BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

Networking researchers, educators & care providers

Trends in drug checking results

across British Columbia

January to December 2024

September 2025

Land Acknowledgement

The BC Centre on Substance Use would like to respectfully acknowledge that the land on which we work is the unceded ancestral homelands of the xwmekwey'em (Musqueam), Skwxwú7mesh (Squamish), and sel'ílweta| (Tsleil-Waututh) Nations.

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Contact

Learn more on www.drugcheckingbc.ca. For further drug checking-related inquiries, please reach out to us through our general mailbox, drugchecking@bccsu.ubc.ca.

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Purpose of the Report

This report provides an overview of the samples checked in 2024 at community drug checking services across British Columbia (BC) that use Fourier-transform infrared (FTIR) spectroscopy in combination with fentanyl and benzodiazepine immunoassay strips.

The data have been analyzed by health authority region and by drug category in order to examine trends in the unregulated drug supply that may be region or category-specific. Health authority regions included: Vancouver Coastal, Fraser Health, Interior Health, Northern Health, and Island Health. We note that the data included in the Island Health region is collected from one drug checking site. Additional drug checking data from the Island Health region can be found on the Substance (University of Victoria) website. The drug categories used were: opioids, depressants, stimulants, psychedelics, other, polysubstance, and unknown.

Select substances, such as the detection of fluorofentanyl, ortho-methylfentanyl. benzodiazepines, and xylazine, were highlighted in the analysis to better understand the changes to, and the adulteration of, the unregulated opioid supply throughout the year. Additionally, samples expected to be pharmaceutical opioids that did not contain the expected active substances were also highlighted in this report, as concern around counterfeit pharmaceutical opioids continues to grow.

Community Drug Checking Organizations

Listed below are the organizations that offered drug checking services in community sites in the 2024 calendar year. The data in this report includes drug checking results collected at those locations.

ANKORS
ASK Wellness
CMHA Mid-Island
Fraser Health Authority
Get Your Drugs Tested
Interior Health Authority
Insite
LIFT Community Services
Lower Mainland Purpose Society
Mountainside Harm Reduction Society
Northern Health Authority
POUNDS Project
Progressive Housing Society
RainCity Housing and Support Society
Sources Community Resources Society
Tla'amin Nation
University of British Columbia-Okanagan
Vancouver Coastal Health Authority
Vernon Medicine Shoppe Pharmacy
Whistler Community Service Society

List of Acronyms and Other Frequently Used Terms

Adulterant:	A compound added into another substance, such as buffing and cutting agents
Analog:	A substance with similar molecular structure to another
BC:	British Columbia
Buffs:	Inert compounds added to the final product to increase size or bulk
Cuts:	Psychoactive or pharmacologically active compounds that mimic or enhance the effects of the intended drug in the substance
"Down":	Colloquial term used for drugs expected to contain an unknown opioid, with fentanyl or heroin most commonly expected. In this report, "down" is a category of unregulated opioids used to capture those samples purchased or obtained as "down" rather than a specific expected opioid.
DTES:	Vancouver's Downtown Eastside neighbourhood
Expected drug:	An individual's expectation of what the drug is prior to the drug check. Samples are considered concordant if the expected drug is present, based on the FTIR or immunoassay strip result
FTIR:	Fourier-Transform Infrared Spectrometry
Polysubstance:	A combination of two or more psychoactive substances
Precursor:	A compound used in making another substance
Tucibi:	A polysubstance mixture with no standard composition, typically MDMA and ketamine
Uncertain Match:	A result option used to denote when a possible compound(s) is suspected to be in a sample, but it is uncertain which is present. Technicians log this result when there are residual peaks that have not been accounted for in a spectrum during FTIR analysis
Unregulated Opioid:	Term used in the data analysis to refer to samples expected to contain opioids and are categorized as fentanyl, heroin, and/or "down", unless otherwise noted

Summary of Key Findings

Drug checking service utilization in 2024 increased from the previous year:

- A total of 32,417 samples were checked, representing an 11.5% increase from 2023.
- There were 100 drug checking locations accessed in 2024, which included both permanent and temporary sample drop off and/or on-site testing sites.

Opioids were the most frequently checked drug category, and continued to show increasing unpredictability and variability:

- A total of 13,998 opioid samples were checked, with most submitted as "down" (10,730 samples).
- Detection of fentanyl analogs (e.g., fluorofentanyl, ortho-methylfentanyl) increased in 2024. In August and September, fluorofentanyl surpassed fentanyl as the most common opioid detected.
- The median concentration of fentanyl in unregulated opioid samples decreased throughout the year, while fluorofentanyl concentrations fluctuated. By December, fentanyl and fluorofentanyl concentrations had declined, converging to an overall median of 8%.
- Benzodiazepine-positivity decreased in the first half of the year to levels last seen in 2022 (~40%). Benzodiazepine-positivity then increased, corresponding with desalkylgidazepam replacing bromazolam as the most common benzodiazepine detected.
- There was an uptick in samples containing xylazine, though detection remained low overall (~2-4%). The true number of samples containing xylazine is likely higher, as it is usually found in low concentrations via confirmatory testing.
- The most common unexpected active ingredient found in samples submitted as pharmaceutical opioids was fentanyl, as detected by FTIR and/or test strip.

Among the other drug categories:

- Sample concordance was highest in the stimulant category, where 95.2% of samples were found to contain the expected drug.
- Cocaine HCl was the most frequently checked stimulant (3,004 samples), with the highest number of samples checked in August (345 samples)
- Benzodiazepines were the most common type of depressant checked (476 samples), followed by GHB (377 samples).
- MDMA was the most frequently checked drug in the psychedelic category (2,957 samples), with the highest number of samples checked in July (508 samples)
- We observed an increase in the number of samples submitted as tucibi compared to the previous year. Tucibi is a polysubstance mixture with no standard composition.
- Fentanyl-positivity in non-opioids was highest in samples submitted as crack cocaine (11.1%), and methamphetamine (9.2%). Of these, 29.8% were expected by the service user to be cross-contaminated prior to testing.

Background

In response to the drug toxicity crisis being declared a public health emergency in 2016, drug checking services have expanded, playing an essential role as a harm reduction intervention in British Columbia (BC).[1,2] Drug checking not only empowers service users with information about what is contained in their drugs, but also provides opportunities to foster engagement with external resources, services, and supports. Importantly, the data collected by drug checking services allows for monitoring trends in the unregulated drug supply. This report describes results of drug checking data collected throughout 2024 in BC.

Methods

Setting

The data presented in this report consists of drug checking samples submitted between January 1, 2024 through December 31, 2024 to community drug checking sites across BC. The health authorities included Vancouver Coastal Health, Fraser Health, Interior Health, Island Health, and Northern Health. Of note, data from Island Health in this report includes only one location that operates an FTIR spectrometer-based service. However, the University of Victoria drug checking project, Substance, reports on data from other communities across the Island Health region separately. Their data is not included in this report as Substance uses different drug checking technologies, and their data has not yet been harmonized with the data presented here. For more information on the UVic Substance drug checking project, visit here.

Drug Checking Technologies

Drug checking services employ Fourier-transform infrared (FTIR) spectroscopy in combination with fentanyl and benzodiazepine immunoassay strips. The FTIR spectrometer shines an infrared laser at the sample to create a unique light spectrum, and the chemical characteristics of a substance affect how the light is absorbed and reflected.[3] By measuring what light is absorbed, the FTIR produces a spectrum (graph) that technicians can interpret against FTIR spectral reference libraries to identify the components contained in a sample. The FTIR limit of detection is approximately 5-10% concentration, meaning that compounds must be present in concentrations higher than this threshold to be detected consistently.

Immunoassay test strips were originally designed for use on urine samples, but have since been validated for use in drug checking settings with non-urine samples.[4-6] Test strips have higher sensitivity compared to the FTIR spectrometer, and are designed to detect the target substances (e.g., fentanyl/fentanyl analogs, benzodiazepines) at low

concentrations. A portion of the sample is dissolved in water to perform the test, which provides binary information (yes vs. no) about whether fentanyl/fentanyl analogs or benzodiazepines are present in a sample. Antibodies embedded within the test strip are designed to bind to the target substance. The test strip will display one line if the target substance is detected, or two lines if it is not. Test strips cannot quantify the concentration of the compound in the sample, or provide information on how many analogs are contained. Additionally, they may miss some fentanyl analogs (e.g., carfentanil), or benzodiazepine-like substances (e.g., etizolam). Together, both the FTIR spectrometer and immunoassay strips support each other to provide accurate and comprehensive drug checking results with both sensitivity and specificity to the compounds present in a sample.[4,6]

Inclusion Criteria

Both fixed and 'pop-up' drug checking sites were included in the analysis. Drug checking at large multi-day music festivals (Bass Coast and Shambhala) were excluded, but pop-up drug checking services at smaller music festivals, such as Burn in the Forest, Electric Love, FVDED in the Park, Laketown Shakedown, Song and Surf, Sunfest, and Wicked Woods were included. Data from Bass Coast and Shambhala music festivals are available on the Interior Health website here. Mail-in samples were also excluded from analyses, as their origin often cannot be confirmed.

Analysis

Drug checking utilization was examined overall in BC as well as by each health authority to evaluate regional differences. Drug checking results data were analyzed by drug categories to determine trends that were substance-specific. Drug categories included opioids, depressants, stimulants, psychedelics, polysubstance, other, and unknown. Substances in the polysubstance category include samples where multiple active drugs were expected which fall into different categories (e.g., a sample containing an opioid and stimulant). The unknown category included samples where the service user did not know what the substance was prior to the substance being checked, and the other category included samples that did not fit into any of the previously mentioned drug categories.

We assessed sample concordance among each drug category by comparing what drug the service user expected their sample to be with the drug checking results. Sample concordance was determined by evaluating whether or not the expected drug was found to be present by either FTIR or immunoassay test strip. Samples are considered to be concordant if the expected drug is present, with or without any other components detected (e.g., adulterants such as cutting and buffing agents). Samples are considered non-concordant if the expected drug is not present. At times, it may not be possible to determine if a sample contains the expected drug, for example, in those that are brought

in for drug checking as an unknown sample, as well as in samples where we presume the expected drug would be below the detection limit, such as pharmaceutical tablets (e.g., oxycodone, alprazolam), and some liquids.

We then examined the most frequently checked expected drugs within each drug category, and provided the components detected by FTIR. Within the opioid category, the subcategory "unregulated opioids" was defined as samples that were expected to contain fentanyl, heroin, fentanyl + heroin together, and/or "down". "Down" is a colloquial term used to refer to a mixture of substances typically containing caffeine, a sugar (e.g., erythritol) and an opioid, generally fentanyl or a fentanyl analog. Adulteration of, and changes to, the unregulated opioid supply were examined by tracking the monthly prevalence of select compounds: fluorofentanyl, ortho-methylfentanyl, benzodiazepines, and xylazine. Both fentanyl and benzodiazepines were determined to be present or absent via FTIR, immunoassay test strip, or both.

We also examined non-concordant samples submitted as pharmaceutical opioids given the increased concern over counterfeit tablets.[7,8] We can infer that non-concordant pharmaceutical opioid samples are counterfeit because the expected drug was not found present by FTIR, and instead another unexpected active ingredient was detected either by FTIR or test strip. Since active ingredients such as fentanyl can be missed by FTIR in pills due to their presence in low concentrations, we also included test strip results in the components list for non-concordant pharmaceutical opioids.

Fentanyl and Fluorofentanyl Quantification

Median fentanyl and fluorofentanyl concentrations were examined overall in BC and by health authority each month to evaluate regional differences throughout the year. Median concentrations were determined retrospectively using a new model developed by the BCCSU in collaboration with the Hein Lab at the University of British Columbia. The model ("Quant3") uses machine learning methods trained on FTIR spectra validated against gold-standard confirmatory testing provided by Health Canada's Drug Analysis Service. Validation of model performance indicates it performs with greater sensitivity and accuracy compared to previous iterations of quantification models. We note that the model excludes samples containing other fentanyl analogs (e.g., ortho-methylfentanyl, carfentanil). More information on the Quant3 model can be found here.

Results

Drug Checking Utilization

Visits and Samples Checked Over Time

Throughout 2024, a total of 32,417 samples were submitted over 26,190 visits to drug checking access points across British Columbia. As seen in **Figure 1**, the number of samples checked each year has steadily increased since drug checking commenced in 2017. Compared to 2018, the first full year of drug checking services operating in BC, 2024 saw a 579.5% increase in samples checked, and an 11.5% increase in samples checked compared to 2023.

Several factors could have contributed to the increase in service utilization in 2024. For example, the expansion of drug checking access points could be reaching more service users, including additional drop off locations, extended hours, commencement of new services, and more mobile services. Other social factors leading to higher service utilization could include increased public awareness and acceptability of drug checking.

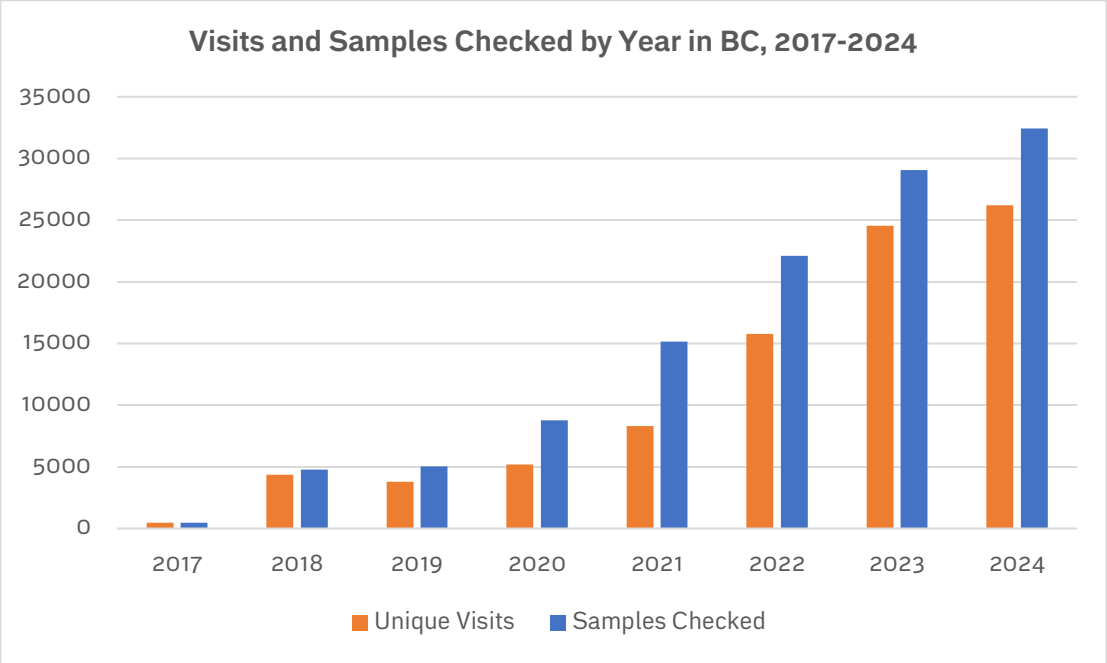

Figure 1 Bar graph of the total number of site visits and samples checked each year in BC from 2017-2024

A total of 32,417 samples were checked in 2024, increasing from 2,420 samples in January to a peak of 3,172 samples checked in July (**Figure 2**). This peak corresponds to an increase in drug checking pop-up locations at small music festivals and other summer events, as well as increases in community drug checking service utilization prior to the larger music festivals that occur in July. The number of samples checked then declined over the second half of the year with the least number of samples checked in December

(2,468 samples), corresponding with service availability slowing down over the winter holiday season.

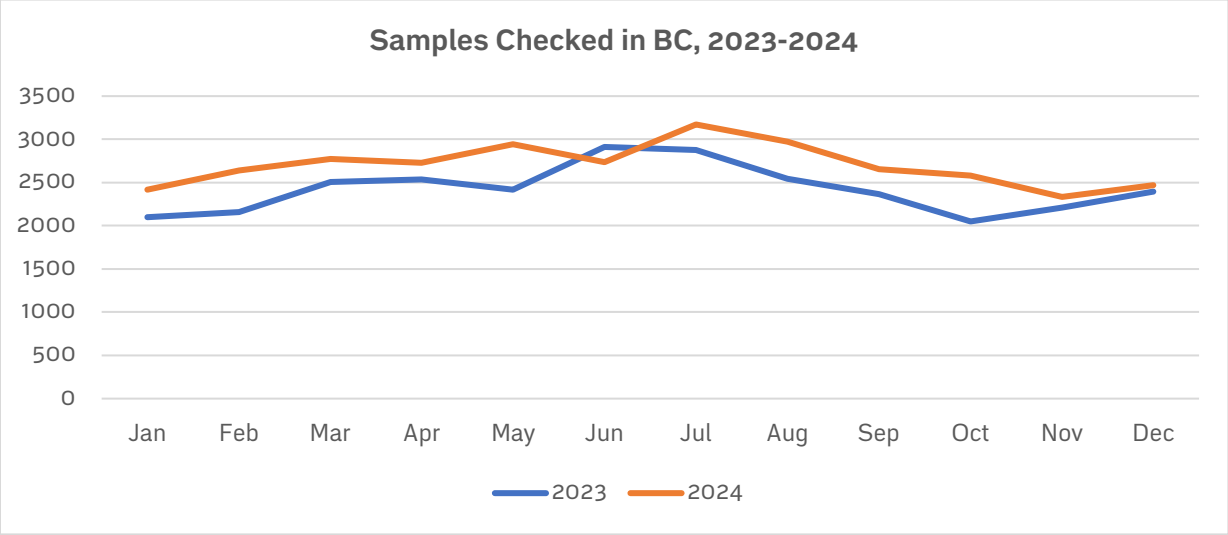

Figure 2 Line graph comparing the total number of samples checked across BC per month in 2023 and 2024

Compared to the previous year, overall number of samples checked grew by 11.5%. The number of samples checked across all drug categories increased, except among samples categorized as "unknown" which saw a slight decrease in 2024. The opioid category saw the largest increase compared to 2023, with 20.6% more opioid samples checked (see **Figure 3**).

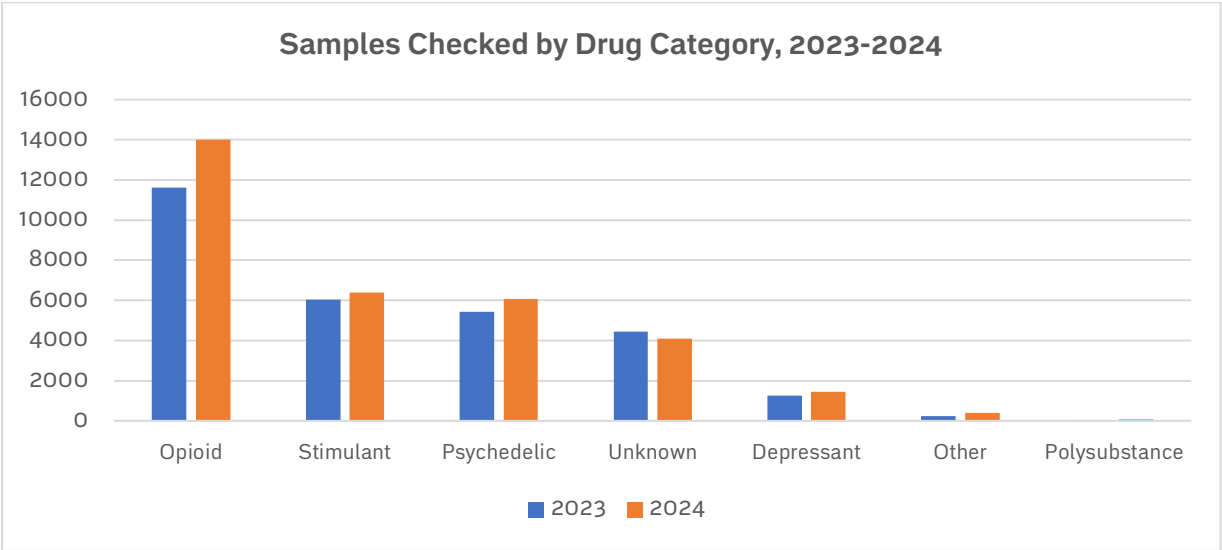

Figure 3 Bar graph comparing the number of samples checked across BC in 2023 and 2024 by drug category

Samples Checked January-December 2024

Opioids were the most frequently checked drug category in 2024, with the highest number of samples occurring in April (1,300 samples) (**Figure 4**). Stimulants were the next most checked category in all months other than July and August. In July, the number of psychedelics reached a peak of 918 samples, and remained high in August with 756 samples. Polysubstance samples were checked the least, with less than 15 submitted each month.

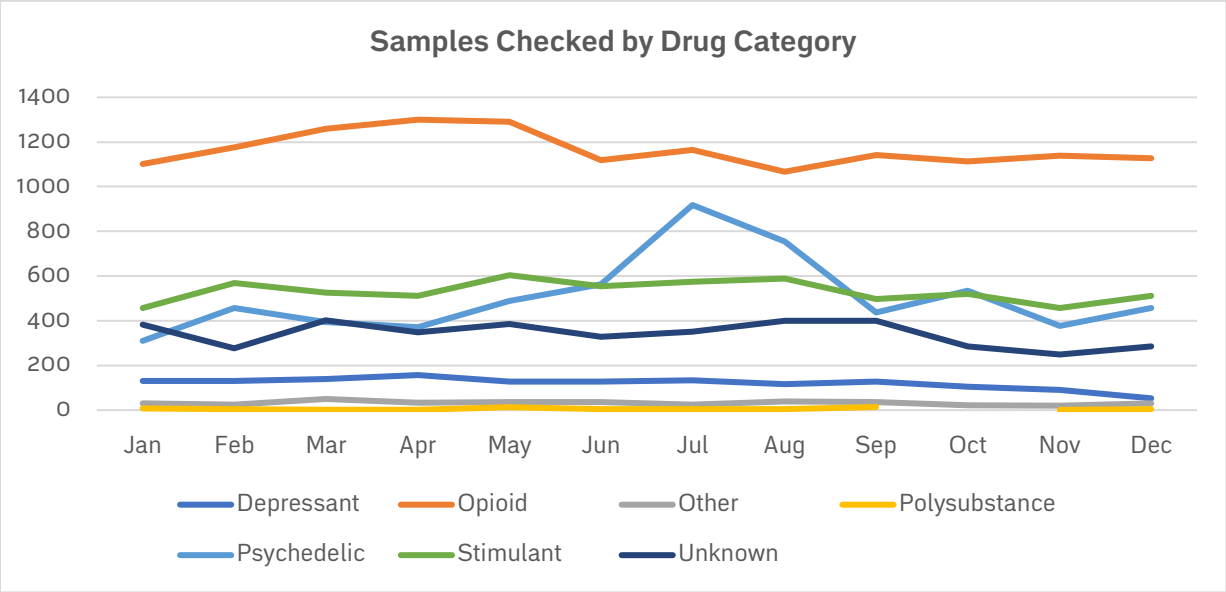

Figure 4 Number of samples checked in each drug category per month across BC in 2024

The Vancouver Coastal Health region had the greatest number of samples checked each month and overall, with a total of 20,212 samples in 2024. One high-volume site contributed most of these samples, which could be attributed to its high accessibility being situated in a densely populated downtown area, providing drug checking services for eight hours a day, six days a week, and with at least two FTIR spectrometers.

The Interior and Fraser Health regions had the next highest number of samples, with approximately 300-400 checked each month (see **Figure 5**). The number of samples increased in the Interior Health region particularly over the summer season, and reached a peak of 663 samples in August. The least number of samples were tested in the Island and Northern Health regions. We note that in the Northern Health region, one of the two organizations contributing data had an interruption in service until September while waiting for FTIR repairs. Additionally, there is only one site contributing to these data in the Island Health region. For more drug checking data collected in the Island Health region, please see the Substance website.

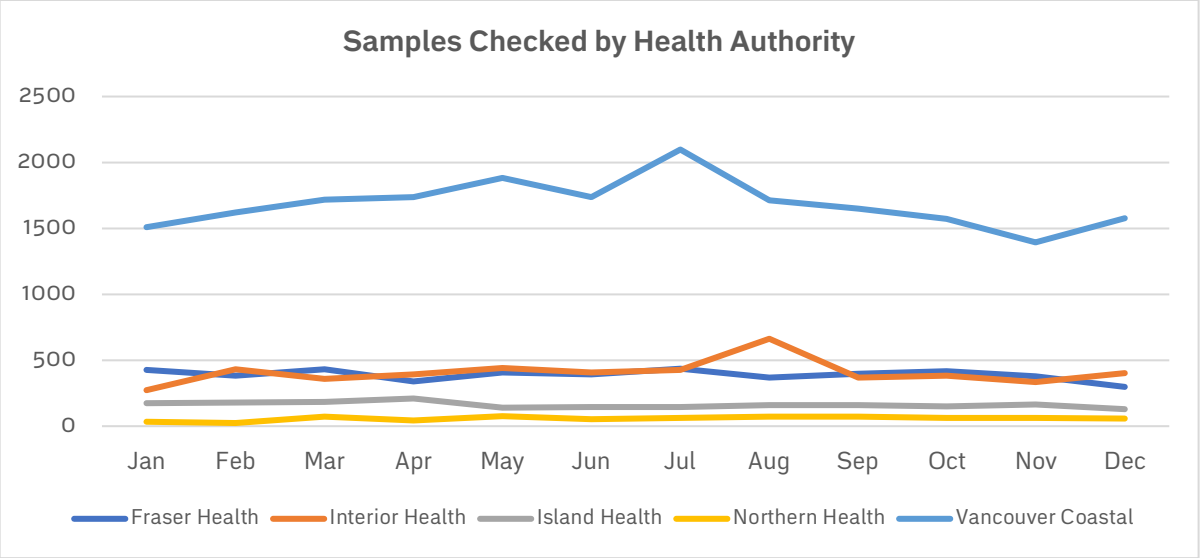

Figure 5 Number of samples checked in each health authority across BC per month in 2024

Access Points

There was a total of 100 unique drug checking access points over the course of 2024, which included both permanent and temporary locations such as fixed analysis sites, sample collection sites, mobile sites, remote services, and pop-up sites. The number of locations accessed reached a high in February (64 access points) with Interior Health comprising approximately one third of all locations (see **Figure 6**).

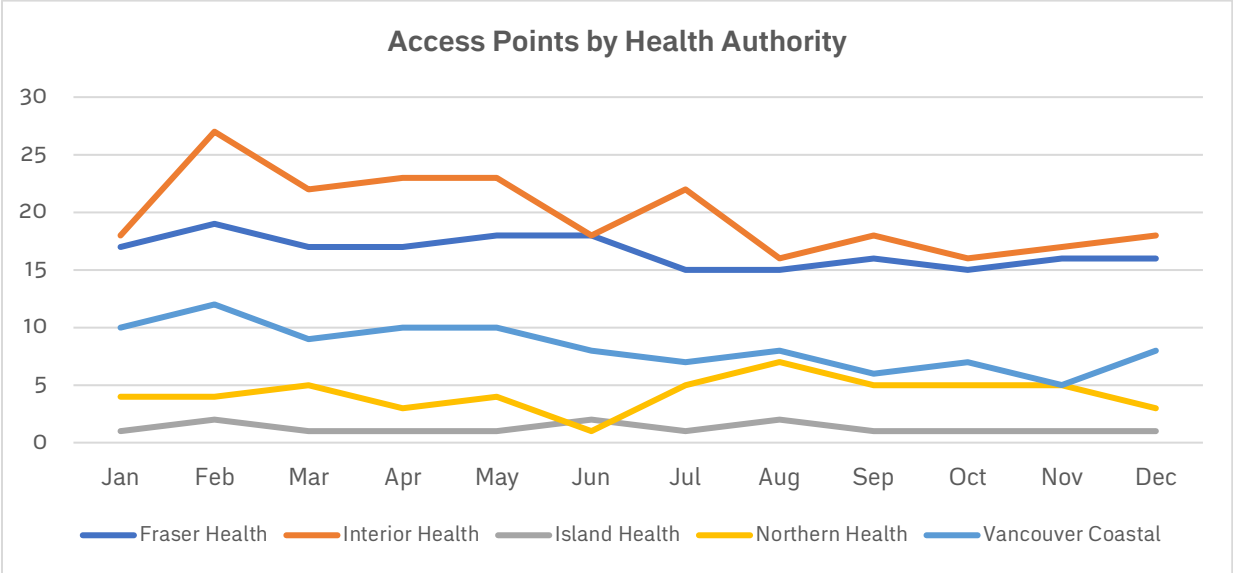

Figure 6 Number of community drug checking access points per month in each health authority across BC in 2024

Sample Concordance

When accessing drug checking services, service users are asked what they expect their sample to be, which is used to determine if the expected drug was present when assessing results. Samples are considered concordant if the expected substance is present, based on the FTIR or, when applicable, immunoassay test strip result. Other active and unexpected compounds may be present in the sample, but are not used to determine sample concordance. A sample is labelled as an N/A result when the expected drug is unable to be confidently identified, for example, when the active compound is potentially present in a low concentration (e.g., pill/tablet), the sample is a complicated mixture, the expected drug is not contained in a reference library, when the individual refuses the use of an immunoassay strip, or if the expected drug was unknown.

Approximately 80% of all samples brought in for drug checking in 2024 contained the expected drug (**Figure 7**). The stimulant category had the highest level of concordance, followed by opioids, and psychedelics (>90% each). Lower concordance was observed in the depressant (74.4%) and polysubstance categories (67%). Polysubstance refers to samples that are expected to contain multiple substances from different drug categories. Lowest concordance occurred in the "other" category (61.2%), as often there is no reference spectra available for the expected drug.

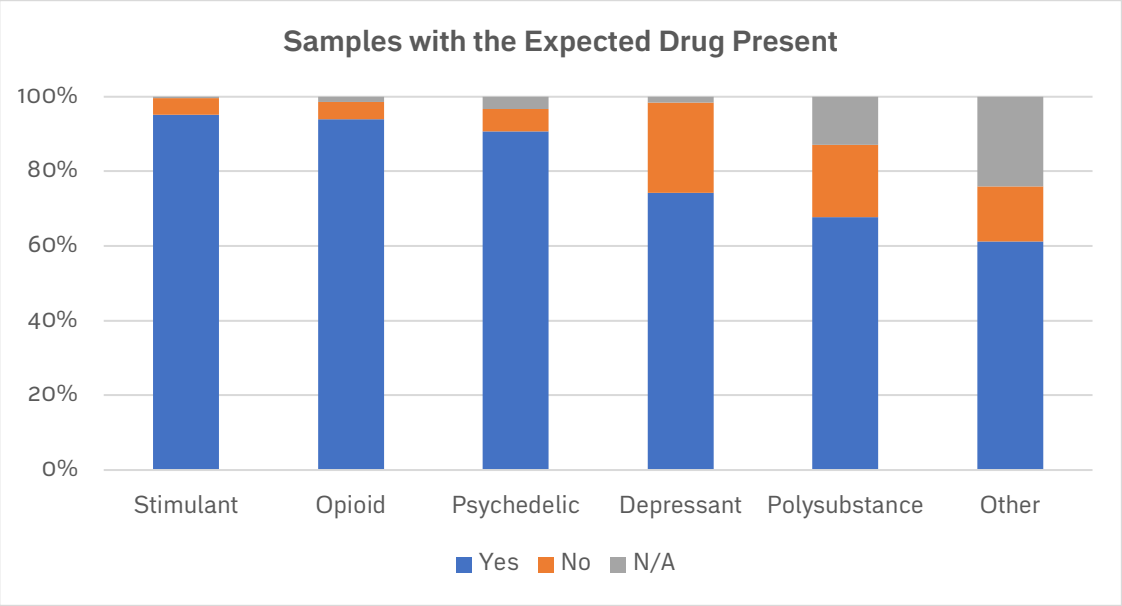

Figure 7 Percentage of sample concordance in BC by drug category in 2024

Opioids

Types of Opioid Samples Checked

In 2024, there were a total of 13,998 opioids checked, making up 43.2% of all samples. Of these, the most frequently checked type each month was "down" which is a colloquial term for a mixture containing an unregulated opioid (generally fentanyl or a fentanyl analog), and buffs such as sugar (e.g., erythritol), and caffeine. The number of down samples submitted reached a high in April (1007 samples), and a low in August (832 samples) (see **Figure 8**). Fentanyl was the next most submitted opioid, reaching a high in May (226 samples), and a low in October (128 samples). The remaining opioids checked throughout the year were comprised mostly of expected-pharmaceutical opioid and heroin samples. Overall, there were 10 samples checked in the "other" category, which included expected-carfentanil, fentanyl + heroin, fluorofentanyl, and nitazene samples.

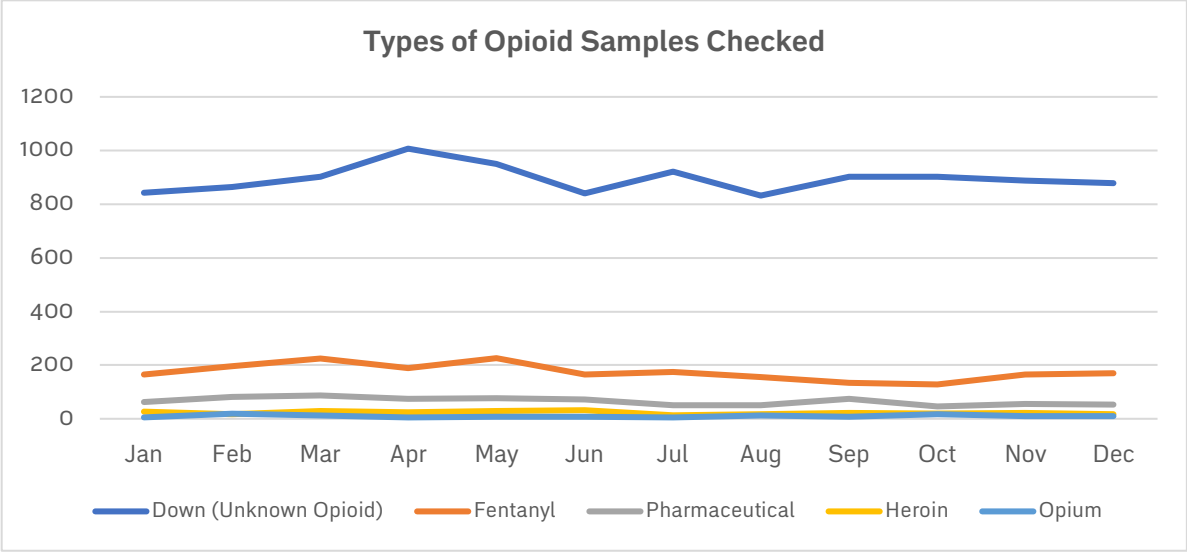

Figure 8 Number of opioid samples checked by type per month across BC in 2024*

Components Detected in Unregulated Opioid Samples

Unregulated opioids, defined as samples expected to be down, fentanyl, and/or heroin, made up 93.2% of all opioids submitted. The following sections focus on components detected by FTIR spectrometer in unregulated opioids where the expected drug was present. We provide more detail about changes in the unregulated opioid supply (e.g., fentanyl analogs), and adulterants (e.g., benzodiazepines, xylazine), further in the report.

Expected-Down Samples

A total of 10,730 expected down samples were submitted for drug checking in 2024. Of these, a total of 10,499 (97.8%) samples were found to be concordant, meaning they

contained any opioid. We note that fentanyl and fentanyl analogs may not be detected by the FTIR spectrometer in all samples if they are present in low concentrations, but may still be determined to be concordant if found through the use of immunoassay test strips. Of these concordant samples, buffs such as caffeine (9,590 samples; 91.3%) and erythritol (7,966 samples; 75.9%) were the two most frequently detected components. Fentanyl HCl was the most common opioid detected (4,340 samples; 41.3%), followed by fluorofentanyl (2,481 samples; 23.6%).

Just over 20% of samples contained an "uncertain match", which indicates the presence of one or more components that could not be confidently identified by FTIR. Common adulterants detected included the benzodiazepines bromazolam (1,313 samples; 12.5%), and desalkylgidazepam (419 samples; 4.0%). Xylazine, a veterinary tranquilizer, was detected less often (310 samples; 3.0%). Of note, an MDMA precursor, MD-MAPA, emerged in the opioid supply in 2024, and was found in 121 (1.1%) down samples. A variety of other compounds were detected less than 1% of samples, as listed below **Figure 9**.

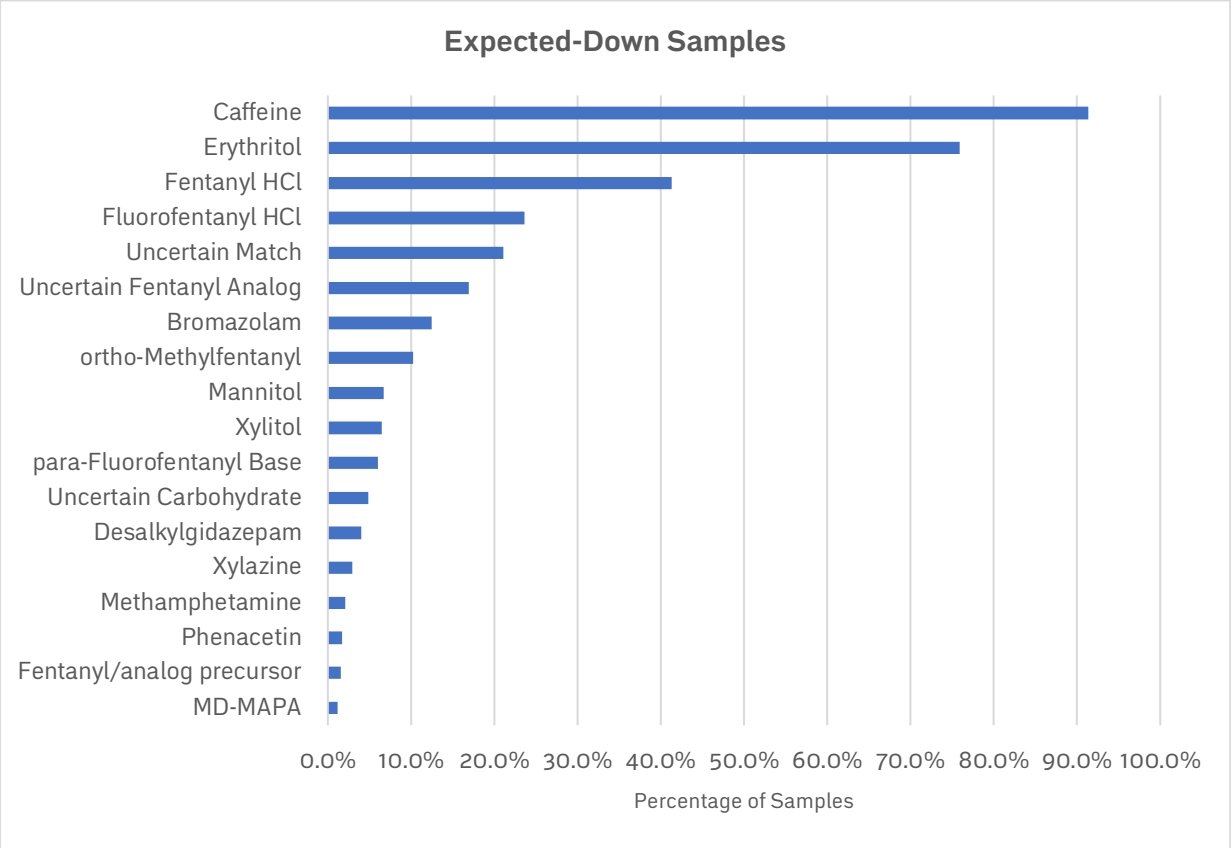

Figure 9 Components most frequently detected in concordant expected-down samples in BC in 2024*

*Other components present in <1% of concordant expected-down samples include: 4-Chloro-deschloroalprazolam, 6-MAM, Acetaminophen, Benzocaine, Bromazepam, Caffeine Citrate, Carfentanil, Citric Acid, Cocaine Base, Cocaine HCl, Desalkylflurazepam, Deschloroetizolam, Dexamethasone Acetate, Diazepam, Dicalcium Phosphate, Dimethyl Sulfone, DMT, Ephedrine, Etizolam, Etodesnitazene, Fentanyl Base, Fentanyl Citrate, Flualprazolam, Flubromazepam, Fructose, Glucose, Glutamine, Heroin Base, Heroin HCl, Inositol, Isotonitazene, Ketamine, Lactose, Levamisole, Lorazepam, MAPA, MDA, MDAI, MDMA, MDP2P, Medetomidine, Microcrystalline Cellulose, Nimetazepam, Nitrazepam, No Library Match, Noscapine, Pentobarbital, PMK Ethyl Glycidate, Polyethylene Glycol, Procaine, Propylene Glycol, Protonitazene,

Sodium Bicarbonate, Sorbitol, Stearic Acid, Sucrose, Tadalafil, Talc, Taurine, THC, Uncertain Mineral, Uncertain Oil, Uncertain Salt, Vitamin C.

Expected-Fentanyl Samples

Of the 2,088 total expected-fentanyl samples submitted for drug checking, 2,011 (96.3%) were concordant, containing fentanyl and/or a fentanyl analog as determined by FTIR or test strip. As shown in **Figure 10**, fentanyl HCl was most common, found in 932 samples (46.3%), followed by fluorofentanyl, detected in 400 samples (19.9%). The two most frequently detected buffs in concordant samples were caffeine (1,171 samples; 58.2%) and erythritol (1,035 sample; 51.5%). This year, we also observed an increase in the number of samples containing fentanyl/fentanyl analog precursors, which were found in 7.2% of concordant fentanyl samples, the most common being propionanilide.

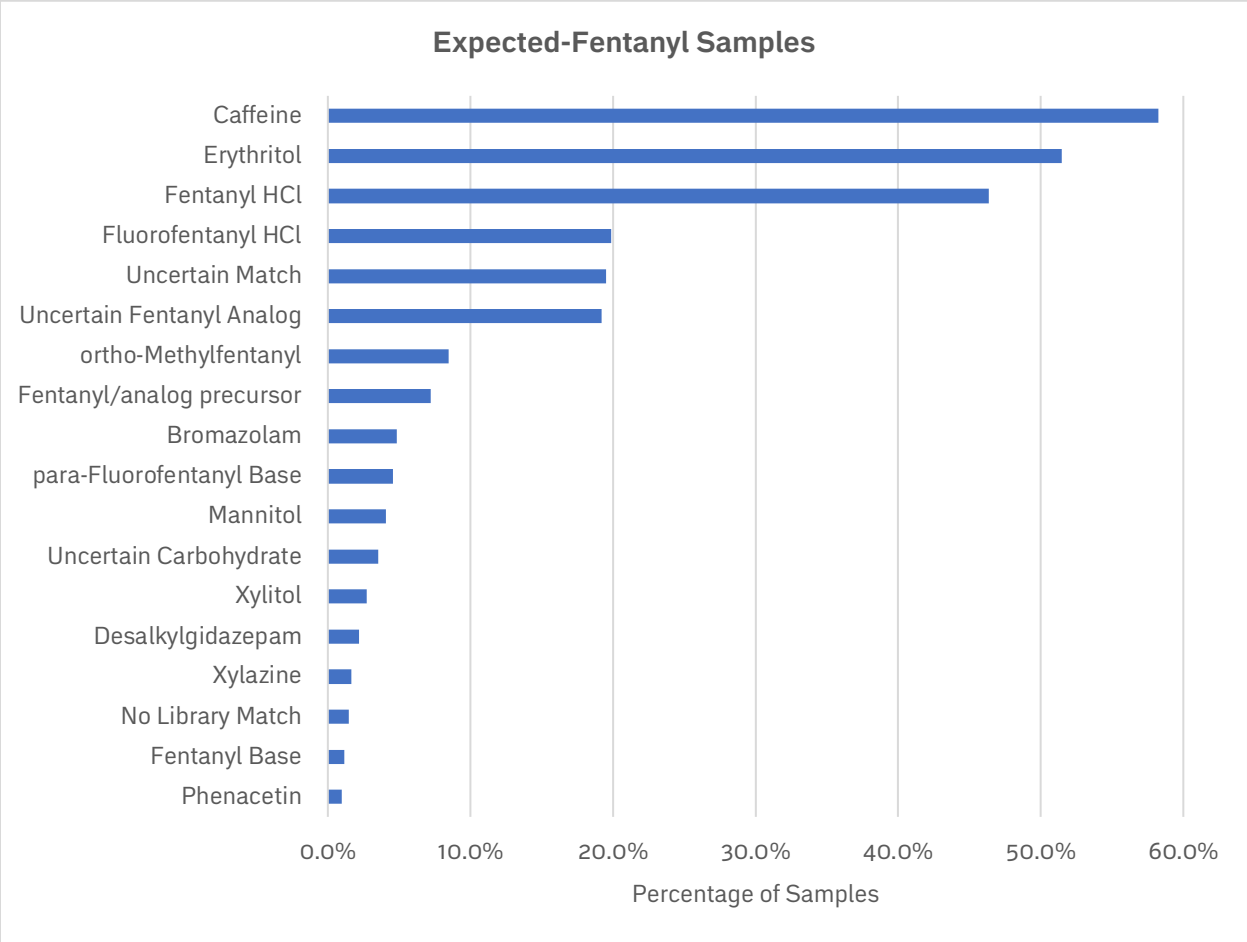

Figure 10 Components most frequently detected in concordant expected-fentanyl samples in BC in 2024*

*Other components present in <1% of concordant expected-fentanyl samples include: 4-Anilinopiperidine, 4-ANPP, 6-MAM, Acetaminophen, Benzocaine, Calcium Carbonate, Cocaine Base, Cocaine HCl, Deschloroetizolam, Dextrose, Dimethyl Sulfone, Fentanyl Citrate, Flualprazolam, Flubromazepam, Furanyl UF-17, Glucose, Heroin HCl, Inositol, Isotonitazene, Ketamine, Lactose, MAPA, MD-MAPA, MDMA, Medetomidine, Methamphetamine, Microcrystalline Cellulose, Pentobarbital, Piracetam, PMK Ethyl Glycidate, Polyethylene Glycol, Procaine, Sodium Bicarbonate, Sodium Sulfate, Sucrose, Uncertain Mineral, Uncertain Oil, Vitamin C.

Expected-Heroin Samples

Heroin was detected in 142 (53.2%) of the total 267 expected-heroin samples submitted for drug checking (see **Figure 11**). This low concordance rate is due to expected-heroin samples often containing fentanyl instead of heroin. Among samples that did contain heroin, the other compounds most frequently detected were caffeine (35 samples; 24.6%), and 6-monoacetylmorphine (6-MAM), a metabolite of heroin (19 samples; 13.4%). Ten samples (7.0%) were found to contain fentanyl and/or analogs alongside heroin. We note that these samples can pose an increased risk of overdose to service users expecting heroin, as the relative potency is substantially higher than when heroin alone is present.[9]

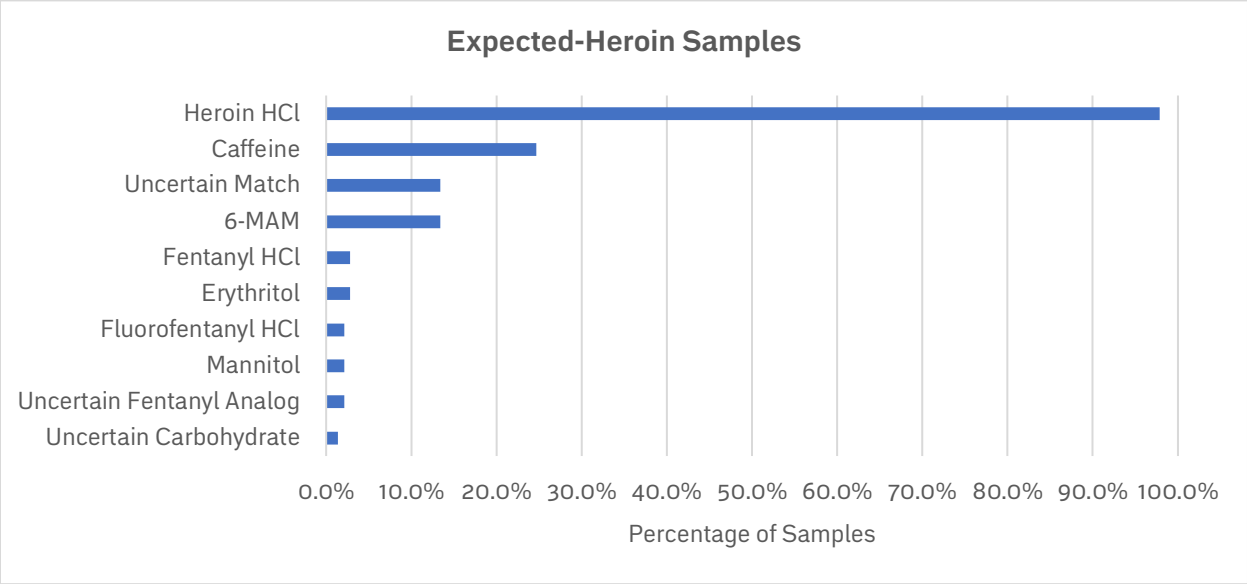

Figure 11 Components most frequently detected in concordant expected-heroin samples in BC in 2024*

*Other components present in <1% of concordant expected-heroin samples include: Acetaminophen, Bromazolam, Cocaine HCl, Dimethyl Sulfone, Fentanyl Citrate, Inositol, Methamphetamine, Ortho-Methylfentanyl, Xylitol.

Fentanyl and Analogs Detected in Unregulated Opioid Samples

Over the past two years we have been monitoring the fluctuating prevalence of fentanyl and fentanyl analogs in unregulated opioid samples. While fentanyl was the most common opioid detected throughout the majority of the year, the number of unregulated opioid samples containing fluorofentanyl steadily increased in first half of 2024 (see **Figure 12**). By June, fentanyl and fluorofentanyl detection were nearly on par in unregulated opioid samples (35.3% vs. 31.2% of samples, respectively). In August and September, fluorofentanyl surpassed fentanyl as the most common opioid detected for the first and second time in a row before decreasing throughout the remainder of the year.

Ortho-methylfentanyl, a novel fentanyl analog, was first detected in a sample sent for confirmatory testing in late 2023. In February 2024 we added a reference spectrum of ortho-methylfentanyl to the BCCSU FTIR library and began tracking its presence in

unregulated opioid samples. The number of samples containing ortho-methylfentanyl increased slowly throughout year, found in approximately 10-15% of unregulated opioids each month, and reached a peak in November (16.1% of samples).

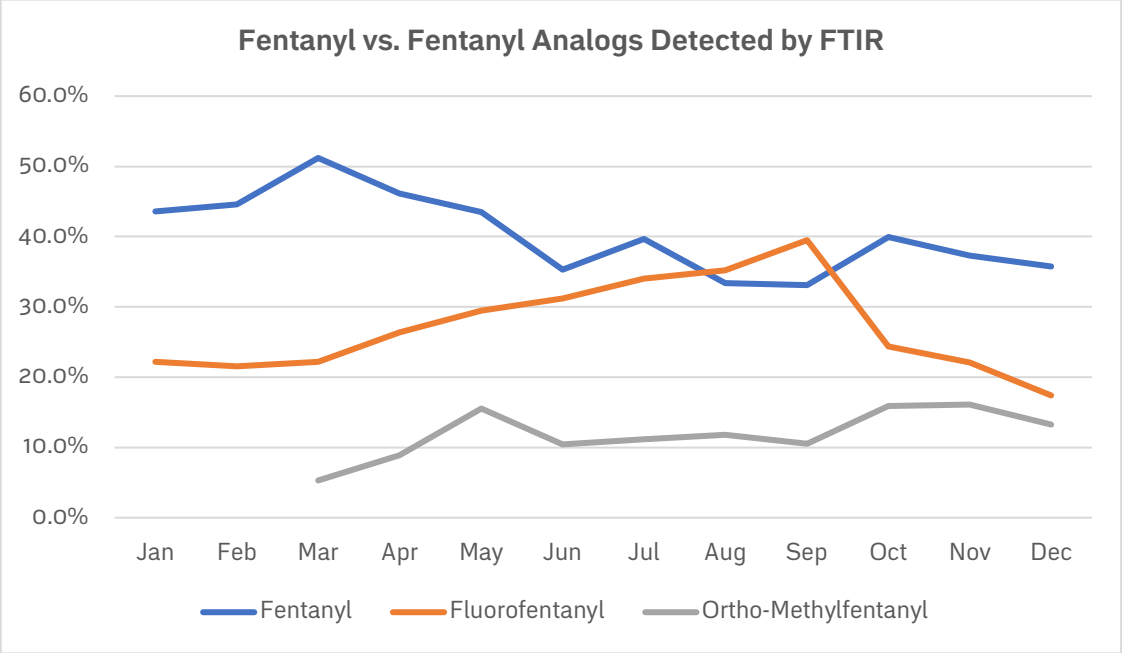

Figure 12 Percentage of unregulated opioids containing fentanyl or an analog per month in BC in 2024

Fentanyl and Fluorofentanyl Concentrations

To accommodate changes in the unregulated opioid supply, the BCCSU Drug Checking Program in collaboration with the Hein Lab at the University of British Columbia constructed a new model that has the ability to estimate fentanyl and fluorofentanyl concentrations in unregulated opioid samples. We note the model does not account for other fentanyl analogs such as ortho-methylfentanyl and carfentanil, though they may be present. For more detailed information about the model, please visit here.

Median Fentanyl and Fluorofentanyl Concentrations in BC

We determined the median concentrations of a) fentanyl, b) fluorofentanyl, and c) the overall concentration of fentanyl and/or fluorofentanyl in unregulated opioid samples. As shown in **Figure 13**, the median concentration of fentanyl progressively declined over the course of 2024, falling from a peak of 12.3% in March to a low of 6.7% in December. Conversely, fluorofentanyl concentrations increased from January to July, and reached a peak in August of 11.8%, corresponding with the aforementioned rise in samples containing fluorofentanyl compared to fentanyl during this time period. The median concentration of fluorofentanyl then declined throughout the remainder of the year, converging with fentanyl concentrations in November and December. The overall median concentration of samples containing fentanyl and/or fluorofentanyl ranged between

approximately 12% to 14% throughout the year until November and December, when concentrations fell to approximately 10% and 8%, respectively.

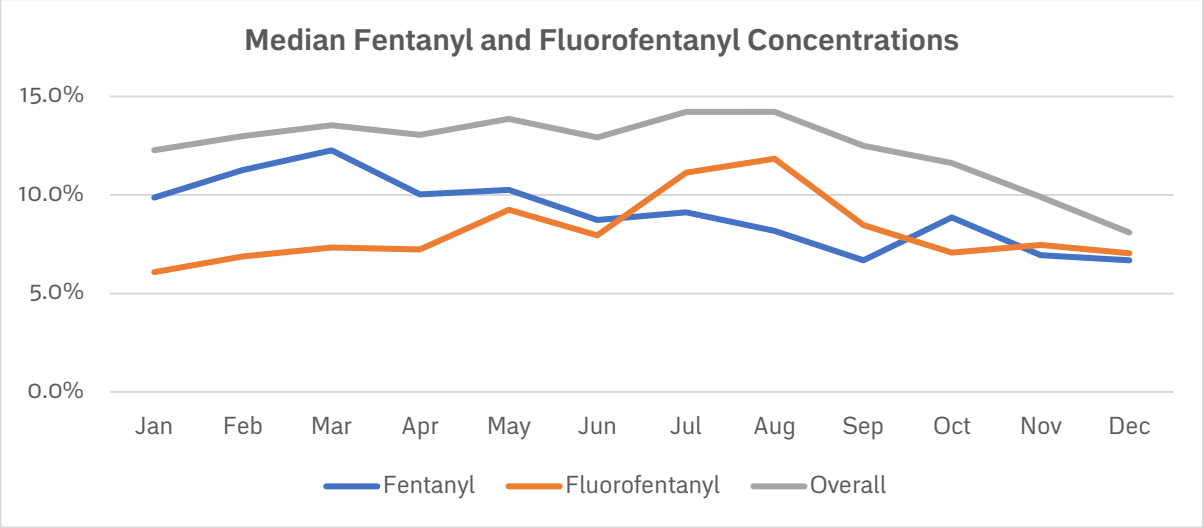

Figure 13 Median fentanyl and fluorofentanyl concentrations per month in BC in 2024

Median Fentanyl and Fluorofentanyl Concentrations by Health Authority

Regional differences in fentanyl and fluorofentanyl concentrations were observed throughout the year. In the first half of 2024, fentanyl concentrations were highest in the Fraser and Vancouver Coastal regions (~11-12%) before steadily declining in the following months (see **Figure 14**). From January to May, median fentanyl concentrations were typically 3-5% lower in the Island Health region compared to the Fraser and Vancouver Coastal regions, but were less variable overall, ranging from approximately 5-9% each month. Between May and July, the highest fentanyl concentrations occurred in the Interior Health region (~10-12%). The most variability was observed in the Northern Health region, which is expected due to the small number of samples tested. By the end of 2024, the median concentration of fentanyl in all regions had converged to approximately 5-7%.

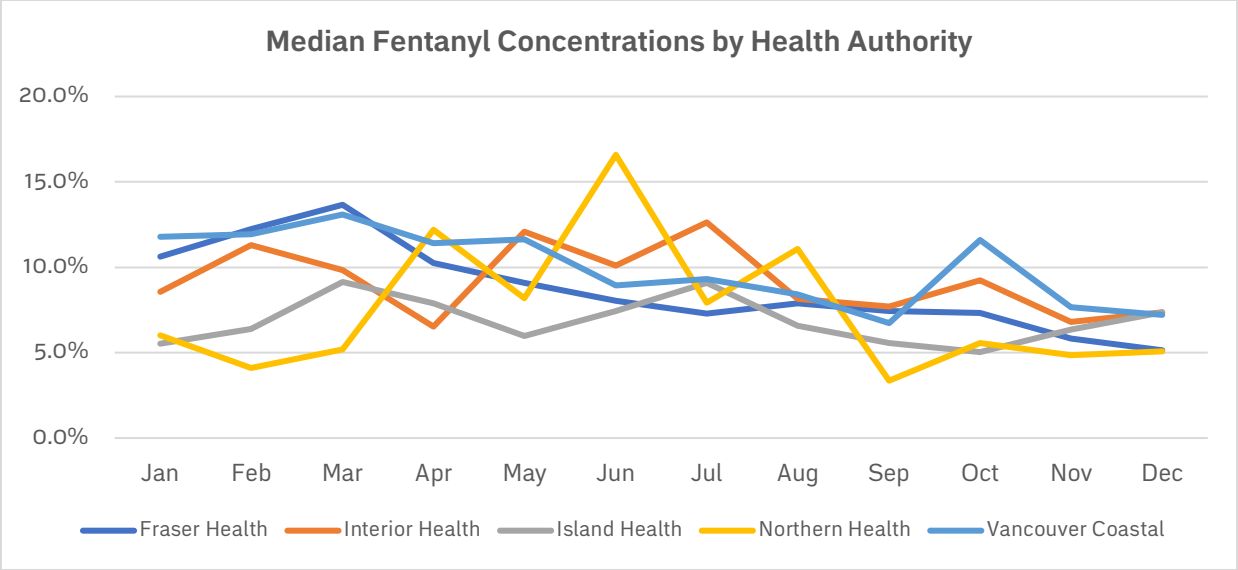

Figure 14 Median fentanyl concentrations per month by BC health authority in 2024

As shown in **Figure 15**, fluorofentanyl concentrations rose across regions throughout the year until the fall and winter. Concentrations were highest in the Interior Health region, where the median fluorofentanyl concentration remained >10% most months, reaching a peak of 18.5% in July. Median fluorofentanyl concentrations were particularly high in all regions in August (>10%). By December, concentrations fell, converging to approximately 8-10% in all regions except Island and Northern Health. In the Island Health region, concentrations remained consistently low each month (~6%), whereas higher variability occurred in the Northern Health region due to the low number of samples checked.

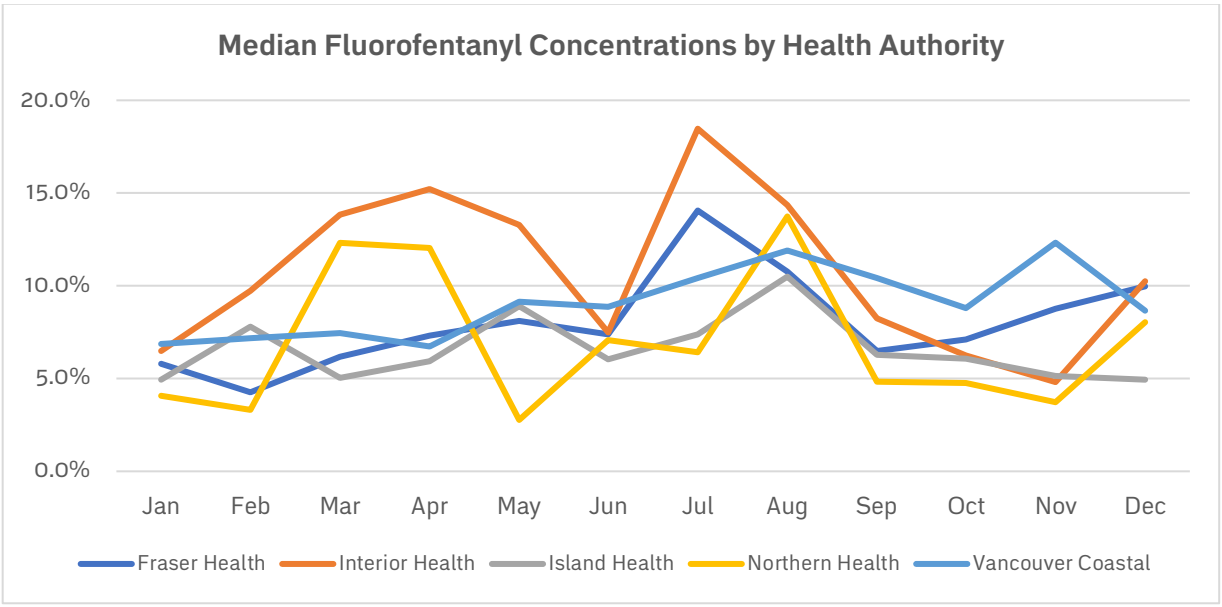

Figure 15 Median fluorofentanyl concentrations per month by BC health authority in 2024

The overall concentration of fentanyl and/or fluorofentanyl varied across health authority regions (see **Figure 16**). Concentrations were consistently highest in the Vancouver Coastal region, where monthly medians remained above 13% from January through September, and peaked in May at 15.7%. Fraser Health also showed elevated concentrations, particularly in August (15.8%). Overall concentrations were relatively stable in the Interior Health region, ranging between approximately 10-13%, with a peak of 14.8% observed in July. Island Health maintained lower concentrations overall, with monthly medians falling between 10-12%. Northern Health showed the greatest variability, with a low of 5.2% observed in December, and a high of 16.6% in June. As previously mentioned, variability in the Northern Health region is expected due to the smaller number of samples tested. By December, overall concentrations declined across all regions, ranging between 5-9%.

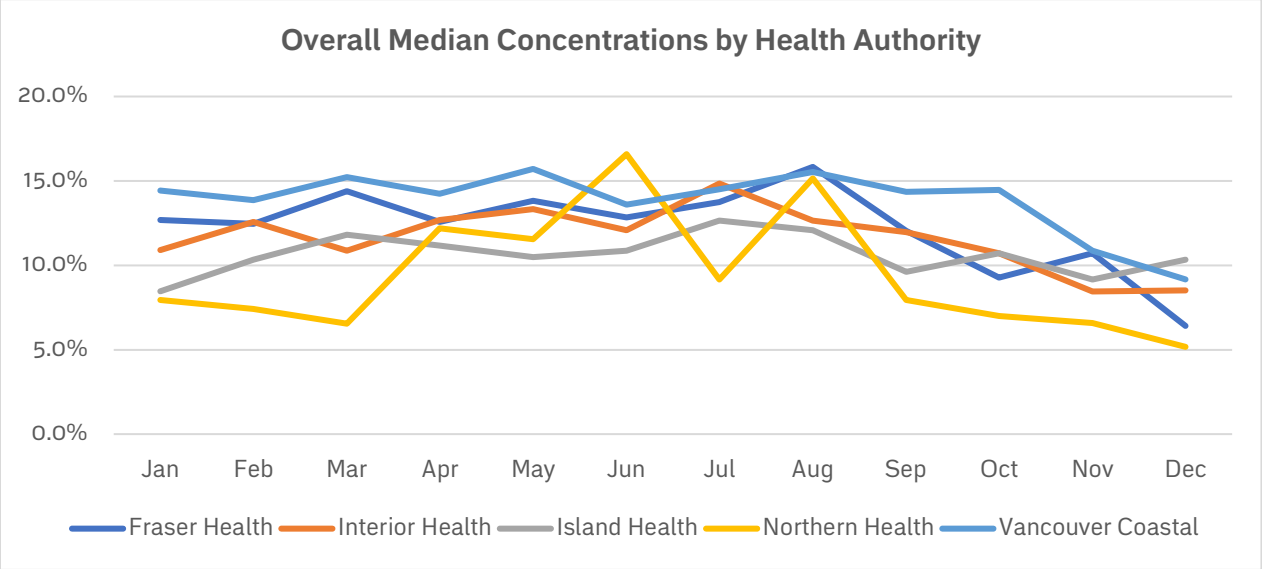

Figure 16 Overall median fentanyl and/or fluorofentanyl concentrations per month by BC health authority in 2024

Adulterants Detected in Unregulated Opioid Samples

As the unregulated opioid supply continues to increase in complexity, it has been necessary to monitor changes in adulterants. In addition to overall benzodiazepine-positivity, we continue to monitor the types of benzodiazepines that are present as they become more commonly detected by FTIR. We also can infer these samples contain a higher concentration of benzodiazepines (above approximately 5-10%), in order to reach the detection threshold of the FTIR. Finally, we also present a section on the detection of xylazine, a veterinary tranquilizer, in unregulated opioids.

Benzodiazepine-Positivity

A total of 6,106 (48.6%) unregulated opioid samples were found to contain benzodiazepines by FTIR and/or immunoassay test strip in 2024. This is lower than 2023, where 53.4% of unregulated opioids were benzodiazepine-positive. The high number of

benzodiazepine-positive samples in January (551 samples; 53.4%) and February (597 samples; 55.6%) was a continuation of the all-time high observed at the end of 2023 (see **Figure 17**). In the following months, the number of samples containing benzodiazepines decreased, and reached a low in July (458 samples; 41.5%) comparable to levels seen towards the end of 2022. Benzodiazepine-positivity then fluctuated throughout the remainder of 2024, ending with 537 (50.7%) benzodiazepine-positive unregulated opioids in December. We note that it is possible the true number of benzodiazepine-containing samples may be greater than what is denoted here, as etizolam, a thienodiazepine that was most common between 2019-2022, is not reliably detected by benzodiazepine test strips, but is still sometimes seen in samples sent for confirmatory testing.

The number of samples containing benzodiazepines in concentrations high enough to be detectable by FTIR followed a similar trend in the first half of the year (see **Figure 17**). Following an all-time high at the end of 2023, the number of unregulated opioids found to contain benzodiazepines by FTIR decreased from 18.4% in January to around 13.0% of samples between April and June. While overall benzodiazepine-positivity had decreased in July, the proportion of samples containing benzodiazepines in concentrations high enough to be detected by FTIR increased to 16.3%. The number of unregulated opioids containing benzodiazepines detectable by FTIR fluctuated for the remainder of the year, before increasing again in December to a record high of 19.4% of samples.

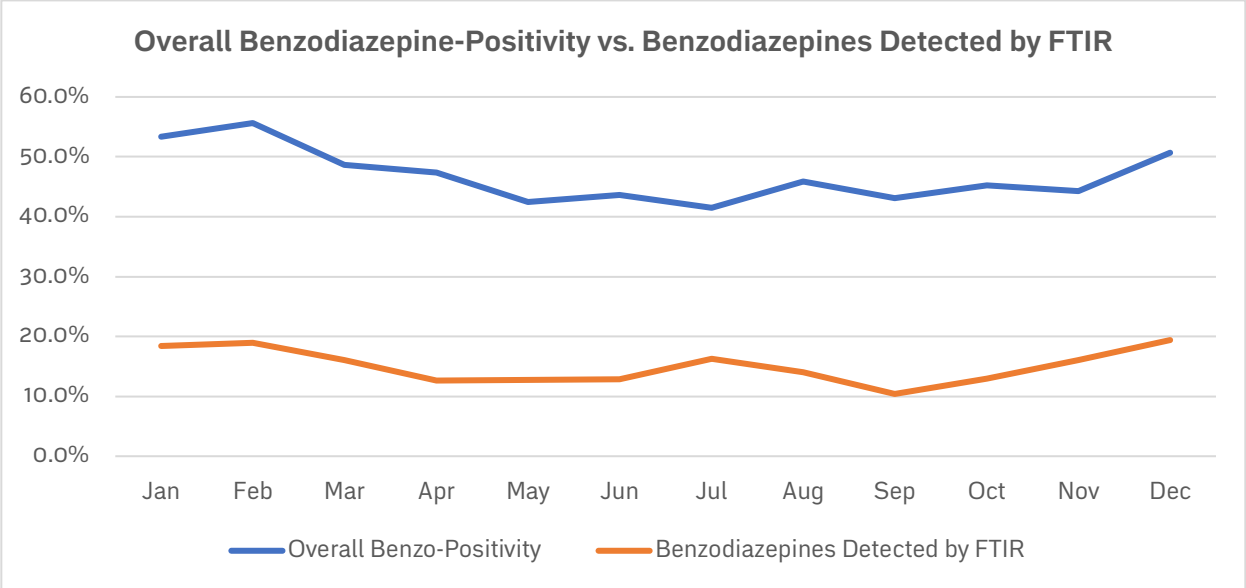

Figure 17 Percentage of unregulated opioids in BC with benzodiazepines detected by FTIR/test strip vs. FTIR alone per month in 2024

Types of Benzodiazepines Detected

There were 22 unique benzodiazepines detected by FTIR in unregulated opioid samples. Of these, bromazolam was most common overall, detected in 1,334 (10.2%) of all unregulated opioids checked throughout the year. However, the number of samples containing bromazolam rapidly declined after reaching a peak in July of 14.5% (see

Figure 18). During this time, the number of samples containing desalkylgidazepam rose, and by November had surpassed bromazolam as the most common benzodiazepine for the first time (9.8% vs 6.3% of samples, respectively). Etizolam remained the third most common benzodiazepine detected by FTIR, though detection remained low throughout the year and never surpassed 1% of all unregulated opioid samples checked each month.

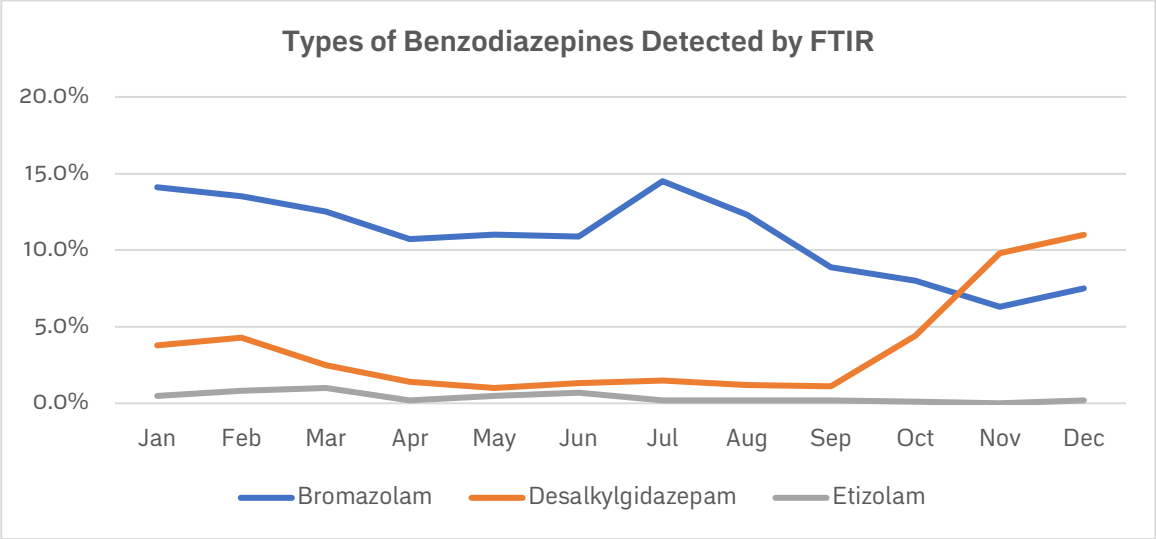

Figure 18 Percentage of unregulated opioids in BC containing benzodiazepines by type per month in 2024

Xylazine Detection in Unregulated Opioid Samples

In 2024, xylazine was detected by FTIR in 344 (2.6%) of the total 13,053 unregulated opioid samples checked. This was a slight increase from 2023, in which 1.6% of unregulated opioids were found to contain xylazine. While the number of samples containing xylazine remained low each month, some fluctuations were observed (see **Figure 19**). In January, 1.9% of all unregulated opioids were found to contain xylazine (20 samples), and by the end of the year, xylazine detection had reached a peak of 3.5% (37 samples). We note, however, that the true number of samples containing xylazine is likely greater than what is reported here, as xylazine tends to be detected by more sensitive confirmatory testing methods in concentrations lower than the FTIR detection threshold.

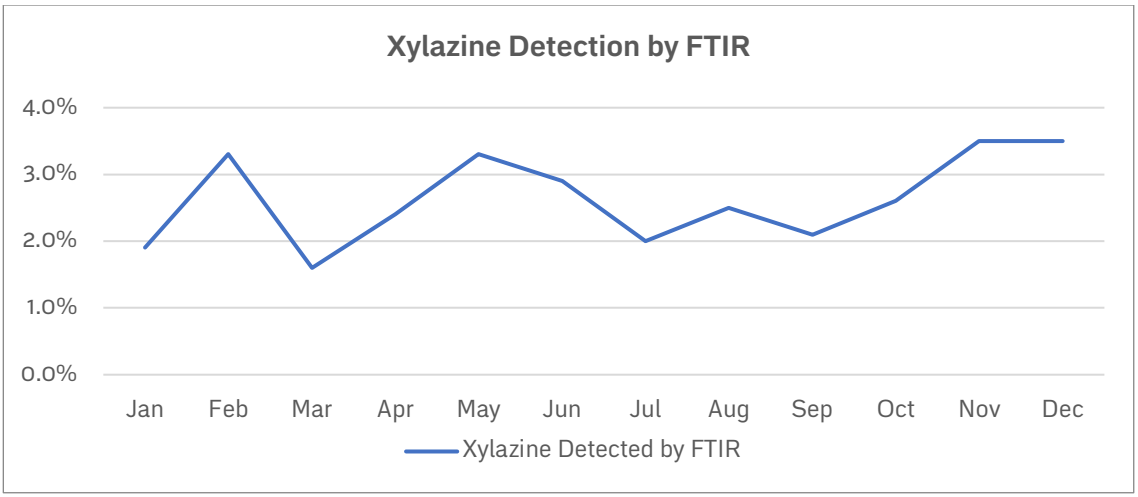

Figure 19 Percentage of unregulated opioids containing xylazine per month as detected by FTIR in BC in 2024

Components Detected in Non-Concordant Pharmaceutical Opioid Samples

A total of 781 samples were expected to be pharmaceutical opioids, making up 5.6% of all opioids checked. This subcategory of opioids includes samples presenting as pharmaceutical tablets that were expected to contain an opioid medication. The most frequently checked pharmaceutical opioids were expected to contain oxycodone (OxyContin, or instant release formulas), hydromorphone (Dilaudid), and acetaminophen + oxycodone (Percocet). We note that tablets pose a challenge when trying to determine the presence of the expected drug by FTIR. This is because the FTIR will detect the inert tablet filler as the main component (e.g., lactose), but cannot detect the expected active ingredient when it is present below the detection limit, which is common. When the expected opioid is detectable by FTIR, it is still not possible to discern authentic pharmaceutical opioid tablets from "good fakes". Based on this approach, we can surmise a sample is counterfeit if it contains an unexpected active ingredient and not the expected drug. The following sections examine expected-pharmaceutical opioids that were non-concordant, meaning they contained an active ingredient that was not the expected drug, as determined by FTIR or fentanyl and/or benzodiazepine immunoassay test strips.

Expected-Oxycodone Samples

Of the 275 samples submitted as oxycodone, 33.5% (92 samples) did not contain the expected drug and instead contained an unexpected active ingredient, usually detected by test strip. As shown in **Figure 20**, the most common active ingredients found were fentanyl/fentanyl analogs (63 samples; 68.5%) and benzodiazepines (18 samples; 19.6%) as detected by test strip. We note that the strips cannot differentiate between fentanyl/fentanyl analogs or types of benzodiazepines, and provides only binary results of their presence or absence.

A total of 12% of non-concordant oxycodone samples were found to contain a precursor for fentanyl or fentanyl analogs by FTIR, the most common being n-propionyl para-fluoro

norfentanyl base. This was a notable increase in detection compared to 2023, where precursors were found by FTIR in <5% of non-concordant oxycodone samples overall. In addition, xylazine detection also increased in comparison to the previous year, being found in six samples (6.5%).

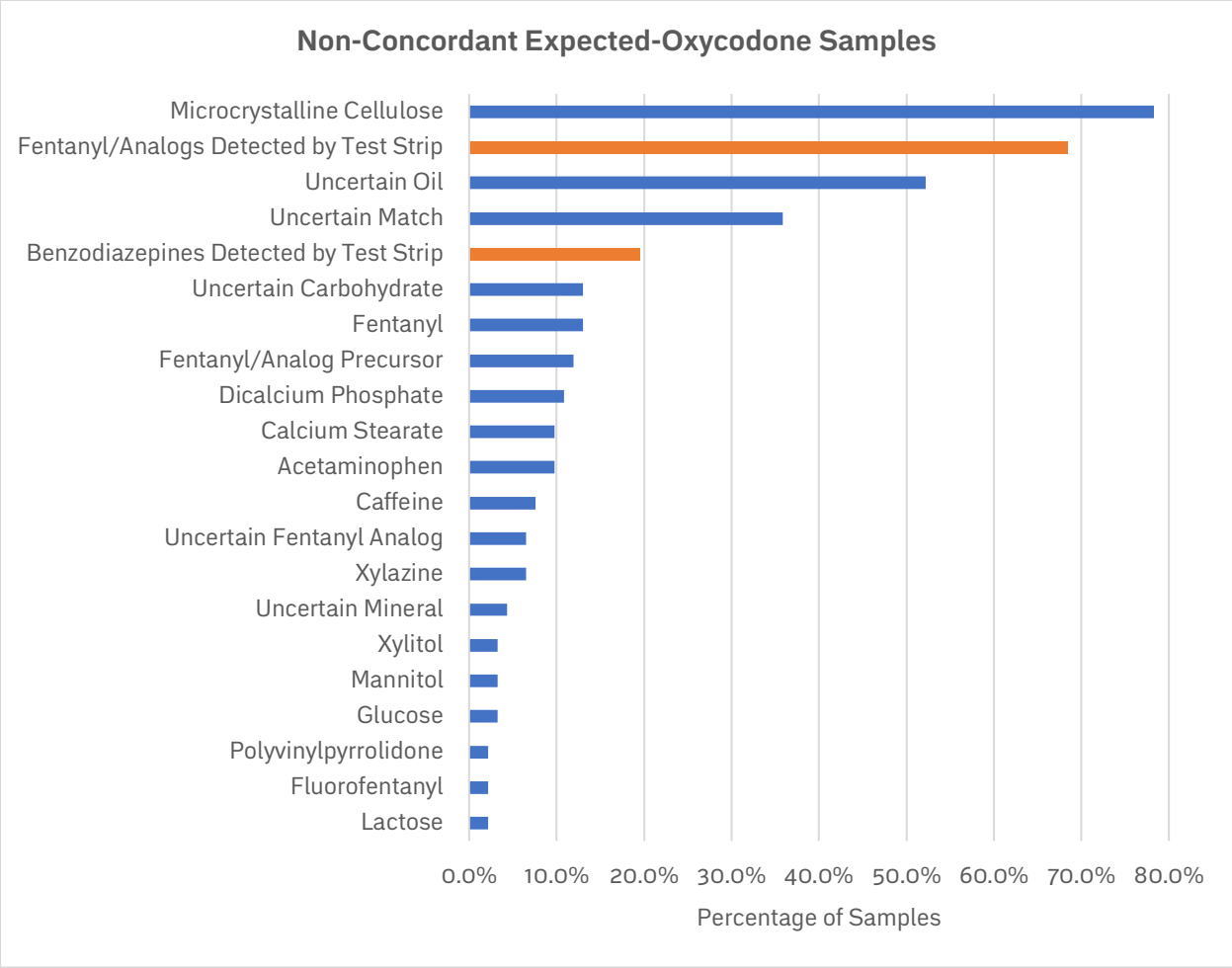

Figure 20 Components most frequently detected in non-concordant expected-oxycodone samples in BC in 2024*

*Other components present in <2 expected-oxycodone samples include: Bromazolam, Erythritol, Methadone, Metodesnitazene, Pregabalin, Protonitazene, Talc, Tramadol.

Expected-Hydromorphone Samples

Out of the 292 samples submitted as hydromorphone, 16.1% (47 samples) did not contain the expected drug and instead contained an unexpected active ingredient. The most common active ingredients detected were fentanyl/fentanyl analogs (34 samples; 72.3%) and benzodiazepines (12 samples; 25.5%), as detected by test strip (**Figure 21**). A total of 16 samples (34%) were found to contain were found to contain a precursor for fentanyl or fentanyl analogs by FTIR, the most common being n-propionyl para-fluoro norfentanyl base. Of note, protonitazene, a potent synthetic opioid, was detected in two samples (4.3%).

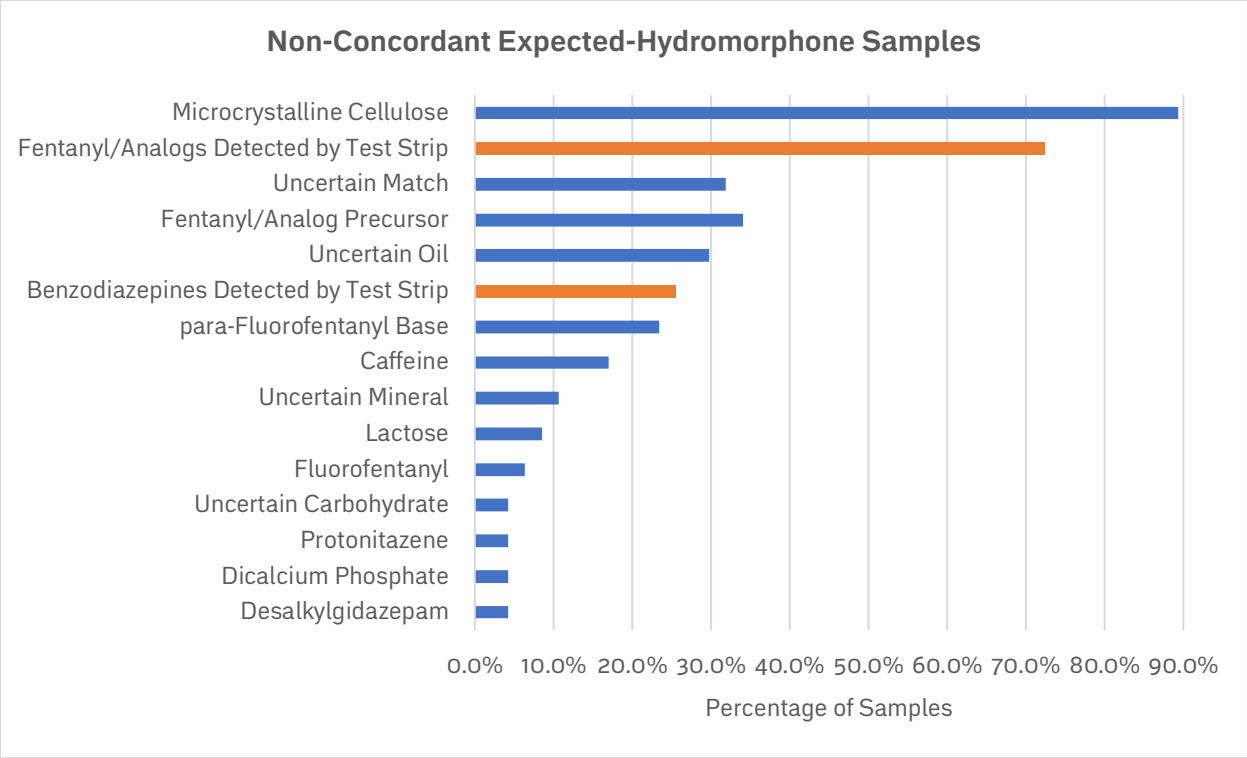

Figure 21 Components most frequently detected in non-concordant expected-hydromorphone samples in BC in 2024*

*Other components present in <2 expected-hydromorphone samples include: Bromazolam Calcium Stearate MDMA No Library Match Uncertain Fentanyl Analog.

Expected-Acetaminophen + Oxycodone Samples

Of the 134 samples submitted as acetaminophen + oxycodone, 43.3% (58 samples) did not contain either expected drug and instead contained an unexpected active ingredient. The most common active ingredients detected were fentanyl/fentanyl analogs (34 samples; 72.3%), as detected by test strip (**Figure 22**).

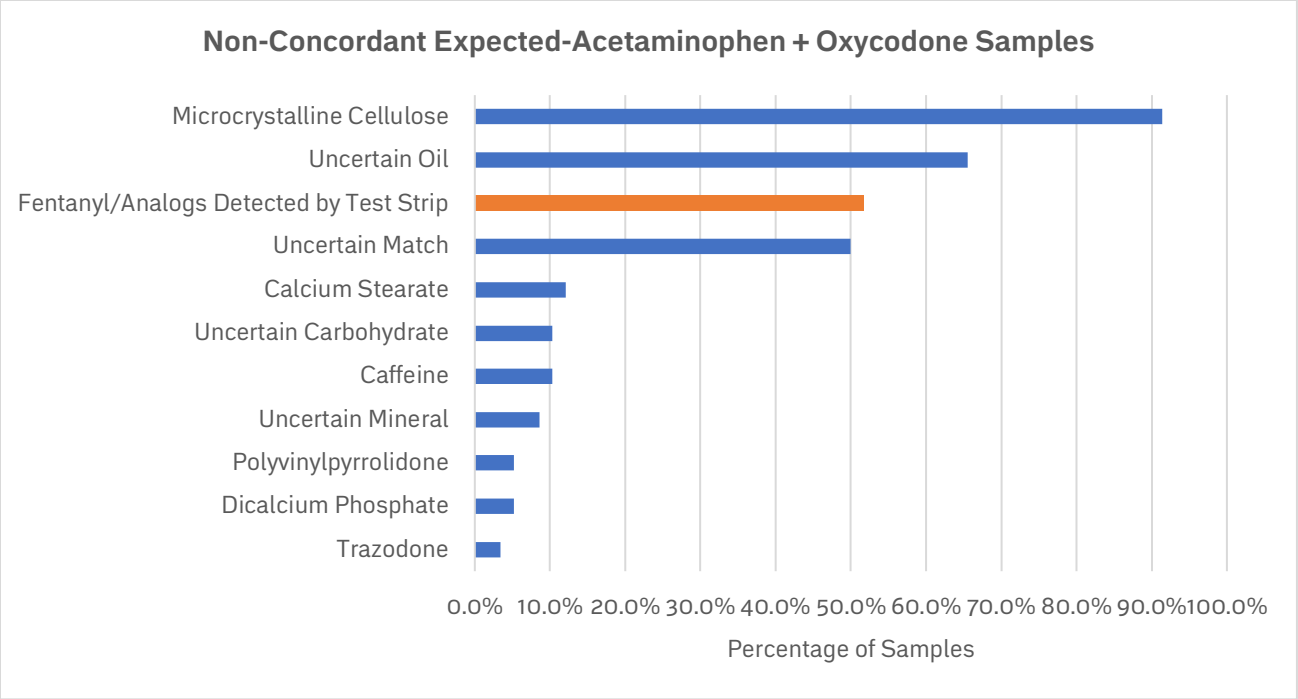

Figure 22 Components most frequently detected in non-concordant expected-acetaminophen + oxycodone samples in BC in 2024*

*Other components present in <2 expected-hydromorphone samples included: Acetaminophen, Fentanyl, Uncertain Fentanyl Analog, Naproxen, Sucrose.

Depressants

Types of Depressant Samples Checked

A total of 1,441 samples were checked in the depressant category in 2024, making up 4.4% of all samples checked. Of these, expected-benzodiazepines were the most commonly submitted depressants overall, with the greatest number occurring in September (51 samples) (see **Figure 23**). GHB was the next most often checked depressant (377 samples), followed by GBL (143). The next most checked depressants included samples expected to be zopiclone, and xylazine, though these were submitted infrequently (<15 samples each).

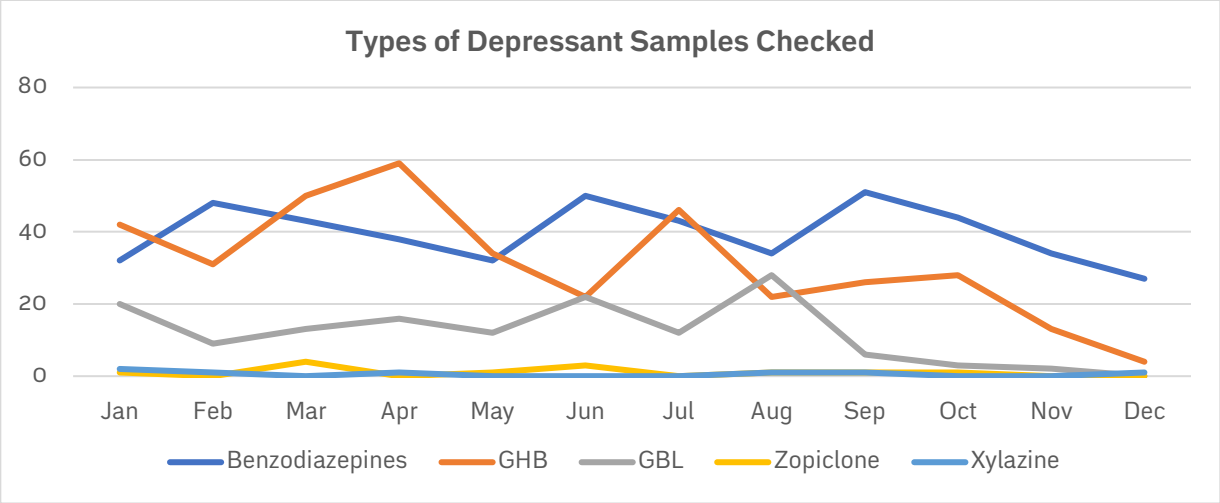

Figure 23 Number of depressant samples checked by type per month across BC in 2024*

*Other samples checked in the depressant category include: 1,4-Butanediol, 4-Fluorophenibut, Avizafone, Baclofen, Carisoprodol, Etomidate, Fluorophenibut, Gabapentin, Kavalactone, Medetomidine, Methaqualone, Phenibut, Pregabalin, Rilmazafone, W-18, Zolpidem.

Types of Benzodiazepines Checked

Of the 1,441 depressant samples checked in 2024, 870 (60.4%) were expected to be benzodiazepines. Alprazolam was the most commonly submitted benzodiazepine throughout the year, with the greatest number of samples occurring in September (476 samples) (see **Figure 24**). "Benzodiazepine (Unknown)" was the next most common benzodiazepine submitted for drug checking (166 samples), which denotes cases where the service user expected a benzodiazepine but was unsure about the specific drug.

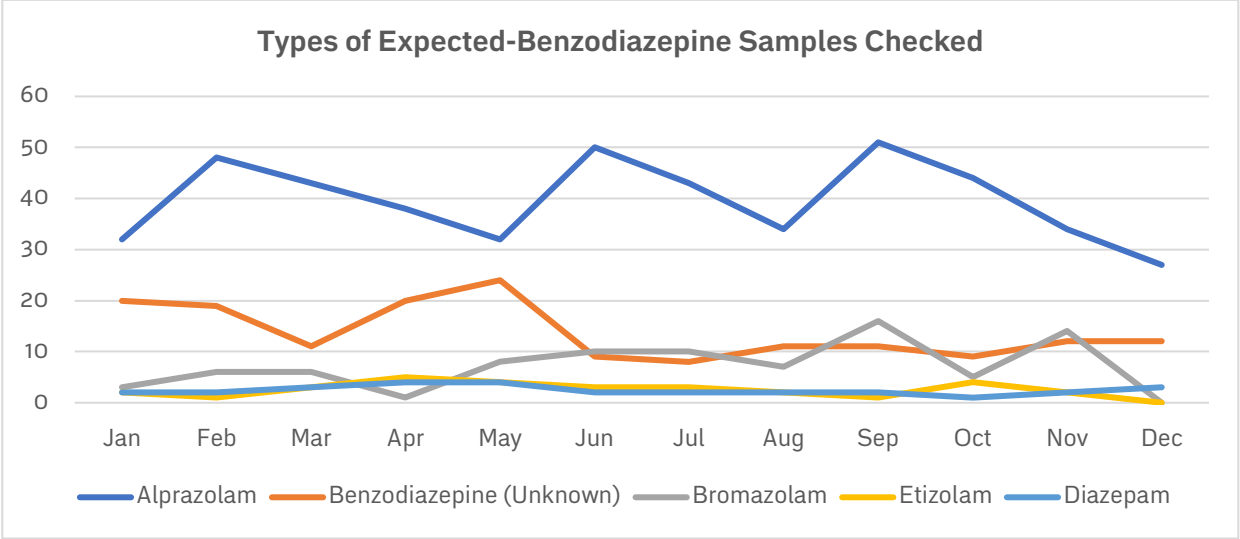

Figure 24 Number of benzodiazepine samples checked by type per month across BC in 2024*

*Other expected-benzodiazepines submitted for drug checking include: Bromazepam, Clobromazolam, Clonazepam, Clonazolam, Diazepam, Etizolam, Flualprazolam, Flubromazepam, Flubromazolam, Flunitrazolam, Lorazepam, Oxazepam.

Components Detected in Depressant Samples

Expected-Alprazolam (Xanax)

Of the total 476 samples expected to be alprazolam, 322 (67.6%) were considered concordant. We note that determining concordance in alprazolam has a few challenges due to samples typically presenting in pharmaceutical tablet form. As previously mentioned, the FTIR will detect the inert tablet filler as the main sample component, and cannot detect the active ingredient (alprazolam), if it is present in concentrations below the FTIR detection limit (<5%), which is common. For the purposes of this analysis, samples were considered concordant if alprazolam was detected by FTIR, and/or if the benzodiazepine test strip produced a positive result, and no other unexpected benzodiazepines (e.g., bromazolam) were detected by FTIR.

Only 15 (4.7%) of these samples were found to contain alprazolam specifically by FTIR. The remaining 307 samples were determined to be concordant based on a positive immunoassay test strip with no other unexpected benzodiazepines detected by FTIR. However, since test strips can only detect the presence or absence of benzodiazepines, it is possible that alternative benzodiazepines could have been present aside from alprazolam.

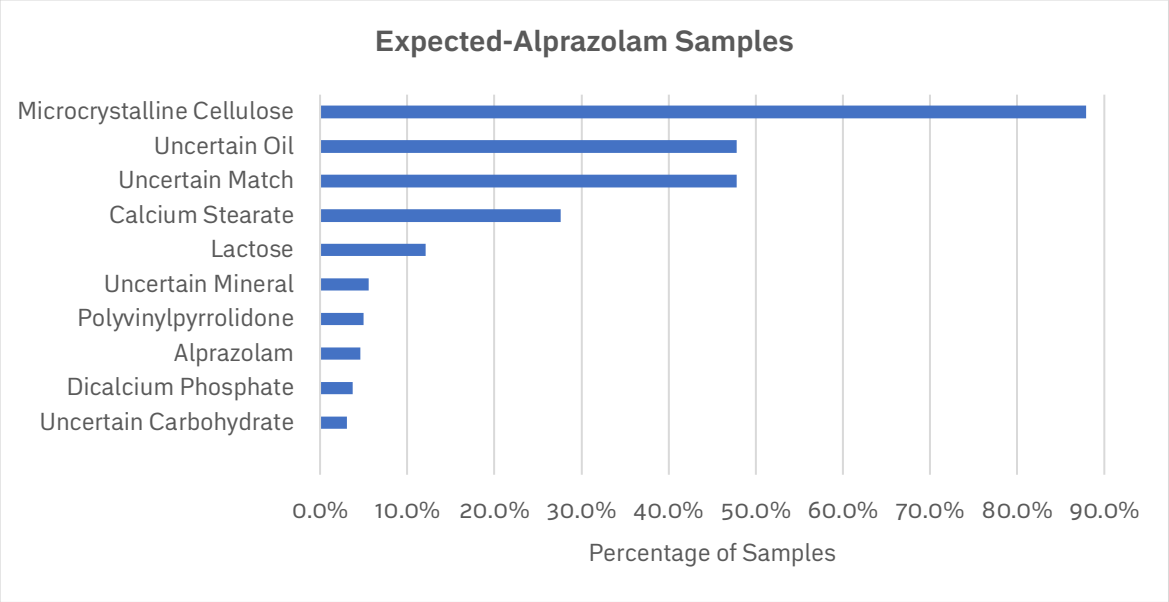

Figure 25 Components most frequently detected in concordant expected-alprazolam samples in BC in 2024*

*Other components present in <1% of concordant expected-alprazolam samples include: ADB-BUTINACA, Bromazolam, Dimethyl Sulfone, Magnesium Sulfate, Methamphetamine, Phenacetin, Polyvinyl Acetate, Sucrose.

Expected-GHB

Samples submitted as GHB made up 26.2% (377 samples) of all samples in the depressant category. Of these, 293 samples (77.7%) were found to contain GHB by FTIR. The most common active components detected in addition to GHB in concordant samples

were GBL (15 samples; 5.1%), 1,4-butanediol (11 samples; 3.8%), and bromo-GBL (11 samples; 3.8%).

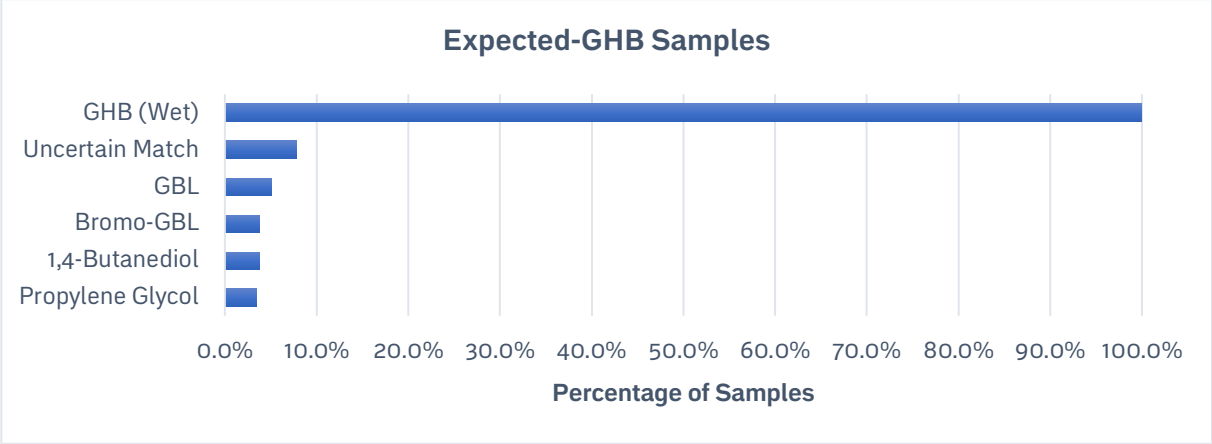

Figure 26. Components most frequently detected in concordant expected-GHB samples in BC in 2024*

*Other components present in <1% of concordant expected-GHB samples include: Caffeine, Inositol.

Stimulants

Types of Stimulant Samples Checked

A total of 6,376 stimulant samples were checked in 2024, with cocaine HCl being the most frequently checked throughout the year (3,004 samples; 47.1%) (see **Figure 27**). The highest number of expected-cocaine HCl samples were submitted in August, which was followed by a low in September (193 samples). Methamphetamine was the second most checked stimulant throughout the year (1,932 samples), followed by crack cocaine, the base form of cocaine (1,114 samples). Cathinones made up the majority of the remaining stimulants submitted for drug checking, comprising of 3.1% of all expected-stimulants. Of the cathinones submitted, 3-MMC was most frequently checked (84 samples), followed by 4-MMC (73 samples), which surpassed 3-MMC as most common cathinone checked in the second half of the year. We note that of all non-opioid samples, fentanyl-positivity was highest in the stimulant category. Please see the fentanyl-positivity section on page 42 for more information.

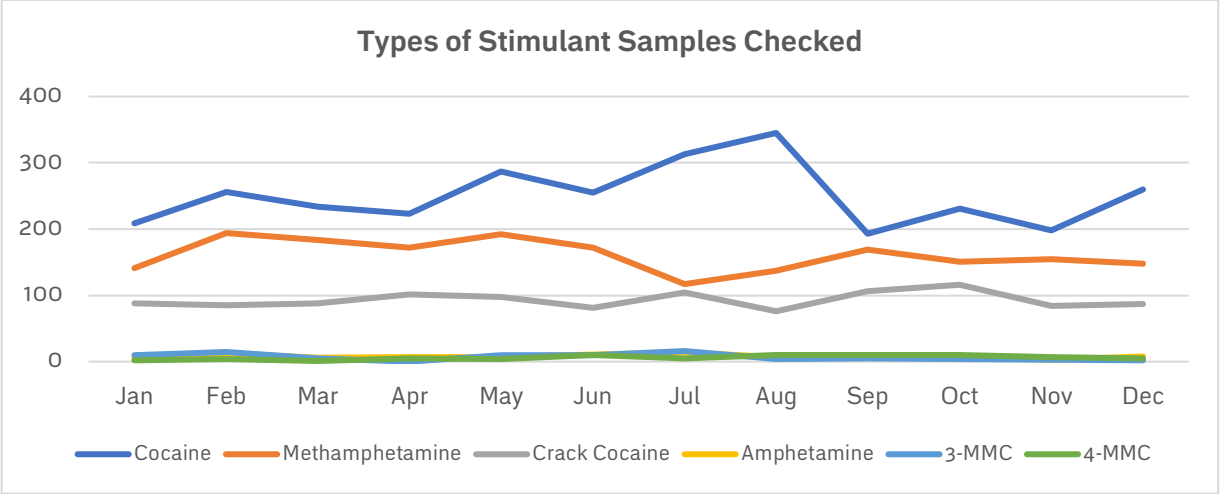

Figure 27 Number of stimulant samples checked by type per month across BC in 2024*

*Other samples checked in the stimulant category include: 2-FMA, 2-MMC, 3-CMC, 3-FA, 3-FPM, 4-MEC, 4F-MPH, Crack Cocaine + Methamphetamine, Dextroamphetamine, Dimethocaine, Dimethylcathinone, Eutylone, Lisdexamfetamine, MDPM, Methylone, Methylphenidate, N-Ethylhexedrone, N-Ethylpentedrone, Speed.

Components Detected in Stimulant Samples

Expected-Cocaine HCl

A total of 3,004 expected-cocaine HCl samples were submitted for drug checking in 2024. Of these, 2,920 (97.2%) were concordant, with cocaine detected by FTIR. As shown in **Figure 28**, additional compounds were found infrequently. Of those detected, buffing agents such as inositol, a sugar, (62 samples; 2%), and phenacetin, a pain-relieving drug (43 samples; 1.5%) were most common.

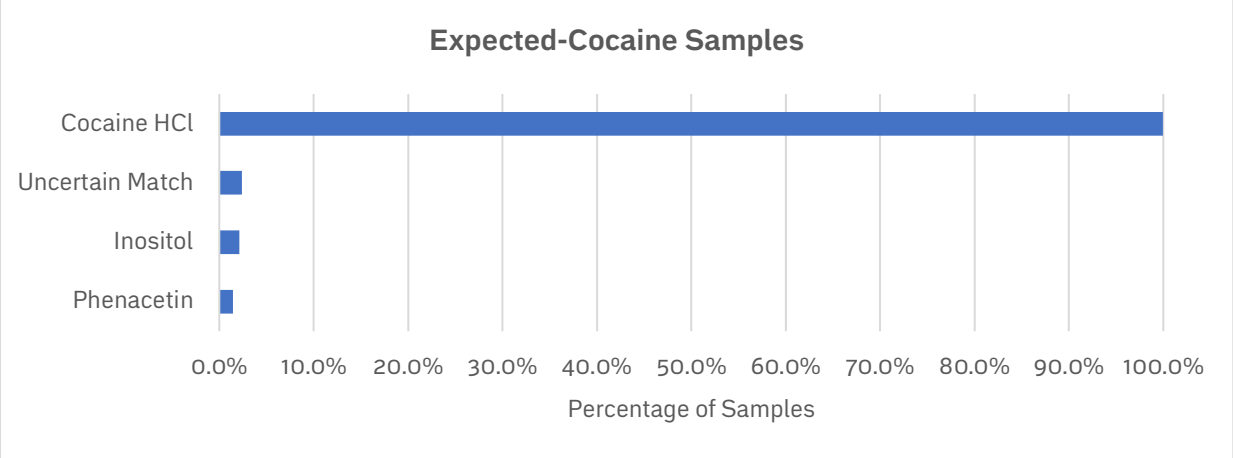

Figure 28 Components most frequently detected in concordant expected-cocaine samples in BC in 2024*

*Other components present in <1% of concordant expected-cocaine samples include: Acetaminophen, Benzocaine, Boric Acid, Cocaine Base, Creatine, Dicalcium Phosphate, Dimethyl Sulfone, Erythritol, Glucose, Glutamine, Ketamine, Ketamine Base, Lactose, Levamisole, Lidocaine, Mannitol, MDMA, Methamphetamine, Microcrystalline Cellulose, Procaine, Pyridoxine, Sodium Bicarbonate, Sucrose, Talc, Thiamine, Uncertain Carbohydrate, Uncertain Mineral, Uncertain Oil, Xylitol.

Expected-Crack Cocaine

Of the 1,114 samples expected to be crack cocaine, 1,072 (96.2%) contained the expected drug, cocaine base, as determined by FTIR. The most frequently detected buffing agent was phenacetin (137 samples; 12.8%) (see **Figure 29**). Though occurring in less than 1% of concordant crack cocaine samples, we note there were five instances of xylazine being detected.

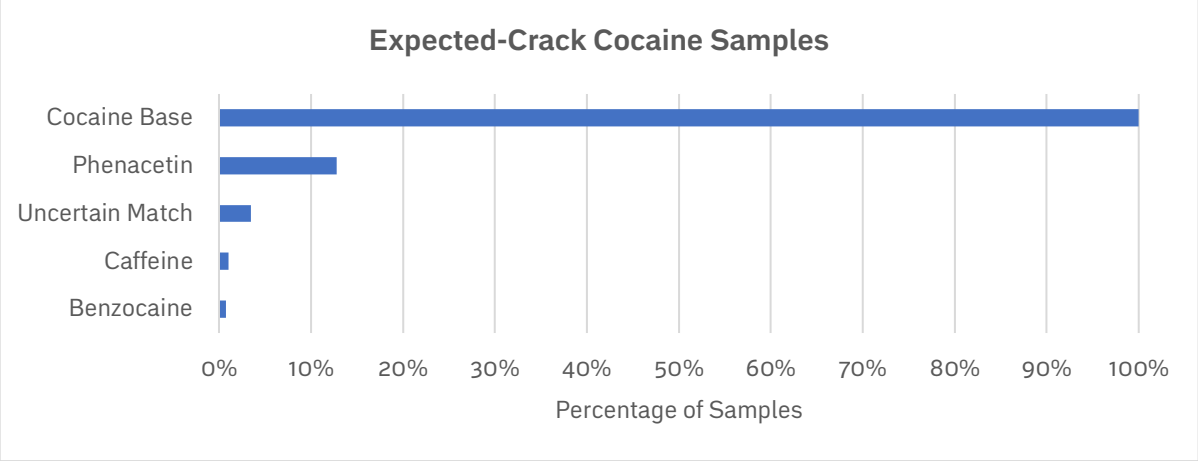

Figure 29 Components most frequently detected in concordant expected-crack cocaine samples in BC in 2024*

*Other components present in <1% of concordant expected-cocaine samples include: Amphetamine, Cocaine HCl, Dimethyl Sulfone, Erythritol, Fentanyl, Fentanyl or Analog, Inositol, Ketamine Base, Levamisole, Methamphetamine, Sodium Bicarbonate, Uncertain Carbohydrate, Uncertain Fentanyl Analog, Uncertain Oil, Xylazine.

Expected-Methamphetamine

There were a total 1,932 samples expected to be methamphetamine in 2024. Of these, 1,868 (96.7%) were found to contain methamphetamine by FTIR. The most common additional compound detected was dimethyl sulfone (see **Figure 30**), found in 100 samples (5.4%). Dimethyl sulfone is an inactive health supplement often used as a buffing agent in methamphetamine and other substances that share similar physical properties (e.g., its crystalline form).

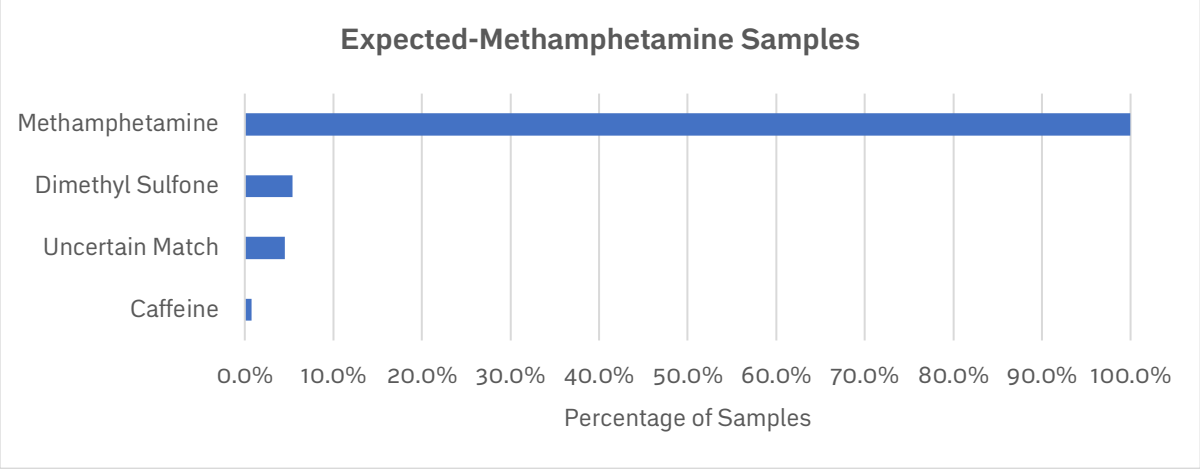

Figure 30 Components most frequently detected in concordant expected-methamphetamine samples*

*Other components present in <1% of concordant expected-methamphetamine samples include: 4-CMC, Acetaminophen, Calcium Stearate, Cocaine Base, Cocaine HCl, Dimethyl Sulfoxide, Ephedrine, Erythritol, Fentanyl, Isopropylbenzylamine, Ketamine, Lactose, Linoleic Acid, Magnesium Sulfate, Mannitol, MD-MAPA, Mephtetramine, Microcrystalline Cellulose, para-Fluorofentanyl, Phenacetin, Phenethylamine, Sodium Bicarbonate, Sucrose, Taurine, Uncertain Carbohydrate, Uncertain Fentanyl Analog, Uncertain Mineral, Uncertain Oil, Xylitol.

Psychedelics

Types of Psychedelic Samples Checked

A total of 6,059 psychedelic samples were submitted for drug checking, making up 18.7% of total samples checked in 2024. This category captures a wide range of substances, including MDMA, MDA, ketamine, LSD, 2C-B, and tucibi. MDMA was the most commonly checked psychedelic substance throughout the year, with a peak of 508 samples occurring in July (see **Figure 31**). The next most frequently checked psychedelic throughout the year was ketamine, with the greatest number of samples checked also in July (275 samples). The increase in MDMA and ketamine samples checked in July corresponds with the occurrence of music festivals in the same month.

Notably, in 2024, the number of 2C-B samples submitted for drug checking was approximately twice the amount checked the previous year. Similarly, the number of samples submitted as tucibi also doubled. Tucibi, also known as “tussi”, “tusi” is expected to be a polysubstance mixture presenting as a pink powder, and was first observed at drug checking services in BC in 2022. While expected-tucibi samples usually contain ketamine and MDMA, there is no standard composition, and a variety of colours have been seen over the years. Tucibi is sometimes mistaken as 2C-B due to its similar sounding name, though it rarely contains 2C-B. Additionally, it is sometimes referred to as “pink cocaine”, though it may not contain cocaine. While tucibi comprises only about 5% of the total number of psychedelics checked, we include a breakdown of components detected in the section below to raise awareness on its varying composition.

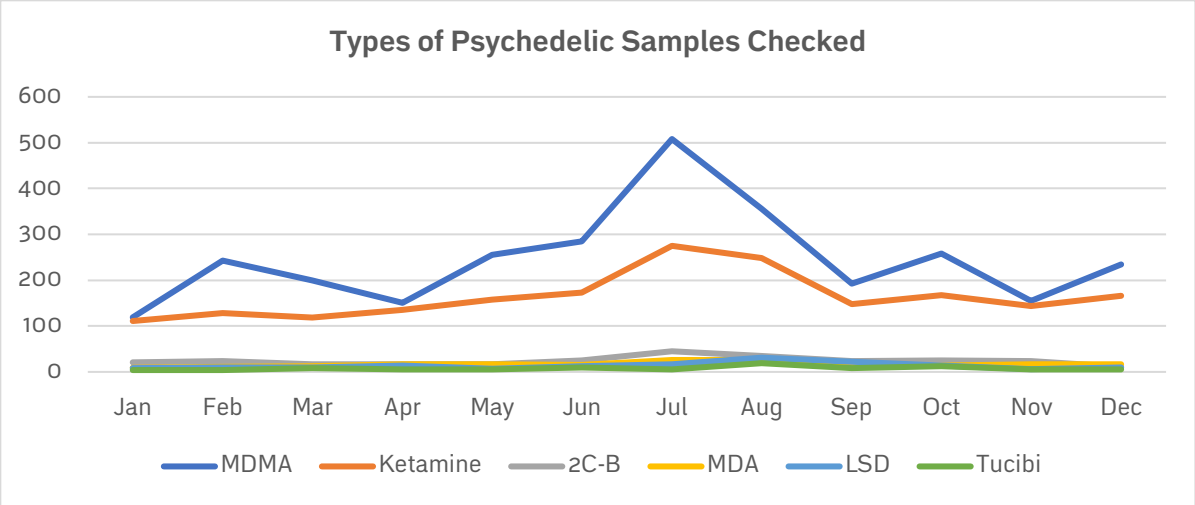

Figure 31 Number of psychedelic samples checked by type per month across BC in 2024*

*Other samples checked in the psychedelic category include: 2-FDCK, 2-Fluoro-2-oxo-PCE, 25B-NBOH, 2C-B-FLY, 2C-C, 2C-D, 2C-E, 2C-Family, 2C-H, 3-HO-PCE, 3-MeO-PCE, 3-MeO-PCP, 3C-P, 4-AcO-DET, 4-AcO-DMT, 4-AcO-EPT, 4-AcO-MiPT, 4-HO-DiPT, 4-HO-MET, 4-HO-MiPT, 4-PrO-DMT, 5-MAPB, 5-MeO-DALT, 5-MeO-DiPT, 5-MeO-DMT, 5-MeO-MET, 5-MeO-MiPT, 6-APB, AL-LAD, ALD-52, AMT, Cannabis and Derivatives, CBD, DiPT, DMT, DMXE, DOB, DOC, DOET, DOI, DPT, DXM, Escaline, FXE, Harmine, Ibogaine, Ketamine and MDMA, MD-X (Unknown), MDA and MDMA, MDMA and Mushrooms, Mescaline, MET, Methallylescaline, MiPT, MMDA, MPT, Mushroom and Derivatives, O-PCE, PCP, Proscaline, Psilocin, Salvia, THC, TMA, Tryptamine.

Components Detected in Psychedelic Samples

Expected-MDMA

Of the 2,957 samples expected to be MDMA, 2,810 (95%) were found to contain MDMA (see **Figure 32**). Generally, MDMA is brought in for testing in crystal or powder form, or alternatively, is the expected active component in pressed tablets (e.g., "ecstasy" pills). When MDMA is present in pressed tablets, the most common compounds detected are uncertain oils (229 samples; 8.1%), and microcrystalline cellulose (217 samples; 7.7%). Microcrystalline cellulose is commonly used as an inert filler, and oils are used as a binder for tablets. Additionally, in 58 instances (2.1%), MDA was detected alongside MDMA. MDA is reported to have similar, but more psychedelic properties compared to MDMA.

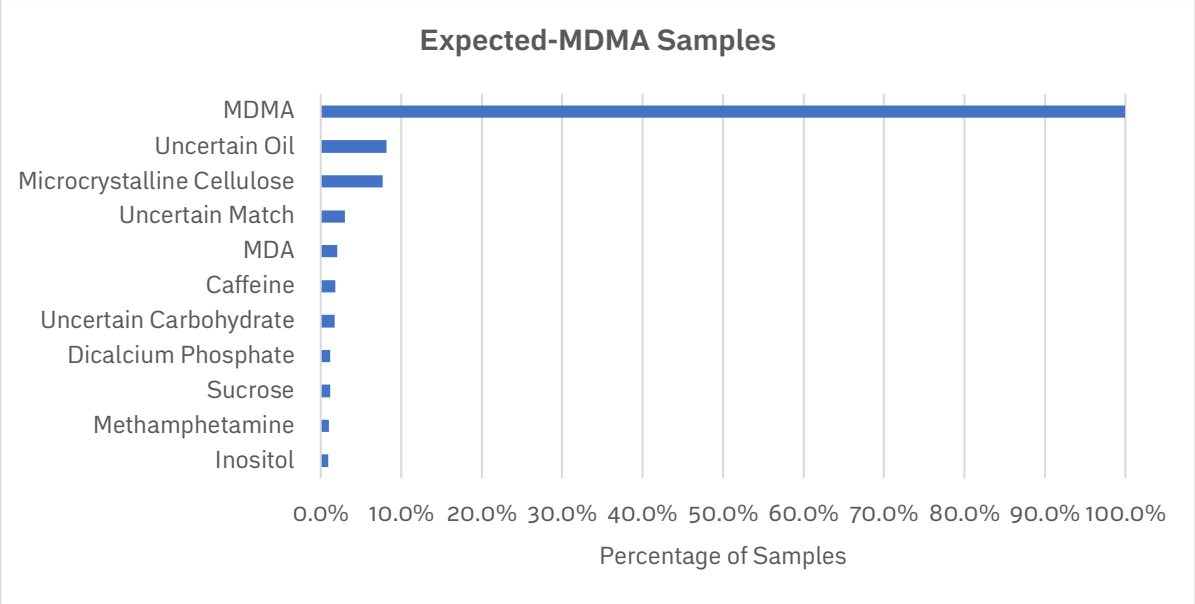

Figure 32 Components most frequently detected in concordant expected-MDMA samples in BC in 2024*

*Other components present in <1% of concordant expected-MDMA samples include: Calcium Stearate, Cocaine HCl, Creatine, Dimethyl Sulfone, Ephedrine, Erythritol, Eutylone, Fentanyl, Glutamine, Hydromorphone, Ketamine, Lactose, Mannitol, MD-MAPA, MDP2P, Methylone, PMK Ethyl Glycidate, Polyvinylpyrrolidone, Safrole, Sildenafil, Stearic Acid, Tadalafil, Talc, Taurine, Uncertain Fentanyl Analog, Uncertain Mineral, Uncertain Salt, Xylitol.

Expected-Ketamine

In 2024, 1,902 (96.5%) of the total 1,971 samples submitted as ketamine were found to be concordant by FTIR. As seen in in **Figure 33**, the most frequently identified compound other than ketamine was monosodium glutamate (86 samples; 5.2%), a flavour enhancer

used in cooking. This marked the first year that monosodium glutamate surpassed dimethyl sulfone as the most common buffing agent in ketamine, likely due to its similar colour and texture, presenting as clear, long crystalline rods.

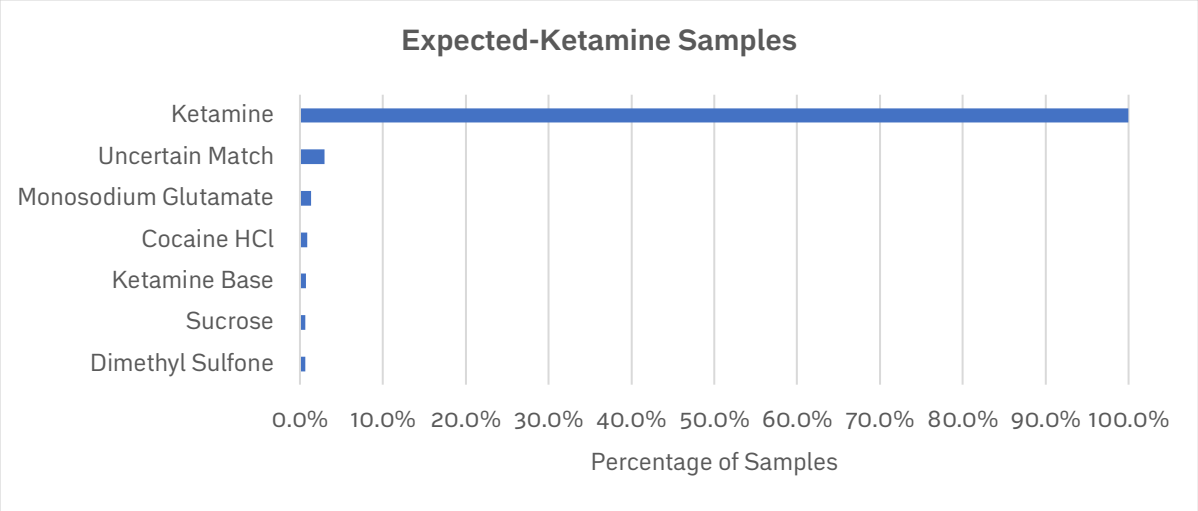

Figure 33 Components most frequently detected in concordant expected-ketamine samples in BC in 2024*

*Other components present in <1% of concordant expected-ketamine samples include: 2-FDCK, Benzocaine, Caffeine, Cocaine Base, Creatine, Inositol, Lidocaine Base, Magnesium Sulfate, Mannitol, MDA, Methamphetamine, Microcrystalline Cellulose, Phenacetin, Taurine, Uncertain Carbohydrate, Uncertain Mineral, Uncertain Oil.

Expected-Tucibi

A total of 92 samples were submitted as tucibi in 2024. Of these, 82 (89.1%) were considered concordant if they were comprised of a mixture of at least two active components and presented as a pink powder. However, throughout the year, a number of expected-tucibi samples began to present in a variety of colours, such as purple and blue. As there is no set criteria for what constitutes tucibi, these samples were also considered concordant as long as they contained a mixture of at least two components, and presented as a coloured powder. Samples are considered non-concordant if only one component was detected (e.g., MDMA with no other components).

As shown in **Figure 34**, ketamine (80 samples; 97.6%) and MDMA (69 samples; 84.1%) were the most frequently detected active components, followed by MDA (27 samples; 32.9%). Notably, nine (11%) samples were found to contain benzodiazepines by immunoassay test strip. This is important to note, as in other parts of the world benzodiazepines are commonly found in tucibi samples.[10] We emphasize that mixtures of drugs, especially depressants and dissociatives, may pose risks of adverse or unexpected effects. As such, we will continue to monitor ongoing changes in the composition of tucibi samples.

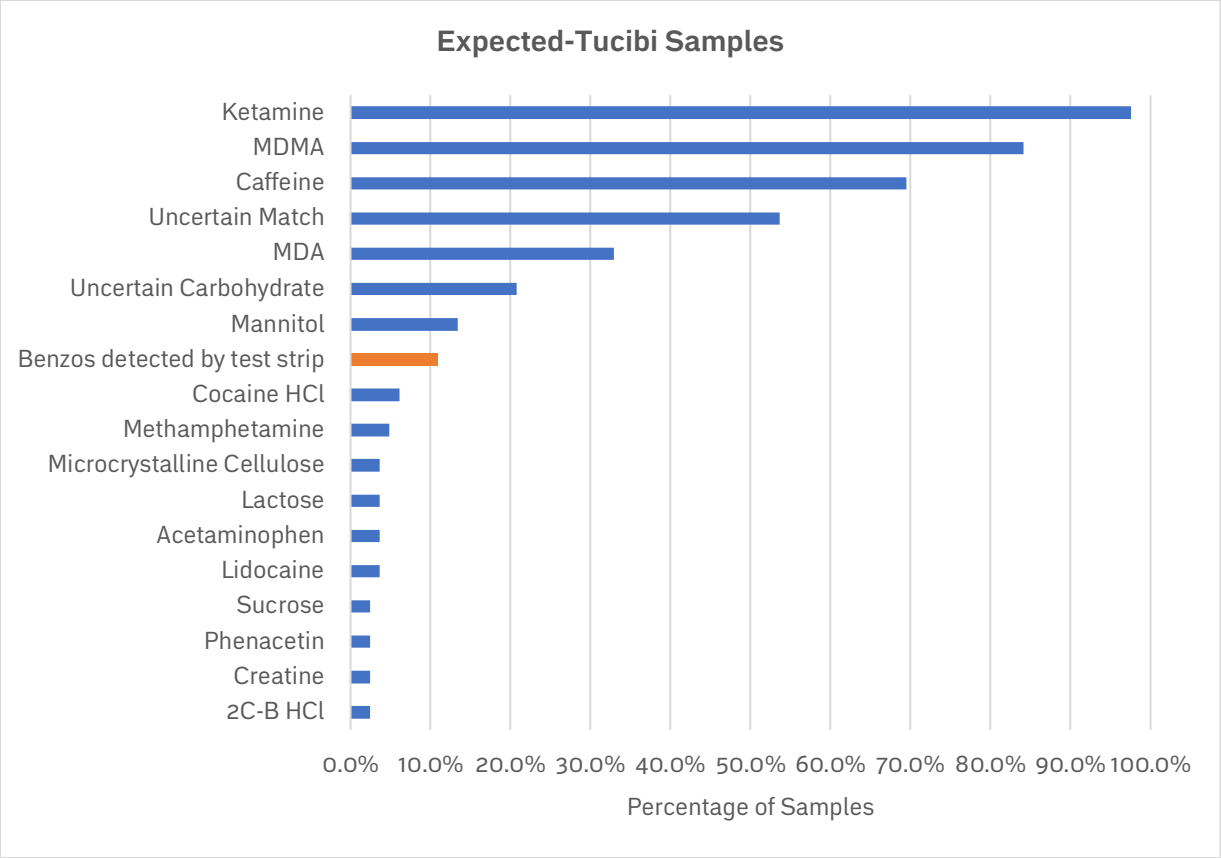

Figure 34 Components most frequently detected in concordant expected-tucibi samples in BC in 2024*

*Other components detected a single time each in concordant expected-tucibi samples include: 2-Fluoro-2-oxo-PCE, 2C-Family, Dimethyl Sulfone, Erythritol.

Fentanyl-Positivity in Non-Opioids

Fentanyl-Positivity of Non-Opioids by Month

As shown in **Figure 35**, the number of non-opioid samples (i.e., stimulants, depressants, and psychedelics) found to contain fentanyl remained low throughout the year compared to the overall number of samples checked. Samples were considered fentanyl-positive if fentanyl or an analog was detected by FTIR, or if the fentanyl test strip produced a positive result.

The fewest fentanyl-positive samples occurred in the psychedelic category, where less than 1% tested positive each month with the exception of March (1.3%). Fentanyl-positivity fluctuated among depressants, with the highest amount occurring in November (6.7%). Among stimulants, fentanyl-positivity was highest in the first quarter of the year, reaching a peak of 6.1% in March before decreasing throughout the remainder of 2024. One reason for this decrease may be due to the addition of a quality

check in the database that reminded technicians to perform a re-test on fentanyl-positive stimulants to prevent recording false-positive results.

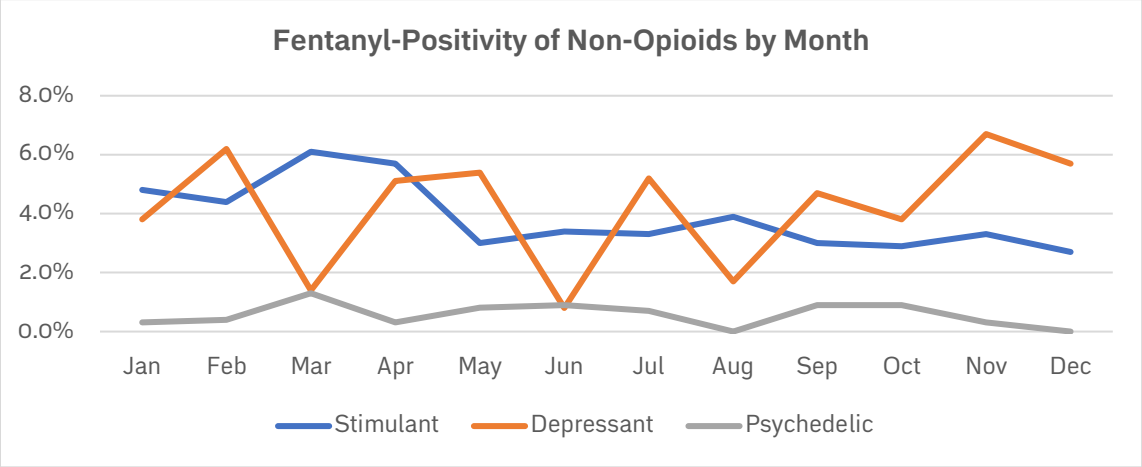

Figure 35 Percentage of non-opioid samples containing fentanyl per month by drug category in BC in 2024

Fentanyl-Positivity by Drug

Table 1 examines the non-opioid substances with the highest overall prevalence of fentanyl adulteration in their respective drug categories. Of the stimulants checked, fentanyl-positivity occurred most often in samples expected to be crack cocaine (124 of 1,1114 samples; 11.1%), followed by methamphetamine (178 of 1,932 samples; 9.2%). In samples expected to be cocaine HCl, 38 (1.3%) tested positive for fentanyl.

In the depressants category, fentanyl-positivity occurred most often in samples expected to be a benzodiazepine of unknown type (28 of 166 samples; 16.9%). There was also a high proportion of fentanyl-positive bromazolam samples, though a low number of samples were submitted overall (13 of 86 samples; 15.1%). In contrast, five (1.1%) of the total 476 expected-alprazolam samples tested positive for fentanyl. In the psychedelic category, 21 (0.7%) of the total 2,957 expected-MDMA samples were fentanyl-positive.

Category	Expected Drug	Fentanyl Positive (%)	Total Samples Submitted
Stimulants	Cocaine HCl	1.3%	3004
	Methamphetamine	9.2%	1932
	Crack Cocaine	11.1%	1114
Depressants	Alprazolam	1.1%	476
	Benzodiazepine (Unknown)	16.9%	166
	Bromazolam	15.1%	86
Psychedelics	MDMA	0.7%	2957

Table 1 Percentage of non-opioids containing fentanyl in BC by drug type, detected by FTIR and/or test strip in 2024

Cross-Contamination Expected by the Service User

We note that some fentanyl-positive samples were expected to contain fentanyl by the service user prior to testing (see **Figure 36**). This was confirmed by technicians logging a comment in the database stating that cross-contamination was expected. Most often, cross-contamination occurred when the service user had stored a non-opioid sample with a "down" or fentanyl sample prior to testing. The remainder of fentanyl-positive samples were either noted to be unexpected by the service user, or were unexplained in the technician comments.

Fentanyl was expected in 29.8% of both fentanyl-positive methamphetamine and crack cocaine samples (53 and 37 samples, respectively). In fentanyl-positive cocaine samples, there was a lower proportion of samples where fentanyl was expected (7 samples; 18.4%). Of the fentanyl-positive depressants, fentanyl was expected in 15.4% of bromazolam samples (13 samples), and in 7.1% of benzodiazepine (unknown) samples (2 samples). Fentanyl was not expected in any of the five fentanyl-positive alprazolam samples, and only expected in one fentanyl-positive MDMA sample (4.8%).

In these cases, technicians provide harm reduction information on the importance of storing opioids and non-opioids separately, and the overdose risk these samples could pose to people who are opioid naïve if they were to use them.

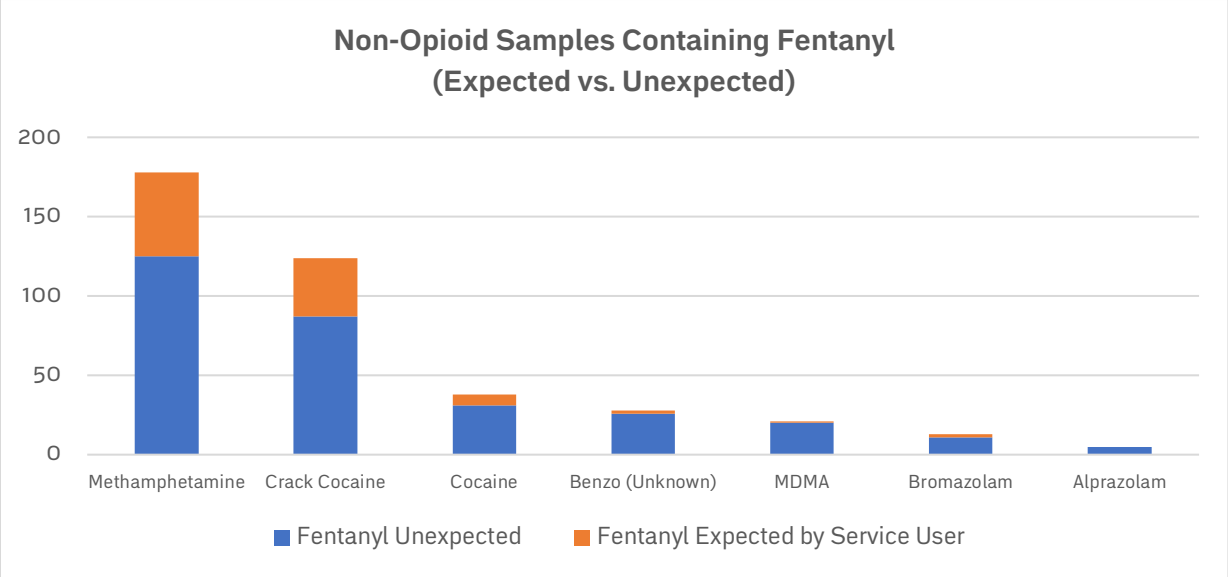

Figure 36 Number of non-opioid samples in BC containing fentanyl (expected vs. unexpected) by drug type in 2024

Limitations

While the paired usage of standard drug checking technologies, the FTIR spectrometer and immunoassay test strips, can provide the quickest and most comprehensive results possible at point of care, they have distinct limitations to consider. As previously mentioned, the FTIR spectrometer has a detection threshold of approximately 5-10% concentration, meaning that if compounds are present below this amount, they are likely to be missed.[3] Fentanyl and benzodiazepine immunoassay strips are used in tandem to determine if these substances are present at concentrations the FTIR cannot detect. However, they can only provide binary information about whether a target substance is present, and cannot quantify their concentrations. They also cannot provide information on which or how many analogs of the target substances are contained. Additionally, they may miss some fentanyl analogs (e.g., carfentanil), and benzodiazepine-like substances (e.g., etizolam). Test strips are also specific to their target substances, thus other emerging adulterants, for example, tranquilizers (e.g., xylazine, medetomidine), will be missed by fentanyl and benzodiazepine test strips. For this reason, as well as the inability of the FTIR to detect tranquilizers at low concentrations, their true prevalence is likely higher than what is reported here.

While it is always possible that substances can be missed, even components that are present at concentrations above the FTIR detection threshold can be misidentified, or go undetected in complex samples. Some fentanyl analogs and benzodiazepines share similarities within their spectra and can be difficult to differentiate. Furthermore, FTIR reference libraries may not yet contain novel compounds that emerge in the drug supply and are not possible to identify. These points speak to the high number of samples that contained an “uncertain match”, “no library match”, or an “uncertain fentanyl analog”. For these reasons, FTIR and test strip results are considered preliminary unless verified by confirmatory testing with more sensitive methods (e.g., mass spectrometry).

As the data presented here is based only on samples that have been submitted for drug checking, results may not be generalizable to the entire unregulated drug supply in BC. For example, drug checking is most commonly offered alongside other harm reduction services, such as supervised consumption sites. As such, this data may be biased towards samples most often brought to these services (e.g., opioids). There also may be important differences between people who get their drug checked vs. not, leading to selection bias. Additionally, as drug checking is an anonymous service, we cannot know how many samples were brought in by the same person. Finally, in some areas, especially those that are rural and remote, there are fewer drug checking sites serving large geographic areas, and so the data may not generalize to a wider region. This is important to note as drug supplies can vary widely even between neighbouring jurisdictions.

Conclusion

Since 2017, drug checking services have expanded in response to the ongoing drug toxicity crisis in British Columbia. Now, there are drug checking sites in every regional health authority, with many sites offering a variety of service delivery models in addition to on-site drug checking, such as drop off locations, mobile services, and pop-up sites at music festivals and other events. While these adaptations have improved accessibility, adapting to rapid changes in the unregulated drug supply remains a challenge.

In unregulated opioid samples, we observed increased variability in the types of fentanyl analogs and benzodiazepines detected. This included the emergence of ortho-methylfentanyl at the beginning of 2024 and, notably, fluorofentanyl surpassing fentanyl as the most common opioid detected for the first time in August. In tandem, fentanyl concentrations decreased as fluorofentanyl concentrations fluctuated. Within a 3-month period, we also observed desalkylgidazepam replace bromazolam as the most common benzodiazepine detected. These changes have important implications, as the potency and effects of different fentanyl analogs and benzodiazepines can vary widely.

Unregulated opioids in 2024 were especially complex in comparison to previous years. In 2021, most unregulated opioid samples contained around three components detectable by FTIR (e.g., an opioid, a sugar, and caffeine), as well as benzodiazepines sometimes being detected by test strip. In 2024, samples were more challenging to analyze, and it was not uncommon to detect five or more components in a single sample, including multiple fentanyl analogs, benzodiazepines, and tranquilizers, in addition to buffing agents such as sugars and caffeine. The presence of multiple high potency substances is associated with increased risk of adverse events, such as prolonged sedation, seizures, and both fatal and non-fatal overdose.[11] Importantly, benzodiazepines and tranquilizers are not reversed by naloxone, which complicates responses to opioid toxicity events.[12-14]

Non-concordant pharmaceutical opioid samples also showed increasing complexity. For example, fentanyl precursors had rarely been found in samples expected to be pharmaceutical opioids in the previous year, but were found in over 30% of non-concordant hydromorphone samples in 2024. Xylazine was not detected in pharmaceutical opioids in 2023, but was detected in six oxycodone samples in 2024. Although detection of these components is low in comparison to fentanyl and benzodiazepines, it reinforces concern over the composition of counterfeit pharmaceutical tablets, and what may be missed due to the limitations of point-of-care drug checking technologies.

While growing complexity continues to be most salient among unregulated opioids, this year's data demonstrates some non-opioid drugs trending towards increased unpredictably as well. Although only 92 samples were submitted as tucibi in 2024, we included their results as their composition was more complex in comparison to all other substances in the psychedelic category. While we found that tucibi generally contained a

mixture of ketamine and MDMA, which was consistent with previous years, in 2024, 11% were found to contain benzodiazepines, which was a novel observation. Mixing substances can increase the risks of adverse effects, for example, when combining dissociatives and depressants, but especially when concentrations are not known. We highlight these results to raise awareness of what may be a growing trend of tucibi use and unpredictability in its polysubstance composition.

Consistent with previous years, stimulant samples demonstrated the highest levels of concordance, but also the highest levels of fentanyl-positivity of all non-opioid drugs. Some of these instances, however, were explained by service users engaging in polysubstance use. Additional context provided by technicians showed that 30% of methamphetamine and crack cocaine samples were expected to contain fentanyl by the service user, usually due to storing their stimulant and opioid samples together. Accessing drug checking services provided opportunities for technicians to engage in conversations about reducing the risks of harms associated with these samples, especially if they were to be shared with someone without a tolerance for opioids.

Drug checking data provides valuable insight to a variety of partners, including service users, community harm reduction organizations, and public health decision makers. At point-of-care, service users are empowered with knowledge of what is contained in their drugs, and harm reduction information so they can make informed decisions on how they use them. Drug checking services communicate notable results within their local communities, delivering timely information on what is circulating in their area. More broadly, drug checking data allows us to identify, monitor, and respond to trends as they emerge. The results of the drug checking data collected in 2024 speak to the risks of the increasingly unpredictable and rapidly changing unregulated drug market and its impacts on people who use drugs and their communities.

For more information about drug checking services in BC and annual reports from previous years, please visit www.drugcheckingbc.ca. The drug checking data collected from 2018 to present is also publicly available and can be viewed on our interactive dashboard at https://drugsense.bccsu.ubc.ca/.

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