

Drug Checking

*Comparing Drugs
Checked Across BC
Drug Checking Sites*



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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List of Acronyms and Frequently Used Terms

ANKORS: AIDS Network Kootenay Outreach and Support Society

BC: British Columbia

Bufs: inert ingredients to bulk or add size to the final product

CMHA: Canadian Mental Health Association

DTES: Vancouver's Downtown Eastside

Down: any opioid drug present in any amount

Expected drugs: individual's expectation of drug purchased

FTIR: Fourier-transform infrared

GYDT: Get Your Drugs Tested, a drug checking service in Vancouver

LPRC: Living Positive Resource Centre, a harm reduction centre in

Kelowna **MHSU:** Mental Health and Substance Use

OPS: overdose prevention sites/services

PWUD: people who use drugs

SCS: supervised consumption site

Purpose of the Report

In BC, drug checking services that use a combination of FTIR spectroscopy and immunoassay strips are offered in four regional health authorities: Fraser Health, Vancouver Coastal Health, Interior Health and Island Health. Drug checking is offered at various harm reduction sites that serve people who use drugs. The purpose of this report is to compare the drugs checked across sites in BC to better understand drug trends in different communities and ultimately provide better insight to improve harm reduction initiatives.

Key Findings

- Between 90% to 100% of opioid samples checked at each of the 11 out of 13 sites tested positive for fentanyl.
- Despite having the lowest fentanyl positivity in opioid samples, both GYDT (in-person) and GYDT (mail-in) sites were found to have the highest mean fentanyl concentration among fentanyl positive samples, of 22% and 21% respectively, while samples from all the other sites ranged from 10% to 14%.
- Opioids were the predominant drug category checked across sites, except for GYDT (mail-in) where the most checked drug category was psychedelics. Most drugs checked contained the expected substance; LPRC Kelowna had the highest concordance of 95% and GYDT (mail-in) the lowest, at 68%. Except for ANKORS (Cranbrook), SafePoint and GYDT (mail-in), opioid concordance was at 80% or more. Stimulants presented the most consistent and highest concordance across sites, ranging from 88% to 100% between sites.
- The most common buffs in expected fentanyl samples were caffeine and a variation of sugar(s) (e.g., erythritol, mannitol).
- Benzodiazepine positivity in opioid samples ranged from 10% to 48% across sites during the study period. LPRC Kelowna, The Centre (Penticton) and ANKORS (Cranbrook) had the highest positivity of 48%, 48% and 45%, respectively.

Background

In BC, the overdose crisis was declared a public health emergency in 2016 and has worsened amidst the COVID-19 pandemic. In response, there have been a broad range of harm reduction strategies, including point-of-care drug checking services, established in health regions across the province. Drug checking provides people with more information on what is in their drugs in order to make informed decisions about use.

There are a range of on-site and off-site drug checking technologies used in BC, whose operations differ in ease of sample preparation, cost, turnaround times, and breadth of qualitative or quantitative information. FTIR spectroscopy can quantify the contents and relative concentrations on an array of compounds; however, generally require concentrations greater than 3-4%.¹ Immunoassay strips can be used with minimal training, can detect compounds at very low concentrations and have a large degree of sensitivity,² though is limited by its qualitative, single drug result. Hence, the combination of these two technologies is employed in many sites across BC as it can provide timely and meaningful drug analysis for people interested in the composition of their drug by offsetting the limitations of each technology when used alone.

Drug Checking Sites

Listed below are 13 drug checking sites in BC that utilize combination FTIR spectroscopy and immunoassay strips. We restricted the sites to those that were actively operational and had a total of 50 or more samples checked between January 1, 2020 to May 31, 2021. Samples checked from pop-up sites and festival settings were excluded. For the purpose of this report, samples received from across Canada by mail and local in-person drop-offs at GYDT were treated distinctly.



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GeoBC

Figure 1. Map of reported drug checking sites in BC health regions. A total of 7 sites in Interior Health (blue), 3 sites in Vancouver Coastal Health (red), 1 site in Fraser Health (yellow), 1 site in Vancouver Island Health (green) in BC and 1 mail-in site were reported.

Interior Health Region:

ANKORS (Cranbrook):

Located in Cranbrook, this harm reduction centre primarily serves PWUD from diverse communities, including people who use daily and those who use substances occasionally. Drug checking services have been offered since 2014, adding FTIR spectroscopy in 2020.

ANKORS (Nelson):

The Nelson location offers a drug consumption space and largely serves a similar community to ANKORS Cranbrook, albeit in the West Kootenay Boundary region. ANKORS Nelson has offered drug checking services since 2015, adding FTIR spectroscopy in 2018.

ASK Wellness Society (Kamloops):

Located in Kamloops, this harm reduction centre offers a drug consumption space. The program provides services to a range of individuals including but not limited to, individuals living with blood borne infections and other chronic health conditions, individuals facing homelessness, Indigenous peoples, 2SLGBTQ+ community members, people facing mental health and substance use issues, low-income seniors, and young adults. This site has offered drug checking services since July 2018.

ASK Wellness Society (Merritt):

The Merritt location has offered drug checking services since March 2019.

LPRC (Kelowna):

This harm reduction centre is situated in downtown Kelowna, largely serving people living with HIV, hepatitis C, or related health issues. Drug checking with FTIR spectroscopy has been offered since December 2020. Immunoassay strip testing was offered prior.

The Centre (Penticton):

Located in Penticton in an industrial complex (the Cannery Trade Centre) located outside the city centre, this harm reduction centre mainly serves women at risk who need a safe space, and has offered drug checking services with FTIR spectroscopy since January 2021. Immunoassay strip testing was offered prior.

MHSU (Vernon):

Located in downtown Vernon, the MHSU site serves anyone in the community who uses substances and has offered drug checking services with FTIR spectroscopy since February 2021. Immunoassay strip testing was offered prior.

Vancouver Coastal Health Region:

GYDT (in-person):

Operated independently by The Medicinal Cannabis Dispensary, Get Your Drugs Tested is located between DTES and the Strathcona neighborhoods. This site offers drug checking services exclusively, largely attracting service users from different demographics and neighborhoods and has operated since June 2019.

GYDT (mail-in):

In addition to point of care testing, Get Your Drugs Tested offers a mail-in service accepting samples from across Canada since May 2019. These results are presented separately from samples dropped off in-person at this site because the sample origin may be different and therefore may not represent local drug trends.

Insite:

Located in the core of DTES, this supervised consumption site largely services the DTES community. Drug checking services have been offered with fentanyl immunoassay strips since July 2016 and combination FTIR spectroscopy since 2017.

Overdose Prevention Society:

This OPS originally opened as a tent in an alleyway in DTES and expanded to a permanent space across the street in January 2021. With both indoor and outdoor spaces consumption spaces, this site largely serves people in the DTES who inhale and inject drugs. Drug checking services have been offered since September 2018.

Fraser Health Region:

SafePoint:

SafePoint is a SCS located in Surrey, run by the Lookout Society. This site operated BC's first smoke tent and largely serves people who inject drugs and others who access other services offered by Lookout Society. Drug checking services have been offered since May 2018.

Island Health Region:

CMHA Wesley Street:

Located in downtown Nanaimo, CMHA's Wesley Street site offers harm reduction services, supplies, peer employment programs, and safe consumption spaces. Since October 2020, drug checking has been offered out of the safe injection space. This site largely serves individuals experiencing homelessness or those who are precariously housed, living with mental health and substance use challenges.

Descriptive analyses of drug samples were summarized and compared between drug checking sites using six key indicators, each stratified by site:

1. fentanyl positivity in expected opioid samples, defined as a positive result via FTIR spectroscopy and/or fentanyl immunoassay strips;
2. fentanyl concentration in fentanyl positive samples, defined as percentage of fentanyl within samples sold as fentanyl, heroin or down quantified by a validated model;³
3. distribution of expected drug categories, stratified as depressants, opioids, stimulants, psychedelics, others (drugs that do not fit into the reported drug classes), polysubstance (e.g., fentanyl and methamphetamine), and unknowns (i.e., the expected drug(s) were not known to the service user);
4. concordance in expected drugs present defined as proportions of expected drugs detected in sample by FTIR spectroscopy and/or immunoassay strips in any quantity and;
5. prevalence of the most common drug combination among fentanyl positive samples at each site, defined using FTIR spectroscopy and;
6. benzodiazepine positivity in expected opioid samples, defined as a positive result via FTIR spectroscopy and/or benzodiazepine immunoassay strips.

Results

The study sample consisted of 15,862 point-of-care drug checking samples checked at 13 sites which offer drug checking services (e.g., supervised consumption sites, overdose prevention sites and other health authority sanctioned sites) across BC between January 1, 2020 to May 31, 2021.

Distribution of Samples Checked

In total, 9,992 samples were checked at GYDT (in-person), 1,963 at Overdose Prevention Society, 1,736 at GYDT (mail-in), 695 at ANKORS (Nelson), 340 at ASK Wellness (Kamloops), 300 at Insite, 242 at SafePoint, 186 at CMHA Wesley St, 112 at The Centre (Penticton), 86 at LPRC Kelowna, 85 at ASK Wellness (Merritt), 73 at ANKORS (Cranbrook) and 52 at Vernon MHSU. Shown in **Figure 2**, the number of samples checked monthly per site ranged between 0 and 999 samples. It is noteworthy that on March 17, 2020, a public health emergency was declared in BC in response to the COVID-19 pandemic, which may be related to fewer service uptake during March and April 2020.

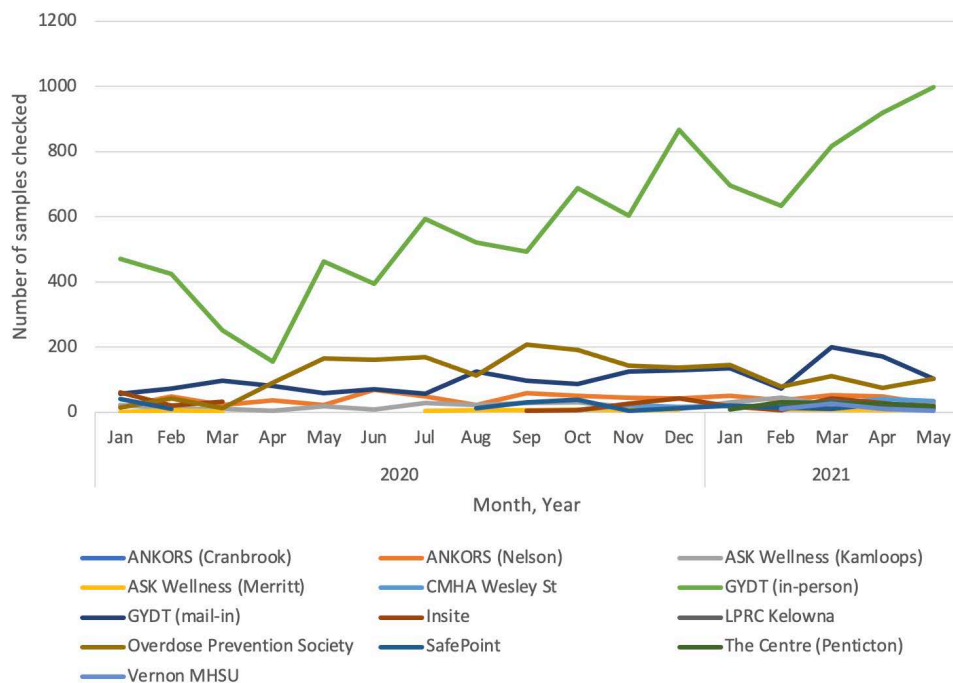


Figure 2. Samples checked per month by site between January 2020 and May 2021.

Fentanyl Positivity in Expected Opioid Samples

Figure 3 shows that over 90% of opioid samples checked at 11 out of 13 sites tested positive for fentanyl. GYDT (mail-in) and GYDT (in-person) had the lowest fentanyl positivity at 66% and 82%, respectively. Although it varied across the province, fentanyl positivity was very high across all sites reported. Results presented in **Figure 3** may not include fentanyl analogs like carfentanyl, which may not be detected by immunoassay test strips and may fall below the detection limit of many point-of-care drug checking technologies.

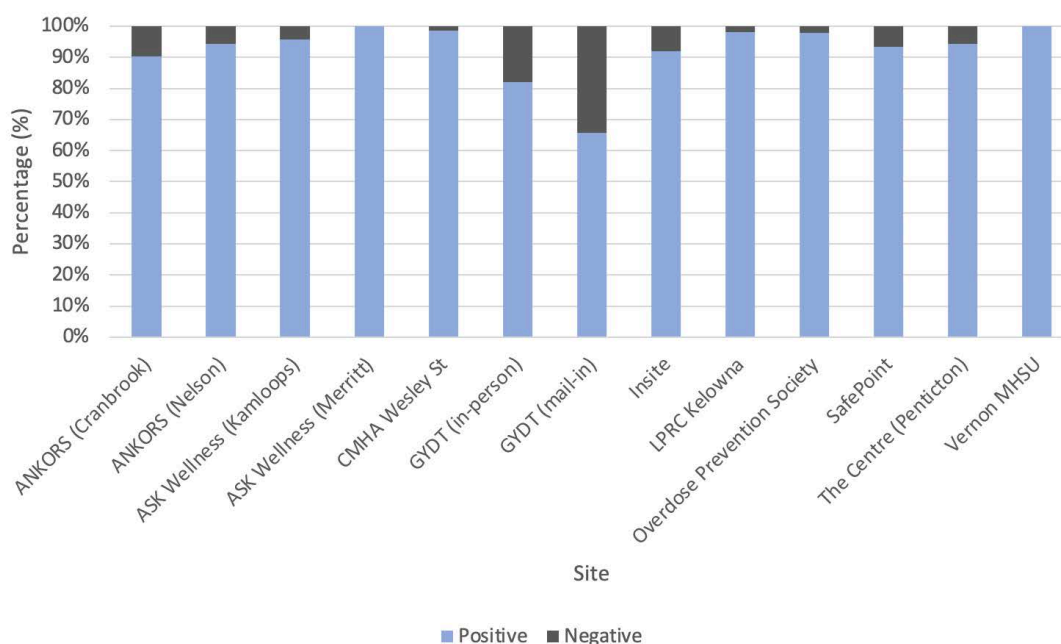


Figure 3. Percentage of fentanyl positivity in expected opioid samples by site

Fentanyl Concentration in Fentanyl Positive Opioid Samples

Fentanyl concentration quantified by a validated model among samples sold as fentanyl, heroin or down, stratified by site are reported in **Figure 4**. Samples checked at GYDT (in-person) and GYDT (mail-in) recorded the highest mean fentanyl concentrations of 22% and 21% respectively, while samples from all the other sites ranged from 9% to 14%. The considerably higher fentanyl concentrations may be credited to more raw fentanyl samples being checked, and/or difference between sites noting samples as general down versus fentanyl. Indicated by box ends, samples checked at GYDT (in-person) and GYDT (mail-in) had the widest range of fentanyl concentrations, with a difference of 19 and 14 percentage points between the first and third quartile, respectively. Samples at the other sites reported had significantly lower range, ranging from a difference of 4 to 8 percentage points between the first and third quartile. As shown in **Figure 4**, whisker ends indicate the minimum and maximum concentrations, with outliers removed. Results presented here do not include fentanyl analogs like carfentanyl.

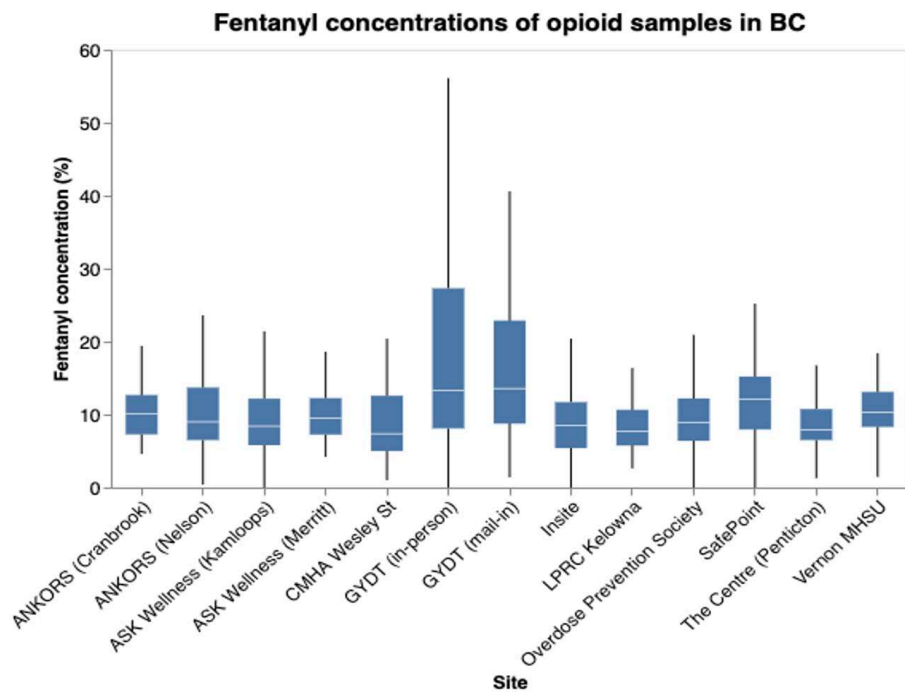


Figure 4. Fentanyl concentrations of opioid samples by site.

Distribution of Expected Drug Categories

Shown in **Figure 5**, with the exception of GYDT (mail-in) of which the highest percentage of drugs checked were psychedelics, opioids were the predominant drug checked across all sites, ranging from 35% to 81% of all drugs checked, making up 41% of all samples checked across sites. Psychedelics make up 22% of all drugs checked across sites, followed by stimulants at 20%, depressants at 8%, unknown drugs at 7%, other drugs at 3% and polysubstance at less than 1%.

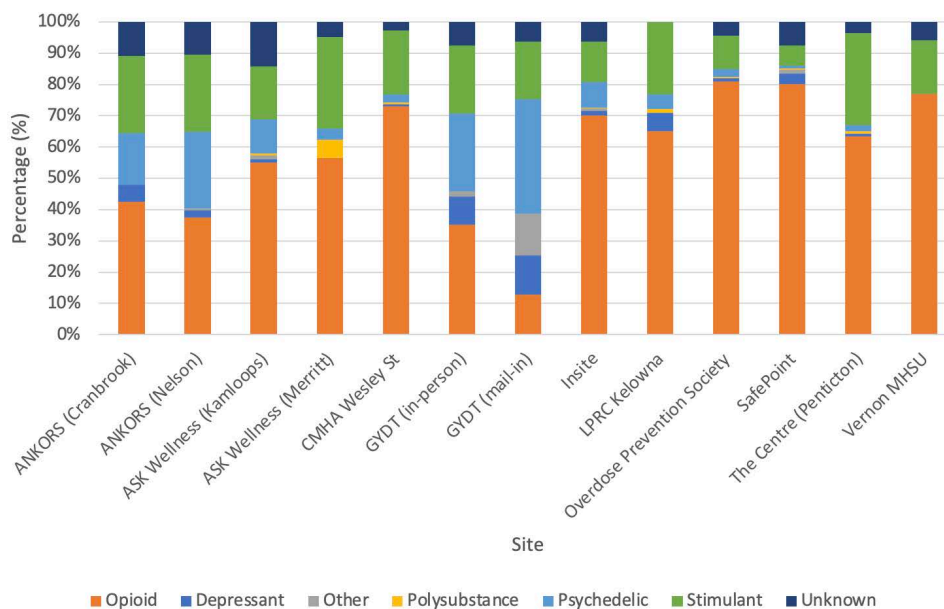


Figure 5. Stacked barplot of the percentage of drug categories checked by site.

Concordance in Expected Drug Present

We defined concordance in expected drug present as the proportion of that drug category checked that contained any quantity of the expected drug by the client. It is important to note that concordance does not indicate purity; contamination of substances other than the expected drug may or may not be present. Overall, more than 90% of all samples checked met client expectation at 4 sites: MHSU (Vernon), ASK Wellness (Merritt), Overdose Prevention Society (Vancouver) and LPRC (Kelowna) and between 75-89% at 7 sites: ANKORS (Cranbrook), GYDT (in-person), ASK Wellness (Kamloops), ANKORS (Nelson), CMHA Wesley St. (Nanaimo), Insite (Vancouver) and The Centre (Penticton). SafePoint (Surrey) and GYDT (mail-in) had the lowest concordance, at 70% and 68% respectively. SafePoint (Surrey) and GYDT (mail-in) are the only 2 sites that offered drop-off services exclusively, and the possible links between self-reporting differences among operating models may be worth investigating.

Opioid concordance varied notably across sites. Concordance was high at most sites, with 10 sites having 80% or more of opioid samples containing the drug the client expected. Around three quarters of opioid samples checked at ANKORS (Cranbrook) and SafePoint (Surrey) met expectations. GYDT (mail-in) was found to have significantly lower opioid concordance than all the other sites, at 57%. Much of the opioid discordance stemmed from expected heroin samples that did not contain any diacetylmorphine (DAM) hydrochloride, the active ingredient in heroin.

Among all drug categories, stimulants presented the most consistent and highest concordance across sites, ranging from 88% to 100% between sites.

Common Fentanyl Combinations

In expected fentanyl samples, the active ingredient was most commonly combined with caffeine and a sugar alcohol. Interestingly however, the type of sugar varied by region. The most common fentanyl combinations of each site made up between 13% to approximately one-third of all fentanyl samples checked at the site. Fentanyl concentrations that fall below the detection limit of FTIR spectroscopy are not included in results presented here.

Except for GYDT mail-in and in-person, erythritol was consistently the most common sugar among fentanyl samples in the Lower Mainland, encompassing the Vancouver Coastal Health and Fraser Health regions.

In the Interior Health region, the most common type of sugar used as a buffering agent varied across sites; mannitol at ASK Wellness (Kamloops) and The Centre (Penticton), xylitol at ASK Wellness (Merritt), erythritol at ANKORS (Nelson), sucrose at MHSU (Vernon), while samples from ANKORS (Cranbrook) mostly contained fentanyl and caffeine only. Interestingly, the most common combination at LPRC (Kelowna) and The Centre (Penticton) contained no fentanyl detected by FTIR and only caffeine with 2 and 1 sugars, respectively.

In the Island Health region at CMHA Wesley St. site, the most common combination contained caffeine and fentanyl only.

Site	Most Common Fentanyl Combination	Total Fentanyl Samples (All Combinations)	Prevalence of Combination Among Fentanyl Samples
ANKORS (Cranbrook)	Caffeine, Fentanyl	19	16%
ANKORS (Nelson)	Caffeine, Erythritol, Fentanyl	233	20%
ASK Wellness (Kamloops)	Caffeine, Mannitol, Fentanyl	141	18%
ASK Wellness (Merritt)	Caffeine, Xylitol, Fentanyl	43	30%
Vernon MHSU	Caffeine, Fentanyl, Sucrose	34	21%
LPRC Kelowna	Caffeine, Erythritol, Mannitol	52	25%
The Centre (Penticton)	Caffeine, Mannitol	61	54%
GYDT (in-person)	Fentanyl, Uncertain match	1519	13%
Overdose Prevention Society	Caffeine, Erythritol, Fentanyl	692	28%
Insite	Caffeine, Erythritol, Fentanyl	86	33%
SafePoint	Caffeine, Erythritol, Fentanyl	117	37%
CMHA Wesley St	Caffeine, Fentanyl	55	22%
GYDT (mail-in)	Fentanyl	40	13%

Table 1. Most common fentanyl combination and prevalence among all fentanyl samples checked, per site. Sites arranged by health authority: Interior Health (blue), Vancouver Coastal (red), Fraser Health (yellow), Vancouver Island Health (green) and 1 mail-in site (unshaded).

Benzodiazepine Positivity in Expected Opioid Samples

Shown in **Figure 6**, the percent of benzodiazepine positivity in expected opioid samples ranged between 10% to 48%, with Insite having the lowest percentage and both LPRC (Kelowna) and The Centre (Penticton) having the highest. It is noteworthy that FTIR spectroscopy and benzodiazepine test strips may miss some benzodiazepine analogs and benzodiazepine-related compounds, such as etizolam, particularly when combined with other substances,^{4,5} thus, the positivity may be higher than reported at some sites. Sites in the Interior and Island Health region have the highest percentage of benzodiazepine positivity, with ANKORS (Cranbrook), LPRC (Kelowna), The Centre (Penticton) and MHSU (Vernon) having about one-third to one-half of expected opioid samples that tested positive for benzodiazepines.

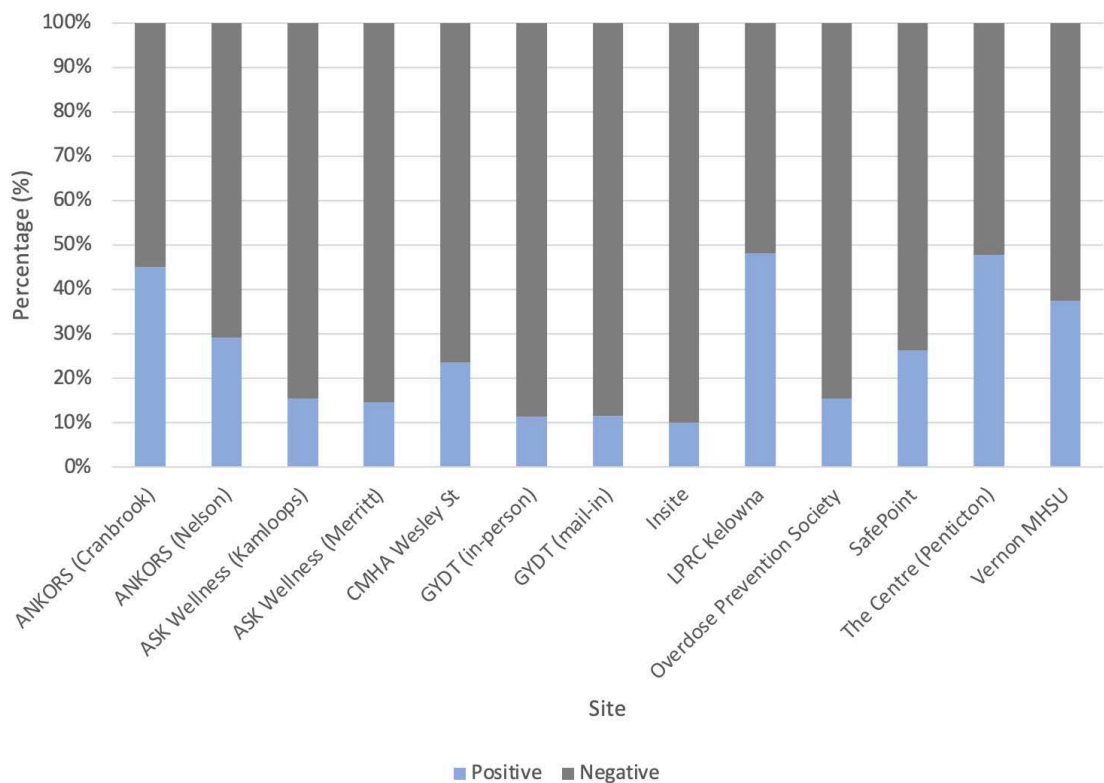


Figure 6. Percentage of benzodiazepine positivity in expected opioid samples by site.

Limitations

We were interested to examine how drugs brought in for drug checking might differ across drug checking sites. However, drugs brought in by service users may not be representative of the actual drug supply circulating in the area, especially in sites where service uptake was low during the study period. BC's drug supply has been increasingly adulterated with highly potent fentanyl and benzodiazepine analogs^{6,7} but there are limitations to the current point-of-care technologies to detect such analogs, especially when presented in combined mixtures.

Conclusion

Despite limitations, the results from this report shed light on unique similarities and differences between drugs checked at sites across BC. Benzodiazepine positivity in opioid samples ranged considerably from 10% to 48% across sites. Consistent with our knowledge of fentanyl adulteration in BC's drug supply, fentanyl positivity in opioid samples was above 90% at most sites, generally with a concentration of 10-13% within samples. Opioids were the predominant drug category checked across sites. Nevertheless, each site had a unique distribution of drug categories checked. Most drugs checked contained the drug that clients expected, and the most common buffs in expected fentanyl samples were caffeine and a variation of sugar(s).

Our findings show that fentanyl dominates the opioid supply across all regions of the province. The high concentration of fentanyl in drug samples observed in urban settings may indicate that samples brought for drug checking had not been yet diluted. The unique distribution of drugs checked per site may suggest that each site attracts different demographics of people who use drugs. The location of the service and the site's model of drug checking may also have contributed to the difference in drugs checked at the different drug checking sites. Sites across BC employed various models of drug checking services. As the drug supply continues to evolve, monitoring the differences in drugs brought in at various sites is warranted to provide more evidence to create targeted harm reduction initiatives.

Future studies looking to better understand drug supply across sites could consider gathering more information on individuals using drug checking services, such as reasons they chose the particular site, factors that motivate drug checking uptake and why they are checking their drugs. It may also be worthwhile to take a longitudinal approach to compare the ever-evolving drug supply over time. Having a better understanding of how the drug supply varies across geographic locations will provide important information to improve harm reduction efforts.

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