for any unexpected substances and, to date, we have not seen fentanyl or other opioids in cannabis samples. The analysis of steroids on FTIR has unique limitations as well. Most steroids brought to our service are delivered in a carrier oil that often complicates the analysis of the FTIR spectrum. Furthermore, we do not have comprehensive spectral libraries available for all of the different esters, meaning we can often only narrow a steroid down to a broad class like “Nandrolone (Undifferentiated)”. Similarly, our spectral libraries for pharmaceuticals are not exhaustive and there are some samples checked for which we do not have a reference spectrum. In these scenarios, we rely on other resources, untargeted analysis on PS-MS, and/or collaboration with other drug checking projects to elucidate the identity of a compound.

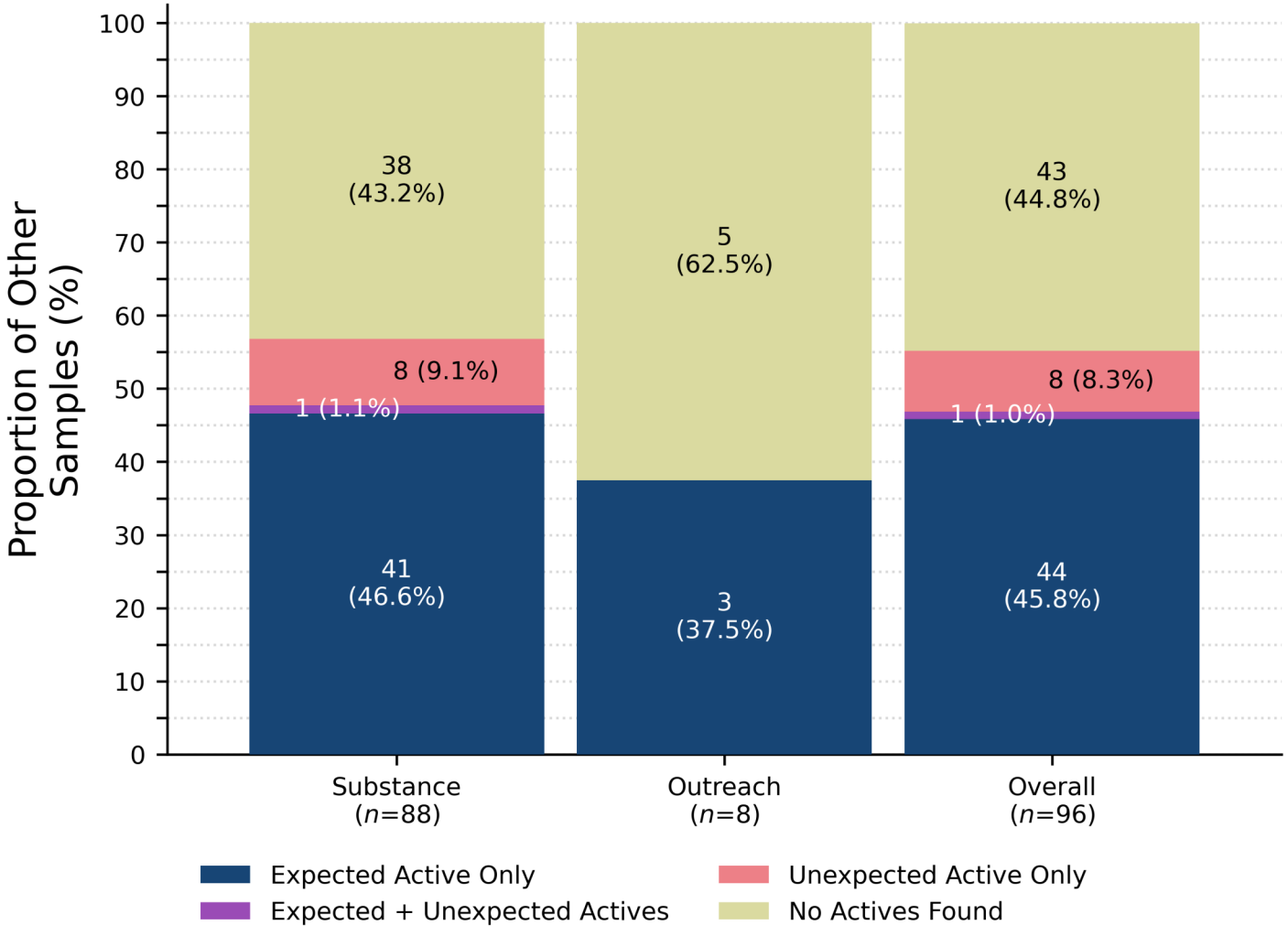

Figure 19. Proportion and number of other samples checked by service locations, grouped by composition class (see page 9 for definitions).

Other categories: What did we find?

Table 35 below aggregates all active compounds detected in "other" samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all "other" samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 36 on page 54 aggregates all cutting agents detected in "other" samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all other samples)
Expected Active Only	***44 (45.8%)***
Alcohol (Ethanol)	1 (1.0%)
Cannabidiol (CBD)	4 (4.2%)
Cannabis	7 (7.3%)
Cyclobenzaprine (Flexeril)	1 (1.0%)
Ivermectin	1 (1.0%)
Nandrolone phenylpropionate	1 (1.0%)
Oxandrolone	2 (2.1%)
Selegiline (L-deprenyl)	1 (1.0%)
Sildenafil (Viagra)	2 (2.1%)
THC	20 (20.8%)
Tadalafil (Cialis)	4 (4.2%)
Tamoxifen	1 (1.0%)
Expected* + Unexpected Active(s)	***1 (1.0%)***
Cannabidiol (CBD)* + THC	1 (1.0%)
Unexpected Active(s) Only	***8 (8.3%)***
Nandrolone (Undifferentiated)	1 (1.0%)
Sildenafil (Viagra)	2 (2.1%)
THC	3 (3.1%)
Testosterone (Undifferentiated)	1 (1.0%)
Zopiclone	1 (1.0%)

Table 35. Active compounds detected in "other" samples checked in 2022, inclusive of all service locations.

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Other categories: Cutting Agents

Compound	Number of Samples (% of all other samples)
Caffeine	3 (3.1%)
Carbohydrate (Undifferentiated)	8 (8.3%)
Dimethoxybenzaldehyde	1 (1.0%)
Lactose	1 (1.0%)
Microcrystalline cellulose	17 (17.7%)
Oil	3 (3.1%)
Sodium dichloroacetate	2 (2.1%)
Starch	1 (1.0%)
Sucrose	5 (5.2%)
Triglyceride	1 (1.0%)

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.

Table 36. Cutting agents detected in "other" samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Other categories: Quantification

No quantitative data is available for samples in the "other" category as none of the compounds detected in these samples are within the targeted method for PS-MS. Compound detection in Tables 35 and 36 is based on FTIR analysis alone.

Unknown samples

Unknown" samples are those with an identity, or suspected identity, unknown to the service user (such as ground scores and unlabeled baggies). "Unknown" samples are the fourth most common "drug class" that we check, representing 7% of the total samples checked in 2022. Given that there is no "expected" active in "Unknown" samples, by default all are either classified as "unexpected" or "inactive" depending on whether active drugs were detected or not.

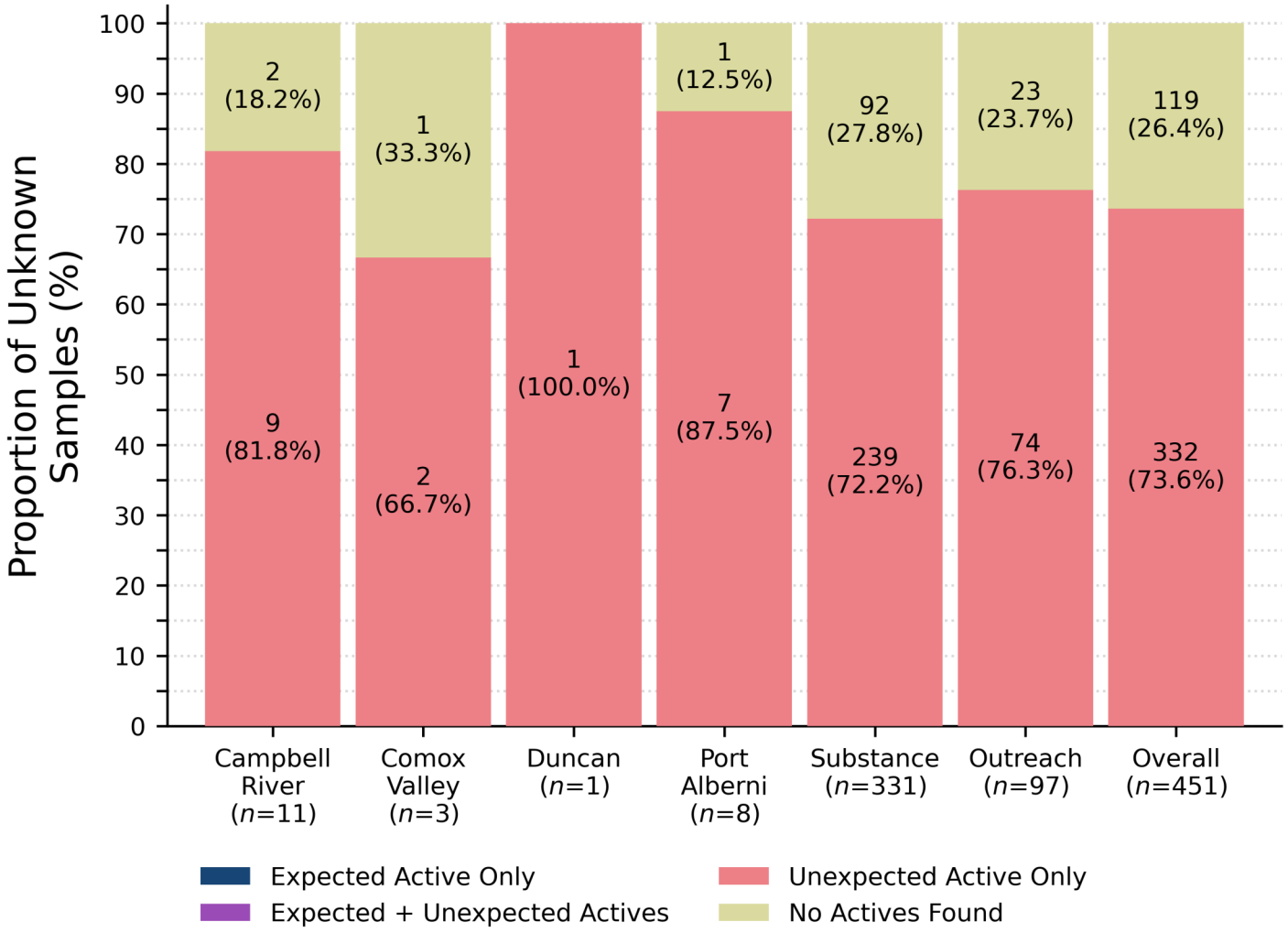

Figure 19. Proportion and number of unknown samples checked by service locations, grouped by composition class (see page 9 for definitions).

Unknown samples: What did we find?

Table 37 below (and on the following page) aggregates all active compounds detected in unknown samples in 2022, across all service locations. The number of detections, and the prevalence with respect to all unknown samples checked, is listed. Samples with no detected actives have been excluded for brevity, however Table 38 on page 58 aggregates all cutting agents detected in unknown samples, across all service locations. See page 9 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all unknown samples)
Unexpected Active(s) Only	***332 (73.6%)***
2C-B	2 (0.4%)
4-HO-MET	1 (0.2%)
Acetaminophen (Tylenol)	10 (2.2%)
Acetylcodeine	3 (0.7%)
Acetylmorphine (MAM)	2 (0.4%)
Adinazolam	1 (0.2%)
Alprazolam (Xanax)	2 (0.4%)
Amphetamine	4 (0.9%)
Aspirin	3 (0.7%)
Benzocaine	3 (0.7%)
Benzodiazepine (Undifferentiated)	24 (5.3%)
Bromazolam	17 (3.8%)
Cannabidiol (CBD)	1 (0.2%)
Citalopram	1 (0.2%)
Clobazam	1 (0.2%)
Cocaine Base (crack, rock, hard)	25 (5.5%)
Cocaine HCl (powder)	33 (7.3%)
DMT	2 (0.4%)
Diazepam (Valium)	2 (0.4%)
Dimenhydrinate	3 (0.7%)

Table 37. Active compounds detected in unknown samples checked in 2022, inclusive of all service locations. *Continued on the next page.*

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Unknown samples: What did we find? - *continued*

Detected Compounds by Composition Class	Number of Samples (% of all unknown samples)
Unexpected Active(s) Only	***332 (73.6%)***
Diphenhydramine (Benadryl)	1 (0.2%)
Ethylphenidate	1 (0.2%)
Etizolam	18 (4.0%)
Fentanyl	120 (26.6%)
Fentanyl or analogue	10 (2.2%)
Flualprazolam	6 (1.3%)
Flubromazepam	8 (1.8%)
Fluorofentanyl	26 (5.8%)
GHB	1 (0.2%)
Heroin	5 (1.1%)
Hydromorphone (Dilaudid, Dillies)	15 (3.3%)
Ketamine	21 (4.7%)
Levamisole	3 (0.7%)
Lorazepam (Ativan)	1 (0.2%)
MDA	13 (2.9%)
MDMA	27 (6.0%)
Mescaline	1 (0.2%)
Methamphetamine	34 (7.5%)
Methenolone acetate	1 (0.2%)
Morphine	10 (2.2%)
Oxycodone (Oxycontin)	3 (0.7%)
Phenacetin	5 (1.1%)
Phenobarbital	1 (0.2%)
Pregabalin	1 (0.2%)
Sildenafil (Viagra)	1 (0.2%)
THC	4 (0.9%)
W-19	1 (0.2%)
Xylazine	20 (4.4%)

Table 37 (*Continued from the previous page*). Active compounds detected in unknown samples checked in 2022, inclusive of all service locations.

*Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations. *Expected active component. "Fentanyl or analogue" and "Benzodiazepine (undifferentiated)" results are based on a positive strip test and are unconfirmed by paper spray.*

Unknown samples: Cutting Agents

Compound	Number of Samples (% of all unknown samples)
Ascorbic acid (Vitamin C)	3 (0.7%)
Caffeine	105 (23.3%)
Calcium carbonate (Chalk)	6 (1.3%)
Carbohydrate (Undifferentiated)	13 (2.9%)
Citric acid	1 (0.2%)
Creatine	1 (0.2%)
Dimethyl sulfone (MSM)	5 (1.1%)
Erythritol	25 (5.5%)
Fat	1 (0.2%)
Flour	3 (0.7%)
Inorganic sulphate	1 (0.2%)
Isopropyl benzylamine	1 (0.2%)
Lactose	23 (5.1%)
Magnesium sulfate	2 (0.4%)
Mannitol	12 (2.7%)
Microcrystalline cellulose	36 (8.0%)
Nicotinamide (Niacin)	1 (0.2%)
Piperonyl methyl ketone (MDP2P, PMK)	1 (0.2%)
Polyethylene glycol (PEG)	3 (0.7%)
Potassium permanganate	1 (0.2%)
Sodium bicarbonate (Baking powder)	9 (2.0%)
Sodium carbonate	2 (0.4%)
Sodium sulfate	1 (0.2%)
Sorbitol	3 (0.7%)
Starch	12 (2.7%)
Stearic acid	17 (3.8%)
Sucrose	13 (2.9%)
Talc	2 (0.4%)
Wax	2 (0.4%)
Xylitol	6 (1.3%)

Table 38. Cutting agents detected in unknown samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Instruments may not be able to detect all ingredients and certainty of interpretations may vary. Multiple substances may be present in one sample and substances may be present in trace concentrations.

Unknown samples: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in unknown samples. Not all samples can be analyzed via PS-MS, primarily due to samples that are too small to be accurately weighed, so the values listed in Table 39 below may not match those listed in Table 37. Table 39 aggregates the results from all unknown samples checked in 2022 across all service locations. Weight percentage is reported below. "IQR" is the interquartile range: the concentration range containing half of the quantified samples.

Compound	# Quant.	Median	Min	Max	IQR
2C-B	1			>80%	
Acetylcodeine	3	3.0%	2.5%	6.0%	
Acetylmorphine	2		1.1%	26.6%	
Adinazolam	1			0.2%	
Alprazolam	2		0.4%	0.6%	
Amphetamine	3	5.4%	4.4%	7.1%	
Benzocaine	1			>80%	
Bromazolam	16	2.8%	0.2%	15.8%	0.8% - 6.3%
Cocaine Base	3	73.4%	6.6%	>80%	
Cocaine HCl	12	76.0%	<0.1%	>80%	15.5% - >80%
Diazepam	2		1.5%	2.8%	
Etizolam	15	1.5%	0.2%	19.0%	0.4% - 1.9%
Fentanyl	111	8.5%	<0.1%	>80%	2.8% - 17.2%
Flualprazolam	6	0.4%	0.1%	0.7%	0.2% - 0.5%
Flubromazepam	7	0.7%	<0.1%	1.0%	0.2% - 0.8%
Fluorofentanyl	26	1.6%	0.2%	46.0%	0.4% - 6.2%
Heroin	3	7.0%	6.0%	>80%	
Hydromorphone	15	2.2%	0.9%	7.8%	1.4% - 4.3%
Ketamine	3	>80%	>80%	>80%	
Levamisole	3	18.8%	0.2%	32.5%	
Lorazepam	1			1.7%	
MDA	2		4.1%	>80%	
MDMA	8	60.1%	10.5%	>80%	56.2% - 74.9%
Methamphetamine	5	>80%	9.2%	>80%	>80% - >80%
Morphine	10	4.8%	1.0%	13.8%	4.0% - 10.2%
Oxycodone	3	1.7%	0.6%	4.9%	
Phenacetin	4	14.3%	2.1%	32.5%	2.9% - 27.2%
Xylazine	20	1.0%	0.1%	25.0%	0.3% - 11.2%

Table 39. PS-MS quantification of targeted active compounds detected in unknown samples, inclusive of all service locations.

**There is a maximum concentration limit that the PS-MS can quantify for each compound of interest. If a sample contains a higher percentage of a compound than the PS-MS limit, then only the upper limit will be reported.*

Opioid–Positivity in Non-Opioid–down Samples

In 2022, we checked 3079 samples across all service locations that were not expected to contain fentanyl or other unexpected opioids. Since the opioid–down supply is no longer "just heroin" or "just fentanyl" and is instead a complex, potent, and ever-changing polysubstance market containing other opioids like fluorofentanyl and nitazenes, here we will examine the prevalence of any unexpected opioid, not just fentanyl, detected in non-opioid–down samples. In the case of "opioid-other" samples, "unexpected opioids" are defined as any other opioid detected that is not the expected opioid (e.g. fentanyl in an expected oxycodone pill). Unknown samples have been excluded from these data.

These data are split into two categories in Table 40 below: samples in each drug class where unexpected opioids were detected (leftmost columns) vs. samples where unexpected opioids were detected alongside the *expected* drug (right most columns). The intention of this split is to examine opioid misrepresentation vs. the co-prevalence of opioids with non-opioids. Examining Table 40, we find that unexpected opioids were detected in 2.6% of all non-opioid–down samples. However, if we are interested in the co-prevalence of opioids and non-opioid samples, we see that 1.2% of the samples *that were confirmed to contain the expected substance* also contained an unexpected opioid.

As a guiding example from these data, 10% (22/220) of expected benzodiazepine samples were found to contain unexpected opioids. However, not all benzo samples are "as expected" and only 30.5% (67/220) of benzo samples actually contained the expected benzo. Of these 67 samples, only 1 sample was found to contain opioids as well (1.5% of benzo samples that contained the expected benzo). Samples in the "Opioid-Other", Methamphetamine, and Benzodiazepine classes showed the highest total prevalence of unexpected opioids. No opioids were detected in psychedelic samples, stimulant–other samples, or in samples in the "other categories" class.

Expected Substance Class	Total Samples	Total Opioid Positive (% of Total Expected)	Samples Containing Expected Active (% of Total Samples in Class)	Samples Containing Expected Active *and* Opioid-Positive (% of Samples Containing Expected Active)
Cocaine	898	19 (2.1%)	864 (96.2%)	13 (1.5%)
MDMA	762	1 (0.1%)	662 (86.9%)	1 (0.2%)
Methamphetamine	370	19 (5.1%)	325 (87.8%)	13 (4.0%)
Dissociatives	321	1 (0.3%)	298 (92.8%)	0
Benzodiazepines	220	22 (10.0%)	67 (30.5%)	1 (1.5%)
Psychedelics	214	0	166 (77.6%)	0
Opioid - Other	115	17 (14.8%)	78 (67.8%)	3 (3.8%)
Stimulants - Other	46	0	29 (63.0%)	0
Depressants - Other	37	1 (2.7%)	29 (78.4%)	1 (3.4%)
Other categories	96	0	45 (46.9%)	0
Total	**3079**	**80 (2.6%)**	**2563 (83.2%)**	**32 (1.2%)**

Table 40. Overview of the prevalence of unexpected opioids found within non-opioid–down samples in 2022, inclusive of all service locations.

Substance Drug Checking

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2022 Publications

- Davis S., Wallace B., Van Roode T., & Hore D. (2022). **Substance use stigma and community drug checking: A qualitative study examining barriers and possible responses.** *International Journal of Environmental Research and Public Health. 19(23):15978.* https://doi.org/10.3390/ijerph192315978

- Gozdzialski, L., Rowley, A., Boden, S., Gill, C., Wallace, B. Hore, D. (2022). **Rapid and accurate etizolam detection using Surface-Enhanced Raman Spectroscopy for community drug checking**. *International Journal of Drug Policy. 102, 103611.* https://doi.org/10.1016/j.drugpo.2022.103611

- Gozdzialski, L., Wallace, B., Noda, I., & Hore, D. (2022). **Exploring the use of infrared absorption spectroscopy and two-trace two-dimensional correlation analysis for the resolution of multi-component drug mixtures**. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy. (282).* https://doi.org/10.1016/j.saa.2022.121684.

- Larnder, A., Saatchi, A., Borden, S., Moa, B., Gill, C., Wallace, B., & Hore, D. (2022). **Variability in the unregulated opioid market in the context of extreme rates of overdose.** 235, 109427. *Drug and Alcohol Dependence.* https://doi.org/10.1016/j.drugalcdep.2022.109427

- Wallace, B., Gozdzialski, L., Qbaich, A., Shafiul, A., Burek, P., Hutchison, A., Teal, T., Louw, R., Kielty, C., Robinson, D., Moa, B., Storey, MA., Gill, C., & Hore, D. (2022). **A distributed model to expand the reach of drug checking.** *Drugs, Habits and Social Policy. Vol.23 (3), p.220-231.* https://doi.org/10.1108/dhs-01-2022-0005

- Wallace, B., van Roode, T., Burek, P., Hore, D. & Pauly, B (2022). Everywhere and for everyone: Proportionate universalism as a framework for equitable access to community drug checking. *Harm Reduction Journal.* https://doi.org/10.1186/s12954-022-00727-0

- Wallace, B., van Roode, T., Burek, P., Pauly, B. & Hore, D. (2022) **Implementing drug checking as an illicit drug market intervention within the supply chain in a Canadian setting**. *Drugs: Education, Prevention and Policy. DOI:* 10.1080/09687637.2022.2087487

Please visit

communityofsubstance.org

for more shared resources, mutual learning and knowledge integration tools, and drug checking training resources

Substance Drug Checking

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Where to Find Us

Campbell River

Vancouver Island Mental Health Society Overdose Prevention Site
1330 Dogwood St, Unit #5, Campbell River, BC

(250) 287 - 9969

Comox Valley

AVI Health & Community Services
355 6th St, Courtenay, BC

(250) 338 - 7400

Duncan

Duncan Lookout Society Overdose Prevention Site
Cowichan Valley Wellness and Recovery Center
5878 York Road, Duncan, BC

(250) 597 - 7779

Port Alberni

Port Alberni Shelter Society Overdose Prevention Site
3699 3rd Ave, Port Alberni, BC

(778) 419 - 0016

Victoria

Substance Drug Checking

1802 Cook St, Victoria, BC

(250) 415 - 7637

Substance Drug Checking

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Substance Drug Checking is based out of the University of Victoria and operates community-wide drug checking services within Campbell River, the Comox Valley, Duncan, Port Alberni, and Victoria, BC. We are continuing to offer drug checking services in response to the dual public health emergencies, and exploring new ways to better reach those who may benefit from this service. We have partnered with Dr. Chris Gill and the team at Vancouver Island University to improve detection and reporting using their methods for the paper spray - mass spectrometer.

Our project works on Indigenous land. We provide drug checking, harm reduction education and support across many territories on what is colonially known as 'Vancouver Island.' We also act as a resource for these services across the province colonially known as 'British Columbia.' We honour and offer respect to many nations for their stewardship, care and leadership on these lands.

Our project originated on the territories of the lək̓ʷəŋən speaking peoples, including the Songhees and Xwsepsum (Esquimalt) Nations, and the W̱SÁNEĆ (Saanich) Nations on whose land the University of Victoria is located. Some of the territories we are honoured to work across specifically include: Halalt, Lyackson, Meluxulh (Malahat), Puneluxutth', Quw'utsun, Stz-uminus, and Ts'uubaa-asatx; Hupačasath and Tseshaht; K'ómoks; and Laich-kwil-tach.

We acknowledge the inextricable links between research, colonization and racism against Indigenous peoples, which continue to this date. Ending the violence faced by people who use drugs cannot be achieved without actively working on decolonization.

For more information please visit: substance.uvic.ca

We gratefully acknowledge our partners and funders on this project

Our Partners

- Agilent Technologies
- AVI Health and Community Services
- BC Ministry of Health
- BC Ministry of Mental Health and Addictions
- BC Support Vancouver Island Centre
- Canadian Institute for Substance Use Research
- Compute Canada
- IBM Canada
- Island Health Authority
- Lantern Services
- PerkinElmer Inc
- ProSpect Scientific
- SOLID Outreach
- STS Pharmacy
- University of Victoria
- Vancouver Island University
- Victoria Hospitals Foundation
- Westgrid

Our Funders

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- Canadian Institutes of Health Research