



BRITISH COLUMBIA
CENTRE ON
SUBSTANCE USE

Networking researchers, educators & care providers

A Report on British Columbia's Unregulated Drug Supply

*Results from British Columbia's
Community Drug Checking Service*

June 2018 – December 2019



Land Acknowledgement

We respectfully acknowledge that this work takes place on the unceded ancestral homelands of the xwmeθkwey'em (Musqueam), Skwxwú7mesh (Squamish), and sel'ílweta | (Tsleil-Waututh) Nations.

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Contact

Learn more about www.drugcheckingbc.ca

For further drug checking-related inquiries, you can reach us at drugchecking@bccsu.ubc.ca

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Purpose of the Report

The purpose of this report is to provide a summary of trends in British Columbia's (BC) unregulated drug supply in the context of an ongoing overdose public health emergency. Drug checking services in BC are operated in collaboration with regional health authorities, community-based organizations, and various levels of government. This report provides a snapshot of point-of-care drug checking results operating in select supervised consumption sites (SCS), overdose prevention sites (OPS), and other health authority sanctioned sites in BC from June 2018 to December 2019.

In BC, several models of drug checking services exist using different technologies. The point-of-care results presented in this report are collected from those drug checking services that use Fourier-transform infrared (FTIR) spectroscopy, fentanyl test strips and benzodiazepine test strips. The report presents results by grouping drug samples into five main drug categories: opioids, stimulants, psychedelics, depressants, and cannabinoids. The categorization of drug samples has been conducted to provide organized themes of important information such as: expected drugs, fentanyl positivity, and cuts & buffs in drug samples.

List of Acronyms and Other Frequently Used Terms

Expected drugs:	Individual's expectation of drugs purchased
Down:	Refers to any opioid drug present in any amount
Other:	Other types of drugs that do not belong in any established drug category
Speed:	Unknown stimulant present in any amount
Unknown:	All samples in which the individual could not identify the expected substance
ANKORS:	AIDS Network Kootenay Outreach and Support Society
BC:	British Columbia
BCCSU:	British Columbia Centre on Substance Use
DTES:	Vancouver's Downtown Eastside
FH:	Fraser Health
FTIR:	Fourier-transform Infrared
GC-MS:	Gas Chromatography-Mass Spectroscopy
IH:	Interior Health
LC-MS:	Liquid Chromatography-Mass Spectroscopy
ODAX:	Overdose Action Exchange
OPS:	Overdose Prevention Sites/Services
PWUD:	People Who Use Drugs
SCS:	Supervised Consumption Sites
qNMR:	quantitative Nuclear Magnetic Resonance
VCH:	Vancouver Coastal Health

Cuts and Buffs

Cuts:	Psychoactive or pharmacologically active ingredients to mimic or enhance effects of a drug
Bufs:	Inert ingredients to bulk or add size to the final product

A list of common cuts and buffs can be found [HERE](#).

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Drug Checking Services Overview

Drug checking services provide timely access to chemical analyses of substances providing people who use drugs (PWUD) with knowledge on the content and purity of their substances.¹ Individuals can anonymously check their drugs before or after consumption and receive feedback on their results as quickly as five to ten minutes. In addition to potential individual-level harm reduction benefits, drug checking also provides an opportunity to monitor trends in the unregulated drug supply.

While initially offered in party or music festival settings in British Columbia (BC),² drug checking services have expanded into other harm reduction settings. In the context of an ongoing overdose public health emergency in BC, point-of-care drug checking services have been offered in select supervised consumption sites (SCS), overdose prevention sites/services (OPS), and health authority sanctioned sites. The drug checking services presented in this report is a collaboration between the BC Centre on Substance Use (BCCSU), regional health authorities, community-based organizations, and various levels of government.

A variety of drug checking technologies are available, each with advantages and disadvantages in terms of applicability and cost, that span resource-intensive laboratory techniques (e.g., gas chromatography-mass spectrometry [GC-MS], quantitative nuclear magnetic resonance spectroscopy [qNMR]) to quick and simple point-of-care techniques (e.g., fentanyl test strips, benzodiazepine test strips).¹ In BC, several models of drug checking services exist using different technologies. The data presented in this report are collected from drug checking services that use a Fourier-transform infrared (FTIR) spectroscopy, fentanyl test strips, and benzodiazepine test strips. Studies have demonstrated that while the FTIR is capable of identifying and quantifying a wide range

of substances in mixtures submitted for analysis, fentanyl test strips can qualitatively detect a lower concentration of fentanyl presence in drug samples.^{1,3} Therefore, these point-of-care technologies are used in tandem to offset the limitations of each technology when used on its own.

Beyond point-of-care services provided, samples can be sent from selected drug checking sites to partnering laboratories for confirmatory testing; the BC Provincial Toxicology Centre (PTC) utilizes gas chromatography/mass spectroscopy (GC-MS) and Health Canada's Drug Analysis Service (DAS) employs a combination of quantitative nuclear magnetic resonance (qNMR), GC-MS, and liquid chromatograph/mass spectroscopy (LC-MS) for confirmatory testing. These confirmatory laboratory techniques provide critical insights into the contents of drug samples by providing important and in-depth information on novel and unique components that may not be detected at point-of-care. qNMR is an absolute quantitative analysis method that assesses impurities and adulterants by comparing NMR signal intensities against a reference.⁴ The qNMR technique provides information such as multi-component quantitative for water soluble drugs, including excipients and adulterants. GC-MS is a common analytical technique for drug testing in clinical and forensic settings. It can measure every chemical present in a given sample by comparing a sample to an extensive reference library of known chemicals.⁵ Similarly, LC-MS relies on mass spectral libraries to identify the chemical make-up of a given sample.⁵

Please visit drugcheckingbc.ca for more information.

Results

Summary of Key Findings

Between June 1, 2018, and December 31, 2019, 7,789 drug samples were checked with the FTIR, fentanyl test strips, and benzodiazepine test strips at point-of-care sites. As well, confirmatory analysis was conducted on a total of 856 drug samples by partnering laboratories at DAS and PTC. The frequency of drugs checked over time varied depending on service and staff availability and the site's geographic location. Of the total drug samples checked, 4,729 samples were expected opioid samples, 1,251 samples were expected stimulant samples, 1,031 psychedelic samples, 152 depressant samples, 29 cannabinoid samples, 26 polysubstance samples, 572 unknown samples, and 28 other drugs samples. Of note, expected drugs refer to individual's expectation of drugs purchased. The median absolute fentanyl concentration of opioid samples containing fentanyl predicted by a quantification model was 7%.

Of all opioids checked, 71% were expected fentanyl or fentanyl analogues. Of these samples, 95% were positive for fentanyl or fentanyl analogues, and caffeine was the most common (96%) substance found other than fentanyl in these samples. Fentanyl was found in 61% of the expected heroin samples. Of the unknown opioid (down) samples, 89% were fentanyl positive. Of the prescription opioid samples, 14% were fentanyl positive, and microcrystalline cellulose was the most common substance other than the active ingredient. Of note, fentanyl positive prescription opioid samples were considered counterfeit prescriptions.

Of all stimulants checked, 45% were expected cocaine samples. Of these, 97% contained cocaine, and 1% tested positive for fentanyl. Phenacetin was the most common (18%) substance found other than cocaine in expected cocaine samples. The median cocaine concentration using qNMR was 85%. Of all stimulants checked, 53% were expected methamphetamine and other methamphetamine samples. Of these,

96% contained methamphetamine, and 2% tested positive for fentanyl.

Of all psychedelics checked, 62% were expected MDMA and related compounds samples. Of these, 93% contained MDMA. Mannitol was the most common (18%) substance found other than MDMA and related compounds. According to confirmatory testing results, fentanyl was found as one of the active ingredients in 1% of expected DMT and related compounds samples, and fentanyl was found in 3% of expected synthetic cannabinoid samples.

Of all depressants checked, 88% were expected benzodiazepine and related drug samples. 91% were expected alprazolam, and 5% were tested positive for fentanyl using fentanyl test strips results. Of all polysubstance samples, 84% expected were fentanyl and methamphetamine mixture. Of the unknown samples, 5% tested positive for fentanyl. Of note, some of the substances found in the unknown samples using confirmatory tests were: acetyl fentanyl (1), cyclopropyl fentanyl (1), etizolam (2), and furanyl fentanyl (2).

Drug Checking Utilization

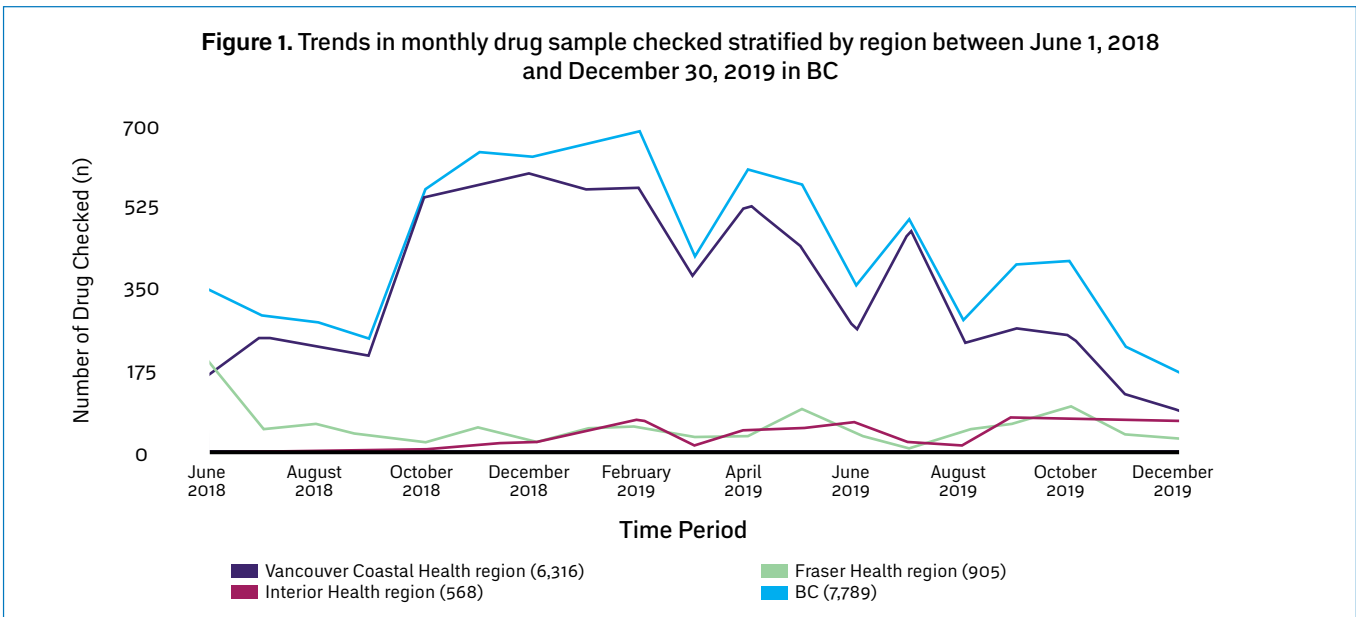
Between June 1, 2018 and December 31, 2019, a total of 7,789 drug samples were checked with the FTIR, fentanyl test strips, and benzodiazepine test strips at various SCS, OPS, and health authority sanctioned sites across BC. The data in this report do not include drug samples tested at music festivals and do not include sites that test with fentanyl test strips alone.

Overall, the majority of drugs were checked within the Vancouver Coastal Health (VCH) region. Among the nine sites that operated out of VCH region, there were a total of 6,316 (81%) drugs checked during this period. In contrast, a total of 905 (12%) drugs checked at two sites that operated within Fraser Health (FH) region, and a total of 568 (7%) drugs checked at five sites that operated within Interior Health (IH) region.

It is noteworthy that the frequency of drugs checked over time varied depending on service and

staff availability, as well as the site's geographic location. For a list of sites operating drug checking

services during this study period, please refer to www.drugcheckingbc.ca.

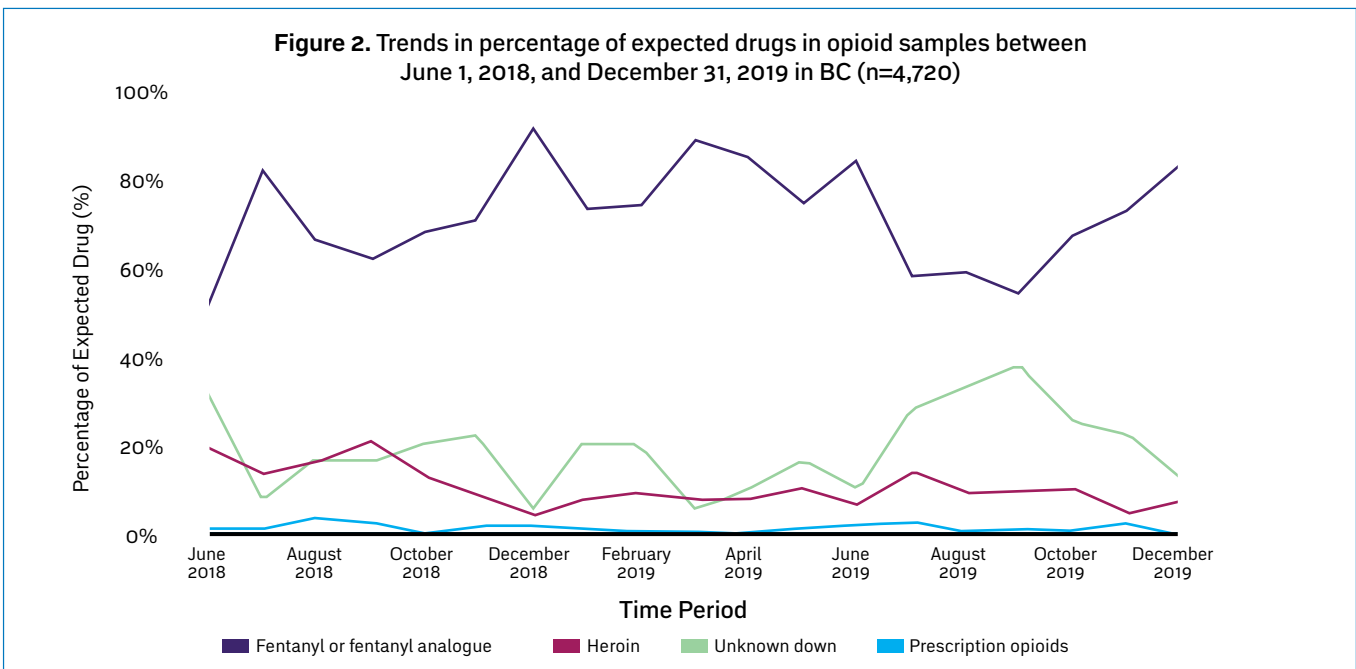


Opioids

Types of opioids checked

Of 7,789 drug samples checked between June 1, 2018 and December 31, 2019, 4,729 (61%) samples were expected to be opioids. Of 4,729 expected opioid samples checked, 3,338 (71%) were expected fentanyl or fentanyl analogue samples; 461 (10%) were expected heroin samples; 871 (18%) were

expected unknown 'down' samples; and 50 (1%) were expected prescription opioid samples (e.g., oxycodone, codeine, hydromorphone, morphine, or tramadol). Additionally, there was a small number (9, <1%) of opium and U-47700 samples that did not fit into any of the expected drug categories. These samples were excluded from further analysis.

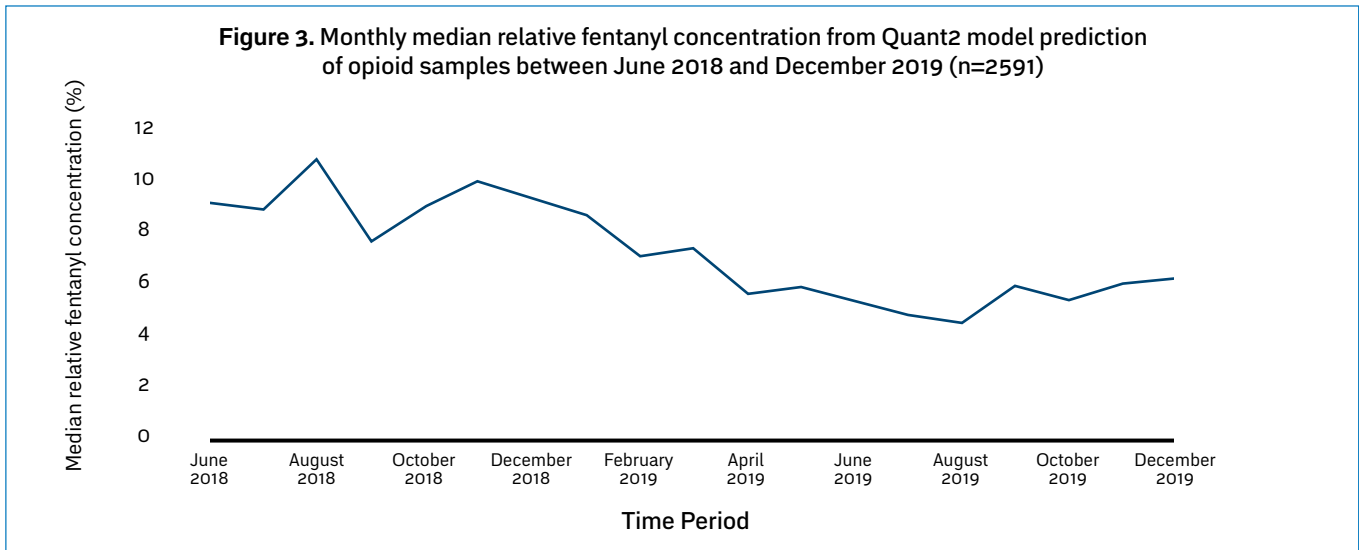


FENTANYL CONCENTRATIONS

A fentanyl quantification model was developed using point-of-care FTIR results and corresponding confirmatory testing qNMR results to predict fentanyl concentrations, as a relative percentage, among samples that test positive by fentanyl test strips.

Of the 2,591 fentanyl-positive samples (identified using fentanyl testing strips) used for prediction

of fentanyl concentration between June 2018 and December 2019, the median absolute fentanyl concentration was 7%. A declining trend in median fentanyl concentration is observed from a peak of 10.4% in August 2018 to a low of 4.5% in August 2019. There is a slight rising trend observed between August and December 2019; however, further monitoring is warranted to determine whether this trend persists.

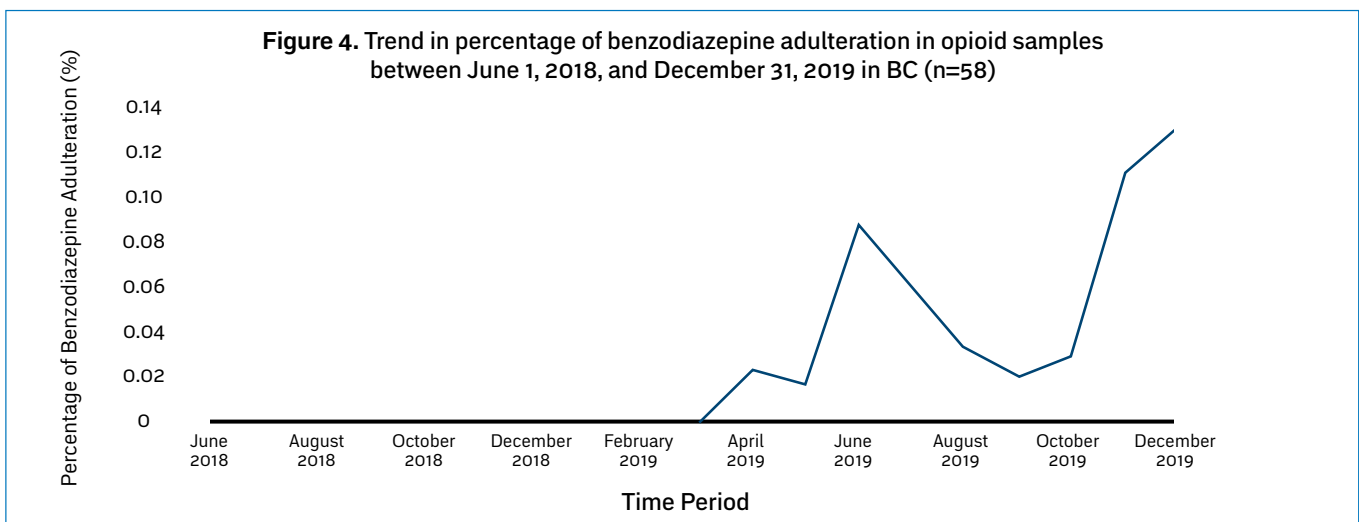


BENZODIAZEPINE ADULTERATION IN OPIOID SAMPLES

Of 4,720 expected opioid samples checked between June 1, 2018, and December 31, 2019, 58 (1%) drug samples tested positive for benzodiazepine using benzodiazepine test strips. A rising trend in benzodiazepine adulteration in expected opioid drug samples is observed, particularly between

September and December 2019; however, furthering monitoring of the trend is warranted.

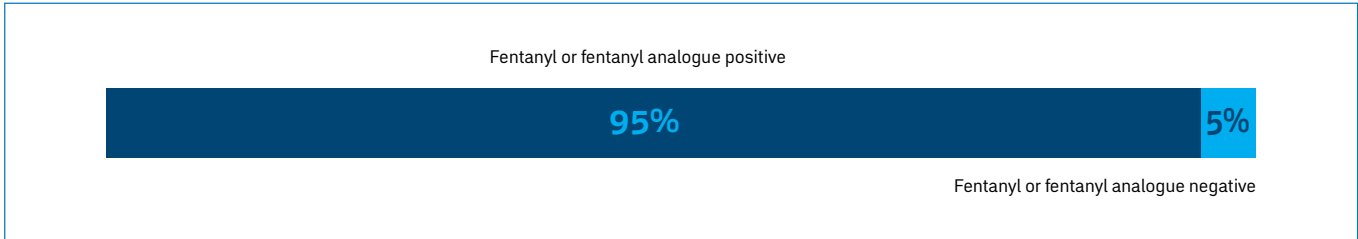
Of note, benzodiazepine test strips were only implemented on opioid samples in March 2019.



EXPECTED FENTANYL OR FENTANYL ANALOGUE SAMPLES

Of 4,729 opioid samples checked between June 1, 2018 and December 31, 2019, 3,338 (71%) were expected fentanyl or fentanyl analogue samples. Of these fentanyl samples, the majority tested positive

for fentanyl (3,184, 95%). In these drug samples, other than fentanyl, carfentanil was the only fentanyl analogue expected.

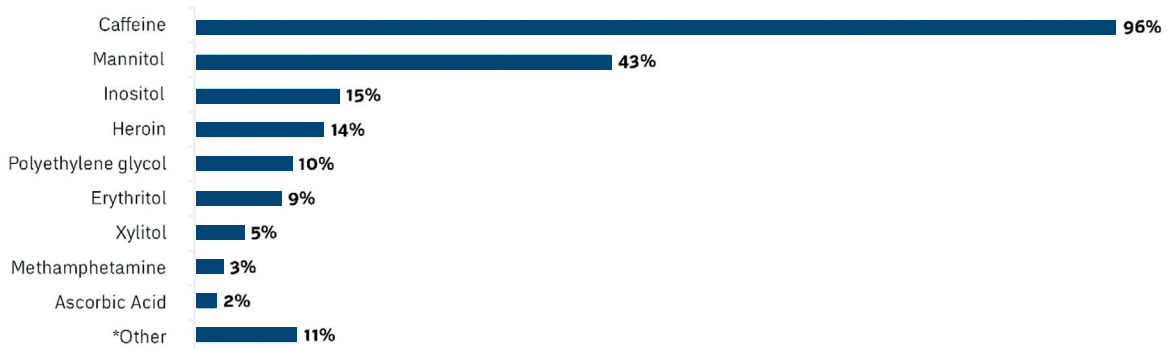


Other substances found in expected fentanyl or fentanyl analogue samples

Figure 5 shows the substances found in expected fentanyl or fentanyl analogue samples using FTIR between June 1, 2018 and December 31, 2019. Of 3,338 expected fentanyl or fentanyl analogue samples, the three most commonly found substances

other than fentanyl were caffeine (96%), mannitol (43%), and inositol (15%), which are substances unlikely to cause increased harm. Of note, carfentanil was found in three samples expected to be fentanyl or fentanyl analogues.

Figure 5. Percentage of other substances found in expected fentanyl or fentanyl analogue samples between June 1, 2018 and December 19, 2019 in BC



***Other included:** 6-Monoacetylmorphine (1); Acetaminophen (10); Acetylsalicylic Acid (1); Boric Acid (1); Calcium Carbonate (3); Calcium Hydroxide (1); Carfentanil (3); Cement (1); Citric Acid (1); Cocaine Base (11); Cocaine (15); Dimethyl Sulfone (11); Etizolam (4); Glucose (15); Glutamine (2); Hydrocodone (1); Lactose (18); Methadone (1); Morphine (2); Noscapine (1); Phenacetin (18); Plaster (3); Polyethylene (2); Procaine (4); Propionanilide (17); Sulfamethoxazole (1); Talc (1); Thiamine (2); Tramadol (1); Uncertain Carbohydrate (105); Wax (2); Xylazine (1); Sucrose (14); AMB-FUBINACA (19); Sorbitol (30)

Confirmatory testing results of expected fentanyl or fentanyl analogue samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 393 (46%) were expected to be fentanyl or fentanyl analogues.

Of 145 expected fentanyl or fentanyl analogue samples that had qNMR fentanyl results, the median fentanyl concentration was 8%, with the majority of samples between 4% and 13%.

Other substances found in expected fentanyl or fentanyl analogue samples via confirmatory testing:

Active ingredients:

- 29 (7%) contained heroin
- 25 (6%) contained one or more benzodiazepine or related drugs:
 - 18 (5%) contained etizolam
 - 4 (1%) contained flualprazolam
 - 3 (0.7%) contained flubromazolam

- 22 (6%) contained 4-ANPP
- 20 (5%) contained N-Phenylpropanamide
- 7 (2%) contained 1-phenethyl-4-propionyloxypiperidine
- 7 (2%) contained furanyl fentanyl
- 4 (1%) contained xylazine
- 2 (0.5%) contained levamisole
- 1 (0.3%) contained acetyl fentanyl
- 1 (0.3%) contained morphine
- 1 (0.3%) contained nicotine
- 1 (0.3%) contained 4-chloro-alpha-PVB
- 1 (0.3%) contained 5-fluoro-ADB
- 1 (0.3%) contained 5-fluoro-MDMB-PICA

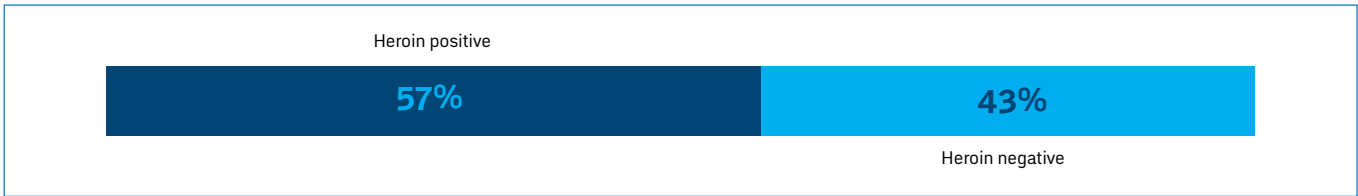
Inert ingredients:

- 1 (0.3%) contained dextrose
- 1 (0.3%) contained lactose

EXPECTED HEROIN SAMPLES

Of 4,729 opioid samples checked between June 1, 2018 and December 31, 2019, 461 (10%) were expected to be heroin samples. Of expected heroin

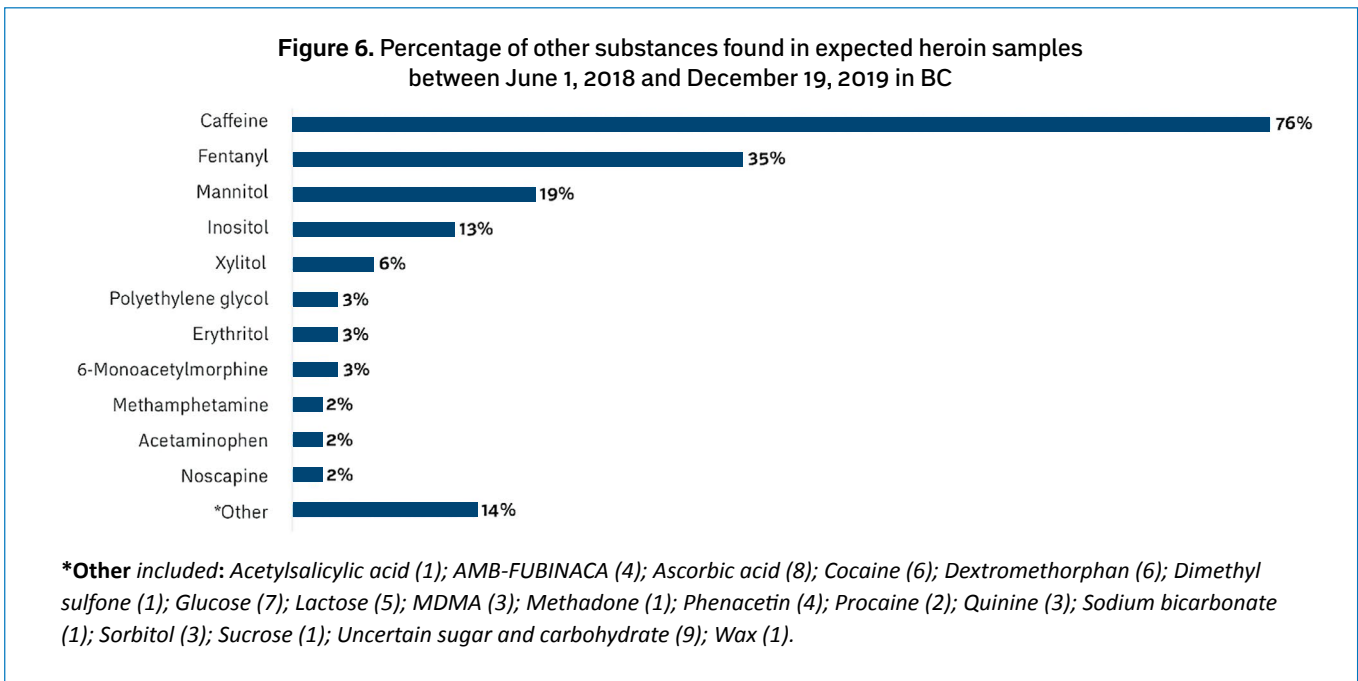
samples checked, 262 (57%) were positive for heroin, and 280 (61%) were positive for fentanyl or fentanyl analogues.



Other substances found in expected heroin samples

Figure 6 shows substances found in expected heroin samples using the FTIR between June 1, 2018 and December 31, 2019. Of 461 expected heroin samples,

the three most commonly found substances other than heroin were caffeine (76%), fentanyl (35%), and mannitol (19%).



Confirmatory testing results of expected heroin samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 79 (9%) were expected heroin samples.

Of 30 expected heroin samples that had qNMR heroin results, the median heroin concentration was 12%, with the majority of samples between 8% and 42%.

Other substances found in expected heroin samples via confirmatory testing:

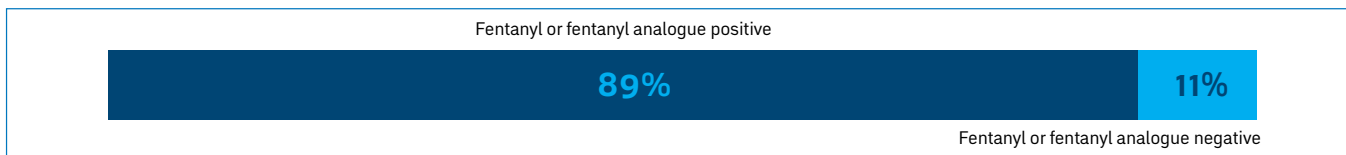
Active ingredients:

- 5 (6%) contained carfentanil
- 1 (1%) contained benzocaine
- 1 (1%) contained etizolam
- 1 (1%) contained papaverine

EXPECTED UNKNOWN DOWN SAMPLES

Of 4,279 opioid samples checked between June 1, 2018 and December 31, 2019, 871 (18%) were expected unknown down samples. Unknown down

refers to any opioid drug present in any amount in a community setting. In total, 774 (89%) samples were positive for fentanyl or fentanyl analogues.

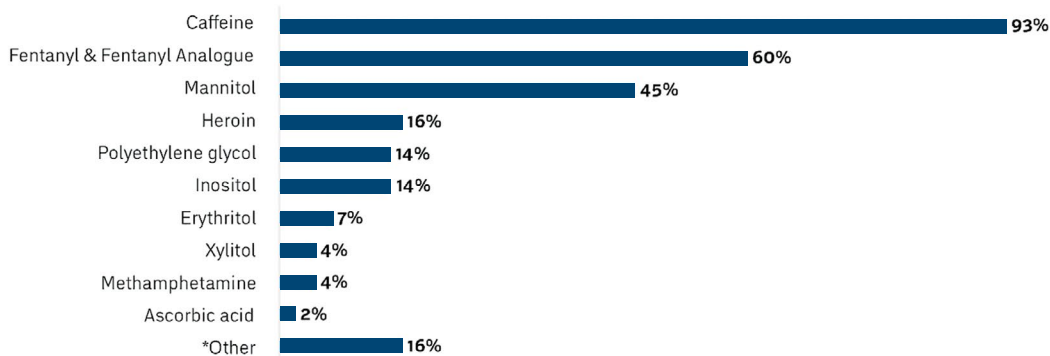


Other substances found in expected unknown down samples

Figure 7 shows substances found in expected unknown down samples beyond expected drugs using the FTIR between June 1, 2018 and December 31, 2019. Of 871 expected unknown down samples, the three most commonly found substances in

unknown down drug samples are caffeine (93%), fentanyl or fentanyl analogues (60%), and mannitol (45%). Of note, carfentanil was found in one sample of expected unknown down.

Figure 7. Percentage of other substances found in expected unknown down samples between June 1, 2018 and December 19, 2019 in BC



**Other included: 5F-ADB (2); 6-Monoacetylmorphine (2); Acetaminophen (4); AMB-FUBINACA (1); Amphetamine (1); Calcium carbonate (2); Carfentanil (1); Cocaine (8); Dextromethorphan (2); Dextrose (1); Dimethyl sulfone (3); Etizolam (3); Glucose (2); Lactose (10); Lidocaine (4); Malic acid (1); MDMA (2); Morphine (1); Noscapine (1); Phenacetin (5); Polyethylene (2); Propionanillide (4); Sodium bicarbonate (1); Sorbitol (8); Sucrose (10); Uncertain Carbohydrate (51); Wax (1).*

Confirmatory testing results of expected unknown down samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 69 (8%) were expected unknown down samples.

Other substances found in expected unknown down samples via confirmatory testing:

Active ingredients:

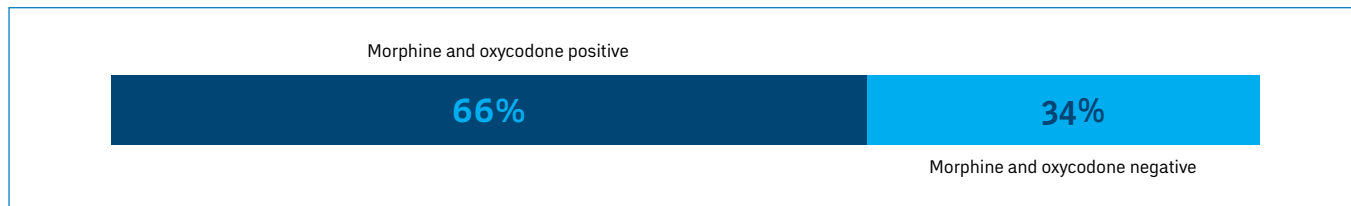
- 3 (4%) contained one or more benzodiazepine or related drug:

- 2 (3%) contained etizolam
- 1 (1%) contained flualprazolam
- 2 (3%) contained N-phenyl propanamide
- 1 (1%) contained 1-phenethyl-4-propionyloxypiperidine
- 1 (1%) contained 4-ANPP
- 1 (1%) contained cyclopropyl fentanyl
- 1 (1%) contained furanyl fentanyl
- 1 (1%) contained U-47700

EXPECTED PRESCRIPTION OPIOID SAMPLES

Of 4,729 opioid samples checked between June 1, 2018 and December 31, 2019, 50 (1%) were expected prescription opioid samples. Of these, morphine and oxycodone made up 66% of the samples. Seven (14%)

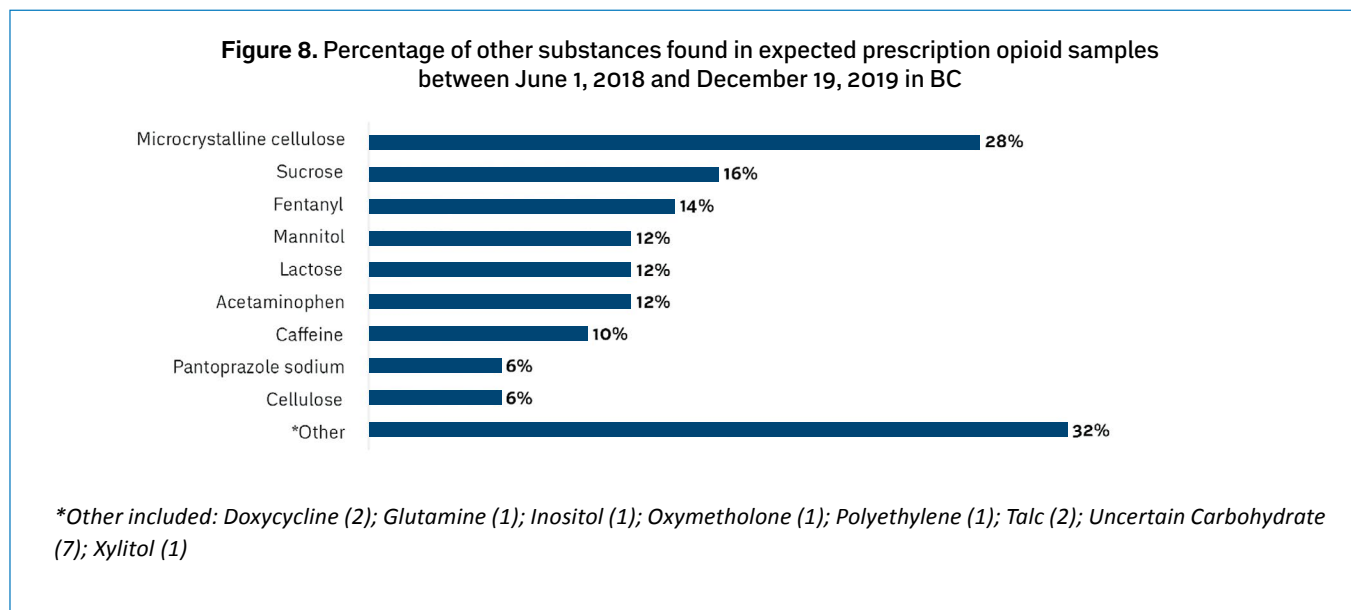
samples of the expected prescription opioid samples tested positive for fentanyl or fentanyl analogues. Of note, fentanyl positive prescription opioid samples were considered counterfeit prescriptions.



Other substances found in expected prescription opioid samples

Figure 8 shows substances found in expected prescription opioid samples beyond expected drugs using the FTIR between June 1, 2018 and December 19, 2019. Of these, the three most commonly found

substances other than prescription opioids were microcrystalline cellulose (28%), and sucrose (16%), and fentanyl (14%).



Confirmatory testing results of expected prescription opioid samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 5 (1%) were expected to be prescription opioids.

The fentanyl concentration of one (0.5%) prescription opioid from qNMR result was 10%.

No other substances found in expected prescription opioid samples via confirmatory testing.

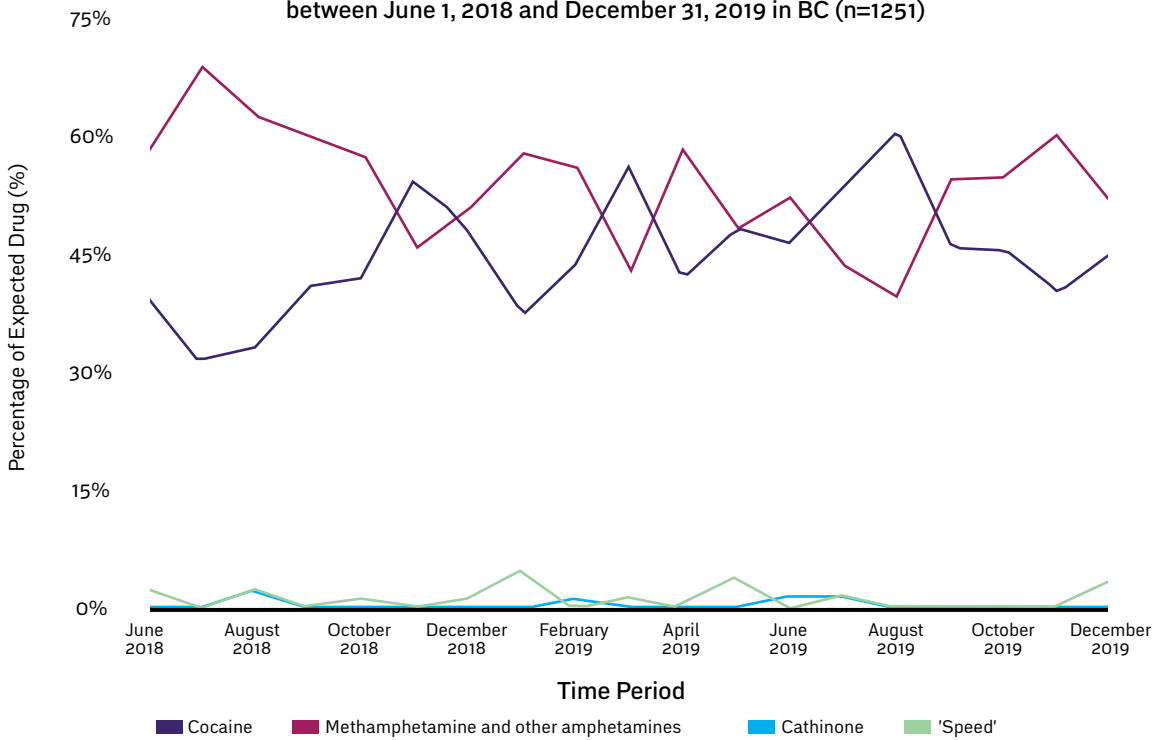
Stimulants

Types of stimulants checked

Of 7,789 drug samples checked between June 1, 2018, and December 31, 2019, 1,251 (16%) samples were expected to be stimulants. Of 1,251 stimulant samples checked, 569 (45%) were expected cocaine (cocaine and crack) samples;

664 (53%) were expected methamphetamine and other amphetamines (4-FA, amphetamine, and methamphetamine) samples; 12 (1%) were expected cathinones (3-MMC and 4-MMC) samples; and 6 (1%) were expected 'speed' samples. 'Speed' refers to unknown stimulant present in any amount.

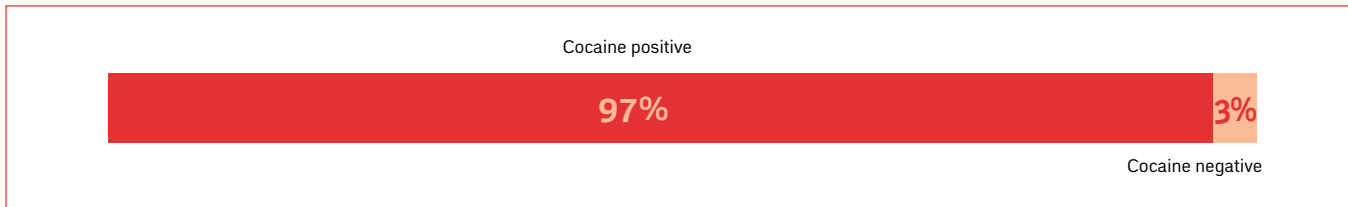
Figure 9. Trends in percentage of expected drugs in stimulant samples between June 1, 2018 and December 31, 2019 in BC (n=1251)



EXPECTED COCAINE SAMPLES

Of 1,251 stimulant samples checked between June 1, 2018 and December 31, 2019, 569 (45%) were expected cocaine samples. Of these samples, almost

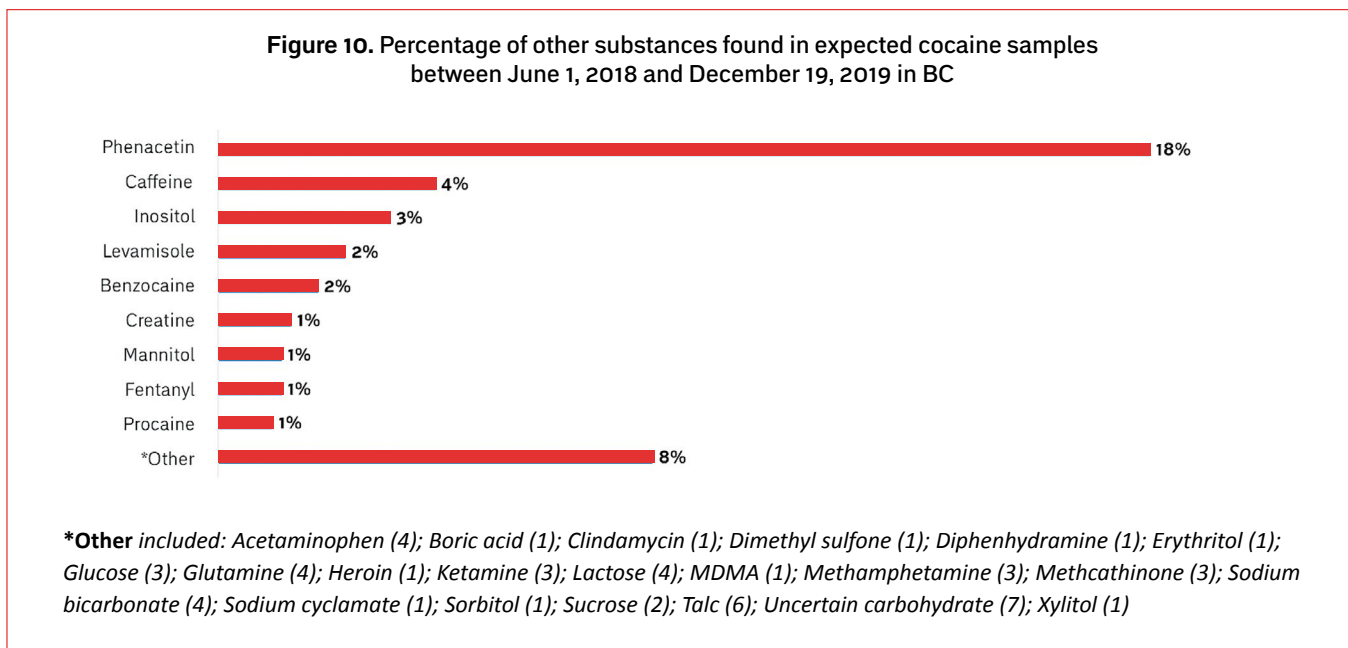
all (551, 97%) were cocaine as opposed to crack cocaine. Seven (1%) samples of expected cocaine samples tested positive for fentanyl.



Other substances found in expected cocaine samples

Figure 10 shows substances found in expected cocaine samples using the FTIR between June 1, 2018 and December 31, 2019. Of 569 expected

cocaine samples, the three most commonly found substances other than cocaine were phenacetin (18%), caffeine (4%), and inositol (3%).



Confirmatory testing results of expected cocaine samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC/MS between June 1, 2018 and December 31, 2019, 49 (6%) were expected to be cocaine.

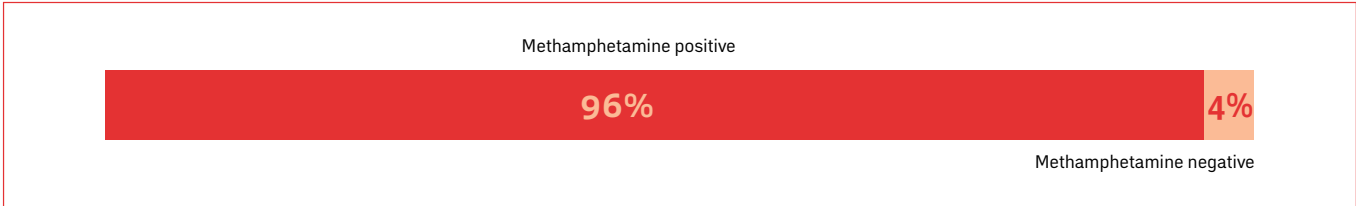
Of 31 expected cocaine samples that had qNMR results, the median cocaine concentration (purity)

was 85%, with the majority of samples between 78% and 88%. Three other substances were found in expected cocaine samples via confirmatory testing: acetyl fentanyl (1), benzoic acid (1), and methyl ecgonidine (1).

EXPECTED METHAMPHETAMINE AND OTHER AMPHETAMINES SAMPLES

Of 1,251 stimulant samples checked between June 1, 2018 and December 31, 2019, 664 (53%) were expected methamphetamine and other amphetamines samples. Of these samples, 637 (96%)

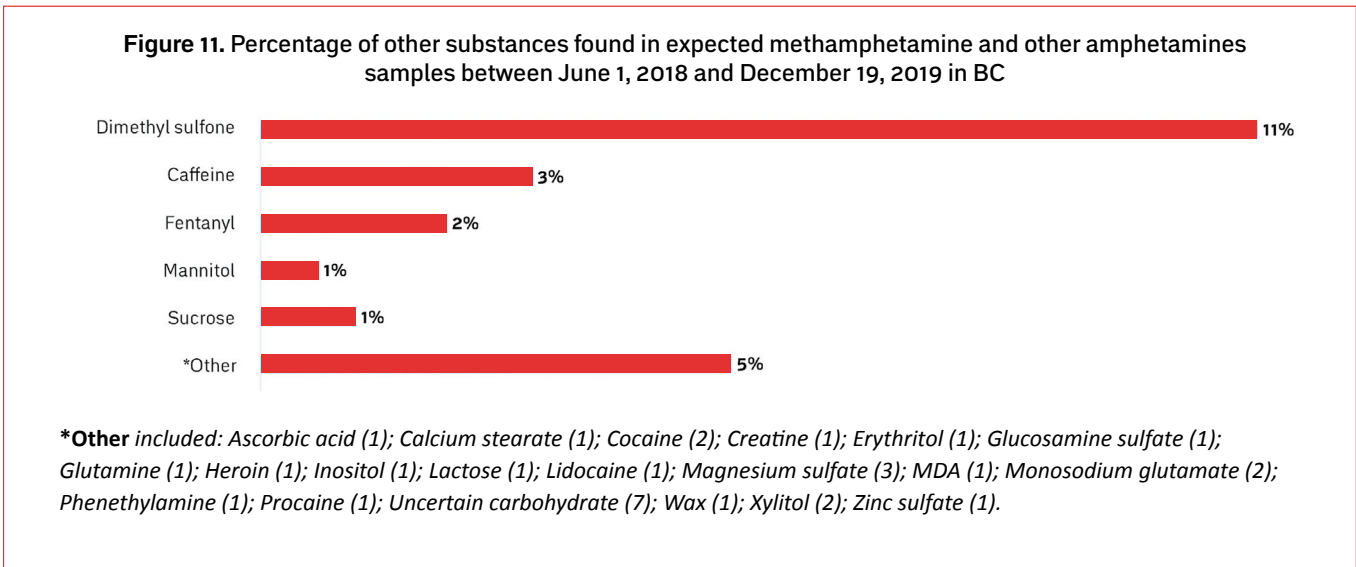
samples tested positive for methamphetamine. Twelve (2%) samples of expected methamphetamine samples tested positive for fentanyl.



Other substances found in expected methamphetamine and other amphetamines samples

Figure 11 shows substances found in expected methamphetamine and other amphetamines samples using the FTIR between June 1, 2018 and December 31, 2019. Of 664 expected methamphetamine

and other amphetamines samples, the three most commonly found substances other than the expected drugs were dimethyl sulfone (10%), caffeine (3%), and fentanyl (2%).



Confirmatory testing results of expected methamphetamine and other amphetamines samples

Of 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 23 (3%) were expected to be methamphetamine and other amphetamines.

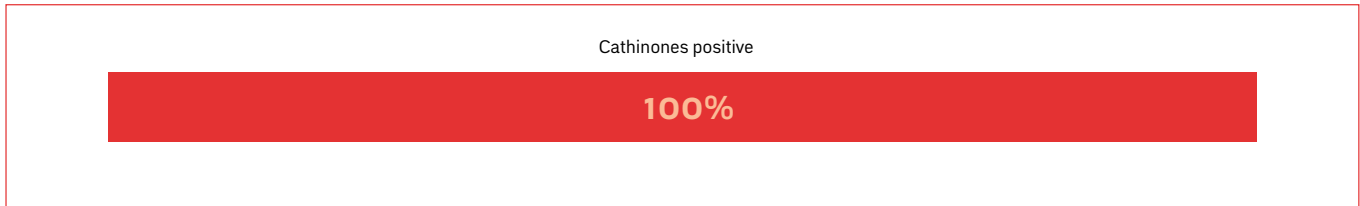
the median methamphetamine concentration was 96%, with the majority of samples between 85% and 100%. One other substance found in expected methamphetamine and other amphetamines samples via confirmatory testing was: procaine (1).

Of 13 expected methamphetamine and other amphetamines samples that had qNMR results,

EXPECTED CATHINONES SAMPLES

Of 1,252 stimulant samples checked between June 1, 2018 and December 31, 2019, 12 (1%) were expected cathinones samples. All samples were contained the

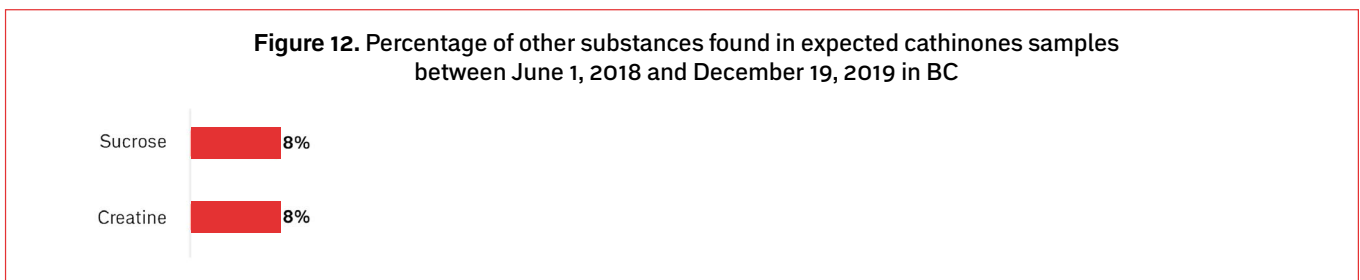
expected cathinones. No positive fentanyl samples were found in this expected drug category.



Other substances found in expected cathinones samples

Figure 12 shows substances found in expected cathinones samples using the FTIR between June 1, 2018 and December 31, 2019. Of 12 expected

cathinones samples, sucrose (8%) and creatine (8%) were the two substances found other than the expected cathinones.



Confirmatory testing results of expected cathinones samples

Of 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 3 (0.4%) were expected to be cathinones.

results, the cathinone (4-MMC) concentration (purity) was 96%.

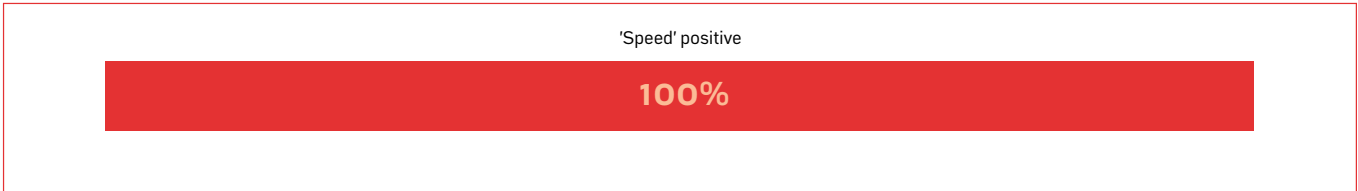
No other substances found in expected cathinones samples via confirmatory testing.

Of one expected cathinones sample that had qNMR

EXPECTED 'SPEED' SAMPLES

Of 1,251 stimulant samples checked between June 1, 2018 and December 31, 2019, 6 (1%) were expected 'speed' samples. Of note, 'speed' means

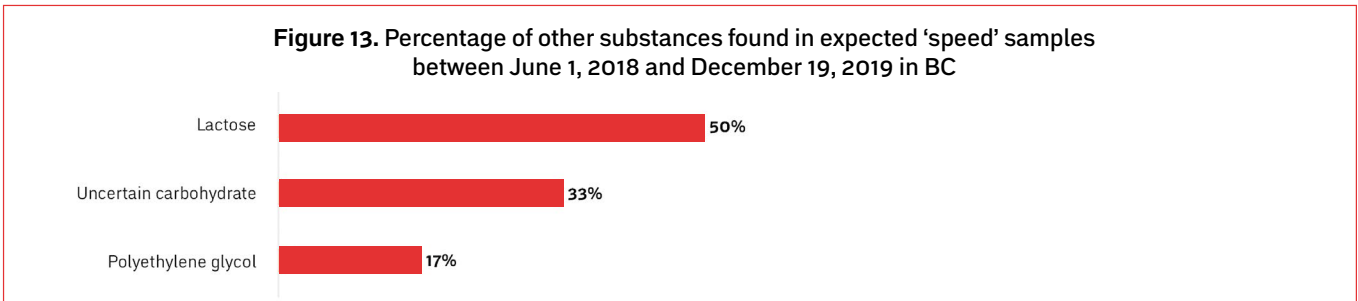
unknown stimulant present in any amount. No fentanyl positive samples were found in this expected drug category.



Other substances found in expected 'speed' samples

Figure 13 shows substances found in expected 'speed' samples using the FTIR between June 1, 2018 and December 31, 2019. Beside methylphenidate and

methamphetamine found in expected 'speed' samples, the most commonly found substance was lactose (50%) as it the excipient in methylphenidate tablets.



Confirmatory testing results of expected 'speed' samples

Of 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, no samples were expected to be 'speed'.

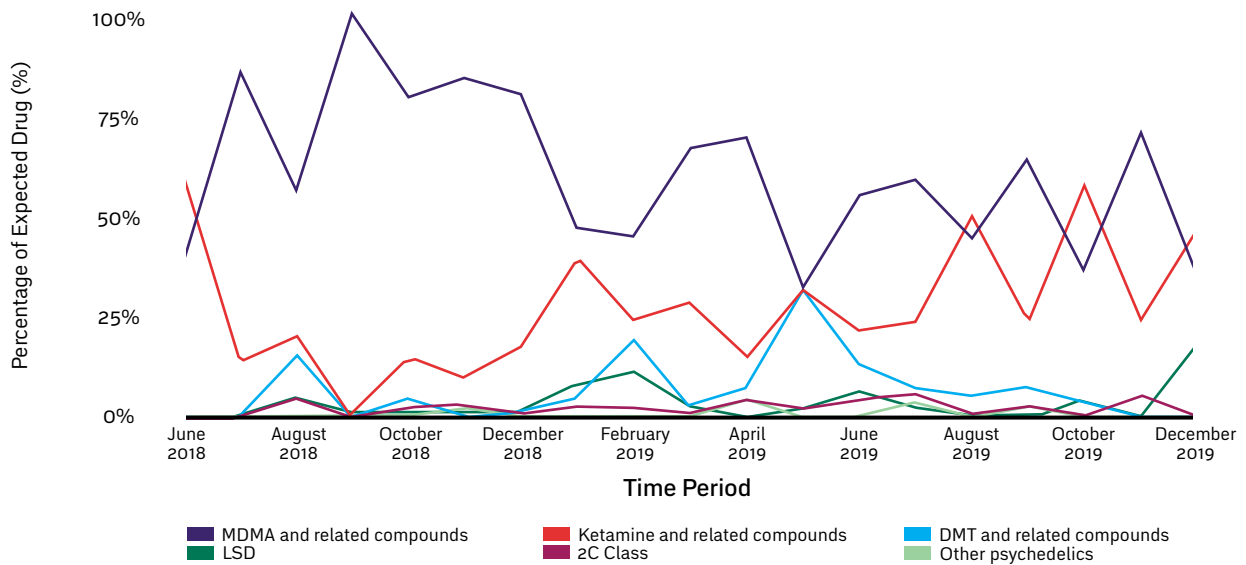
No other substances found in expected 'speed' samples via confirmatory testing.

Types of psychedelic checked

Of 7,789 drug samples checked between June 1, 2018 and December 31, 2019, 1,002 (13%) samples were expected to be psychedelics. Of 1,002 psychedelic samples checked, 637 (64%) were expected MDMA and related compounds; 242 (24%) were expected ketamine and related compounds; 69 (7%) were expected DMT and related compounds; 29 (3%) were expected LSD; 22 (2%) were expected 2C-class drugs; and 9 (1%) were expected other psychedelics. For this purpose of this report, psychedelics include drugs which fall under more specific categories including dissociatives, empathogens, tryptamines and hallucinogens.

expected DMT and related compounds; 29 (3%) were expected LSD; 22 (2%) were expected 2C-class drugs; and 9 (1%) were expected other psychedelics. For this purpose of this report, psychedelics include drugs which fall under more specific categories including dissociatives, empathogens, tryptamines and hallucinogens.

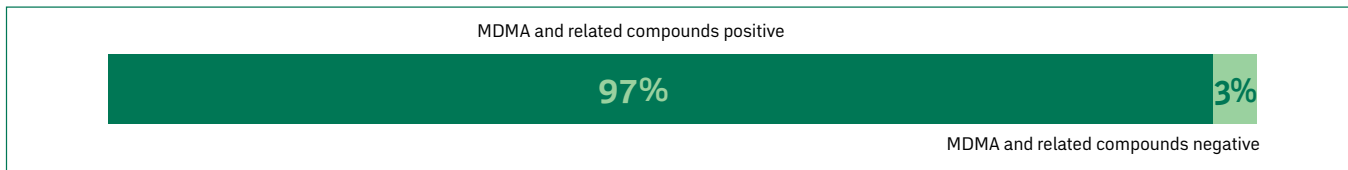
Figure 14. Trend in percentage of expected drugs in psychedelic samples between June 1, 2018 and December 31, 2019 in BC (n=1002)



EXPECTED MDMA AND RELATED COMPOUNDS SAMPLES

Of 1,002 psychedelic samples checked between June 1, 2018 and December 31, 2019, 637 (62%) were expected MDMA and related compounds. MDMA-related compounds in this sample were MDMA,

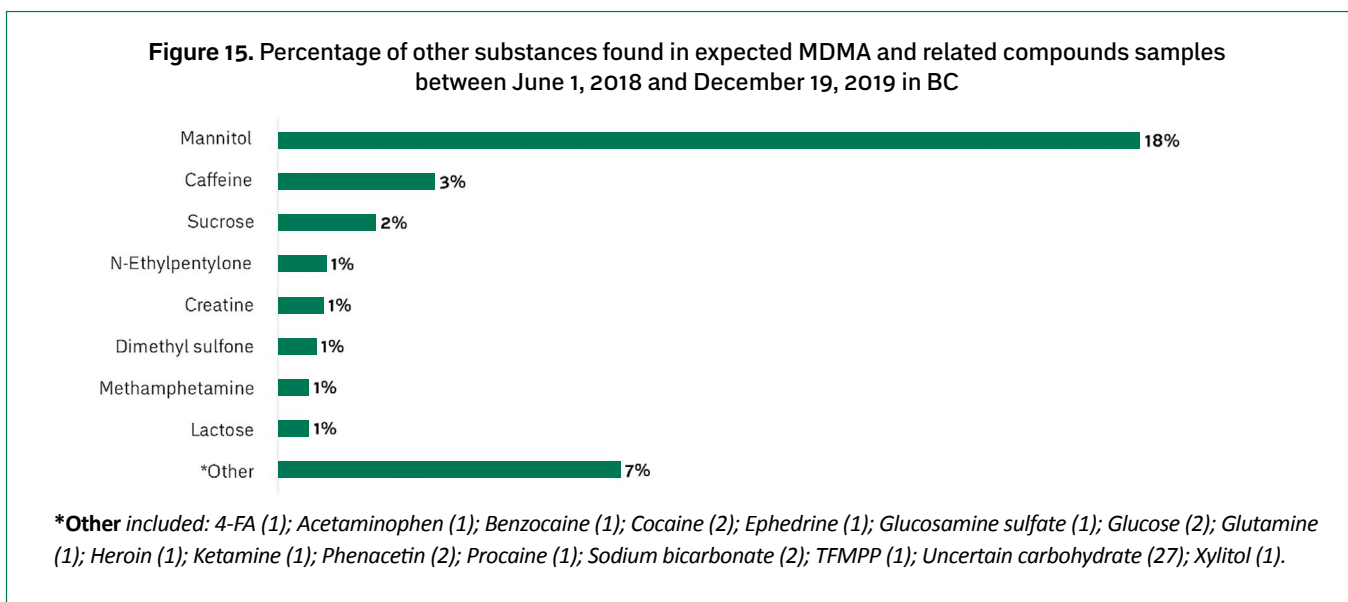
MDA, and MMDA. Of these samples, the majority were MDMA samples (593, 93%). No fentanyl positive samples were found in this expected drug category.



Other substances found in expected MDMA and related compounds samples

Figure 15 shows substances found in expected MDMA and related compounds samples using the FTIR between June 1, 2018 and December 31, 2019. Of 637 expected MDMA and related compounds,

the three most commonly found substances other than MDMA and related compounds were mannitol (18%), caffeine (3%), and sucrose (2%).



Confirmatory testing results of expected MDMA and related compounds samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 60 (7%) were expected to be MDMA and related compounds.

Of 41 expected MDMA and related compounds that had qNMR results, the median MDMA concentration (purity) was 83%, with the majority of samples between 77% and 87%.

Other substances found in expected MDMA and related compounds samples via confirmatory testing:

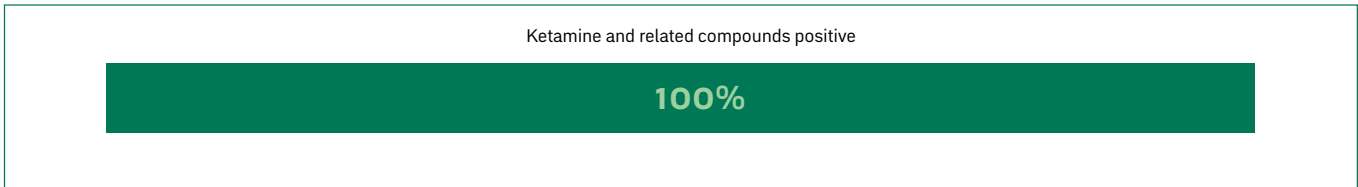
Active ingredients:

- 2 (3%) contained MDP2P
- 1 (2%) contained 4-fluoroamphetamine
- 1 (2%) contained cyproheptadine
- 1 (2%) contained dextromorphan
- 1 (2%) contained lidocaine
- 1 (2%) contained morphine
- 1 (2%) contained NBOMe
- 1 (2%) contained promethazine

EXPECTED KETAMINE AND RELATED COMPOUNDS SAMPLES

Of 1,002 psychedelic samples checked between June 1, 2018 and December 31, 2019, 242 (23%) were expected ketamine and related compounds. Ketamine-related compounds in this sample were

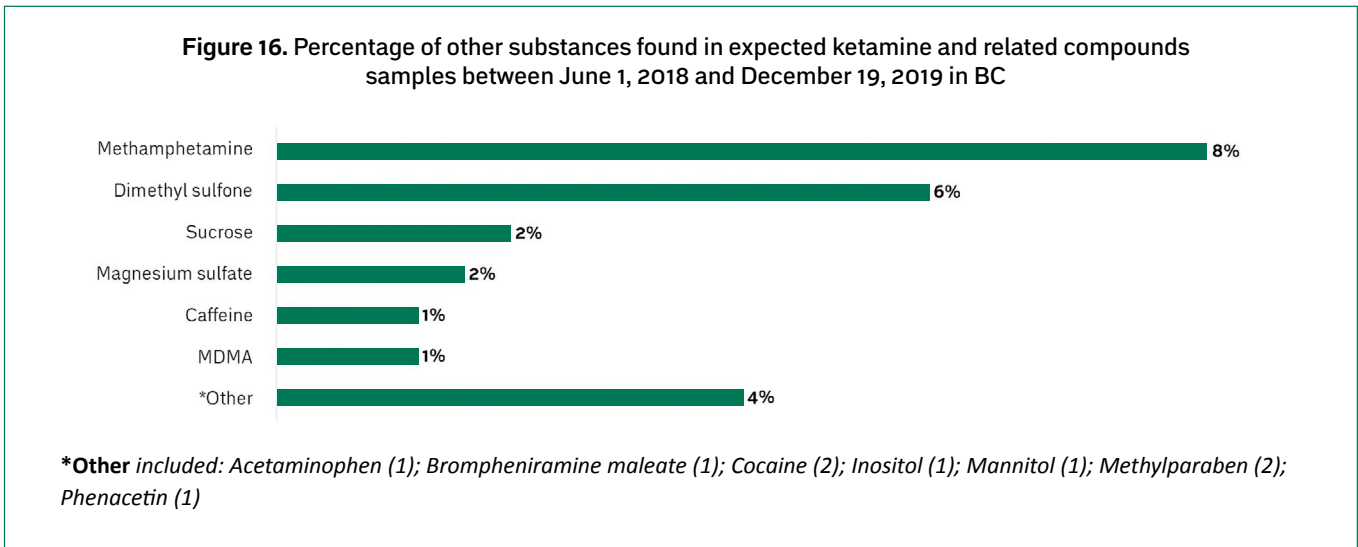
3-MeO-PCP, diphenidine, DXM, MXE, and O-PCE. Of these samples, the majority were ketamine (233, 96%). No fentanyl positive samples were found in this expected drug category.



Other substances found in expected ketamine and related compounds samples

Figure 16 shows substances found in expected ketamine and related compounds samples using the FTIR between June 1, 2018 and December 31, 2019. Of 242 expected ketamine and related compounds,

the three most commonly found substances other than ketamine and related compounds were methamphetamine (8%), dimethyl sulfone (6%), and sucrose (2%).



Confirmatory testing results of expected ketamine and related compounds samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 17 (2%) were expected to be ketamine and related compounds.

concentration was 90%, with the majority of samples between 79% and 100%.

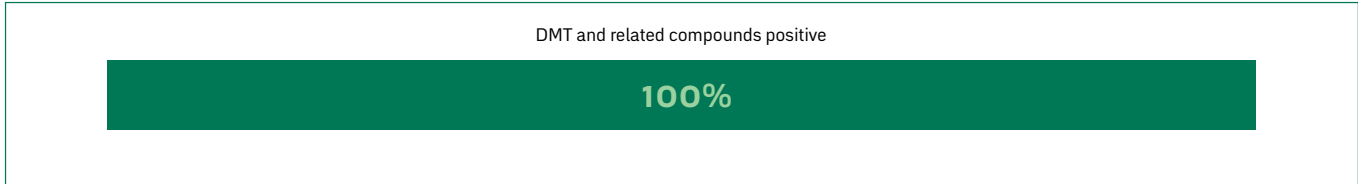
Of 16 expected ketamine and related compounds that had qNMR results, the median ketamine

No other substances found in expected ketamine and related compounds samples via confirmatory testing.

EXPECTED DMT AND RELATED COMPOUNDS SAMPLES

Of 1,002 psychedelic samples checked between June 1, 2018 and December 31, 2019, 69 (7%) were expected DMT and related compounds. DMT-related compounds in this sample were AMT, DiPT, DPT, EPT, MALT, MET, MiPT, MPT, 4-AcO-DET, 4-AcO-DMT, 4-AcO-DPT, 4-AcO-EPT, 4-AcO-MET, 4-AcO-MiPT, 4-HO-DiPT, 4-HO-MALT, 4-HO-McPT, 4-HO-MET,

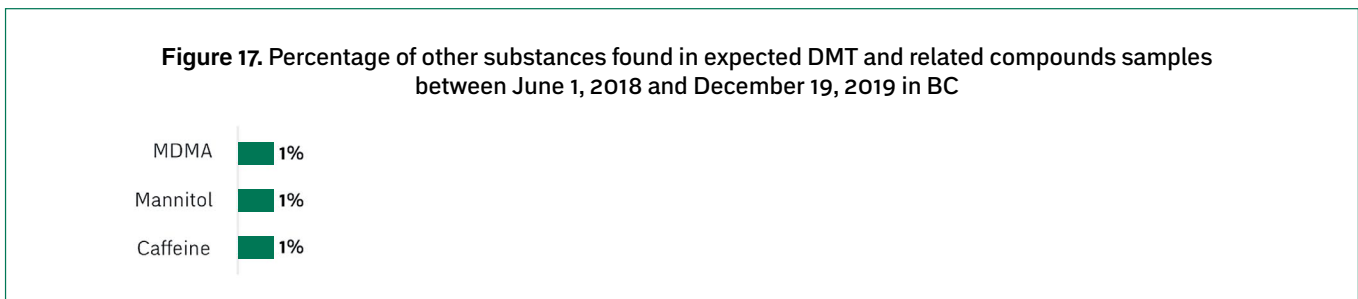
4-HO-MiPT, 4-HO-MPT, 4-MeO-MiPT, 5-MeO-MiPT, 5-MeO-DMT, 5-MeO-DPT, 5-MeO-MALT, 5-MeO-MET, 5-MeO-MiPT. Of these samples, over one-third was DMT (26, 38%). No fentanyl positive samples were found in this expected drug category.



Other substances found in expected DMT and related compounds samples

Figure 17 shows substances found in expected DMT and related compounds samples using the FTIR between June 1, 2018 and December 31, 2019. Of 69 expected DMT and related compounds, the

three substances found other than DMT and related compounds were caffeine (1%), mannitol (1%), and MDMA (1%).



Confirmatory testing results of expected DMT and related compounds samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 32 (4%) were expected to be DMT and related compounds.

Of six expected DMT and related compounds that had qNMR results, the median DPT concentration was 54%.

Using confirmatory testing results, the confirmed DMT-related compounds were: 4-AcO-DMT (1), 4-HO-DiPT (1), 4-HO-MALT (1), 4-HO-McPT (1), 4-HO-MET (1), 4-HO-MiPT (1), 4-HO-MPT (1), 4-MeO-MiPT (1), 5-MeO-DMT (2), 5-MeO-MALT (1), and DPT (3).

Other substances found in expected DMT and related compounds samples via confirmatory testing:

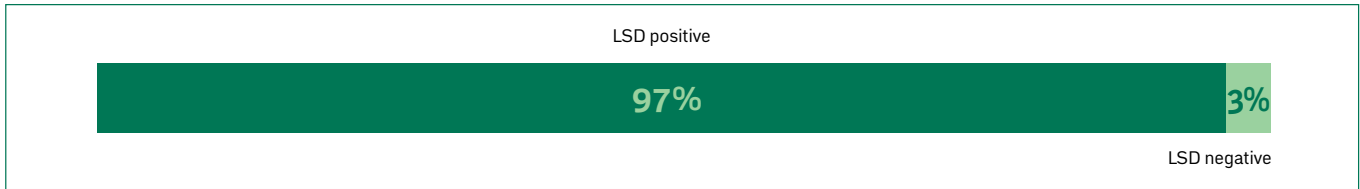
Active ingredients:

- 2 (6%) contained 2-Methyltryptoline
- 1 (3%) contained 4-AcO-DiPT
- 1 (3%) contained 4-HO-DET
- 1 (3%) contained 4-HO-DPT
- 1 (3%) contained 5-MeO-DiPT
- 1 (3%) contained fentanyl

EXPECTED LSD SAMPLES

Of 1,002 psychedelic samples checked between June 1, 2018 and December 31, 2019, 32 (3%) were expected LSD. Of these samples, all were expected to

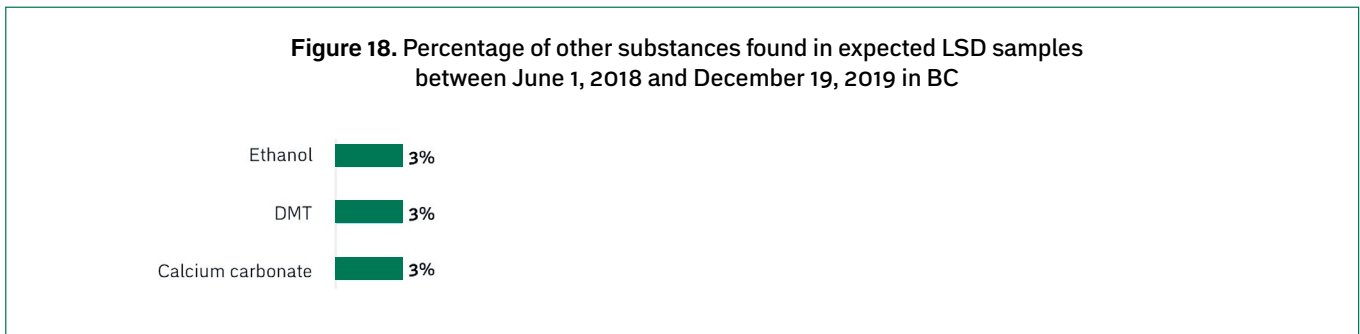
be LSD (32, 72%), and 31 (97%) were tested positive for LSD using LSD test strips. No fentanyl positive samples were found in this expected drug category.



Other substances found in expected LSD samples

Figure 18 shows substances found in expected LSD samples using the FTIR between June 1, 2018 and December 31, 2019. Of 32 expected LSD, the three other substances found beside LSD were calcium carbonate (3%), DMT (3%), and ethanol (3%).

No confirmatory tests were completed for expected LSD samples.



EXPECTED 2C-CLASS DRUG SAMPLES

Of 1,002 psychedelic samples checked between June 1, 2018 and December 31, 2019, 22 (2%) were expected 2C-class drugs. 2C-Class drugs found in this sample were 2C-B, 2C-C, 2C-E, 2C-I,

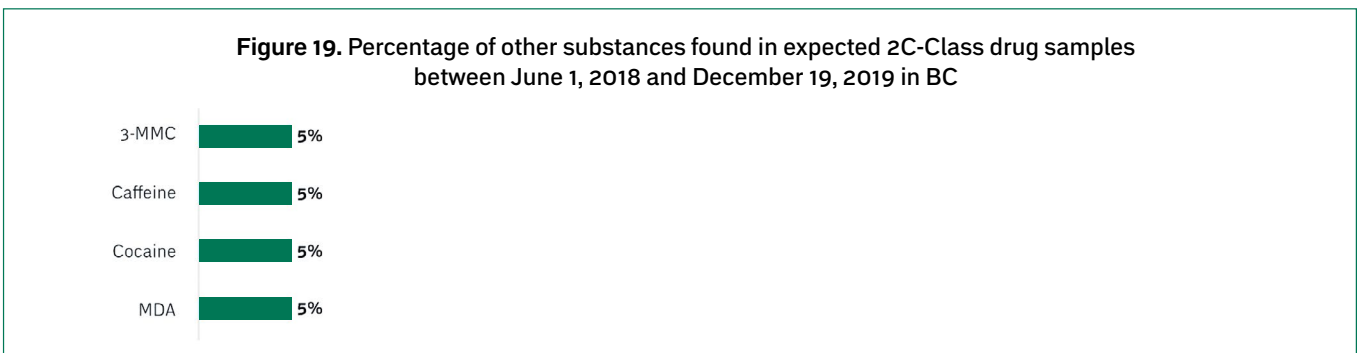
and 2C-T-7. Of these samples, 16 (73%) were 2C-B. No fentanyl positive samples were found in this expected drug category.



Other substances found in expected 2C-Class Drug samples

Figure 19 shows substances found in expected 2C-Class drug samples using the FTIR between June 1, 2018 and December 31, 2019. Of 22 expected

2C-class drugs, the other substances found beside 2C-Class drugs were 3-MMC (5%), caffeine (5%), cocaine (5%), and MDA (5%).



Confirmatory testing results of expected 2C-Class Drug samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 6 (1%) were expected to be 2C-class drugs. No qNMR results were reported for this expected drug category.

Using confirmatory testing results, the confirmed 2C-class drugs were: 2C-B (3), 2C-E (1), and 2C-T-7 (1).

Other substances found in expected 2C-class drug samples via confirmatory testing:

Active ingredients:

- 1 (17%) contained 2C-P
- 1 (17%) contained 2C-T-6

EXPECTED OTHER PSYCHEDELIC SAMPLES

Of 1,002 psychedelic samples checked between June 1, 2018 and December 31, 2019, 9 (1%) were expected other psychedelics. Other psychedelics found in this sample were escaline, mescaline, methylallyescaline, and proscaline. Of these

samples, 4 (44%) tested positive for mescaline, matched expectation, and contained any amount of mescaline. No fentanyl positive samples were found in this expected drug category.



Other substances found in expected other psychedelic samples

Of 9 expected other psychedelic samples tested between June 1, 2018 and December 31, 2019, the

only substance found beside other psychedelic drugs using the FTIR was DMT (11%).

Confirmatory testing results of expected other psychedelic samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 4 (0.5%) were expected to be other psychedelic drugs. No qNMR results were reported for this expected drug category.

Using confirmatory testing results, the confirmed other psychedelic drugs were: escaline (1), methylallyescaline (1), and proscaline (1).

Other substances found in expected other psychedelic samples via confirmatory testing:

Active ingredients:

- 1 (25%) contained cocaine
- 1 (25%) contained ketamine

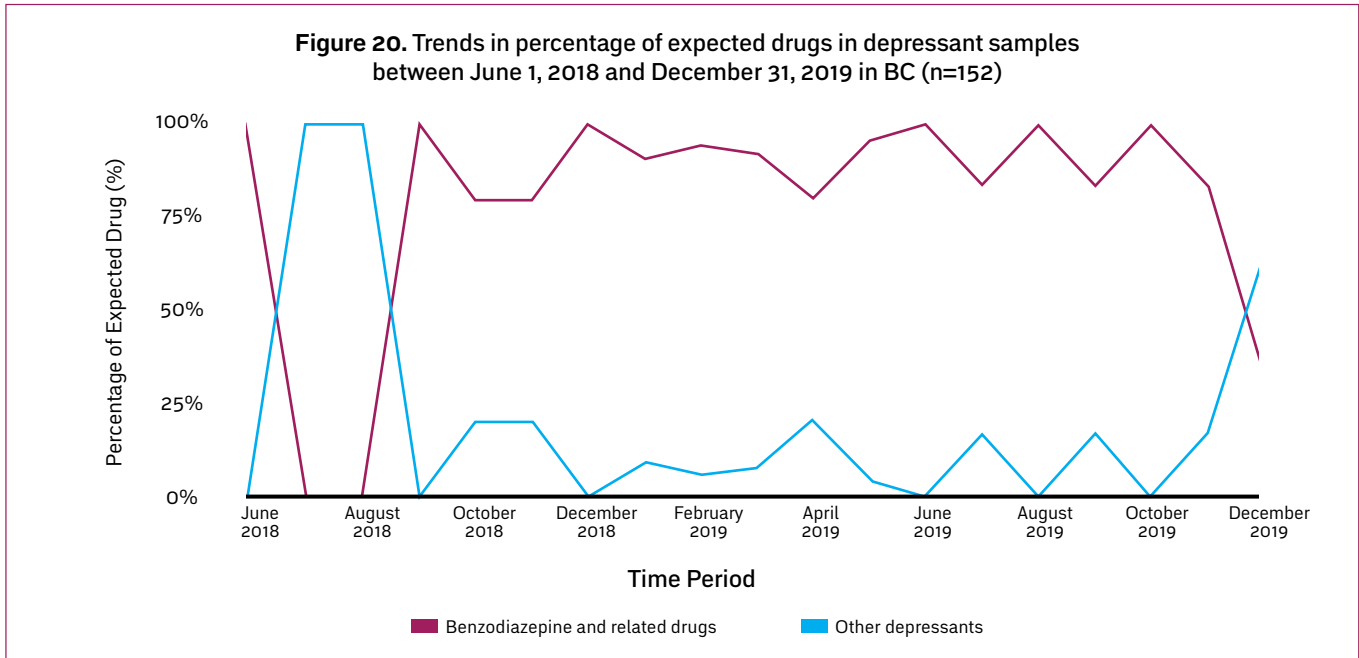
Of note, only trace amounts of ketamine and cocaine were found in an expected mescaline sample.

Depressants

Types of depressant checked

Of 7,789 drug samples checked between June 1, 2018, and December 31, 2019, 152 (2%) samples were expected to be depressants. Of

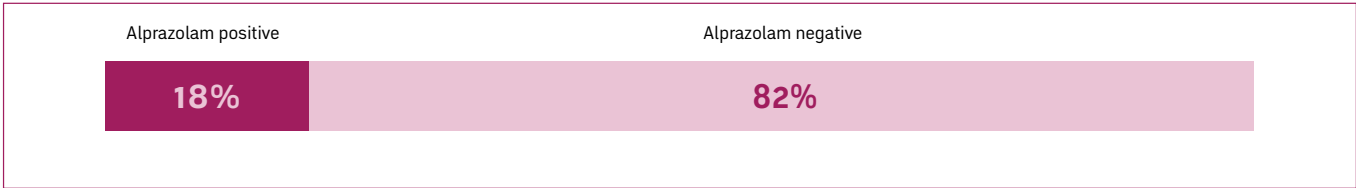
152 expected depressant samples checked, 134 (88%) were expected benzodiazepine and related drugs samples, and 18 (12%) were expected other depressants samples (GBL, GHB, methaqualone, pargoclon, and zopiclone).



EXPECTED BENZODIAZEPINE AND RELATED DRUGS SAMPLES

Of 152 depressant samples checked between June 1, 2018 and December 31, 2019, 134 (88%) were expected benzodiazepine and related drugs.

Of these samples, the majority (122, 91%) was expected to be alprazolam.



Of note, other related drugs found in this sample were clonazepam, diazepam, etizolam, lorazepam, temazepam, and triazolam.

82 (73%) were tested positive for benzodiazepine or related drugs.

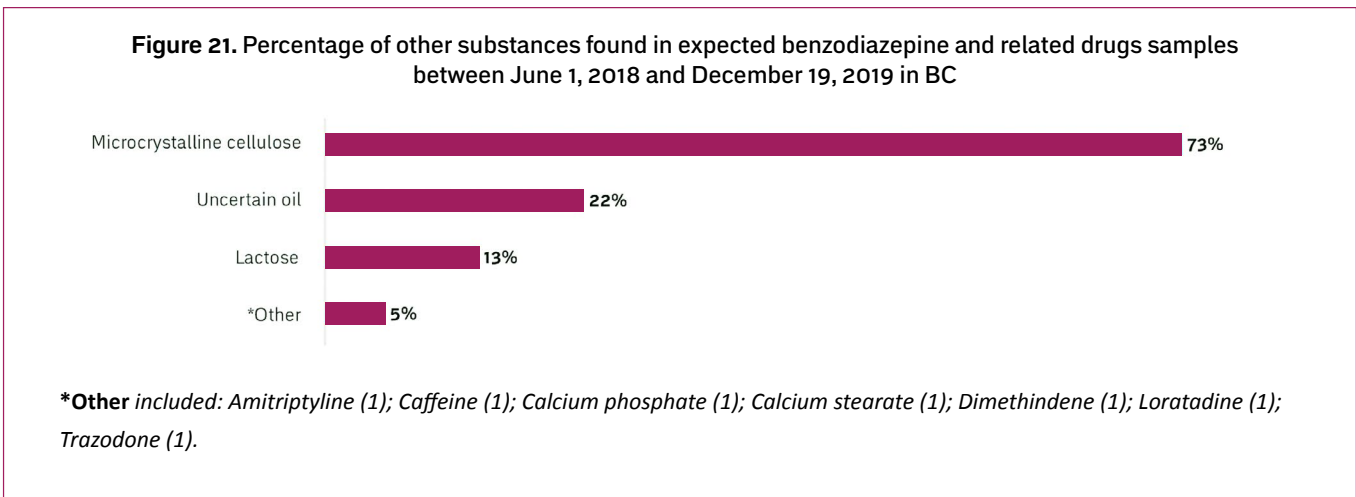
Of 113 benzodiazepine test strips conducted from expected benzodiazepine and related drugs samples,

Seven (5%) expected benzodiazepine and related drugs samples were tested positive for fentanyl using fentanyl test strips.

Other substances found in expected benzodiazepine and related drugs samples

Figure 21 shows substances found in expected benzodiazepine and related drugs samples using the FTIR between June 1, 2018 and December 31, 2019. Of 134 samples, the three most commonly found

substances beside expected benzodiazepine and related drugs were uncertain carbohydrate (73%), uncertain oil (22%), and lactose (13%).



Confirmatory testing results of expected benzodiazepine and related drugs samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 21 (2%) were expected to be benzodiazepine or related drugs. No qNMR results were reported for this expected drug category.

Other substances found in expected benzodiazepine and related drugs samples via confirmatory testing:

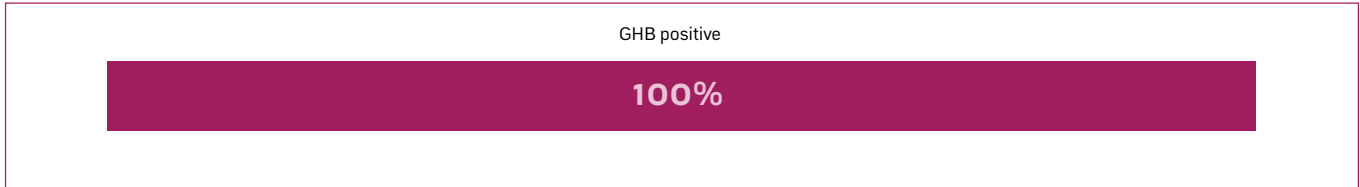
Active ingredients:

- 6 (29%) contained alprazolam
- 5 (24%) contained cyproheptadine
- 4 (19%) contained etizolam
- 3 (14%) contained AB-FUBINACA
- 3 (14%) contained amantadine
- 2 (10%) contained fentanyl
- 2 (10%) contained promethazine
- 1 (5%) contained 5F-ADB
- 1 (5%) contained cyclopropyl fentanyl
- 1 (5%) contained flubromazolam
- 1 (5%) contained ketamine
- 1 (5%) contained methamphetamine
- 1 (5%) contained palmitic acid
- 1 (5%) contained temazepam
- 1 (5%) contained U-47700

EXPECTED OTHER DEPRESSANTS SAMPLES

Of 152 depressant samples checked between June 1, 2018 and December 31, 2019, 18 (12%) were expected to be other depressants. Of note, other depressants beside GHB in this sample were GBL, methaqualone,

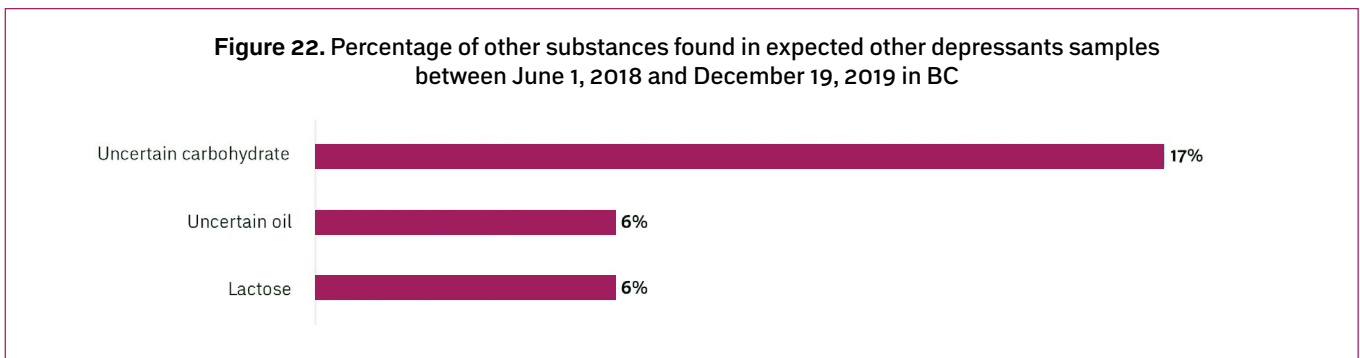
pagoclon, and zopiclon. Of these samples, 9 (50%) were expected GHB. Of GHB samples, all tested positive for GHB. No fentanyl positive samples were found in this expected drug category.



Other substances found in expected other depressants samples

Figure 22 shows substances found in expected other depressants samples using the FTIR between June 1, 2018 and December 31, 2019. Of 18 samples,

the other substances found beside expected other depressants were uncertain carbohydrate (17%), lactose (6%), and uncertain oil (6%).



Confirmatory testing results of expected other depressants samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 2 (0.2%) were expected to be other depressants including GBL and pagoclon. No qNMR results were reported for this

expected drug category.

No other substances found in expected other depressants samples via confirmatory testing.

Cannabinoid

Of 7,789 drug samples checked between June 1, 2018, and December 31, 2019, 29 (3%) were expected cannabinoids. One of which was expected synthetic

cannabinoid. Of note, the main cannabinoids found in this sample were CBD and THC.

EXPECTED CANNABINOID SAMPLES

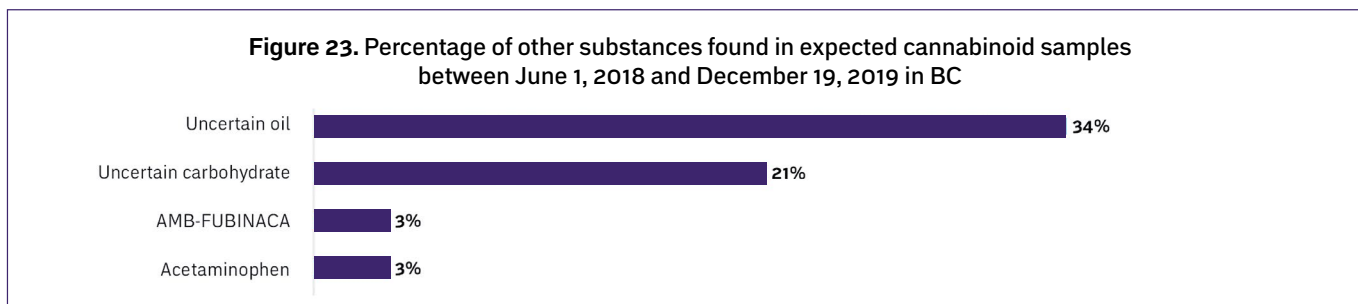
Of 29 cannabinoid samples checked between June 1, 2018 and December 31, 2019, 23 (79%) tested positive for cannabinoid.



Other substances found in expected cannabinoid samples

Figure 23 shows substances found in expected cannabinoid samples using the FTIR between June 1, 2018 and December 31, 2019. Of 29 expected cannabinoids, the other substances found beside

THC and CBD were uncertain oil (34%), uncertain carbohydrate (21%), AMB-FUBINACA (3%), and acetaminophen (3%).



Confirmatory testing results of expected cannabinoid samples

Of the 856 samples submitted for confirmatory testing using qNMR, GC-MS and/or LC-MS between June 1, 2018 and December 31, 2019, 5 (1%) were expected to be cannabinoid. No qNMR results were reported for this expected drug category. Of note, the one synthetic cannabinoid from this expected drug category tested positive for fentanyl via confirmatory testing.

Other substances found in expected cannabinoid samples via confirmatory testing:

Active ingredients:

- 1 (3%) contained tetrahydrocannabinolic acid (THCA)
- 1 (3%) contained cannabiniol (CBN); and 1 (3%) contained oxandrolone

Polysubstance, Unknown, and Other Drug Samples

Of 7,789 drug samples checked between June 1, 2018 and December 31, 2019, 26 (0.3%) samples were expected polysubstance samples, 572 (7%) were unknown samples, and 28 (0.4%) were other drug samples.

Of the polysubstance samples, 22 (84%) were a mixture of fentanyl and methamphetamine, 2 (8%) were a mixture of heroin and methamphetamine, 1 (4%) was a mixture of cocaine and ketamine, and 1 (4%) was a mixture of ketamine, MDMA and methamphetamine. Of 26 polysubstance drugs, 24 (92%) matched individual expectation and contained any amount of the expected mixture.

Of the unknown samples, 29 (5%) tested positive for fentanyl. Caffeine was the most common substance found in the unknown samples beside fentanyl using the FTIR. Of 47 unknown samples that had qNMR results, seven (15%) had qNMR fentanyl results. The median fentanyl concentration was 7%, with the majority of samples between 4% and 13%. The following substances were found in the unknown samples via confirmatory testing: 1-[3-(trifluoromethyl)phenyl]piperazine (1),

1,4-dibenzylpiperazine (1), 1-benzylpiperazine (1), 3-HO-PCP (1), 4-ANPP (1), 5-MeO-MiPT (1), acetyl fentanyl (1), AMB-FUBINACA (1), cyclopropyl fentanyl (1), etizolam (2), furanyl fentanyl (2), harmine (1), harmaline (1), heliomethylamine (1), ibogaine (2), ibogamine (2), methyl palmitate (1), noscapine (1), palmitic acid (2), sildenafil (1), THC (1), U-47700 (1), and vardenafil (1).

Of the other drug samples, the following substances were the expected drugs reported by individuals at point-of-care: steroids (8, 29%), vape juice (4, 14%), tianeptine (3, 11%), caffeine (2, 7%), tadalafil (2, 7%), citric acid (1, 4%), enobosarm (1, 4%), harmine (1, 4%), ibutamoren (1, 4%), modanafil (1, 4%), ondansetron (1, 4%), piracetam (1, 4%), sildenafil (1, 4%), and quetiapine (1, 4%). Alcohol (erythritol [1], inositol [1], mannitol, [5], polyethylene glycol [3], and sorbitol [2]) was the most common substance found in the other drug samples using the FTIR as they are often the excipient in liquid preparations. No other substances were found in the other drug samples via confirmatory testing.

Limitations

The majority of the drug samples in this report were collected in selected urban settings and thus might not represent BC's entire drug supply. While drug checking can help reduce risk by providing information about what substances are in a drug sample, it does not guarantee that the drug is safe to use. Point-of-care technologies such as the FTIR, fentanyl test strips, and benzodiazepine test strips may occasionally miss fentanyl, fentanyl analogues, novel psychoactive benzodiazepines, or other dangerous adulterants. Test strips can only test for compounds within the sample provided; that particular compound may still be present in the

remainder of the drug batch. Therefore, the results of a checked sample may not represent the rest of the drugs that the sample was taken from; this is known as the "chocolate chip cookie effect". In addition, these technologies cannot detect new or rare substances that do not exist in the reference libraries. Thus, individuals only receive point-of-care results that may only provide partial knowledge of the content of the drugs checked. Point-of-care drug checking services also lack access to advanced technologies that can potentially off-set point-of-care technological limitations.

References

1. Kerr T, Tupper K. Drug Checking as a Harm Reduction Intervention: Evidence Review Report. Published online 2017. <https://www.bccsu.ca/wp-content/uploads/2017/12/Drug-Checking-Evidence-Review-Report.pdf>
2. Mema SC, Sage C, Xu Y, et al. Drug checking at an electronic dance music festival during the public health overdose emergency in British Columbia. *Can J Public Health*. 2018;109(5-6):740-744. doi:10.17269/s41997-018-0126-6
3. McCrae K, Tobias S, Tupper K, et al. Drug checking services at music festivals and events in a Canadian setting. *Drug Alcohol Depend*. 2019;205:107589. doi:10.1016/j.drugalcdep.2019.107589
4. Weber M, Hellriegel C, Rueck A, Wuethrich J, Jenks P. Using high-performance ¹H NMR (HP-qNMR®) for the certification of organic reference materials under accreditation guidelines—Describing the overall process with focus on homogeneity and stability assessment. *J Pharm Biomed Anal*. 2014;93:102-110. doi:10.1016/j.jpba.2013.09.007
5. Maurer HH. Hyphenated mass spectrometric techniques—indispensable tools in clinical and forensic toxicology and in doping control. *J Mass Spectrom*. 2006;41(11):1399-1413. doi:10.1002/jms.1112



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