Substance Drug Checking

Annual Review 2023

Substance Drug Checking offers free and confidential drug checking services in Victoria, Port Alberni, Comox Valley, Campbell River, Duncan, and at local events. 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.

9676

Samples Tested
Jan 1 - Dec 31 2023

Highlighted Findings:

- Fentanyl continues to be the most common opioid found within the opioid–down supply with 85.4% (3931/4599) 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 10.6%.

- Fluorofentanyl prevalence within the opioid-down supply remained relatively high, with 41.5% of opioid-down samples containing fluorofentanyl in January, 60.8% containing fluorofentanyl in December, with a high of 73.1% in October. The median fluorofentanyl concentration found in down samples checked across all service locations was 7.0%.

- Benzodiazepines were detected in 47.4% (2180/4599) of down samples checked in 2023. Bromazolam was the most common benzodiazepine detected in 2023, comprising 82.1% (1790/2180) of benzodiazepines detected.

- The prevalence of xylazine in down samples peaked in August, when 8.4% of down samples contained xylazine. Across the entire year xylazine was detected in 4.8% (221/4599) of down samples checked. The median xylazine concentration found in opioid–down samples checked across all service locations was 1.2%.

- Outside of opioid–down samples, unexpected opioids were found most frequently in samples expected to be “opioid - other” (20%), benzodiazepines (5.9%), and methamphetamine (2.8%). Unexpected opioids were only detected in 2 (0.2%) MDMA sample and in 1 (0.3%) psychedelic sample. No unexpected opioids were detected in samples expected to dissociatives.

- Samples expected to be benzodiazepines showed the highest level of misrepresentation, with 58.6% (129/220) of benzo samples containing an unexpected benzo. The least misrepresented samples were dissociatives, with 95.7% (491/513) of dissociative samples containing the expected active component.

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Land Acknowledgement

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 2023

Narrative Report

In 2023, Substance Drug Checking, formerly known as the Vancouver Island Drug Checking Project, continued to provide life-saving information throughout the community of so-called "Victoria", the larger geographic region of so-called "Vancouver Island", and within the province of "British Columbia". 2023 marked 7th year of the overdose crisis fueled by the toxic unregulated drug supply, to which drug checking remains a vital, community-level response.

Our main point-of-care site located within the North Park community of "Victoria" continues to thrive. All walks of life are welcome in this space to learn about their substances via a world-class suite of instruments. We receive samples that arrive by mail and through outreach conducted by Substance staff and partner organizations. We continue to receive samples for confirmatory analysis from our distributed sites on Vancouver Island. Furthermore, we started to receive samples for confirmatory analysis via paper spray mass spectrometry from drug checking sites throughout the province as part of a new pilot project in partnership with British Columbia Centre on Substance Use (BCCSU).

In June of 2023, we checked a record number of samples for any given month–1062 to be exact. As shown in Figure 1, nearly every month in 2023 we checked more samples than any month in 2022, with the exceptions of February and October. Overall, 2023 was our busiest year to date, both at our hub location (also referred to as "Substance") and at all other sites affiliated with our project.

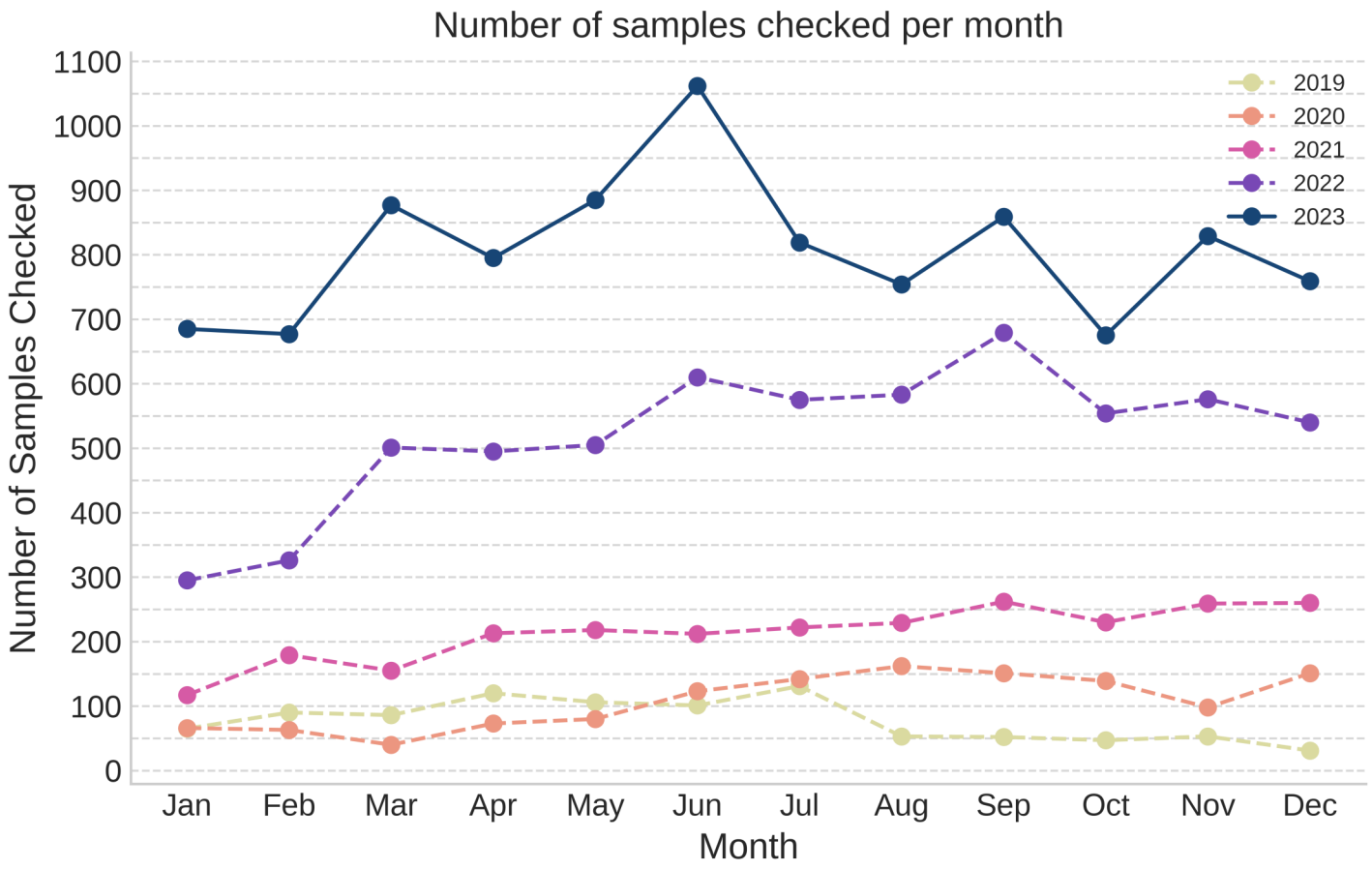

Figure 1. Number of samples checked per month between 2019 and 2023, across all service locations.

Substance Drug Checking

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This year we continued to provide secondary analysis via paper spray mass spectrometry to our distributed sites located in 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 and Campbell River. The continuity of drug checking services in these communities was clearly valued as each of the distributed sites more than doubled the number of samples they checked in 2023, greatly surpassing the relative increase seen at our hub location.

Overall, our distributed site in Duncan saw the highest increase in samples from 2022 with a whopping 1063.6% increase! Our distributed site in the Comox Valley also saw a fairly hefty increase, with a 462.3% increase in samples from 2022. Campbell River saw a 204.0% increase in samples, which is possibly attributed a second distributed site opening at Campbell River AVI. Last but certainly not least, our distributed site in Port Alberni saw a 106.0% increase in samples checked.

Service Model / Location	Samples Checked in 2023	Samples Checked in 2022	Percent Increase from 2022
Campbell River	**228**	75	204.0%
Comox Valley	**343**	61	462.3%
Duncan	**256**	22	1063.6%
Port Alberni	**276**	134	106.0%
Outreach	**2117**	980	116.0%
Substance	**6456**	4967	30.0%
Total samples checked	**9676**	6239	55.1%

Table 1. Number of samples checked and percent increase by service location.

Here in so-called “Victoria” our outreach program collects samples from various housing and supervised consumption sites, including but not limited to the Howard Johnson Hotel (now closed), Tiny town (now closed), Mt. Tolmie (now closed), Soleil, Johnson St. Housing, 900 block Pandora St., The Harbour supervised consumption site, The Juniper, Tally Ho, Queens Manor, AVI Victoria, and Capital City Centre. In 2023 this program saw a 116.0% increase in samples compared to 2022.

While one goal of the outreach program is to help more people access drug checking, another goal is to create and nurture connections with community members and staff from other organizations. One way we maintain these connections is by sharing information about the local drug supply through our weekly and monthly reports, in addition to other resources made or maintained by Substance such as drug pamphlets and benzo equivalency charts. Overall, our outreach program has grown tremendously in 2023, part of which can also be attributed to the success of our event and festival drug checking, discussed on the following page.

Substance Drug Checking

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We were able to utilize the BC Ministry of Health's authorization to operate Urgent Public Health Need Sites (UPHNS) in order to provide pop-up drug checking at various events, festivals, and housing sites across Vancouver Island during 2023. In total, we operated 17 pop-up drug checking services in 2023, these services reached a total of 285 service users and provided valuable, potentially life saving information about the composition of 398 samples. When compared with the 2022 event drug checking data, this represents a 111.1% increase in service users reached and a 109.5% increase in samples checked.

Overall, the three busiest events were Otherworld, which had the highest volume of samples at 121 (nearly double number of sample checked at Otherworld 2022), followed by Lamplight Year One (48), and Rifflandia Electric Ave (43).

Event Name	Event Date(s)	Event Location	Service Users	Samples Checked
Lamplight Year One	May 20 - 22, 2023	Lake Cowichan, BC	32	48
Capital City Centre Pop-up	June 7, 2023	Victoria, BC	24	29
Otherworld	June 08 - 12, 2023	Lake Cowichan, BC	76	121
TILT at Phillips	July 07 - 09, 2023	Victoria, BC	13	13
Salt Spring Island Pride	July 28 - 30, 2023	Salt Spring Island, BC	1	1
REVERB at Phillips	August 11 - 13, 2023	Victoria, BC	4	5
Samsara Music Festival	August 11 - 13, 2023	Port Renfrew, BC	16	26
Cumberland Wild	August 19 - 20, 2023	Cumberland, BC	15	21
International Overdose Awareness Day BBQ	August 31, 2023	Victoria, BC	6	9
Rifflandia Electric Ave	September 15 - 17, 2023	Victoria, BC	37	43
Rifflandia The Park	September 07 - 09, 2023	Victoria, BC	20	28
Johnson St. Community Pop-up	November 6, 2023	Victoria, BC	9	11
Woodstove Festival	November 04 - 06, 2023	Cumberland, BC	7	12
SOLID BBQ	November 17, 2023	Victoria, BC	3	3
PeeJays n' DeeJays	November 30, 2023	Victoria, BC	0	0
Solid BBQ	December 21, 2023	Victoria, BC	9	10
Event:Horizon Media and Arts Festival	December 31, 2023	Duncan, BC	13	18
		Total	**285**	**398**

Table 2. Number of samples checked at festivals and events in 2023. Samples from Cumberland Wild and Woodstove Festival are included in Comox Valley samples throughout the remainder of this document, all other events are included in Outreach samples throughout the remainder of this document.

What were people bringing to get 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.

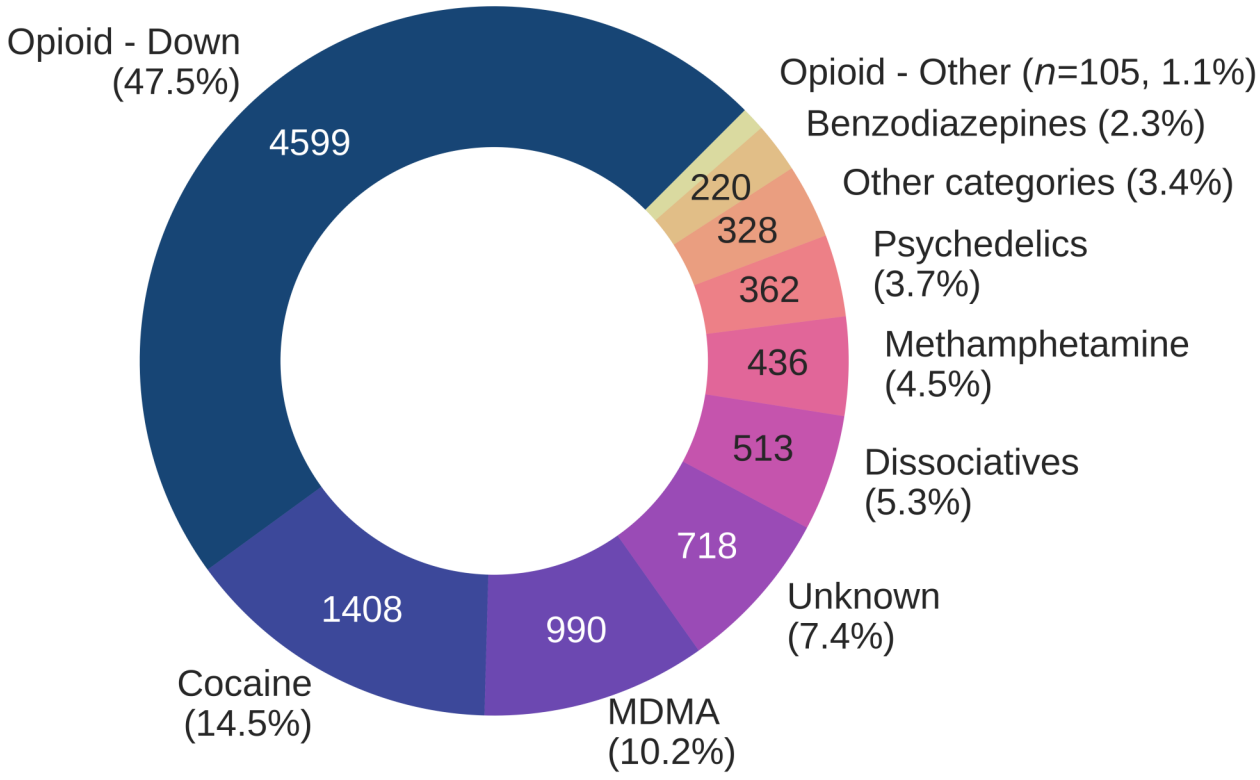

Figure 2. Number and proportion of samples checked by expected drug class, across all service locations.

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. **Benzodiazepines**: alprazolam (Xanax), bromazolam, diazepam (Valium), etizolam. **Psychedelics**: 2C-B, DMT, LSD. **Opioid - Other**: hydromorphone (Dilaudid), oxycodone. **Other categories**: 3-MMC, Adderall, methylphenidate (Ritalin), GHB, quaaludes, 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 subcategory

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.

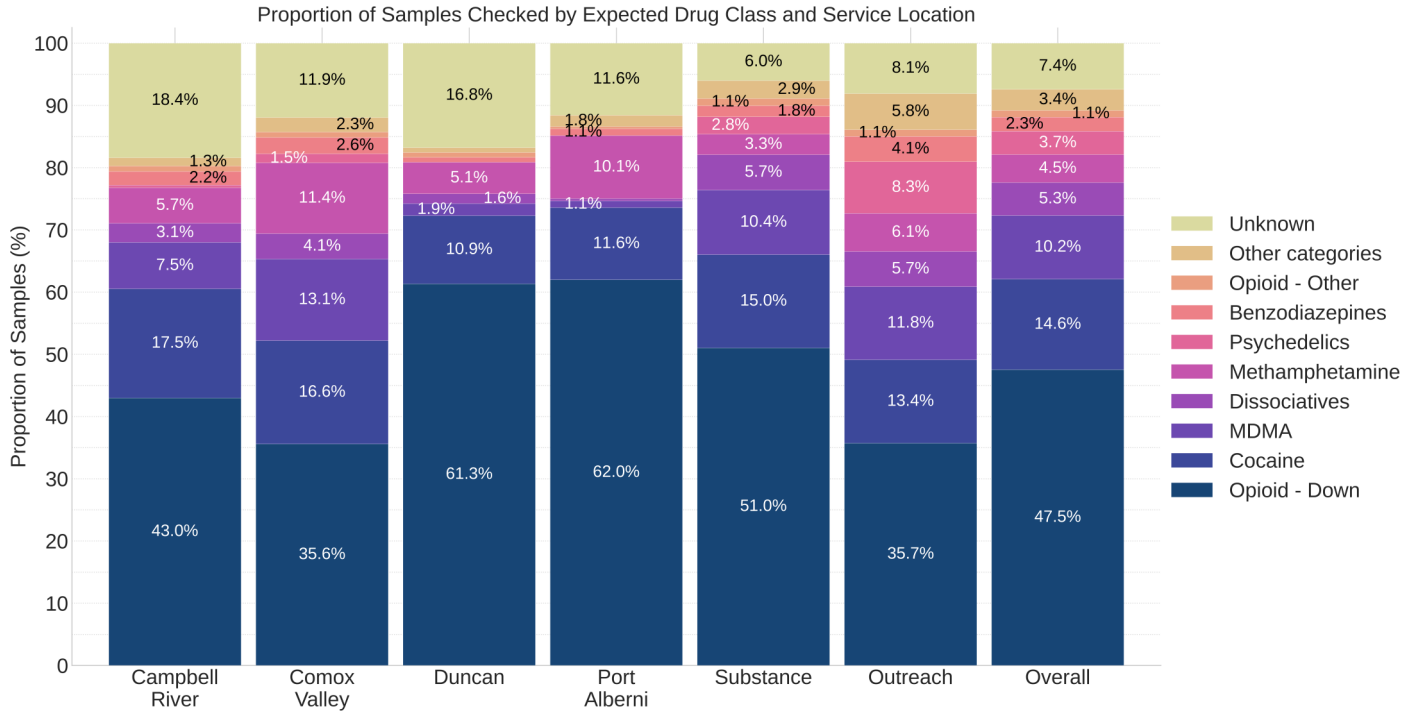

Figure 3. Proportion of samples checked by expected drug class and service location. Proportions less than or equal to 1.0% are omitted for readability.

Expected Drug Class	Campbell River	Comox Valley	Duncan	Port Alberni	Substance	Outreach	Overall
Opioid - Down	98	122	157	171	3294	757	4599
Cocaine	40	57	28	32	967	284	1408
MDMA	17	45	5	3	671	249	990
Dissociatives	7	14	4	1	367	120	513
Methamphetamine	13	39	13	28	213	130	436
Psychedelics	1	5	0	0	180	176	362
Benzodiazepines	5	9	2	3	115	86	220
Opioid - Other	2	3	2	1	74	23	105
Other categories	3	8	2	5	187	120	325
Unknown	42	41	43	32	388	172	718
Total	228	343	256	276	6456	2117	9676

Table 3. Number of samples checked by expected drug class and service location.

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":*** 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":*** samples where no active compounds were detected[3]
    - Example: An expected hydromorphone (Dilaudid) tablet that was found to be a sugar pill
- ***"Unknown composition":*** samples where analysis was performed but we were unable to determine the composition

[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 the 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 bromazolam have an upper limit of quantitation set to 25%, and other drugs such as fluorofentanyl have an upper limit of quantification set to 40% . 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 35.6% - 62.0% of the samples that we check, depending on service location (see Fig. 3 on page 7).

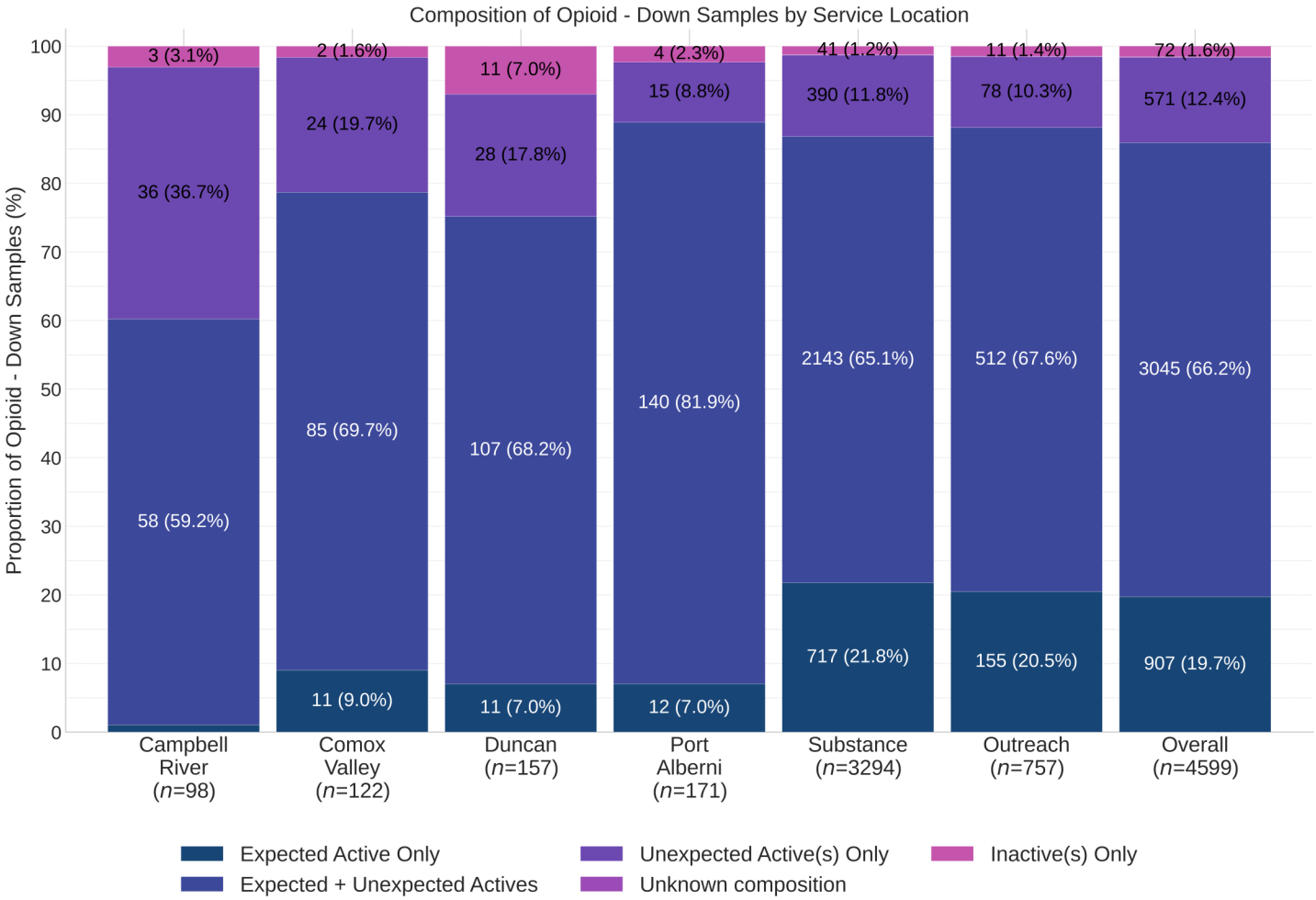

Figure 4. Proportion and number of opioid -down samples checked by service locations, grouped by composition class (see page 8 for definitions). Proportions less than or equal to 1.1% are omitted for readability.

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. 66.2% of down samples contained the expected active (fentanyl or heroin) *in addition* to other unexpected actives. 12.4% 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.

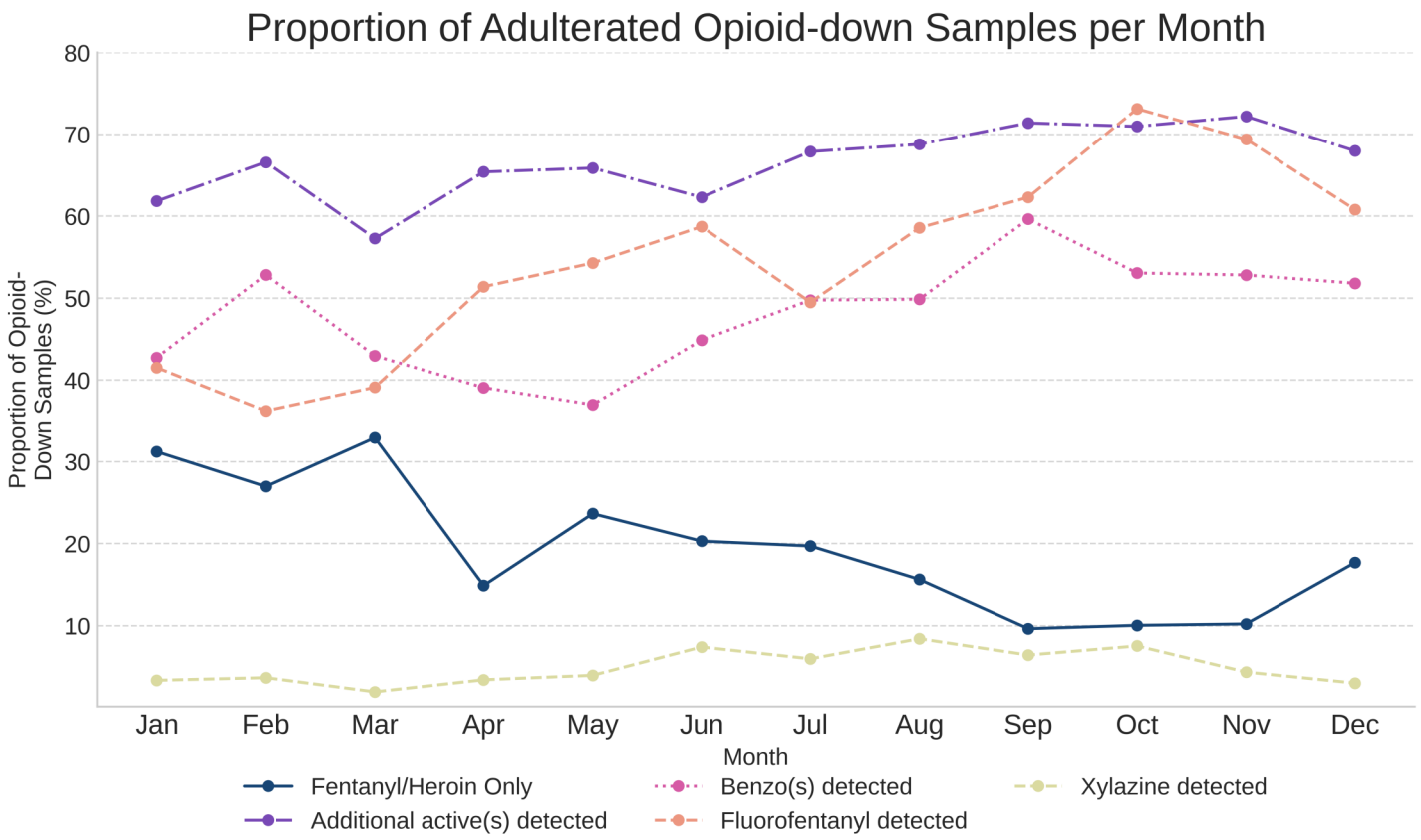

Figure 5. The proportion of expected opioid–down samples checked in 2023 that contained fentanyl/heroin as the only detected actives **(solid dark blue)**, opioid–down samples with an additional active detected **(dot-dashed purple)**, opioid–down samples that contained benzodiazepine-related drugs **(dotted magenta)**, opioid–down samples that contained fluorofentanyl **(dashed salmon)**, and opioid–down samples that contained xylazine **(dashed Lime)**. Data are inclusive of all service locations.

Fluorofentanyl was the most common fentanyl analogue detected within the opioid–down supply in 2023 found in 54.0% 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.

Xylazine (a.k.a “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. A more in depth look at xylazine can be found on page 13.

Opioid–down: Benzodiazepines

"Benzo-down" is not new to 2023 and the prevalence of benzodiazepines in the down supply remained high throughout the year: 47.4% of all opioid–down samples checked in 2023 contained a benzodiazepines, averaged across all locations. This is a 1% decrease in the prevalence of "benzo-down" compared to 2022. September showed the highest prevalence of benzodiazepines (59.6%) while May had the lowest proportion of benzo-positive down samples (39.0%). By region, Campbell River showed the highest level of benzodiazepine adulteration with 84.7% (83/98) of opioid–down samples containing benzodiazepines; Outreach samples showed the lowest degree of benzodiazepine positivity with 42.7% (323/757) of down samples containing benzodiazepines.

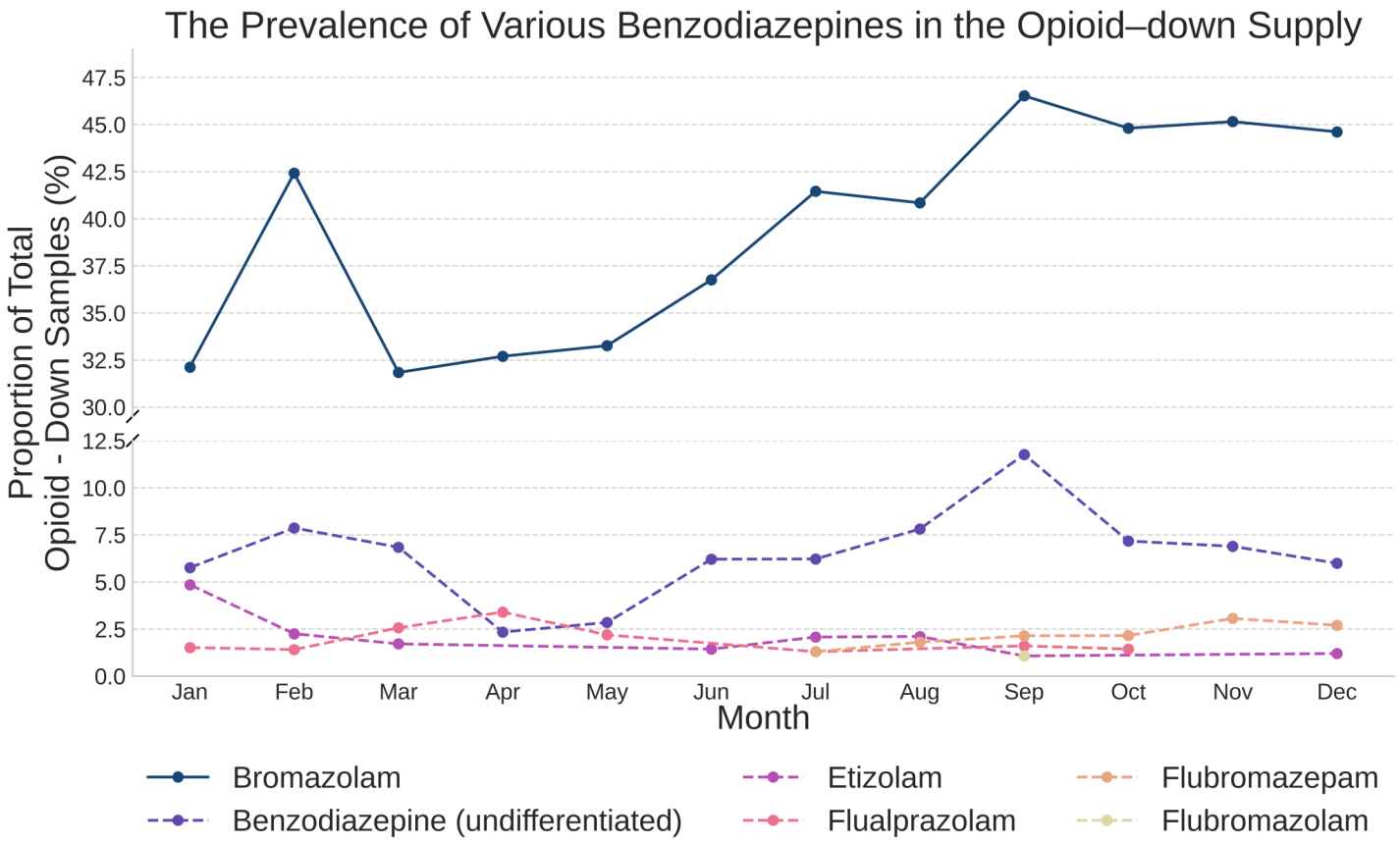

Figure 6. Prevalence of benzodiazepines detected in opioid–down samples in 2023. "Benzodiazepine (unknown type) describes samples that tested positive for benzodiazepines via immunoassay strip test but the identity of the benzo(s) could not be determined via FTIR or PS-MS analysis. Benzodiazepines comprising less than or equal to 1% of a given months proportion (Alprazolam, Bromazepam, Flubromazepam, Desalkylgidazepam, Flubromazolam, Etizolam, Clonazepam, Flualprazolam) of opioid-down samples are omitted for brevity.

In 2023, bromazolam continued to be the most common benzo found in the down supply, found in 33.9% of all down samples aggregated across all months of the year. In order to allow for easier viewing of the benzos which comprised less than 12.5% of down supply per month, the y-axis of Fig. 6 had to be split between 12.5% and 30% to account for the higher prevalence of bromazolam.

Opioid–down: Xylazine

Xylazine-positive down samples, a.k.a. "Tranq-dope" continue to attract attention in 2023. However, this year the prevalence of xylazine was lower than in 2022. As shown in Figure 7, a majority of months (7/12) in 2023 showed xylazine prevalence lower than the 2022/2023 aggregate (5.5%) and all months in 2023 showed xylazine prevalence lower than the 2022 peak of 18.3%. In addition, the 2023 aggregate proportion of xylazine positive down samples (4.8%) was lower than the 2022 aggregate proportion (6.8%). This indicates that while xylazine has remained in the down supply, that it is being found to a lesser extent than in 2022.

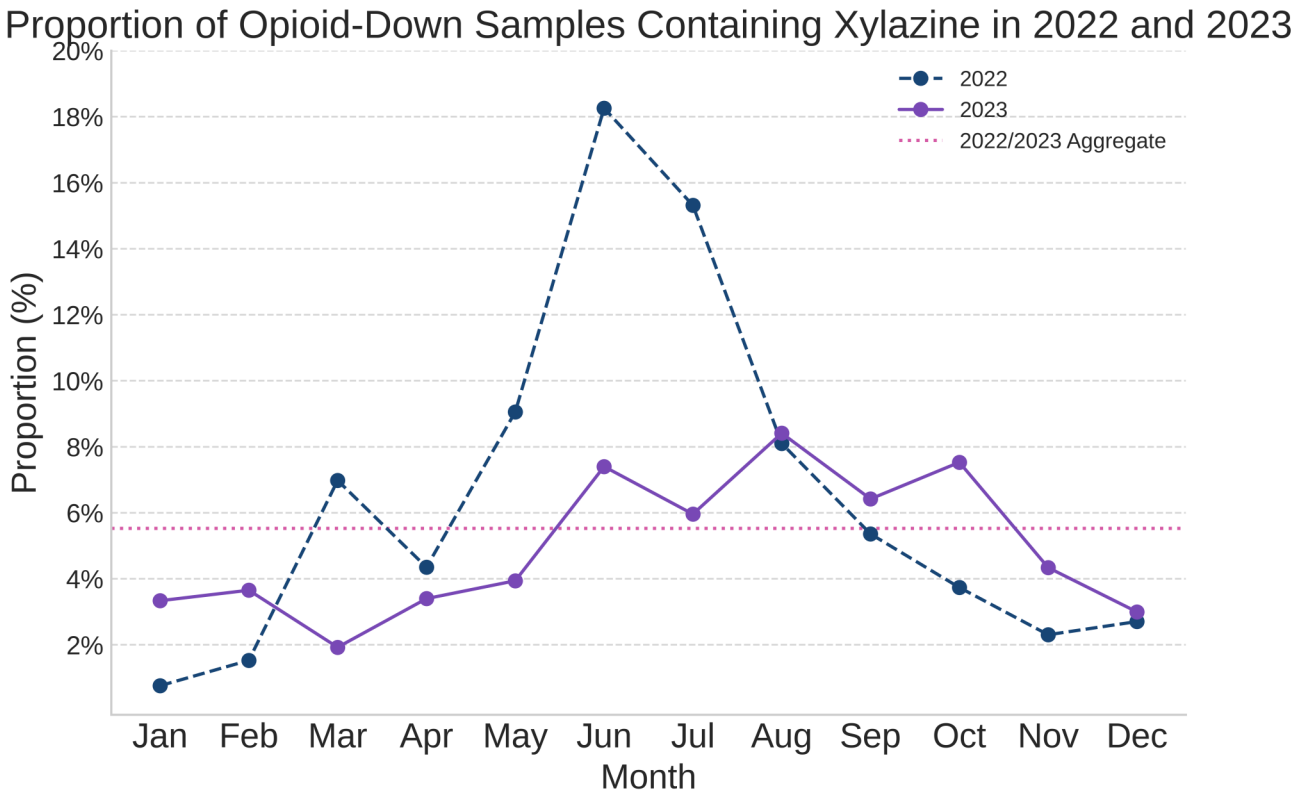

Figure 7. Prevalence of xylazine in opioid-down samples in 2023 and 2022 across all service locations.

Per service location we found that our Comox Valley service location had the highest prevalence of "Tranq-dope", with 31.1% (Table 4) of down samples containing xylazine, followed by Campbell River with 12.2%, and Duncan with 8.9%. Our hub location, Substance, had the lowest proportion of "Tranq-dope" samples, with only 3.1% of the down supply being contaminated with xylazine. As mentioned above, 4.8% of all down samples checked in 2023, contained xylazine.

Service Location	Proportion of Opioid Samples Containing Xylazine
Campbell River	12.2%
Comox Valley	31.1%
Duncan	8.9%
Port Alberni	4.7%
Substance	3.1%
Outreach	6.1%
Overall	4.8%

Table 4. Prevalence of xylazine in opioid-down samples in 2023 per service location

Opioid–down: What did we find?

Table 5 below (and on the following pages) aggregates all active compounds detected in the opioid–down supply in 2023, 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 6 on page 18 aggregates all cutting agents detected in opioid -down samples, across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all down samples)
Expected Active Only	***907 (19.7%)***
Fentanyl	906 (19.7%)
Sufentanil	1 (<0.1%)
Expected* + Unexpected Active(s)	***3045 (66.2%)***
Fentanyl*	2999 (65.2%)
Heroin*	145 (3.2%)
2C-B	1 (<0.1%)
5F-ADB	12 (0.3%)
Acetaminophen (Paracetamol, Tylenol)	7 (0.2%)
Acetylcodeine	105 (2.3%)
Acetylfentanyl	28 (0.6%)
Acetylmorphine (MAM, 6-MAM)	97 (2.1%)
Alprazolam (Xanax)	4 (<0.1%)
Benzocaine	2 (<0.1%)
Benzodiazepine (unknown type)	243 (5.3%)
Bromazepam	3 (<0.1%)
Bromazolam	1558 (33.9%)
Carfentanil	43 (0.9%)
Clonazepam (Klonopin)	1 (<0.1%)
Cocaine Base (crack, rock, hard)	4 (<0.1%)
Cocaine HCl (powder)	12 (0.3%)
Desalkylgidazepam	9 (0.2%)

Table 5 (*Continued on the next page*). Active compounds detected in opioid–down samples checked in 2023, 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. "Benzodiazepine (unknown type)" 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)	***3045 (66.2%)***
Diphenhydramine (Benadryl)	1 (<0.1%)
Etizolam	70 (1.5%)
Etodesnitazene	1 (<0.1%)
Fentanyl or analogue	3 (<0.1%)
Flualprazolam	60 (1.3%)
Flubromazepam	40 (0.9%)
Flubromazolam	11 (0.2%)
Fluorofentanyl	2064 (44.9%)
Fluorofentanyl Base	93 (2.0%)
Furanyl UF-17	7 (0.2%)
Hydromorphone (Dilaudid, Dillies)	2 (<0.1%)
Isobutyryl fentanyl	45 (1.0%)
Isotonitazene	5 (0.1%)
Levamisole	3 (<0.1%)
Lidocaine	27 (0.6%)
MDMA	1 (<0.1%)
Methadone	4 (<0.1%)
Methamphetamine	37 (0.8%)
Methylfentanyl	1 (<0.1%)
Metonitazene	3 (<0.1%)
Morphine	18 (0.4%)
N-Pyrrolidino Etonitazene	1 (<0.1%)
Norfentanyl	5 (0.1%)
Oxycodone (Oxycontin)	3 (<0.1%)
Phenacetin	5 (0.1%)

Table 5 (*Continued from previous page).* Active compounds detected in opioid–down samples checked in 2023, 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" 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)	***3045 (66.2%)***
Procaine	3 (<0.1%)
Promethazine	2 (<0.1%)
Tramadol	1 (<0.1%)
Unspecified / Other	1 (<0.1%)
Xylazine	189 (4.1%)
Unexpected Active(s) Only	**571 (12.4%)**
2C-B	2 (<0.1%)
4-Fluoro-ADB	1 (<0.1%)
5-Fluoro-MDMB-PINICA	1 (<0.1%)
5F-ADB	1 (<0.1%)
Acetaminophen (Paracetamol, Tylenol)	6 (0.1%)
Acetylcodeine	7 (0.2%)
Acetylmorphine (MAM, 6-MAM)	4 (<0.1%)
Amitriptyline	1 (<0.1%)
Benzodiazepine (unknown type)	47 (1.0%)
Bromazepam	1 (<0.1%)
Bromazolam	232 (5.0%)
Carfentanil	11 (0.2%)
Cocaine Base (crack, rock, hard)	4 (<0.1%)
Cocaine HCl (powder)	7 (0.2%)
Desalkylgidazepam	3 (<0.1%)
Etizolam	2 (<0.1%)
Fentanyl	25 (0.5%)
Fentanyl Base	23 (0.5%)
Fentanyl or analogue	16 (0.3%)

Table 5 (*Continued from previous page*). . Active compounds detected in opioid–down samples checked in 2023, 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

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

Unexpected Active(s) Only	***571 (12.4%)***
Flualprazolam	5 (0.1%)
Flubromazepam	12 (0.3%)
Flubromazolam	1 (<0.1%)
Fluorofentanyl	424 (9.2%)
Fluorofentanyl Base	44 (1.0%)
Heroin	7 (0.2%)
Hydromorphone (Dilaudid, Dillies)	1 (<0.1%)
Isobutyryl fentanyl	3 (<0.1%)
Isotonitazene	3 (<0.1%)
Ketamine	2 (<0.1%)
MDA	1 (<0.1%)
MDEA	1 (<0.1%)
MDMA	2 (<0.1%)
Methadone	1 (<0.1%)
Methamphetamine	10 (0.2%)
Metonitazene	2 (<0.1%)
Morphine	3 (<0.1%)
N-Pyrrolidino Etonitazene	1 (<0.1%)
O-PCE (Deschloro-N-ethyl-ketamine)	1 (<0.1%)
Phenacetin	3 (<0.1%)
THC	2 (<0.1%)
Theophylline	1 (<0.1%)
Xylazine	32 (0.7%)
Unknown Composition	4 (0.1%)
Unknown	4 (0.1%)

Table 5 (*Continued from previous page*). . Active compounds detected in opioid–down samples checked in 2023, 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.

Opioid–down: Cutting Agents

Compound	Number of Samples (% of all down samples)
Caffeine	4017 (87.3%)
Ascorbic acid (Vitamin C)	2 (<0.1%)
Calcium carbonate (Chalk)	4 (<0.1%)
Calcium sulfate dihydrate (Gypsum)	1 (<0.1%)
Carbohydrate (unknown type)	68 (1.5%)
Citric acid	1 (<0.1%)
Dextrose	2 (<0.1%)
Dicalcium Phosphate	2 (<0.1%)
Dimethyl sulfone (MSM)	31 (0.7%)
Erythritol	1684 (36.6%)
Flour	4 (<0.1%)
Fructose	1 (<0.1%)
Glucose	1 (<0.1%)
Glutamine	2 (<0.1%)
Inositol	1 (<0.1%)
Lactose	12 (0.3%)
Lactose anhydrous	1 (<0.1%)
Magnesium sulfate	1 (<0.1%)
Mannitol	260 (5.7%)
Microcrystalline cellulose	10 (0.2%)
Mineral (unknown type)	1 (<0.1%)
Sodium bicarbonate (Baking powder)	2 (<0.1%)
Sorbitol	1 (<0.1%)
Starch	8 (0.2%)
Stearic acid	6 (0.1%)
Sucrose	20 (0.4%)
Xylitol	133 (2.9%)

Table 6. 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 7 below may not match those listed in Table 5. Table 7 aggregates the results from all *expected* opioid–down samples checked in 2023 across all service locations. Refer to Table 8 on page 20 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
Etodesnitazene	1			0.6%	
N-Pyrrolidino Etonitazene	2		0.6%	8.1%	
Oxycodone (Oxycontin)	3	0.5%	0.5%	0.6%	
Levamisole	3	0.2%	0.1%	0.3%	
Alprazolam (Xanax)	4	0.9%	0.5%	2.0%	0.5% - 1.5%
Metonitazene	5	0.3%	0.2%	1.9%	0.2% - 0.7%
Phenacetin	6	30.8%	6.1%	66.7%	17.7% - 45.4%
Furanyl UF-17	7	0.5%	0.2%	1.7%	0.4% - 1.1%
Isotonitazene	8	2.4%	0.2%	>25.0%	0.5% - 9.3%
Flubromazolam	12	1.5%	<0.1%	14.4%	1.0% - 2.2%
5F-ADB	13	8.4%	1.3%	34.7%	3.1% - 11.3%
Fentanyl Base	20	10.4%	1.4%	24.2%	5.4% - 14.4%
Lidocaine	27	0.9%	0.2%	2.7%	0.4% - 1.3%
Flubromazepam	51	1.8%	<0.1%	>25.0%	0.7% - 3.7%
Carfentanil	54	0.4%	<0.1%	8.8%	0.2% - 1.1%
Flualprazolam	63	0.3%	<0.1%	>25.0%	0.1% - 0.7%
Etizolam	71	4.5%	0.2%	>25.0%	0.8% - 23.2%
Fluorofentanyl Base	97	12.7%	0.2%	77.6%	6.7% - 22.5%
Acetylmorphine (MAM, 6-MAM)	100	2.1%	<0.1%	66.7%	1.5% - 3.2%
Acetylcodeine	112	4.3%	<0.1%	19.5%	0.6% - 7.8%
Heroin	143	12.5%	0.1%	>80.0%	3.2% - >80.0%
Xylazine	217	1.2%	<0.1%	66.7%	0.2% - 7.7%
Bromazolam	1704	3.6%	<0.1%	>25.0%	1.1% - 7.4%
Fluorofentanyl	2415	7.0%	0.1%	>40.0%	2.2% - 15.5%
Fentanyl	3795	10.6%	<0.1%	>80.0%	3.9% - 19.0%

Table 7. PS-MS quantification of targeted active compounds detected in *expected* opioid–down samples, inclusive of all service locations.

Opioid–down: Quantification by Service Location

In Table 8 below we expand upon Table 7 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 *98 total down samples* *84.7% (83/98) benzo-positive*	Bromazolam	44	8.4%	0.2%	>25.0%	2.4% - 13.1%
	Carfentanil	17	0.4%	0.1%	1.4%	0.3% - 0.6%
	Fentanyl	53	9.0%	0.2%	57.4%	4.9% - 16.9%
	Fluorofentanyl	45	3.5%	0.2%	>40.0%	1.7% - 13.3%
	Xylazine	10	6.6%	0.1%	41.8%	0.2% - 22.6%
Comox Valley *122 total down samples* *84.4% (103/122) benzo-positive*	Bromazolam	69	7.3%	0.2%	>25.0%	1.6% - 15.6%
	Carfentanil	5	0.9%	0.1%	1.5%	0.6% - 1.0%
	Fentanyl	85	8.5%	0.1%	68.1%	2.4% - 22.2%
	Fluorofentanyl	45	2.1%	0.2%	>40.0%	0.8% - 10.6%
	Xylazine	37	0.8%	0.1%	15.9%	0.4% - 6.6%
Duncan *157 total down samples* *71.3% (112/157) benzo-positive*	Bromazolam	76	4.5%	0.1%	>25.0%	2.1% - 8.3%
	Carfentanil	3	0.3%	0.2%	2.5%	0.2% - 1.4%
	Fentanyl	114	6.2%	0.1%	53.1%	0.9% - 16.0%
	Fluorofentanyl	65	12.2%	0.2%	>40.0%	1.8% - 18.7%
	Xylazine	13	6.6%	0.1%	31.6%	0.1% - 24.6%
Port Alberni *171 total down samples* *77.8% (133/171) benzo-positive*	Bromazolam	71	6.4%	0.2%	>25.0%	2.0% - 14.2%
	Carfentanil	7	1.1%	0.1%	5.3%	0.5% - 1.9%
	Fentanyl	122	8.7%	0.1%	46.7%	2.7% - 15.1%
	Fluorofentanyl	32	6.8%	0.2%	>40.0%	0.9% - 15.8%
	Xylazine	8	0.3%	0.1%	7.2%	0.2% - 1.4%
Substance *2199 total down samples* *43.4% (1426/3294) benzo-positive*	Bromazolam	1165	3.5%	0.0%	>25.0%	1.1% - 6.8%
	Carfentanil	15	0.3%	0.0%	8.8%	0.1% - 1.0%
	Fentanyl	2680	10.3%	0.1%	>80.0%	3.9% - 17.7%
	Fluorofentanyl	1835	7.1%	0.1%	>40.0%	2.5% - 15.1%
	Xylazine	103	1.0%	0.0%	30.8%	0.2% - 6.4%
Outreach *358 total down samples* *42.7% (323/757) benzo-positive*	Bromazolam	224	3.7%	0.0%	>25.0%	1.2% - 7.6%
	Carfentanil	7	0.4%	0.1%	2.6%	0.1% - 1.4%
	Fentanyl	592	10.1%	0.1%	>80.0%	4.1% - 16.5%
	Fluorofentanyl	336	5.0%	0.1%	>40.0%	1.4% - 11.3%
	Xylazine	45	2.7%	0.1%	29.0%	0.5% - 4.9%

Table 8. PS-MS quantification of select active compounds detected in *expected* opioid–down samples per service locations.

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 2023. 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.

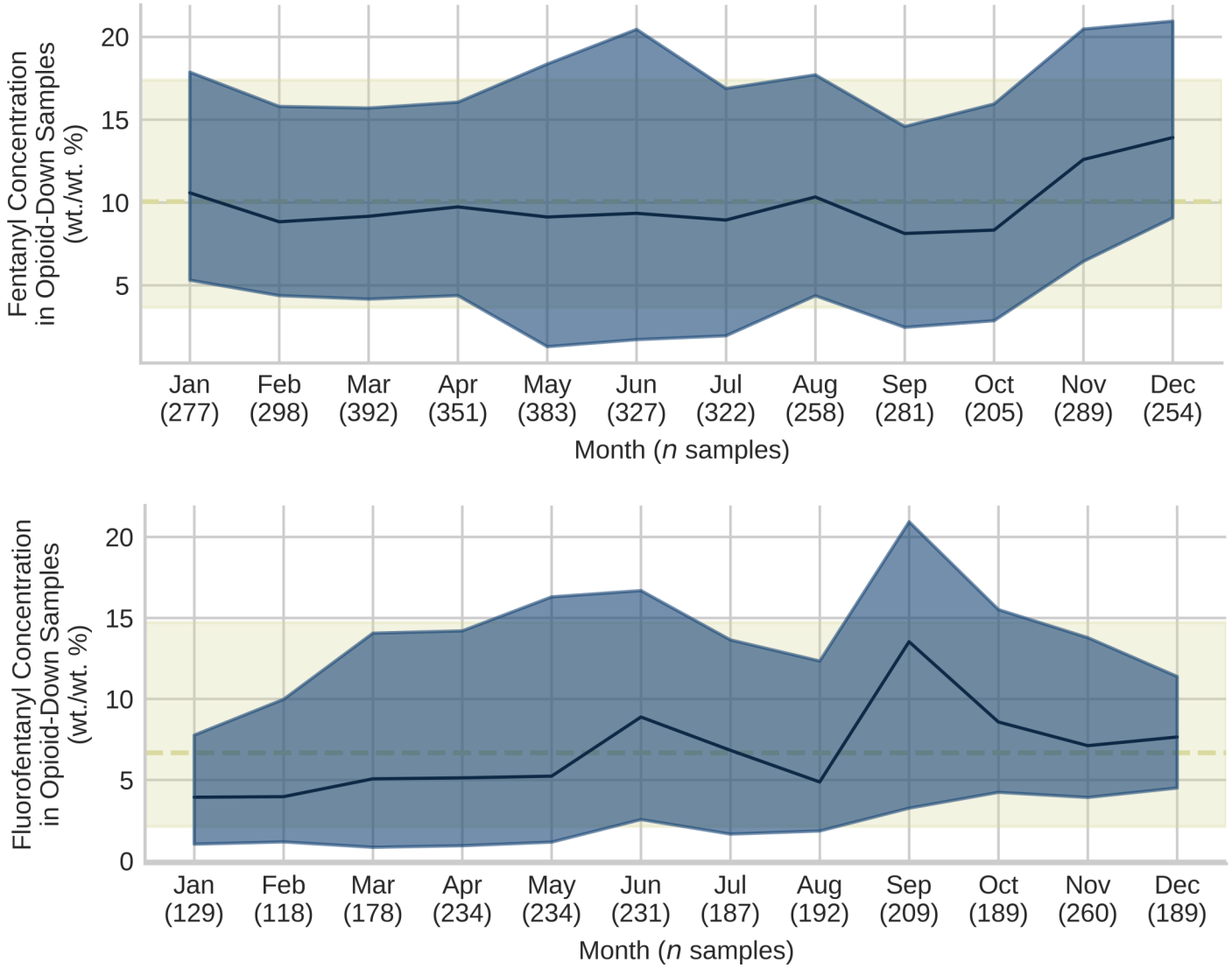

Figure 8. Monthly variability of the concentration of fentanyl (top) and fluorofentanyl (bottom) quantified in opioid–down samples checked in 2023 across all service locations. The number of samples quantified each month is shown in parentheses. The solid line represents the median concentration each 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*

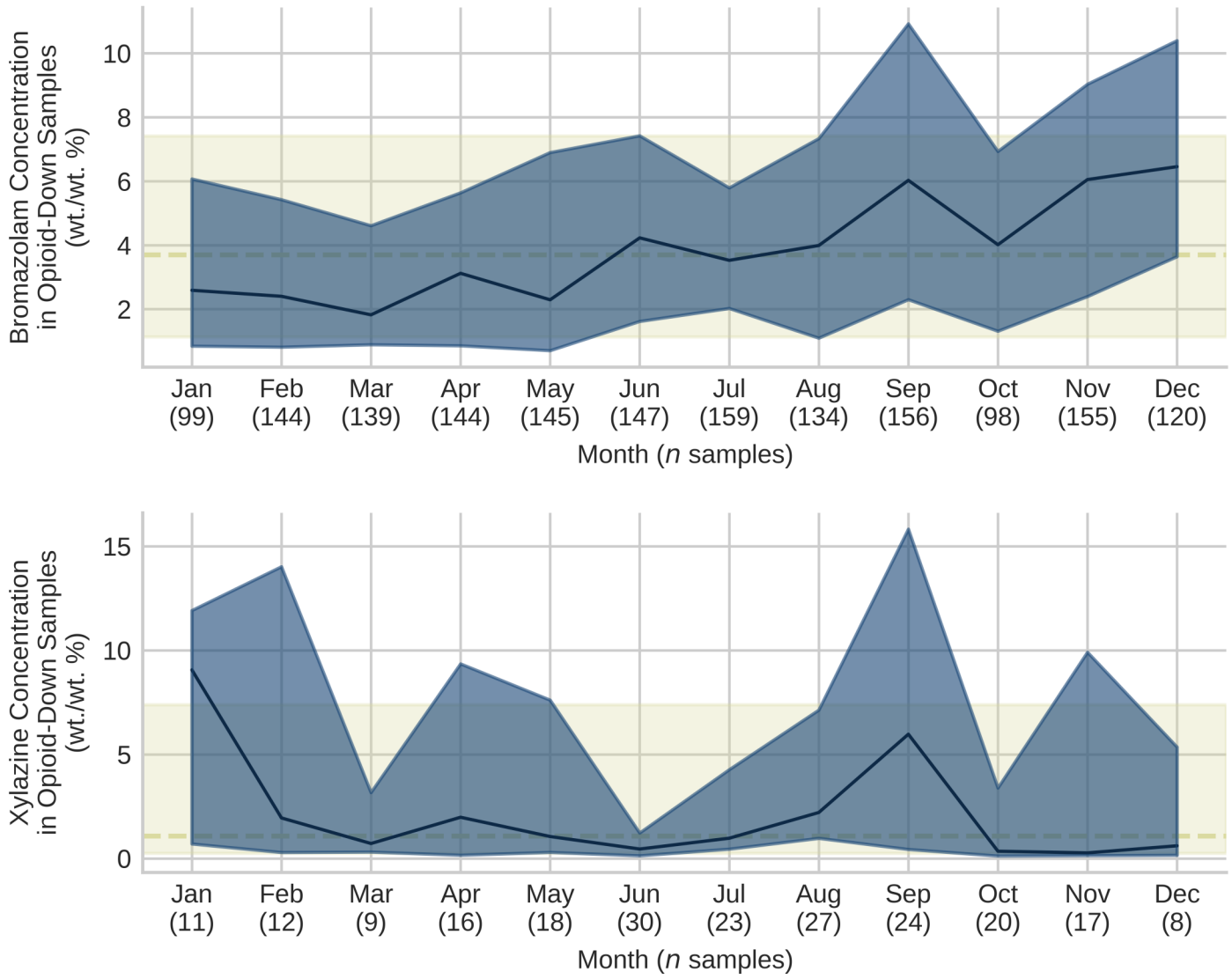

Figure 9. Monthly variability of the concentration of bromazolam (top) and xylazine (bottom) quantified in opioid–down samples checked in 2023 across all service locations. The number of samples quantified each month is shown in parentheses. The solid line represents the median concentration each month, 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.

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 8 and 9 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, and phenacetin, with quantification possible down to approximately 0.1% by weight using PS-MS. Table 10 on page 26 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 25 in Table 9.

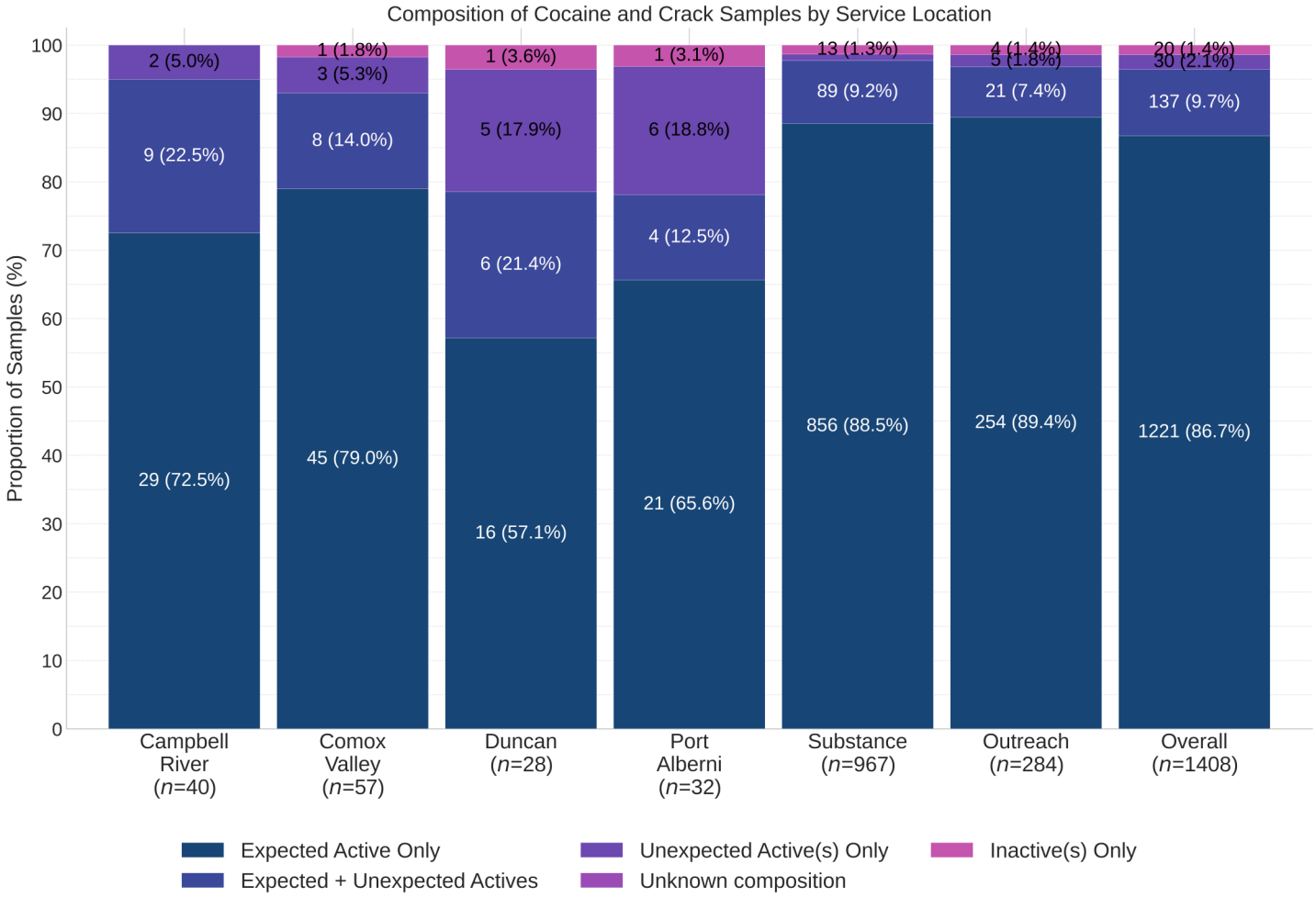

Figure 10. Proportion and number of cocaine samples checked by service locations, grouped by composition class (see page 9 for definitions). Proportions less than or equal to 1.1% are omitted for readability.

Cocaine: What did we find?

Table 9 below (and on the following page) aggregates all active compounds detected in cocaine samples in 2023, 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 10 on page 25 aggregates all cutting agents detected in cocaine samples, across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all cocaine samples)
Expected Active Only	**1221 (86.7%)**
Cocaine Base (crack, rock, hard)	237 (16.8%)
Cocaine HCl (powder)	984 (69.9%)
Expected* + Unexpected Active(s)	137 (9.7%)
Cocaine Base (crack, rock, hard)*	61 (4.3%)
Cocaine HCl (powder)*	76 (5.4%)
3-MMC (Metaphedrone)	1 (<0.1%)
Acetaminophen (Paracetamol, Tylenol)	2 (0.1%)
Benzocaine	15 (1.1%)
Benzodiazepine (unknown type)	2 (0.1%)
Bromazolam	1 (<0.1%)
Fentanyl	7 (0.5%)
Fentanyl or analogue	5 (0.4%)
Fluorofentanyl	2 (0.1%)
Ketamine	4 (0.3%)
Levamisole	50 (3.6%)
Lidocaine	1 (<0.1%)
MDMA	3 (0.2%)
Methamphetamine	1 (<0.1%)
Phenacetin	52 (3.7%)
Procaine	1 (<0.1%)

Table 9 *(Continued on the next page)*. Active compounds detected in cocaine samples checked in 2023, 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

Cocaine: What did we find? - *continued*

Unexpected Active(s) Only	30 (2.1%)
3,4-Methylenedioxypyrovalerone (MDPV)	1 (<0.1%)
Acetylfentanyl	1 (<0.1%)
Benzocaine	1 (<0.1%)
Bromazolam	10 (0.7%)
Fentanyl	12 (0.9%)
Fentanyl or analogue	1 (<0.1%)
Fluorofentanyl	4 (0.3%)
Ketamine	7 (0.5%)
MDA	1 (<0.1%)
MDMA	2 (0.1%)
Methamphetamine	4 (0.3%)
Procaine	1 (<0.1%)
Xylazine	2 (0.1%)

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 9 (*Continued from previous page)*. Active compounds detected in cocaine samples checked in 2023, inclusive of all service locations. *Continued on the next page.*

Cocaine: Cutting Agents

Compound	Number of Samples (% of all Cocaine samples)	Compound	Number of Samples (% of all cocaine samples)
Boric acid	1 (0.1%)	Oil (unknown type)	2 (0.1%)
Caffeine	27 (1.9%)	Pyridoxine	1 (0.1%)
Carbohydrate (unknown type)	3 (0.2%)	Residual	2 (0.1%)
Creatine	5 (0.4%)	Salt	1 (0.1%)
Erythritol	5 (0.4%)	Sodium bicarbonate	5 (0.4%)
Flour	1 (0.1%)	Sodium carbonate	1 (0.1%)
Glutamine	4 (0.3%)	Sorbitol	4 (0.3%)
Inositol	9 (0.6%)	Stearic acid	1 (0.1%)
Lactose anhydrous	1 (0.1%)	Sucrose	1 (0.1%)
Mannitol	3 (0.2%)	Water	6 (0.4%)
Microcrystalline cellulose	3 (0.2%)	Xylitol	1 (0.1%)

Table 10. Cutting agents detected in cocaine samples across all service locations. *Quantitative concentrations are not available for these compounds.*

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 11 below may not match those listed in Table 9. Table 11 aggregates the results from all *expected* cocaine samples checked in 2023 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
Lidocaine	1			3.7%	
Procaine	2		0.1%	6.7%	
Xylazine	2		2.5%	5.1%	
Fluorofentanyl	5	2.7%	0.5%	13.9%	1.1% - 12.1%
Bromazolam	8	3.5%	0.2%	11.2%	2.3% - 8.2%
Benzocaine	14	45.8%	8.3%	66.7%	12.7% - 66.7%
Fentanyl	16	1.3%	0.1%	15.4%	0.6% - 6.4%
Phenacetin	41	15.8%	<0.1%	66.7%	4.7% - 43.5%
Levamisole	48	0.6%	0.1%	14.3%	0.2% - 2.5%

Table 11. PS-MS quantification of targeted active compounds detected in *expected* cocaine samples, inclusive of all service locations.

MDMA

"MDMA" groups samples that are expected to be either MDMA or MDA. In 2023, 86.5% of expected MDMA/MDA samples were confirmed to be MDMA/MDA with no other active compounds detected. 24 samples (2.4% of all expected MDMA/MDA samples) came in the form of pressed pills, and inactive cutting agents were found in an additional 55 samples (5.6% of all expected MDMA/MDA). Dimethyl sulfone (MSM) and caffeine were the most common cuts detected in non-pressed pills. 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 76.0% of unexpected MDMA or MDA samples instead containing MDA or MDMA respectively. This also occurred with samples that had a unexpected additional composition (expected + unexpected actives in Fig. 11), with 66.1% (37/56) of unexpected additional samples including a combination of MDMA and MDA. Lastly are the samples which did not contain an active, these are omitted from Fig. 11 as they make up less than 1.1% of the overall samples within the MDMA category.

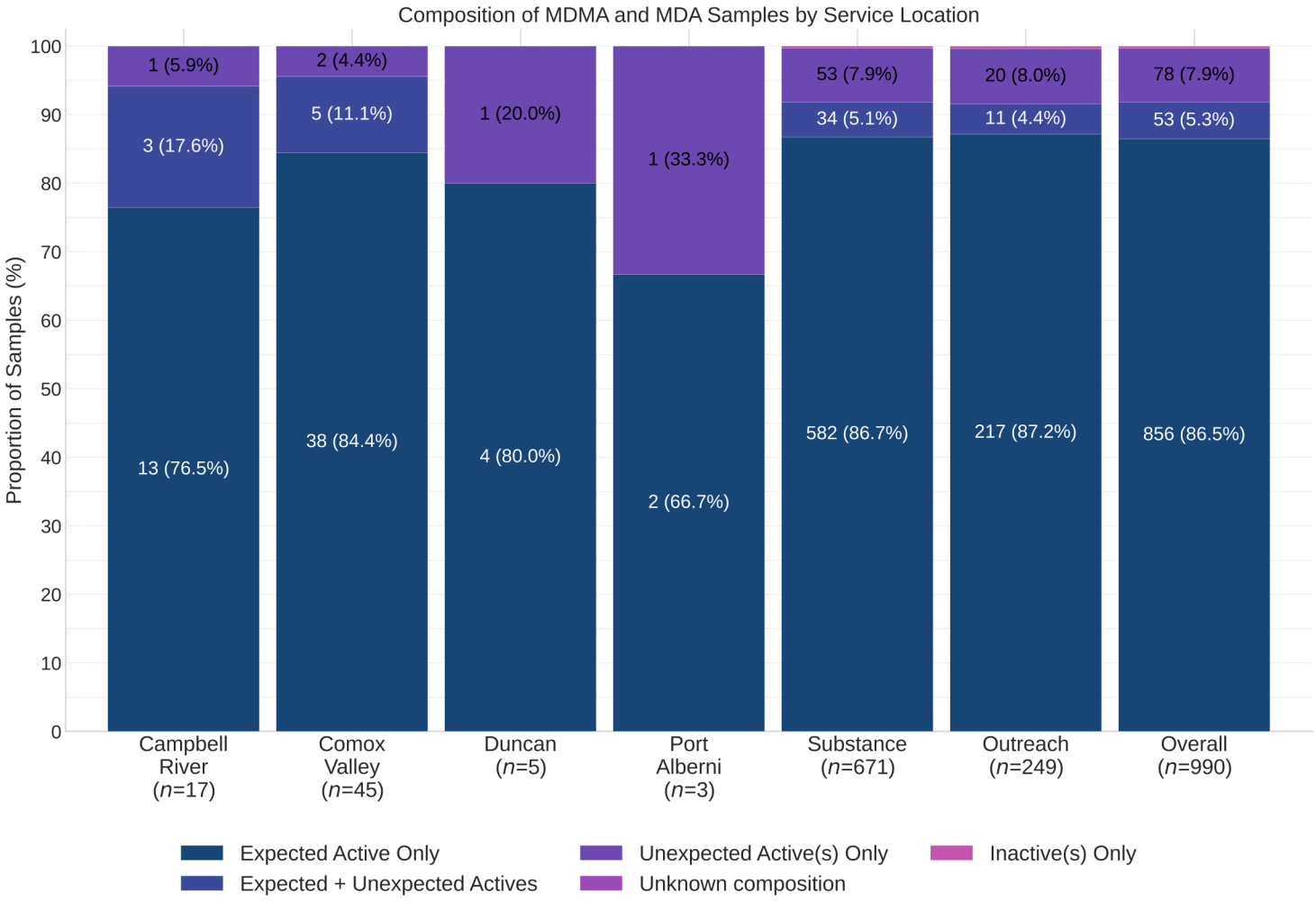

Figure 11. Proportion and number of MDMA samples checked by service locations, grouped by composition class (see page 8 for definitions). Proportions less than or equal to 1.1% are omitted for readability.

MDMA: What did we find?

Table 12 below (and on the following page) aggregates all active compounds detected in MDMA/MDA samples in 2023, 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 13 on page 29 aggregates all cutting agents detected in MDMA, across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all MDMA samples)
Expected Active Only	853 (86.2%)
MDA	46 (4.6%)
MDMA	809 (81.7%)
MDPM	1 (0.1%)
Expected* + Unexpected Active(s)	53 (5.4%)
MDA*	39 (3.9%)
MDMA*	52 (5.3%)
Cathinone (unknown type)	1 (0.1%)
Cocaine Base (crack, rock, hard)	2 (0.2%)
Cocaine HCl (powder)	2 (0.2%)
Ketamine	3 (0.3%)
MDEA	8 (0.8%)
Unexpected Active(s) Only	**78 (7.9%)**
4-AcO-DMT (O-Acetylpsilocin)	1 (0.1%)
4F-PHP (4-Fluoro-alpha-PHP)	1 (0.1%)
Bromazolam	1 (0.1%)
Cocaine HCl (powder)	3 (0.3%)
Fentanyl or analogue	1 (0.1%)
Ketamine	8 (0.8%)
MDA	39 (3.9%)
MDMA	22 (2.2%)
MMDPPA	1 (0.1%)

Table 12 *(Continued on the next page)*. Active compounds detected in MDMA samples checked in 2023, 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" results are based on a positive strip test and are unconfirmed by paper spray.*

MDMA: What did we find? - *continued*

Unexpected Active(s) Only	78 (7.9%)
Methamphetamine	3 (0.3%)
Methandrostenolone	1 (0.1%)
N-Pyrrolidino Etonitazene	1 (0.1%)
Xylazine	1 (0.1%)

Table 12 (*Continued from previous page)*. Active compounds detected in MDMA/ MDA samples checked in 2023, inclusive of all service locations.

MDMA: Cutting Agents

Compound	Number of Samples (% of all MDMA samples)
Caffeine	22 (2.2%)
Carbohydrate (unknown type)	4 (0.4%)
Creatine	1 (0.1%)
Dimethyl sulfone (MSM)	9 (0.9%)
Erythritol	1 (0.1%)
Glutamine	2 (0.2%)
Lactose anhydrous	1 (0.1%)
Mannitol	2 (0.2%)
Microcrystalline cellulose	34 (3.4%)
Oil (unknown type)	9 (0.9%)
Residual	1 (0.1%)
Starch	2 (0.2%)
Stearic acid	3 (0.3%)
Sucrose	7 (0.7%)
Xylitol	1 (0.1%)

Table 13. 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 14 below may not match those listed in Table 12. Table 14 aggregates the results from all *expected* MDMA samples checked in 2023 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
Bromazolam	1			3.1%	
MDPM	1			<0.1%	
N-Pyrrolidino Etonitazene	1			11.1%	
Xylazine	1			5.2%	
MDEA	7	1.2%	0.7%	1.8%	1.1% - 1.4%

Table 14. PS-MS quantification of targeted active compounds detected in *expected* cocaine samples, inclusive of all service locations.

Methamphetamine

91.1% (397/436) of the methamphetamine samples checked in 2023 were confirmed to contain methamphetamine with no other active compounds detected. Cutting agents were found in 9.9% (43/436) of methamphetamine samples. Dimethyl sulfone (MSM), the most common cut found in methamphetamine, was detected 5% (22/436) of samples and caffeine was found in 3.2% (14/436) 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.

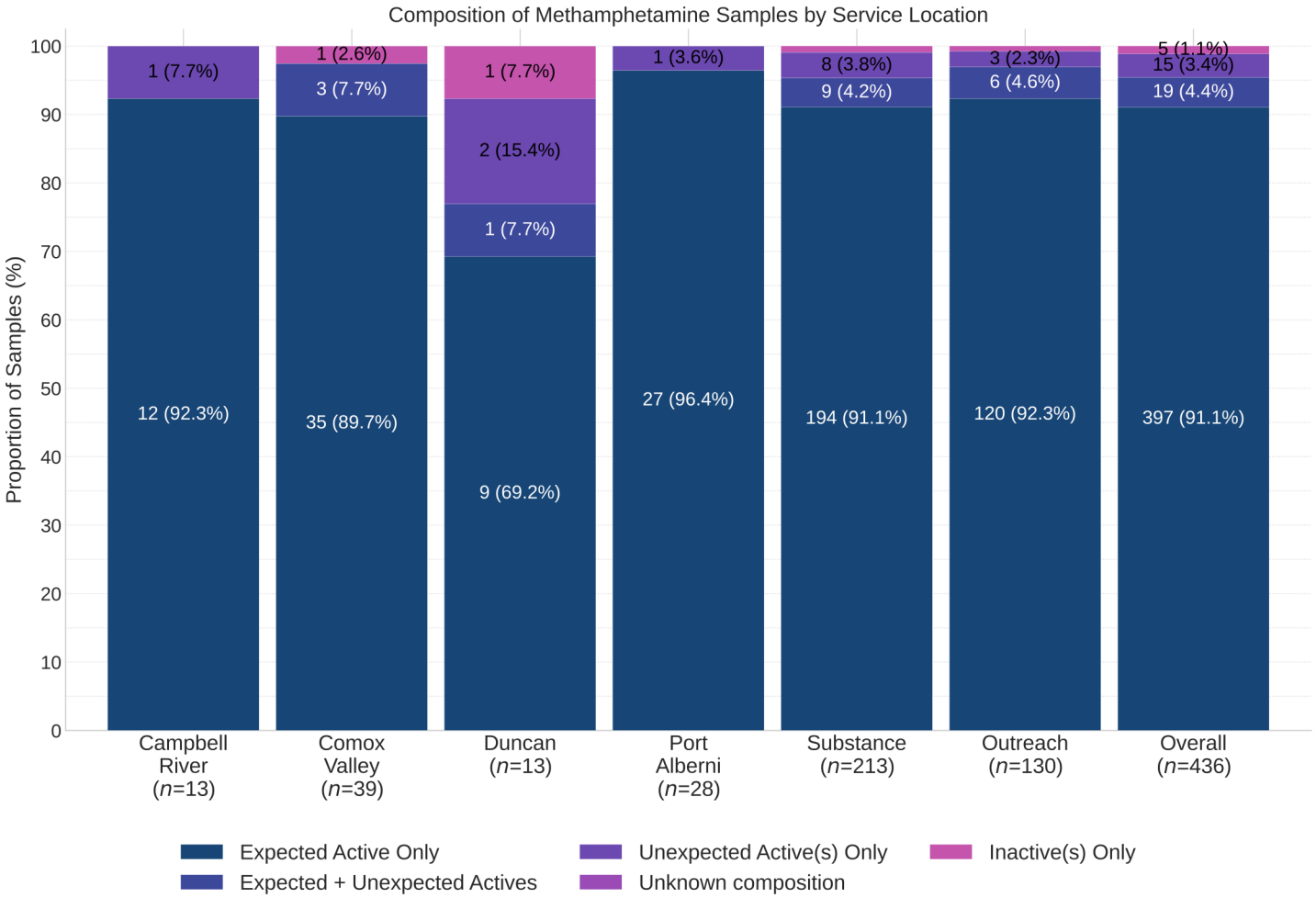

Figure 12. Proportion and number of methamphetamine samples checked by service locations, grouped by composition class (see page 8 for definitions). Proportions less than or equal to 1.0% are omitted for readability.

Methamphetamine: What did we find?

Table 15 below aggregates all active compounds detected in methamphetamine samples in 2023, 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 16 aggregates all cutting agents detected in meth, across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all meth samples)
Expected Active Only	**397 (91.1%)**
Methamphetamine	397 (91.1%)
Expected* + Unexpected Active(s)	**19 (4.4%)**
2C-B	1 (0.2%)
Amphetamine	2 (0.5%)
Benzodiazepine (unknown type)	2 (0.5%)
Bromazolam	4 (0.9%)
Cocaine HCl (powder)	2 (0.5%)
Fentanyl	4 (0.9%)
Fentanyl or analogue	5 (1.1%)
Fluorofentanyl	2 (0.5%)
Lidocaine	1 (0.2%)
Methamphetamine*	19 (4.4%)
Phenacetin	2 (0.5%)
Unexpected Active(s) Only	15 (3.4%)
Acetylcodeine	1 (0.2%)
Acetylmorphine (MAM, 6-MAM)	1 (0.2%)
Bromazolam	1 (0.2%)
Cocaine Base (crack, rock, hard)	3 (0.7%)
Fentanyl	1 (0.2%)
Fluorofentanyl	1 (0.2%)
Heroin	1 (0.2%)

Table 15 (*Continued on the next page)*. Active compounds detected in methamphetamine samples checked in 2023, 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

Methamphetamine: What did we find? - *continued*

Unexpected Active(s) Only	15 (3.4%)
Ketamine	4 (0.9%)
MDA	2 (0.5%)
MDMA	5 (1.1%)

Table 15 (*Continued from previous page).* Active compounds detected in methamphetamine samples checked in 2023, 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.

Methamphetamine: Cutting Agents

Compound	**Number of Samples** (% of all meth samples)
Caffeine	14 (3.2%)
Calcium carbonate (Chalk)	1 (0.2%)
Carbohydrate (unknown type)	1 (0.2%)
Dimethyl sulfone (MSM)	22 (5.0%)
Erythritol	1 (0.2%)
Mannitol	1 (0.2%)
Microcrystalline cellulose	7 (1.6%)
Residual	1 (0.2%)
Sodium bicarbonate (Baking soda)	1 (0.2%)
Stearic acid	6 (1.4%)
Sucrose	1 (0.2%)
Water	1 (0.2%)

Table 16. Cutting agents detected in methamphetamine samples across all service locations. *Quantitative concentrations are not available for these compounds.*

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 17 below may not match those listed in Table 15. Table 17 aggregates the results from all *expected* meth samples checked in 2023 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			1.0%	
Acetylcodeine	1			1.2%	
Acetylmorphine (MAM, 6-MAM)	1			1.4%	
Heroin	1			18.7%	
Lidocaine	1			0.8%	
Phenacetin	1			4.1%	
Amphetamine	2		9.2%	14.6%	
Fluorofentanyl	3	0.9%	0.5%	2.3%	
Bromazolam	5	0.3%	0.0%	1.8%	<0.1% - 1.0%
Fentanyl	5	0.3%	0.1%	9.0%	0.1% - 0.9%

Table 17. 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 99.2% (509/513) of the dissociative samples checked in 2023. We occasionally see novel dissociatives such as 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: 95.7% of dissociative samples checked in 2023 were "as expected" and cutting agents were detected in only 3.5% 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.

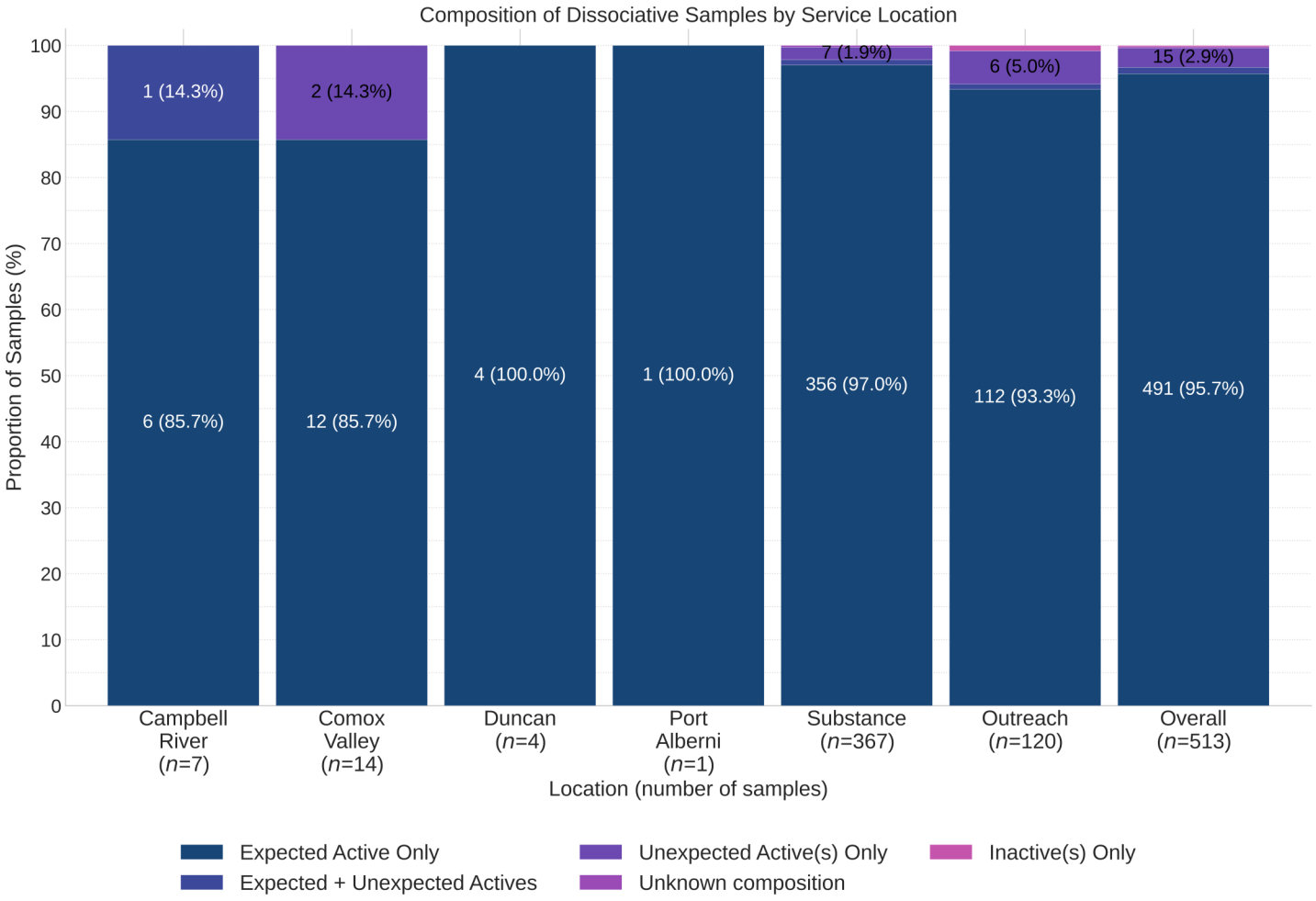

Figure 13. Proportion and number of dissociative samples checked by service locations, grouped by composition class (see page 8 for definitions). Proportions less than or equal to 1.1% are omitted for readability.

Dissociatives: What did we find?

Table 18 below aggregates all active compounds detected in dissociative samples in 2023, 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 19 on page 37 aggregates all cutting agents detected in dissociative samples across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all dissociative samples)
Expected Active Only	**491 (95.7%)**
Ketamine	484 (94.3%)
O-PCE (Deschloro-N-ethyl-ketamine)	2 (0.4%)
3-F-PCP	1 (0.2%)
3-HO-PCP	1 (0.2%)
3-MeO-PCE	1 (0.2%)
3-MeO-PCP	1 (0.2%)
Fluorexetamine (FXE)	1 (0.2%)
Expected* + Unexpected Active(s)	5 (1.0%)
Ketamine*	5 (1.0%)
Cocaine HCl (powder)	1 (0.2%)
MDA	1 (0.2%)
MDMA	1 (0.2%)
Phenacetin	2 (0.4%)
Unexpected Active(s) Only	15 (2.9%)
Bromazolam	2 (0.4%)
Cocaine HCl (powder)	3 (0.6%)
Ephenidine	1 (0.2%)
Fluorexetamine (FXE)	3 (0.6%)
Fluorodeschloroketamine	1 (0.2%)
MDMA	2 (0.4%)
Methamphetamine	2 (0.4%)
O-PCE (Deschloro-N-ethyl-ketamine)	1 (0.2%)
Unknown Composition	**1 (0.2%)**
Unknown	1 (0.2%)

Table 18. Active compounds detected in dissociative samples checked in 2023, 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.*

Dissociatives: Cutting Agents

Compound	Number of Samples (% of all dissociative samples)
Caffeine	1 (0.2%)
Dextrose	1 (0.2%)
Dimethyl sulfone (MSM)	5 (1.0%)
Erythritol	2 (0.4%)
Inositol	1 (0.2%)
Monosodium glutamate (MSG)	4 (0.8%)
Sodium 3-chloro-2-hydroxypropanesulfonate	1 (0.2%)
Taurine	2 (0.4%)
Water	1 (0.2%)

Table 19. Cutting agents detected in dissociative 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

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 20 below may not match those listed in Table 18. Table 20 aggregates the results from all *expected* dissociative samples checked in 2023 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
Bromazolam	2		0.1%	0.1%	
Phenacetin	2		1.1%	4.8%	

Table 20. 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 (54.1% of benzo samples) which often present similar to 2mg Xanax bars. Though alprazolam is expected, alprazolam is only detected in 21.0% (25/119) of expected alprazolam tablets. Instead, non-medical benzos/benzo analogues like Flualprazolam (found in 35.3% (42/119) of expected alprazolam samples) and bromazolam (found in 21.0% (25/119) of expected alprazolam samples) 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. Table 21 on page 39 lists the other benzodiazepines that are considered “unexpected actives”.

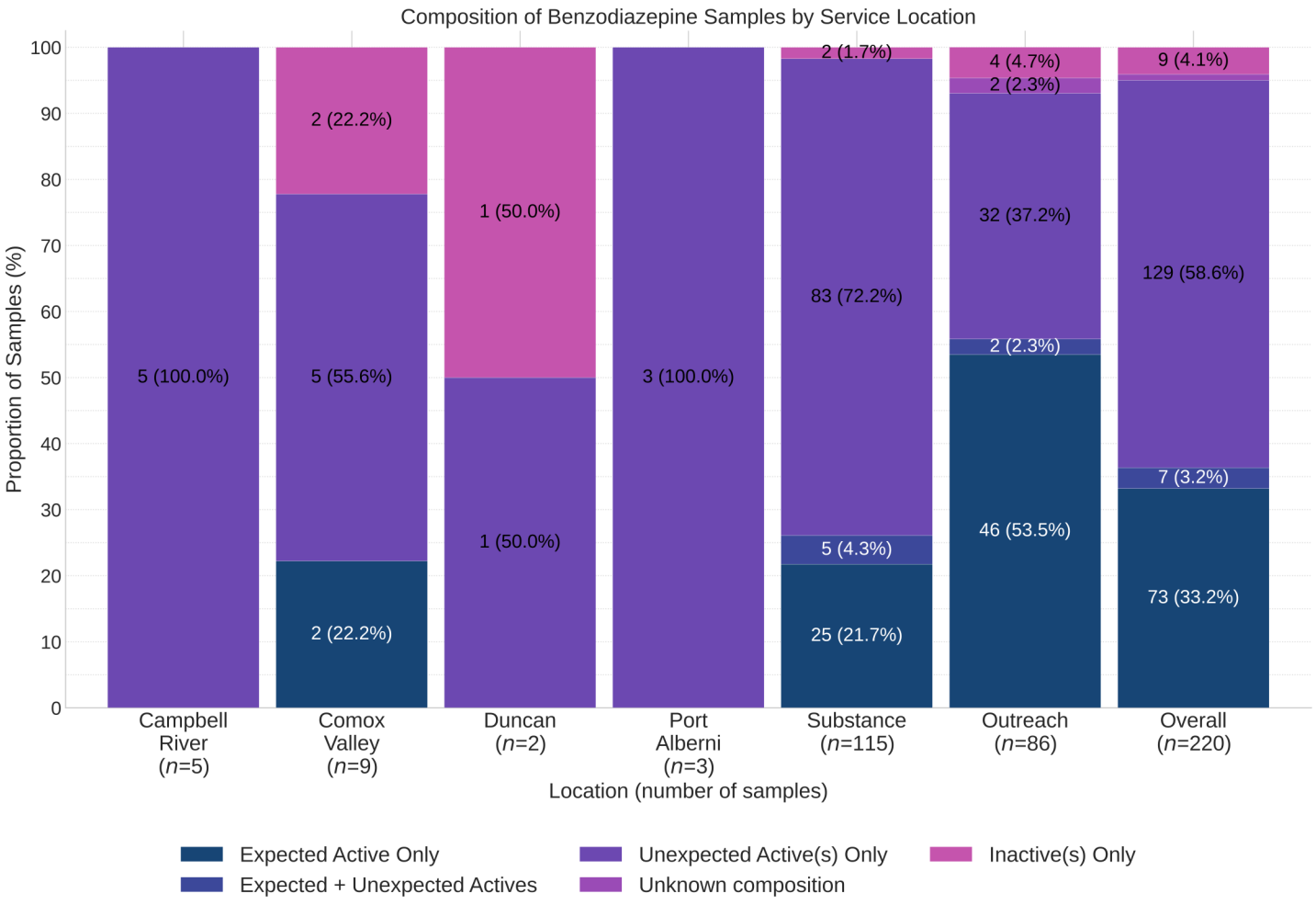

Figure 14. Proportion and number of benzodiazepine samples checked by service locations, grouped by composition class (see page 8 for definitions).

Benzodiazepines: What did we find?

Table 21 below (and on the following page) aggregates all active compounds detected in benzodiazepine samples in 2023, 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 22 on page 40 aggregates all cutting agents detected in benzodiazepines, across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all benzo samples)
Expected Active Only	**73 (33.2%)**
3-Hydroxyphenazepam	1 (0.5%)
Alprazolam (Xanax)	21 (9.5%)
Bromazepam	1 (0.5%)
Bromazolam	15 (6.8%)
Clonazepam (Klonopin)	6 (2.7%)
Diazepam (Valium)	3 (1.4%)
Etizolam	8 (3.6%)
Flualprazolam	12 (5.5%)
Fluclotizolam	1 (0.5%)
Lorazepam (Ativan)	3 (1.4%)
Pyrazolam	2 (0.9%)
Expected* + Unexpected Active(s)	**7 (3.2%)**
Alprazolam (Xanax)*	4 (1.8%)
Bromazolam*	3 (1.4%)
Etizolam*	4 (1.8%)
Fentanyl	1 (0.5%)
Flualprazolam	2 (0.9%)
Unexpected Active(s) Only	**129 (58.6%)**
Alprazolam (Xanax)	2 (0.9%)
Amphetamine	1 (0.5%)
Aspirin	1 (0.5%)

Table 21 (*Continued on the next page)*. Active compounds detected in benzodiazepine samples checked in 2023, 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.*

Benzodiazepines: What did we find? - *continued*

Unexpected Active(s) Only	**129 (58.6%)**
Benzodiazepine (unknown type)	9 (4.1%)
Bromazolam	42 (19.1%)
Cocaine HCl (powder)	1 (0.5%)
Desalkylgidazepam	3 (1.4%)
Diclazepam	1 (0.5%)
Etizolam	12 (5.5%)
Fentanyl	6 (2.7%)
Fentanyl or analogue	4 (1.8%)
Flualprazolam	45 (20.5%)
Flubromazepam	1 (0.5%)
Flubromazolam	4 (1.8%)
Fluorofentanyl	4 (1.8%)
Methamphetamine	1 (0.5%)
Mirtazapine	1 (0.5%)
N-Desalkylflurazepam	1 (0.5%)
Oxazepam	1 (0.5%)
Pregabalin	1 (0.5%)
Xylazine	5 (2.3%)
Unknown Composition	**2 (0.9%)**
Unknown	2 (0.9%)

Table 21 (Left, *Continued from previous page).* Active compounds detected in benzodiazepine samples checked in 2023, 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. "Benzodiazepine (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.

Benzodiazepines: Cutting Agents

Compound	Number of Samples (% of all benzo samples)	Compound	Number of Samples (% of all benzo samples)
Caffeine	14 (6.4%)	Mannitol	1 (0.5%)
Carbohydrate (unknown type)	3 (1.4%)	Microcrystalline cellulose	128 (58.2%)
Erythritol	2 (0.9%)	Oil (unknown type)	16 (7.3%)
Glucose	1 (0.5%)	Sodium bicarbonate (Baking soda)	1 (0.5%)
Lactose	28 (12.7%)	Stearic acid	20 (9.1%)
Lactose anhydrous	9 (4.1%)	Water	2 (0.9%)

Table 22. Cutting agents detected in benzodiazepine samples across all service locations. *Quantitative concentrations are not available for these compounds.*

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 23 below may not match those listed in Table 21. Table 23 aggregates the results from all *expected* benzodiazepine samples checked in 2023 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			4.4%	
Pregabalin	1			<0.1%	
Pyrazolam	1			<0.1%	
Flubromazepam	1			>25.0%	
N-Desalkylflurazepam	1			<0.1%	
Diazepam (Valium)	2		3.3%	5.4%	
Flubromazolam	2		0.3%	0.6%	
Lorazepam (Ativan)	3	1.8%	1.0%	2.8%	
Fluorofentanyl	4	23.4%	0.4%	>40.0%	5.2% - >40.0%
Xylazine	5	0.3%	0.1%	0.8%	0.3% - 0.4%
Clonazepam (Klonopin)	5	3.6%	0.7%	9.7%	1.0% - 6.8%
Fentanyl	6	1.7%	0.4%	17.6%	1.0% - 13.0%
Etizolam	23	1.3%	0.3%	>25.0%	0.7% - 2.3%
Alprazolam (Xanax)	26	3.5%	<0.1%	9.5%	1.5% - 5.6%
Flualprazolam	57	0.5%	0.1%	>25.0%	0.4% - 0.6%
Bromazolam	58	4.8%	<0.1%	>25.0%	0.5% - >25.0%

Table 23. 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. Instead this class focuses on what are generally thought of as "classical" psychedelics. Overall, 76.2% of expected psychedelic samples were "as expected", yet, we still see misrepresentations quite regularly. Often times this misrepresentation can be attributed to the often confusing naming convention of psychedelics (sometimes we like to call this "alphabet soup"): 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. 55% (11/20) of psychedelic samples that contained unexpected actives were found to contain an analogue of the expected compound. 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.

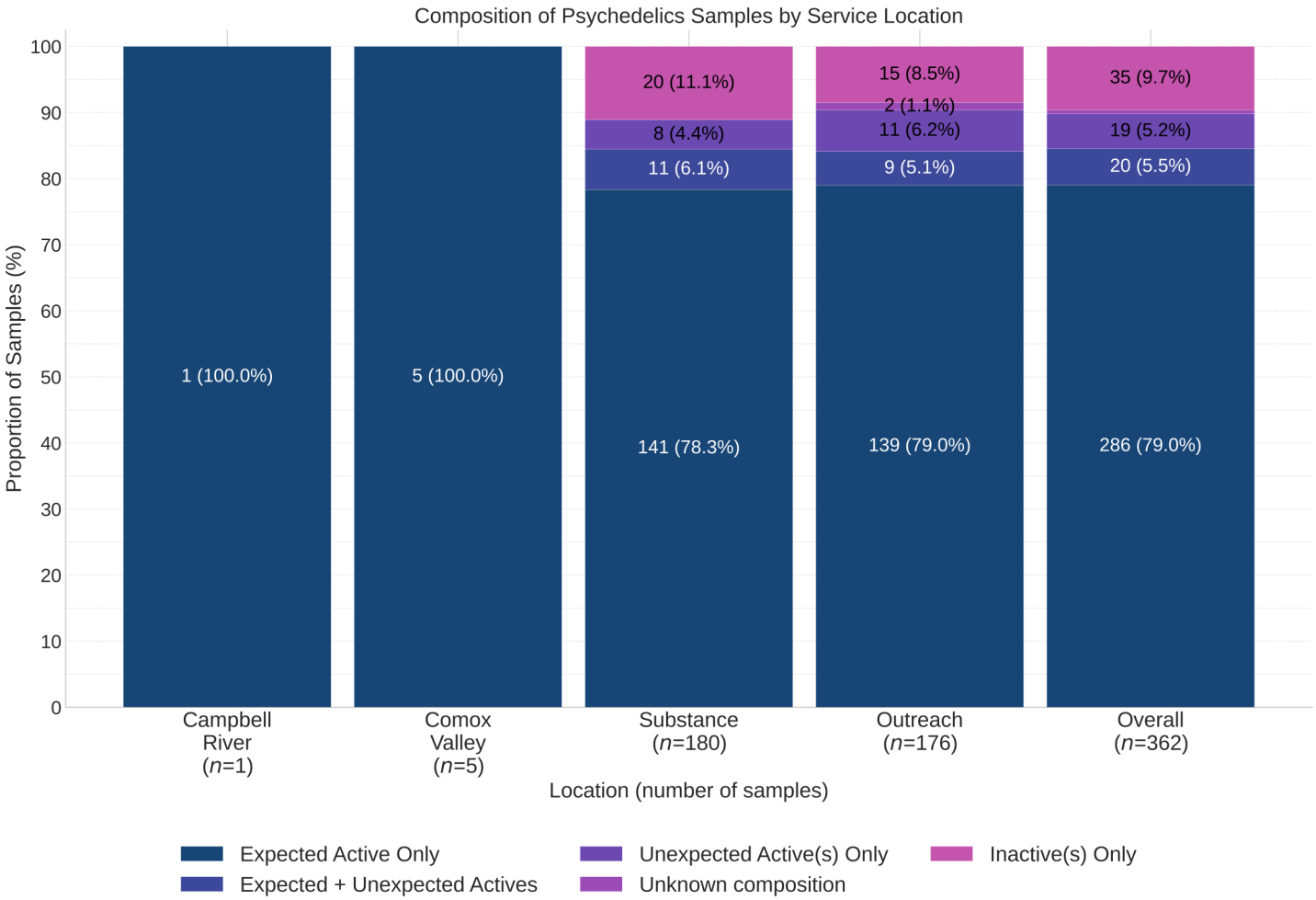

Figure 15. Proportion and number of psychedelic samples checked by service locations, grouped by composition class (see page 9 for definitions).

Psychedelics: What did we find?

Table 24 below (and on the following page) aggregates all active compounds detected in psychedelic samples in 2023, 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 25 on page 46 aggregates all cutting agents detected in psychedelics, across all service locations. See page 8 for definitions of the different composition classes.

Detected Compounds by Composition Class	Number of Samples (% of all psychedelic samples)
Expected Active Only	**286 (79.0%)**
1P-LSD	1 (0.3%)
2C-B	58 (16.0%)
2C-B-FLY	1 (0.3%)
2C-C	1 (0.3%)
2C-D	1 (0.3%)
2C-E	1 (0.3%)
2C-I	1 (0.3%)
2C-T-2	2 (0.6%)
2C-T-7	1 (0.3%)
4-AcO-DMT [O-Acetylpsilocin]	12 (3.3%)
4-AcO-EPT	1 (0.3%)
4-AcO-MET	5 (1.4%)
4-HO-DiPT	1 (0.3%)
4-HO-MET [Metocin, Colour]	5 (1.4%)
4-HO-MiPT [Miprocin]	3 (0.8%)
5-MeO-DALT	1 (0.3%)
5-MeO-DMT	10 (2.8%)
5-MeO-DiPT [Foxy]	3 (0.8%)
5-MeO-MiPT [Moxy]	13 (3.6%)
5-bromo-DMT	1 (0.3%)

Table 24 (*Continued on the next page*). Active compounds detected in psychedelic samples checked in 2023, 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

Psychedelics: What did we find? - *continued*

Expected Active Only	**286 (79.0%)**
5-chloro-DMT	1 (0.3%)
ALD-52	15 (4.1%)
AMT	1 (0.3%)
Allylescaline	3 (0.8%)
Bufotenine	4 (1.1%)
DMT [Dimethyltryptamine]	26 (7.2%)
DOM	3 (0.8%)
DPT	3 (0.8%)
DiPT	1 (0.3%)
Escaline	1 (0.3%)
Ibogaine	3 (0.8%)
Isoproscaline	1 (0.3%)
Ketamine	2 (0.6%)
LSD [acid]	95 (26.2%)
MDMA	2 (0.6%)
Mescaline	3 (0.8%)
Methallylescaline	4 (1.1%)
Proscaline	1 (0.3%)
Psilocybin [mushrooms]	1 (0.3%)
Expected* + Unexpected Active(s)	**20 (5.5%)**
2C-B*	11 (3.0%)
2C-E*	1 (0.3%)
2C-H	8 (2.2%)
2C-I	1 (0.3%)
4-AcO-DMT [O-Acetylpsilocin]*	1 (0.3%)
5-MeO-DMT*	4 (1.1%)
5-MeO-MALT	1 (0.3%)

Table 24 (*Continued from previous page). A*ctive compounds detected in psychedelic samples checked in 2023, 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.*

Psychedelics: What did we find? - *continued*

Expected* + Unexpected Active(s)	**20 (5.5%)**
ALD-52*	1 (0.3%)
Allylescaline*	1 (0.3%)
Cocaine HCl [powder]	2 (0.6%)
DMT [Dimethyltryptamine]*	3 (0.8%)
Dimethylpentylone	1 (0.3%)
Ketamine	1 (0.3%)
MDMA	1 (0.3%)
Methallylescaline	1 (0.3%)
Phenacetin	3 (0.8%)
Unknown	2 (0.6%)
Unexpected Active(s) Only	**19 (5.2%)**
2C-B	1 (0.3%)
2C-E	1 (0.3%)
3-MeO-PCP	2 (0.6%)
4-AcO-DMT [O-Acetylpsilocin]	1 (0.3%)
5-MeO-DMT	4 (1.1%)
5-MeO-MiPT [Moxy]	1 (0.3%)
Bromazolam	1 (0.3%)
DMT [Dimethyltryptamine]	1 (0.3%)
Dimethylpentylone	1 (0.3%)
Fentanyl	1 (0.3%)
Ketamine	4 (1.1%)
Levamisole	1 (0.3%)
MDA	2 (0.6%)
MDMA	4 (1.1%)
Procaine	1 (0.3%)
Tryptamine (unknown type)	3 (0.8%)
Unknown Composition	**2 (0.6%)**
Unknown	2 (0.6%)

Table 24 (*Continued from previous page). A*ctive compounds detected in psychedelic samples checked in 2023, 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.

Psychedelics: Cutting Agents

Compound	Number of Samples (% of all psychedelic samples)
Caffeine	8 (2.2%)
Calcium acetate	1 (0.3%)
Carbohydrate (unknown type)	14 (3.9%)
Cellulose	1 (0.3%)
Dimethyl sulfone (MSM)	3 (0.8%)
Fat	1 (0.3%)
Flour	1 (0.3%)
Mannitol	6 (1.7%)
Microcrystalline cellulose	37 (10.2%)
Oil (unknown type)	5 (1.4%)
Plant	3 (0.8%)
Potassium bitartrate	1 (0.3%)
Residual	3 (0.8%)
Sodium bicarbonate (Baking soda)	8 (2.2%)
Starch	2 (0.6%)
Stearic acid	6 (1.7%)
Sucrose	1 (0.3%)
Taurine	1 (0.3%)
Water	7 (1.9%)

Table 25. Cutting agents detected in psychedelic 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

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 24. Table 26 aggregates the results from all *expected* psychedelic samples checked in 2023 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
Levamisole	1			0.2%	
Fentanyl	1			3.1%	
Procaine	1			0.1%	
Bromazolam	1			1.4%	
Phenacetin	3	66.7%	6.3%	66.7%	

Table 26. 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. 57.1% (60/105) of opioid–other samples were expected to contain oxycodone, either as oxycodone alone or as Percocet (oxycodone + acetaminophen), however, only 68.3% (41/60) of these samples were "as expected". Nitazenes were found in 12/19 of oxycodone samples containing unexpected actives. In comparison, 33 samples were expected to be hydromorphone; 72.7% (24/33) were as expected, nitazenes were detected in 2/3 hydromorphone samples containing unexpected actives. Table 42 on page 71 gives a full break down of which and how many unexpected opioids were detected in "opioid - other" samples.

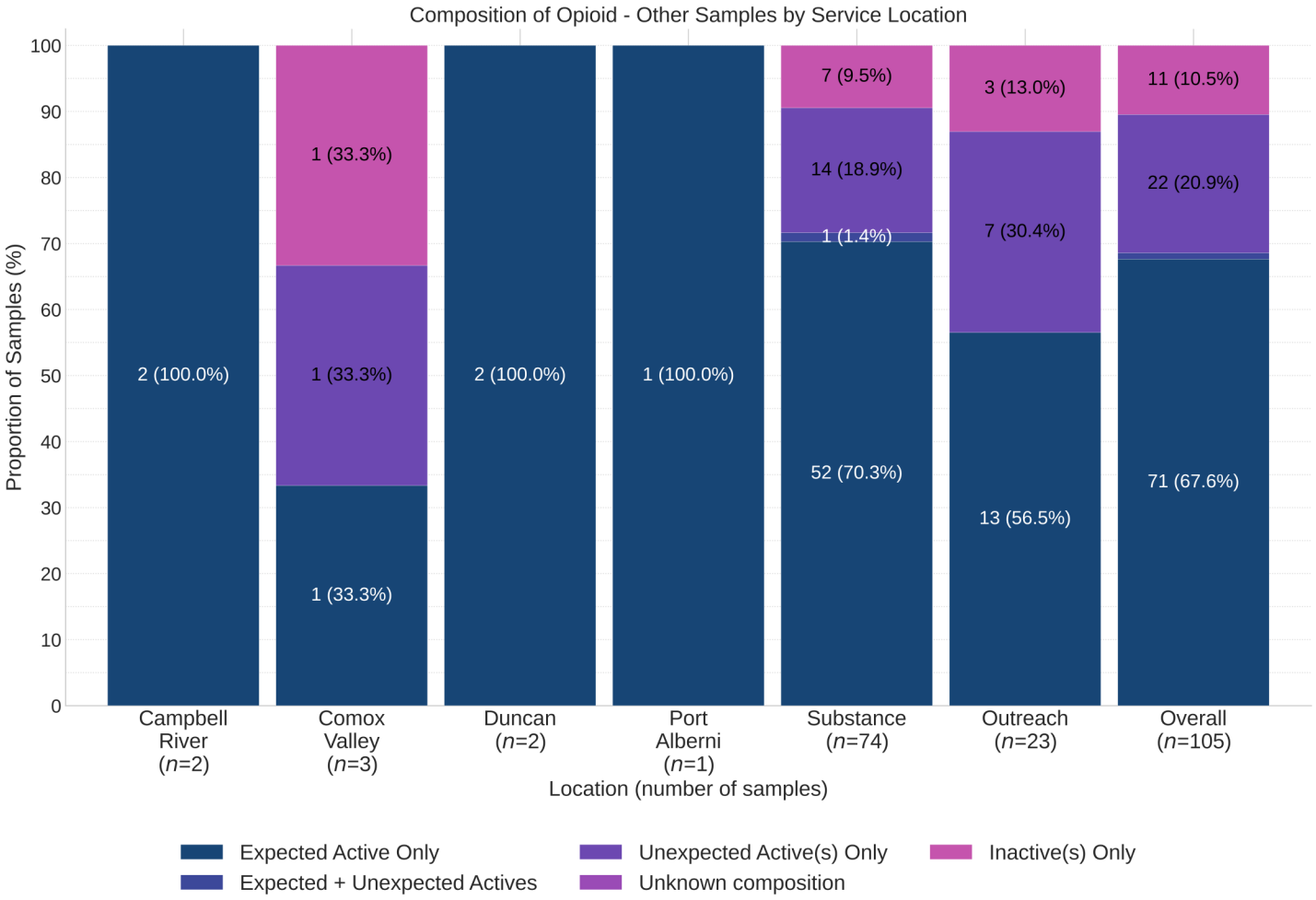

Figure 16. Proportion and number of opioid–other samples checked by service locations, grouped by composition class (see page 8 for definitions).

Opioid–Other: What did we find?

Table 27 below aggregates all active compounds detected in opioid–other samples in 2023, 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 28 on page 50 aggregates all cutting agents detected in opioid–other samples, across all service locations. See page 8 for definitions of the different composition classes.

Expected Active Only	**71 (67.6%)**
Acetaminophen (Paracetamol, Tylenol)	15 (14.3%)
Hydromorphone (Dilaudid, Dillies)	24 (22.9%)
Morphine	3 (2.9%)
Naltrexone	1 (1.0%)
Opium	1 (1.0%)
Oxycodone (Oxycontin)	39 (37.1%)
Tramadol	2 (1.9%)
Expected* + Unexpected Active(s)	**1 (1.0%)**
Isotonitazene*	1 (1.0%)
Metonitazene	1 (1.0%)
Unexpected Active(s) Only	**22 (21.0%)**
Acetaminophen (Paracetamol, Tylenol)	1 (1.0%)
Butonitazene	1 (1.0%)
Diazepam (Valium)	1 (1.0%)
Fentanyl	3 (2.9%)
Fentanyl or analogue	1 (1.0%)
Fluorofentanyl	1 (1.0%)
Isotonitazene	10 (9.5%)
Metonitazene	4 (3.8%)
Morphine	1 (1.0%)
N-Pyrrolidino Etonitazene	1 (1.0%)
Noscapine	1 (1.0%)

Table 27. Active compounds detected in opioid–other samples checked in 2023, 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 (unknown type)" 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)
Caffeine	2 (1.9%)
Carbohydrate (unknown type)	15 (14.3%)
Dextrose	1 (1.0%)
Dicalcium Phosphate	8 (7.6%)
Erythritol	1 (1.0%)
Lactose	13 (12.4%)
Lactose anhydrous	13 (12.4%)
Mannitol	1 (1.0%)
Microcrystalline cellulose	41 (39.0%)
Oil (unknown type)	12 (11.4%)
Polyethylene glycol (PEG)	2 (1.9%)
Starch	1 (1.0%)
Stearic acid	6 (5.7%)
Sucrose	4 (3.8%)
Water	4 (3.8%)

Table 28. Cutting agents detected in opioid–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.

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 29 aggregates the results from all *expected* opioid–other samples checked in 2023 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
Butonitazene	1			0.2%	
Diazepam (Valium)	1			4.0%	
Fluorofentanyl	1			1.8%	
N-Pyrrolidino Etonitazene	1			0.3%	
Noscapine	1			<0.1%	
Tramadol	2		8.0%	12.4%	
Fentanyl	3	2.9%	1.2%	5.9%	
Morphine	4	6.3%	0.2%	24.4%	2.1% - 13.5%
Metonitazene	5	2.4%	0.8%	11.5%	1.5% - 10.8%
Isotonitazene	10	0.5%	<0.1%	25.0%	0.1% - 0.9%
Hydromorphone (Dilaudid, Dillies)	22	6.4%	1.4%	16.0%	4.1% - 8.2%
Oxycodone (Oxycontin)	36	3.4%	0.0%	30.4%	1.0% - 6.0%

Table 29. 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, Dexedrine, or amphetamine in general. 36 samples checked in 2023 were expected to contain amphetamine in some form (Adderall, Dexedrine, or simply amphetamine). Of these, 27.8%% (10/36) contained an unexpected active (8 contained methamphetamine, 1 contained cocaine, and 1 contained Methylphenidate). The most commonly expected stimulat was 3-MMC (a.k.a. met-aphedrone), 84% (21/25) of 3-MMC samples were as expected. Out of the remaining 4 samples, 2 contained 3-CMC, 1 contained 3 -BMC, and 1 contained methamphetamine.

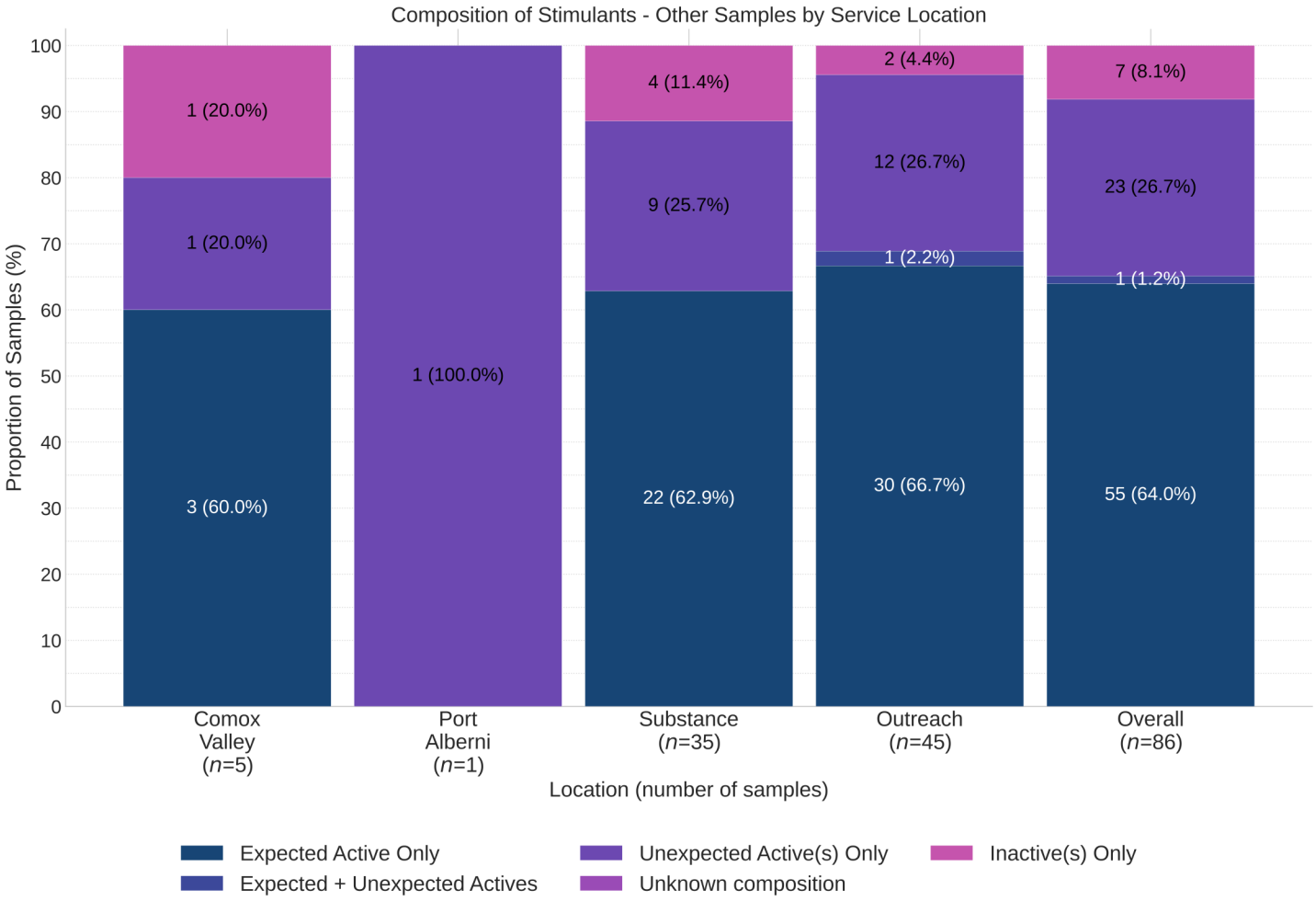

Figure 17. Proportion and number of opioid–other samples checked by service locations, grouped by composition class (see page 8 for definitions).

Stimulants–Other: What did we find?

Table 30 below aggregates all active compounds detected in stimulant–other samples in 2023, 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 31 aggregates all cutting agents detected in stimulant–other samples, across all service locations. See page 8 for definitions of the different composition classes.

Expected Active Only	**56 (62.9%)**
3-MMC (Metaphedrone)	21 (23.6%)
4-FMA	1 (1.1%)
4-MEC	1 (1.1%)
4-MMC (Mephedrone)	6 (6.7%)
4F-MPH	3 (3.4%)
5-MAPB	1 (1.1%)
6-APB	1 (1.1%)
Amphetamine	20 (22.5%)
Isopropylphenidate	1 (1.1%)
Methylphenidate (Ritalin)	1 (1.1%)
Expected* + Unexpected Active(s)	**1 (1.1%)**
Amphetamine*	1 (1.1%)
Unknown	1 (1.1%)
Unexpected Active(s) Only	**25 (28.1%)**
2-MAPB	2 (2.2%)
3-BMC	1 (1.1%)
3-CMC (Clophedrone)	2 (2.2%)
3-MMC (Metaphedrone)	2 (2.2%)
4-CMC (Clephedrone)	4 (4.5%)
Cocaine HCl (powder)	1 (1.1%)
Dimethylpentylone	3 (3.4%)
Methamphetamine	9 (10.1%)
Methylphenidate (Ritalin)	1 (1.1%)
Unknown	1 (1.1%)

Table 30. Active compounds detected in opioid–other samples checked in 2023, 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.*

Stimulants–Other: Cutting Agents

Compound	Number of Samples (% of all stimulant - other samples)
Caffeine	12 (13.5%)
Carbohydrate (unknown type)	3 (3.4%)
Creatine hydrate	1 (1.1%)
Erythritol	1 (1.1%)
Lactose	3 (3.4%)
Lactose anhydrous	2 (2.2%)
Microcrystalline cellulose	14 (15.7%)
Oil (unknown type)	2 (2.2%)
Polyethylene glycol (PEG)	1 (1.1%)
Residual	1 (1.1%)
Stearic acid	4 (4.5%)
Sucrose	9 (10.1%)
Water	1 (1.1%)

Table 31. 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

Stimulants–Other: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in stimulant 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 30. 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
Dimethylpentylone	1			<0.1%	
Methylphenidate (Ritalin)	1			12.0%	
Methamphetamine	3	<0.1%	<0.1%	0.6%	
Amphetamine	16	11.4%	2.1%	80.0%	5.1% - 26.7%

Table 32. PS-MS quantification of targeted active compounds detected in *expected* stimulant–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.*

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 and GBL samples make up a majority of these samples, representing 72.4% (89/123) of "depressant–other" samples checked. Expected Rilmazafone, a pro-drug that is metabolized into several benzodiazepines in the body, makes up 11.4% (14/123) of the samples checked within this drug class. A majority (10/13) of the samples classified as "inactive" are expected GHB or GBL samples in which we could only detect water as the main component. 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.

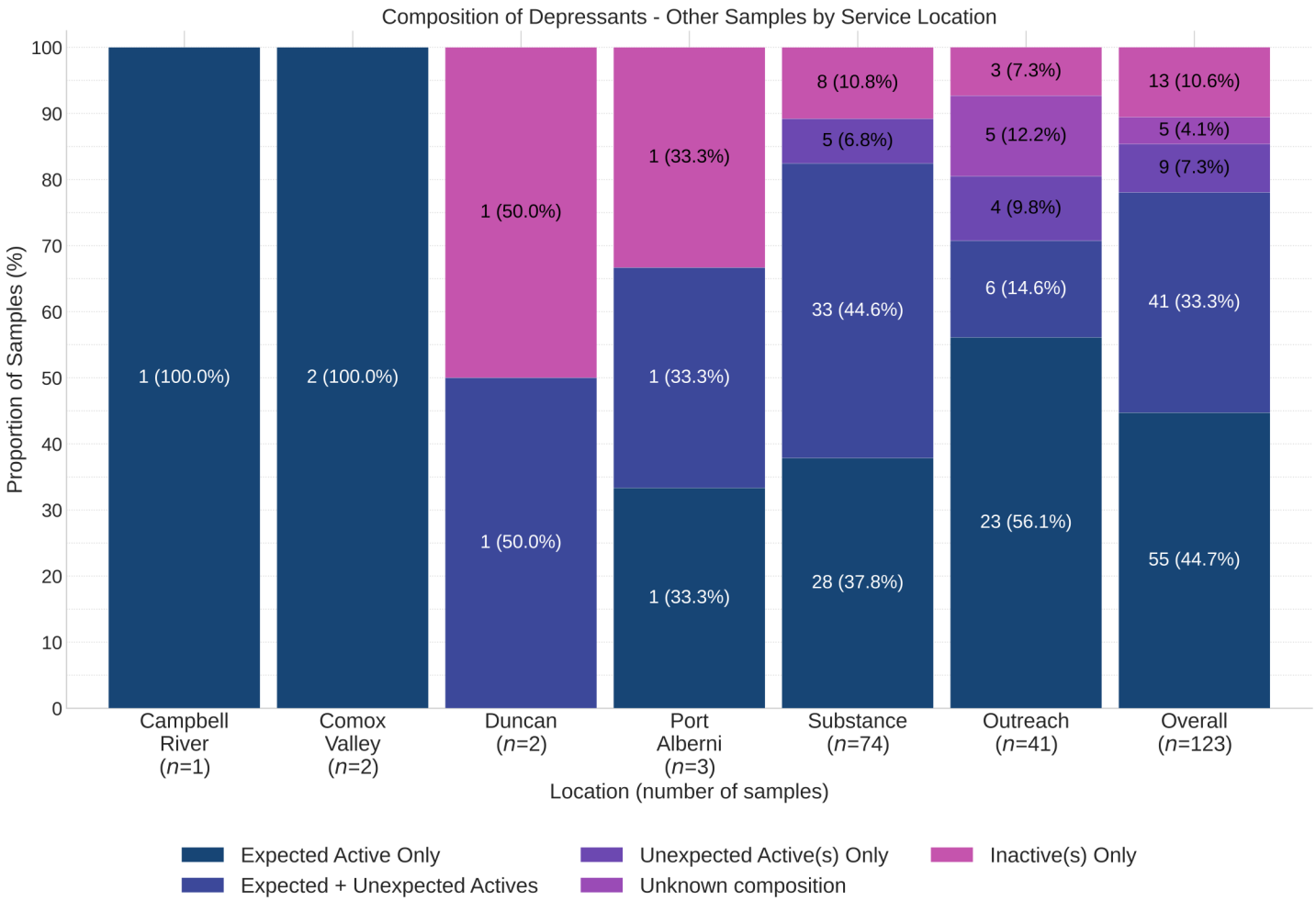

Figure 18. Proportion and number of depressant-other samples checked by service locations, grouped by composition class (see page 8 for definitions).

Depressants–Other: What did we find?

Table 33 below aggregates all active compounds detected in depressant-other samples in 2023, 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 34 aggregates all cutting agents detected in depressant-other samples, across all service locations. See page 8 for definitions of the different composition classes.

Expected Active Only	**55 (44.7%)**
GBL	3 (2.4%)
GHB	32 (26.0%)
Gabapentin	2 (1.6%)
Phenibut	2 (1.6%)
Rilmazafone	12 (9.8%)
Zolpidem (Ambien)	1 (0.8%)
Zopiclone	3 (2.4%)
Expected + Unexpected Active(s)*	**9 (7.3%)**
GHB*	40 (32.5%)
GBL	40 (32.5%)
Methaqualone (Quaaludes)*	1 (0.8%)
Methaqualone Base	1 (0.8%)
Unknown	1 (0.8%)
Unexpected Active(s) Only	**9 (7.3%)**
1,4-Butanediol	2 (1.6%)
GBL	1 (0.8%)
GHB	1 (0.8%)
Methaqualone Base	3 (2.4%)
Nitromethaqualone	2 (1.6%)
Unknown Composition	**5 (4.1%)**
Unknown	5 (4.1%)

Table 33. Active compounds detected in depressant-other samples checked in 2023, 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.*

Depressants–Other: Cutting agents

Compound	Number of Samples (% of all depressant - other samples)
Carbohydrate (unknown type)	8 (6.5%)
Lactose	5 (4.1%)
Microcrystalline cellulose	3 (2.4%)
Sucrose	2 (1.6%)
Water	70 (56.9%)

Table 34. 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 (unknown type)" results are based on a positive strip test and are unconfirmed by paper spray.*

Depressants–Other: Quantification

Using PS-MS, we were able to quantify the concentration of select compounds detected in 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 33. 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
Zolpidem (Ambien)	1			>25.0%	

Table 35. 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 (Unknown type)”. 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.

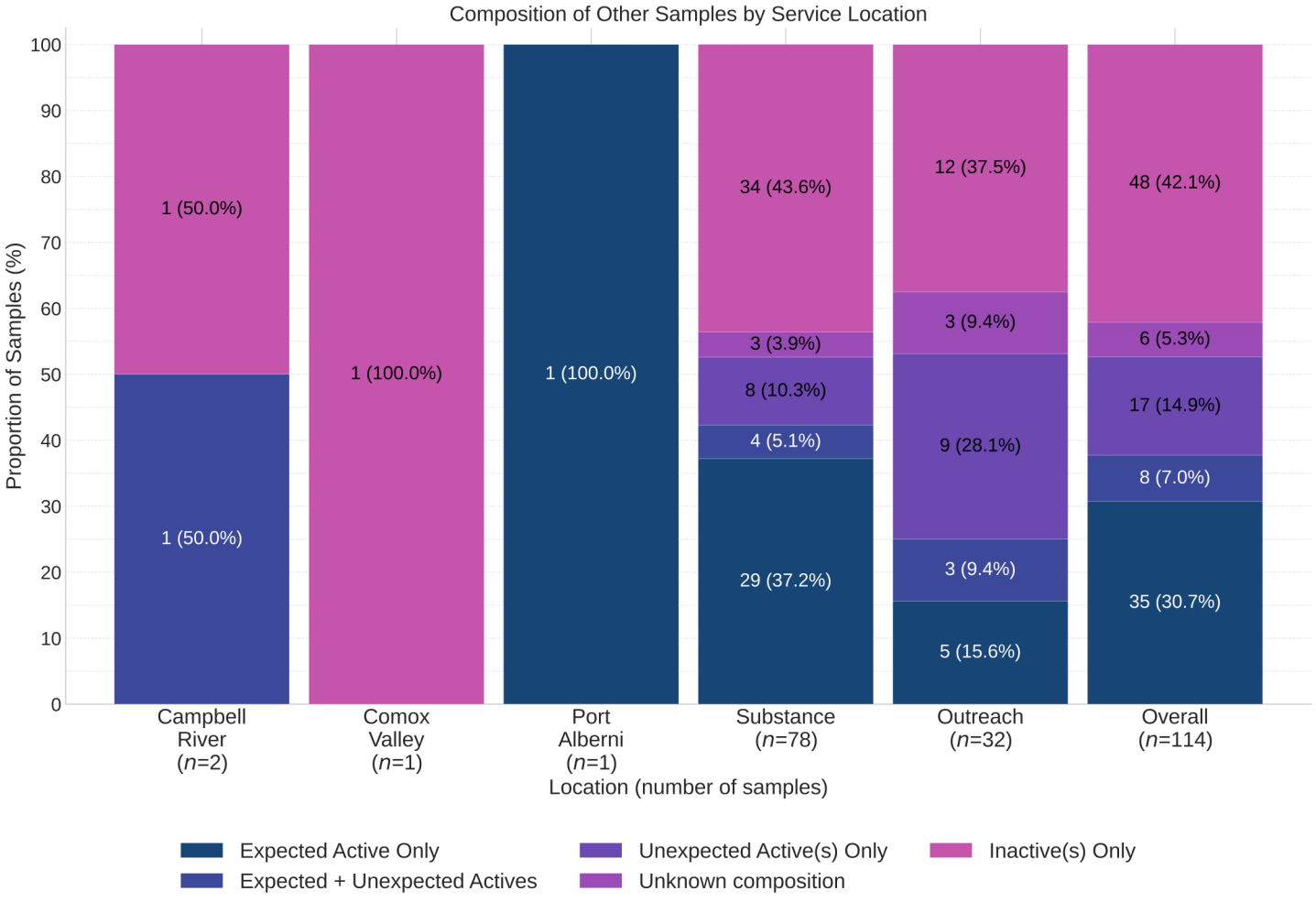

Figure 19. Proportion and number of other samples checked by service locations, grouped by composition class (see page 8 for definitions).

Other categories: What did we find?

Table 36 below aggregates all active compounds detected in "other" samples in 2023, 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 37 on page 61 aggregates all cutting agents detected in "other" samples, across all service locations. See page 8 for definitions of the different composition classes.

Expected Active Only	**35 (30.7%)**
Amitriptyline	1 (0.9%)
Aspirin	1 (0.9%)
Bupropion	2 (1.8%)
Cannabidiol (CBD)	1 (0.9%)
Cannabis	3 (2.6%)
Carisoprodol	1 (0.9%)
Clomiphene	1 (0.9%)
Ivermectin	2 (1.8%)
Ketamine	1 (0.9%)
MDMA	1 (0.9%)
Metoclopramide	1 (0.9%)
Mirtazapine	1 (0.9%)
Modafinil	1 (0.9%)
Olanzapine	1 (0.9%)
Oxandrolone	2 (1.8%)
Sildenafil (Viagra)	1 (0.9%)
THC	12 (10.5%)
Tadalafil (Cialis)	1 (0.9%)
Tamoxifen	1 (0.9%)
Trazodone	1 (0.9%)
Expected* + Unexpected Active(s)	**8 (7.0%)**
Acetaminophen [Paracetamol, Tylenol]*	1 (0.9%)
Benzocaine*	1 (0.9%)
Cocaine HCl [powder]	2 (1.8%)
Ephedrine	2 (1.8%)

Table 36 *(Continued on the next page)*. Active compounds detected in "other" samples checked in 2023, inclusive of all service locations.

Other categories: What did we find? - *continued*

Expected* + Unexpected Active(s)	**8 (7.0%)**
Flualprazolam	1 (0.9%)
Ketamine*	3 (2.6%)
MDMA	3 (2.6%)
Methocarbamol [Robaxin]	1 (0.9%)
Sildenafil [Viagra]	2 (1.8%)
THC*	1 (0.9%)
Tadalafil [Cialis]*	2 (1.8%)
Unexpected Active(s) Only	**17 (14.9%)**
Acetaminophen (Paracetamol, Tylenol)	1 (0.9%)
Benzodiazepine (unknown type)	1 (0.9%)
Bromazolam	1 (0.9%)
Cocaine HCl (powder)	1 (0.9%)
Fentanyl	2 (1.8%)
Fluorofentanyl	1 (0.9%)
Flurazepam	1 (0.9%)
Methamphetamine	1 (0.9%)
Morphine	1 (0.9%)
Nandrolone decanoate	1 (0.9%)
Quetiapine hemifumarate (Seroquel)	1 (0.9%)
Sildenafil (Viagra)	3 (2.6%)
Steroid (unknown type)	3 (2.6%)
THCA	1 (0.9%)
Testosterone	1 (0.9%)
Testosterone capronate	1 (0.9%)
Testosterone enanthate	2 (1.8%)
Xylazine	1 (0.9%)
Unknown Composition	**6 (5.3%)**
Unknown	6 (5.3%)

Table 36 (*Continued from previous page*). Active compounds detected in "other" samples checked in 2023, inclusive of all service locations.

Other categories: Cutting Agents

Compound	Number of Samples (% of all depressant - other samples)
Caffeine	15 (13.2%)
Carbohydrate (unknown type)	6 (5.3%)
Cellulose	1 (0.9%)
Dicalcium Phosphate	1 (0.9%)
Erythritol	1 (0.9%)
Lactose	6 (5.3%)
Lactose anhydrous	1 (0.9%)
Mannitol	2 (1.8%)
Microcrystalline cellulose	18 (15.8%)
Mineral (unknown type)	1 (0.9%)
Oil (unknown type)	7 (6.1%)
Plant	1 (0.9%)
Polyethylene glycol (PEG)	1 (0.9%)
Sodium bicarbonate (Baking soda)	5 (4.4%)
Sorbitol	1 (0.9%)
Starch	2 (1.8%)
Stearic acid	4 (3.5%)
Talc	1 (0.9%)
Water	1 (0.9%)
Xylitol	1 (0.9%)
alpha-Lactose	1 (0.9%)

Table 37. Cutting agents detected in “other” samples across all service locations. *Quantitative concentrations are not available for these compounds.*

Other categories: Quantification

Little quantitative data is available for samples in the "other" category as none of the compounds expected "other" category are within the targeted method for PS-MS. Therefore, the compounds present in Table 38 below (except for benzocaine) are considered adulterants.

Compound	# Quant.	Median	Min	Max	IQR
Benzocaine	1			60.9%	
Bromazolam	1			0.6%	
Flualprazolam	1			<0.1%	
Fluorofentanyl	1			1.0%	
Morphine	1			12.8%	
Xylazine	1			0.2%	
Fentanyl	2		6.0%	9.8%	

Table 38. PS-MS quantification of targeted active compounds detected in *expected* "other" samples, inclusive of all service locations.

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 7.3% of the total samples checked in 2023. Given that there is no "expected" active in "Unknown" samples, by default all are either classified as "unexpected", "inactive", or "unknown composition" depending on whether active drugs were detected, not detected, or if we were unable to determine what was present in the sample.

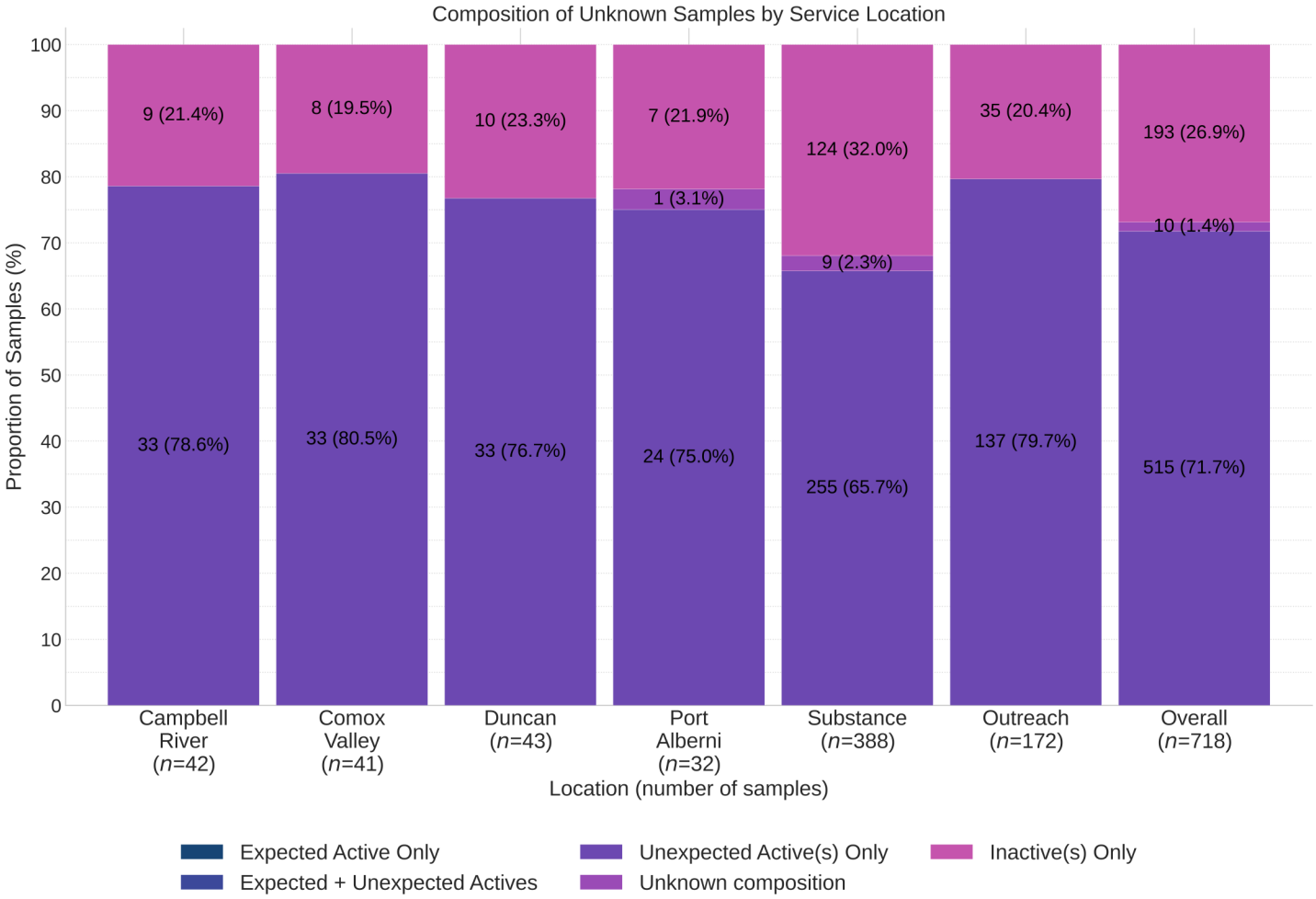

Figure 20. Proportion and number of expected unknown samples checked by service locations, grouped by composition class (see page 9 for definitions).

Unknown: What did we find?

Table 38 below aggregates all active compounds detected in unknown samples in 2023, 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 39 on page 67 aggregates all cutting agents detected in unknown samples, across all service locations. See page 8 for definitions of the different composition classes.

Unexpected Active(s) Only	**515 (71.7%)**
2C-B	2 (0.3%)
3-MMC (Metaphedrone)	1 (0.1%)
4-AcO-DMT (O-Acetylpsilocin)	1 (0.1%)
4-MMC (Mephedrone)	1 (0.1%)
5F-ADB	2 (0.3%)
Acetaminophen (Paracetamol, Tylenol)	8 (1.1%)
Acetildenafil	1 (0.1%)
Acetylcodeine	5 (0.7%)
Acetylmorphine (MAM, 6-MAM)	6 (0.8%)
Amphetamine	2 (0.3%)
Benzocaine	3 (0.4%)
Benzodiazepine (unknown type)	27 (3.8%)
Bromazepam	2 (0.3%)
Bromazolam	95 (13.2%)
Carfentanil	5 (0.7%)
Cathinone (unknown type)	1 (0.1%)
Cephalexin	1 (0.1%)
Chlorodehydromethyltestosterone	1 (0.1%)
Clindamycin	1 (0.1%)
Clonazepam (Klonopin)	2 (0.3%)
Cocaine Base (crack, rock, hard)	30 (4.2%)
Cocaine HCl (powder)	58 (8.1%)
DMT (Dimethyltryptamine)	2 (0.3%)
DXM (Dextromethorphan)	1 (0.1%)
Diazepam (Valium)	1 (0.1%)

Table 38 *(Continued on the next page)*. Active compounds detected in unknown samples checked in 2023, inclusive of all service locations.

Unknown: What did we find? - *continued*

Unexpected Active(s) Only	**515 (71.7%)**
Diclofenac (Voltaren)	1 (0.1%)
Etizolam	5 (0.7%)
Fentanyl	167 (23.3%)
Fentanyl Base	3 (0.4%)
Fentanyl or analogue	9 (1.3%)
Flualprazolam	5 (0.7%)
Flubromazepam	6 (0.8%)
Flubromazolam	1 (0.1%)
Fluorofentanyl	88 (12.3%)
Fluorofentanyl Base	7 (1.0%)
Fluoxetine	1 (0.1%)
Furanyl UF-17	1 (0.1%)
Furosemide	2 (0.3%)
GBL	1 (0.1%)
GHB	2 (0.3%)
Gabapentin	2 (0.3%)
Heroin	6 (0.8%)
Hydrocodone	2 (0.3%)
Hydromorphone (Dilaudid, Dillies)	8 (1.1%)
Ivermectin	2 (0.3%)
Ketamine	43 (6.0%)
LSD (acid)	1 (0.1%)
Lisdexamfetamine dimesylate (Vyvanse)	1 (0.1%)
Lorazepam (Ativan)	2 (0.3%)
MDA	18 (2.5%)
MDEA	1 (0.1%)
MDMA	53 (7.4%)
Metformin	3 (0.4%)
Methamphetamine	49 (6.8%)

Table 38 *(Continued from previous page)*. Active compounds detected in unknown samples checked in 2023, inclusive of all service locations.

Unknown: What did we find? - *continued*

Unexpected Active(s) Only	**515 (71.7%)**
Metonitazene	3 (0.4%)
Morphine	6 (0.8%)
N-desethyl isotonitazene	3 (0.4%)
Nandrolone	1 (0.1%)
Nandrolone phenylpropionate	1 (0.1%)
Naproxen	2 (0.3%)
Oxazepam	1 (0.1%)
Oxycodone (Oxycontin)	6 (0.8%)
Phenacetin	8 (1.1%)
Procaine	1 (0.1%)
Quetiapine hemifumarate (Seroquel)	1 (0.1%)
Sildenafil (Viagra)	7 (1.0%)
Steroid (unknown type)	2 (0.3%)
THC	3 (0.4%)
Tadalafil (Cialis)	6 (0.8%)
Testosterone enanthate	1 (0.1%)
Tianeptine	2 (0.3%)
Tramadol	1 (0.1%)
Trazodone	1 (0.1%)
Trenbolone enanthate	1 (0.1%)
Unknown	1 (0.1%)
Xylazine	14 (1.9%)

Table 38 *(Continued from previous page)*. Active compounds detected in unknown samples checked in 2023, inclusive of all service locations.

Unknown: Cutting Agents

Compound	Number of Samples (% of all unknown samples)	Compound	Number of Samples (% of all unknown samples)
Caffeine	186 (25.9%)	Microcrystalline cellulose	49 (6.8%)
Calcium carbonate (Chalk)	3 (0.4%)	Mineral (unknown type)	3 (0.4%)
Carbohydrate (unknown type)	34 (4.7%)	Nicotinamide (Niacin)	1 (0.1%)
Cellulose	1 (0.1%)	Oil (unknown type)	36 (5.0%)
Creatine	6 (0.8%)	Polyethylene glycol (PEG)	2 (0.3%)
Dicalcium Phosphate	1 (0.1%)	Residual	1 (0.1%)
Dimethyl sulfone (MSM)	6 (0.8%)	Salt	3 (0.4%)
Erythritol	67 (9.3%)	Sodium bicarbonate (Baking soda)	24 (3.3%)
Fat	2 (0.3%)	Sodium carbonate	1 (0.1%)
Flour	5 (0.7%)	Sorbitol	1 (0.1%)
Fumaric acid	1 (0.1%)	Starch	8 (1.1%)
Glucose	2 (0.3%)	Stearic acid	16 (2.2%)
Inositol	3 (0.4%)	Sucrose	12 (1.7%)
Lactose	31 (4.3%)	Titanium dioxide	1 (0.1%)
Lactose anhydrous	11 (1.5%)	Water	17 (2.4%)
Magnesium sulfate	2 (0.3%)	Wax	1 (0.1%)
Mannitol	20 (2.8%)	Xylitol	3 (0.4%)

Table 39. Cutting agents detected in unknown samples across all service locations. *Quantitative concentrations are not available for these compounds.*

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 40 below may not match those listed in Table 38. Table 40 aggregates the results from all unknown samples checked in 2023 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
DXM (Dextromethorphan)	1			0.0%	
MDEA	1			1.4%	
Diazepam (Valium)	1			2.7%	
Gabapentin	1			25.0%	
Flubromazolam	1			1.0%	
Clonazepam (Klonopin)	1			3.5%	
Fentanyl Base	1			3.1%	
Oxazepam	1			25.0%	
Bromazepam	1			4.5%	
Tramadol	1			1.0%	
Furanyl UF-17	1			1.1%	
Procaine	1			40.0%	
5F-ADB	1			56.8%	
Lorazepam (Ativan)	2		2.2%	3.6%	
2C-B	2		1.7%	34.1%	
Benzocaine	2		9.6%	66.7%	
Amphetamine	2		4.7%	9.1%	
Metonitazene	2		>25.0%	>25.0%	
Hydrocodone	2		0.0%	0.0%	
N-desethyl isotonitazene	3	18.8%	17.4%	25.0%	
Oxycodone (Oxycontin)	4	3.1%	0.6%	6.2%	1.1% - 5.2%
Fluorofentanyl Base	4	17.1%	12.1%	23.0%	13.1% - 21.4%
Etizolam	4	1.1%	0.0%	4.7%	0.4% - 2.4%
Flualprazolam	4	0.2%	0.1%	1.5%	0.1% - 0.6%

Table 40 (*Continued on the next page)*. PS-MS quantification of targeted active compounds detected in *expected* unknown samples, inclusive of all service locations.

Unknown samples: Quantification

Compound	# Quant.	Median	Min	Max	IQR
Acetylcodeine	5	5.9%	0.8%	7.0%	1.9% - 6.5%
Carfentanil	5	0.1%	0.1%	0.7%	0.1% - 0.4%
Acetylmorphine (MAM, 6-MAM)	6	1.7%	1.0%	24.3%	1.2% - 2.6%
Flubromazepam	6	23.4%	0.4%	25.0%	6.3% - 25.0%
Phenacetin	6	24.2%	4.2%	65.0%	19.8% - 31.0%
Morphine	6	3.3%	1.0%	4.3%	2.1% - 4.2%
Heroin	6	38.0%	3.5%	80.0%	32.5% - 70.9%
Hydromorphone (Dilaudid, Dillies)	8	2.7%	0.0%	19.5%	0.7% - 7.2%
Xylazine	14	1.7%	0.1%	35.4%	0.1% - 3.8%
Fluorofentanyl	81	3.2%	0.0%	40.0%	0.9% - 10.3%
Bromazolam	86	3.1%	0.0%	25.0%	0.6% - 10.3%
Fentanyl	148	7.5%	0.0%	80.0%	2.4% - 16.7%

Table 40 (*Continued from previous page)*. PS-MS quantification of targeted active compounds detected in *expected* unknown samples, inclusive of all service locations.

Opioid–Positivity in Non-Opioid–Down Samples

In 2023, we checked 4362 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 and "Other categories" is comprised of the following drug classes: other, stimulant - other and depressant - other .

These data are split into two categories in Table 40 below: samples in each drug class where unexpected opioids were detected (*Total Opioid Positive*) vs. samples where unexpected opioids were detected alongside the *expected* drug (Number of Samples Containing Expected Active & Opioid-Positive). 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 1.8% (versus 2.6% in 2022) of all non-opioid–down samples. However, if we are interested in the co-prevalence of opioids and non-opioid samples, we see that 0.7% of the samples *that were confirmed to contain the expected substance* also contained an unexpected opioid.

As a guiding example from these data, 5.9% (13/220) of expected benzodiazepine samples were found to contain unexpected opioids. However, not all benzo samples are "as expected" and only 33.2% (73/220) of benzo samples actually contained the expected benzo. Of these 73 samples, only 1 sample was found to contain opioids as well (1.2% of benzo samples that contained the expected benzo). Samples in the "Opioid-Other", Benzodiazepine, and Methamphetamine classes showed the highest total prevalence of unexpected opioids. No opioids were detected in Dissociative samples.

Expected Substance Class	**Total Samples**	**Total Opioid Positive** (% of Total Expected)	**Number of Samples Containing Expected Active** (% of Total Samples in Class)	**Number of Samples Containing Expected Active & Opioid-Positive** (% of Samples Containing Expected Active)
Cocaine	1408	28 (2.0%)	1358 (96.4%)	14 (1.0%)
MDMA	990	2 (0.2%)	909 (91.8%)	0 (0.0%)
Dissociatives	513	0 (0.0%)	496 (96.7%)	0 (0.0%)
Methamphetamine	436	12 (2.8%)	416 (95.4%)	10 (2.4%)
Psychedelics	362	1 (0.3%)	306 (84.5%)	0 (0.0%)
Other categories	328	2 (0.6%)	198 (60.4%)	0 (0.0%)
Benzodiazepines	220	13 (5.9%)	80 (36.4%)	1 (1.2%)
Opioid - Other	105	21 (20.0%)	72 (68.6%)	1 (1.4%)
Total	**4362**	**79 (1.8%)**	**3835 (87.9%)**	**26 (0.7%)**

Table 41. Overview of the prevalence of unexpected opioids found within non-opioid–down samples in 2023, inclusive of all service locations.

Opioid–Positivity in Non-Opioid–Down Samples - *continued*

Opioid–Positivity in "Opioid - Other" Samples

20.0% (21/105) of expected "opioid - other" samples contained an unexpected opioid. 10 were expected to be oxycodone, 6 were expected to be Percocet, 3 were expected to be hydromorphone, 1 was expected to be protonitazine, and 1 was expected to be isotonitazene. The composition of the 21 expected "opioid - other" samples which contained an unexpected opioid are shown below in Table 41.

Expected Active Compound	Unexpected Opioid Detected	Number of Samples
Oxycodone (Oxycontin)	Fentanyl	3
	Metonitazene	3
	Isotonitazene	2
	N-Pyrrolidino Etonitazene	1
	N-Desethyl Isotonitazene	1
Percocet (Oxycodone + Acetaminophen)	Isotonitazene	5
	Fentanyl or analogue	1
Hydromorphone (Dilaudid, Dillies)	Isotonitazene	2
	Fluorofentanyl	1
Protonitazene	Butonitazene & Isotonitazene	1
Isotonitazene	Isotonitazene & Metonitazene	1

Table 42. Expected "Opioid - Other" samples checked in 2023 containing an unexpected opioid, inclusive of all service locations.

Opioid–Positivity in Benzodiazepine Samples

5.9% (13/220) of expected benzodiazepine samples contained an unexpected opioid. 10 had an unspecified expected compound, 1 was expected to be bromazolam, 1 was expected to be diazepam, and 1 was expected to be alprazolam. The composition of the 13 expected benzodiazepine samples which contained an unexpected opioid are shown below in Table 42.

Expected Active Compound	Unexpected Opioid Detected	Number of Samples
Unspecified / Other	Fentanyl	4
	Fentanyl or analogue	3
	Fluorofentanyl	3
Bromazolam	Fentanyl	1
Diazepam (Valium)	Fentanyl	1
Alprazolam (Xanax)	Fentanyl or analogue	1

Table 43. Expected Benzodiazepine samples checked in 2023 containing an unexpected opioid, inclusive of all service locations.

"Fentanyl or analogue" results are based on a positive strip test and are unconfirmed by paper spray.

Opioid–Positivity in Non-Opioid–Down Samples - *continued*

Opioid–Positivity in Methamphetamine Samples

Unexpected opioids were found in 2.8% (12/436) of expected methamphetamine samples. Among these, 10 samples also contained methamphetamine. In 7 of the 10 samples containing methamphetamine, the presence of fentanyl or a fentanyl analogue was likely due to cross-contamination. One sample contained heroin and related alkaloids, while another sample was consistent with a down sample, containing fentanyl, fluorofentanyl, and bromazolam.

Opioid–Positivity in Cocaine Samples

2.0% (28/1408) of expected cocaine samples were found to contain an unexpected opioid. In all 28 cases, the unexpected opioid was fentanyl or a fentanyl analogue. Among the samples with an unexpected opioid, 50% (14/28) also contained the expected active component (cocaine or crack). In 10 of these 14 samples, fentanyl or a fentanyl analogue was detected via a strip test, indicating cross-contamination rather than intentional adulteration with fentanyl. The remaining 50% were consistent with down samples, containing fentanyl or a fentanyl analogue, often cut with caffeine and/or sugar. Among the samples consistent with down samples, 9 contained bromazolam.

Opioid–Positivity in MDMA Samples

Out of 990 expected MDMA samples, two were found to contain an unexpected opioid, one of which also contained MDMA. The first sample contained MDMA, methamphetamine, and fentanyl or a fentanyl analogue. Analysis revealed that the green portions of the sample primarily contained MDMA, while the clear crystals contained primarily methamphetamine. Fentanyl or a fentanyl analogue was detected via a strip test at a low concentration. The second sample contained a mixture of substances consistent with an opioid-down sample and did not contain any MDMA. Specifically, it contained N-pyrrolidino etonitazene, bromazolam, and xylazine, cut with xylitol and dimethyl sulfone.

Opioid–Positivity in Psychedelic Samples

The lone expected psychedelic sample (out of 362) containing an unexpected opioid was expected to be "Tucibi," also known as "pink cocaine" or "Tusi." Contrary to expectations, this sample, described as a light pink powder, contained a mixture of fentanyl and bromazolam, cut with caffeine, dimethyl sulfone, and mannitol.

Opioid–Positivity in Other Categories

The two samples falling into "other categories" (i.e., other, stimulant - other, depressant - other, and steroids) that contained an unexpected opioid were expected to be caffeine, the most common cutting agent in opioid-down samples, found in 87.3% of expected opioid-down samples. However, these samples were consistent with opioid-down samples. The first sample contained fluorofentanyl, fentanyl, xylazine, and bromazolam, cut with caffeine. The second sample contained fentanyl, cocaine, an unknown benzodiazepine, cut with caffeine.

Benzodiazepine (unknown type) results are based on a positive strip test and are unconfirmed by paper spray.

2023 Publications

- Gozdzialski, L., Hutchison, A., Wallace, B., Gill, C., & Hore, D. (2023). **Toward automated infrared spectral analysis in community drug checking.** Drug Testing and Analysis. https://doi.org/doi.org/10.1002/dta.3520
- Gozdzialski, L., Wallace, B., & Hore, D. (2023). **Point-of-care community drug checking technologies: an insider look at the scientific principles and practical considerations.** Harm Reduction Journal, 20(1), 39. https://doi.org/doi.org/10.1186/s12954-023-00764-3
- Laxton, J.-C., Monaghan, J., Wallace, B., Hore, D., Wang, N., & Gill, C. G. (2023). **Evaluation and improvement of a miniature mass spectrometry system for quantitative harm reduction drug checking.** International Journal of Mass Spectrometry, 484, 116976. https://doi.org/doi.org/10.1016/j.ijms.2022.116976
- Borden, S. A., Mercer, S. R., Saatchi, A., Wong, E., Stefan, C. M., Wiebe, H., Hore, D. K., Wallace, B., & Gill, C. G. (2023). **Carfentanil structural analogs found in street drugs by paper spray mass spectrometry and their characterization by high-resolution mass spectrometry.** Drug Testing and Analysis, 15(5), 484–494. https://doi.org/doi.org/10.1002/dta.3431

Please visit substance.uvic.ca for a full list of our publications, reports, and drug checking resources

Substance Drug Checking

Annual Review 2023

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

Campbell River AVI
AVI Health & Community Services
1371 Cedar Street, Campbell River
(250) 830-0787

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 Street, Victoria, BC
(250) 415 - 7637

Substance Drug Checking

Preliminary Results for October 2023

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.

See the blog portion of our website to view our more detailed interpretations of our reports.

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

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Agilent Technologies
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