Bulletin: Carfentanil

Summary

- Carfentanil is a synthetic opioid that, due to its extreme potency, can be difficult to manufacture consistently and dose safely within the unregulated drug supply. It carries a particularly high risk of causing a drug poisoning, even in an unregulated drug supply noted for its toxicity and unpredictability.
- Recent signals suggest carfentanil is re-emerging in BC's drug supply, coinciding with a possible rise in paramedic-attended overdoses.
- Drug checking technologies have limitations. Drug checking with Fourier-transformed infrared spectrometry (FTIR) – the most common technology used in BC – may not detect carfentanil even when there is enough carfentanil in the substance to cause drug poisoning. Fentanyl test strips are reportedly able to detect carfentanil, but may miss it at concentrations that are low but still pose a health risk1,2. Fentanyl test strips only report positive/negative results, so they cannot be used to distinguish between fentanyl and carfentanil. Drug checking with mass spectrometry can detect carfentanil, even in very low amounts, but is much less accessible than drug checking with FTIR in most regions of BC .
- Aside from drug checking, interventions to reduce harm from carfentanil are the same as for other opioids. The safest option is not to use substances from the unregulated drug supply; however, this is not always possible. For people who continue to use unregulated drugs, harm reduction measures can include never using alone, having naloxone (more doses may be needed but it is effective), and using at overdose prevention sites/supervised consumption sites (including virtual services).

Background

Carfentanil is a synthetic opioid that is approximately 20-100 times stronger than fentanyl and 10,000 times stronger than morphine. Carfentanil is so potent that microgram-level doses can cause life-threatening drug poisoning (overdose) . It is not approved for use in humans and is legally restricted to veterinary use in large animals. Aside from its potency, it is otherwise a standard opioid in its effects (i.e., causes analgesia, euphoria, and respiratory depression)[3].

Carfentanil can dramatically increase the risk of fatal drug poisoning. This is because it is so potent that it is difficult to dilute it consistently in street-level samples (i.e., without hotspots) and dose it safely within the unregulated supply. While naloxone is effective on carfentanil, multiple doses of naloxone may be required to reverse the respiratory depression. As with fentanyl, effects can return when naloxone wears off.

Periods of change in the prevalence of carfentanil have sometimes correlated with changes in drug poisoning deaths in BC. For example, deaths fell in the second half of 2019, at the same time that carfentanil detections were decreasing in police seizures and urine drug testing specimens. Similar relationships between carfentanil detections and deaths have been noted elsewhere[4]. Carfentanil detections were less frequent during the period in 2024 in which BC was seeing a reduction in deaths.

Multiple data sources show an increase in carfentanil in BC

Carfentanil has been increasingly detected in BC in 2025, particularly since March/April. See below (“Detailed information on carfentanil data sources") for further quantitative information.

The increase in detections is particularly pronounced in drug checking data from sites supported by the BC Centre on Substance Use (BCCSU) and Substance Drug Checking. BCCSU-supported sites use Fourier-transformed infrared spectrometry (FTIR) and may only detect carfentanil when it presents at more than ~5% w/w (i.e. the weight of carfentanil is more than 5% of the total weight of the sample) -- therefore the detections at BCCSU show they are finding it in high concentrations. Substance Drug Checking’s technology, paper spray mass spectrometry, can detect smaller quantities. The BC Coroners Service has also noted a small increase in detections of carfentanil in post-mortem samples. In law enforcement data, there has been only a slight increase in submission of seized samples containing carfentanil.

Drug checking and law enforcement seizure data show that carfentanil is primarily detected alongside other opioids (fentanyl and other analogues).

Alberta law enforcement recently issued a bulletin on increasing drug poisoning deaths associated with carfentanil. After a period of declining deaths, deaths are again increasing in Alberta, particularly in Edmonton. The increase appears to be associated with carfentanil.

Implications

Multiple data sources suggest an increase in carfentanil in the unregulated drug supply in BC, a substance which carries a high risk of drug poisoning and has been implicated in past periods of increased health harms in BC and elsewhere.

Drug checking sites should be aware of the possibility of carfentanil occurring in opioid or down(a) samples at clinically significant amounts but below the limit of detection of FTIR, even in samples which test positive for fentanyl and other analogues. For example, a point of down containing 1% carfentanil (well within the range reported from mass spectrometry) is considered potent enough to have the same impact as a point of down containing 20-100% fentanyl (i.e., much higher concentration than the average point containing fentanyl, which is <10%). Clients should be counselled about the limits of FTIR with regards to carfentanil, and offered information about confirmatory testing if available. Clients should also be counselled that fentanyl test strips may miss carfentanil in lower (but still clinically significant) concentrations, and that test strips will not be able to distinguish between fentanyl and carfentanil.

Clinicians and health care workers can inform clients of the increased risk of drug poisoning from carfentanil in the drug supply. Carfentanil will not be detected on standard immuno-assay urine drug tests, but can be detected by confirmatory testing at some laboratories on request. For Lifelabs, clinicians can write “carfentanil confirmatory testing” and should also order fentanyl testing. Withdrawal management and initiation of opioid agonist therapy should follow standard approaches for opioids (i.e., there are no carfentanil-specific procedures). Standard harm reduction advice applies (never use alone, carry naloxone and know how to use it, use at overdose prevention sites/supervised consumption sites, smoking is not safer than injecting). Using a test dose (partial dose) may still carry a significant risk, because even partial doses can contain very high amounts of carfentanil if the sample is imprecisely mixed (i.e., contains hotspots). Test doses should therefore be recommended in combination with other strategies such as using at an overdose prevention site. Providers can share that the risk from carfentanil exists regardless of route of use (i.e., risk exists with smoking, injecting, insufflation, and oral consumption).

First responders should be aware of the increasing presence of carfentanil; however, existing protocols for drug poisoning response and handling of unknown substances are already designed to apply to carfentanil. Additional naloxone doses may be required, and first responders should continue to emphasize high quality ventilation (i.e., giving breaths) and, where appropriate, chest compressions, alongside administering naloxone.

(a) “Down” is a street name for substances expected to contain opioids.

Resources

- ☑ HelpStartsHere
- ☑ Toward the Heart
- ☑ Drug Alerts
- ☑ BCCSU Drug Checking
- ☑ Substance Drug Checking

Detailed information on carfentanil data sources

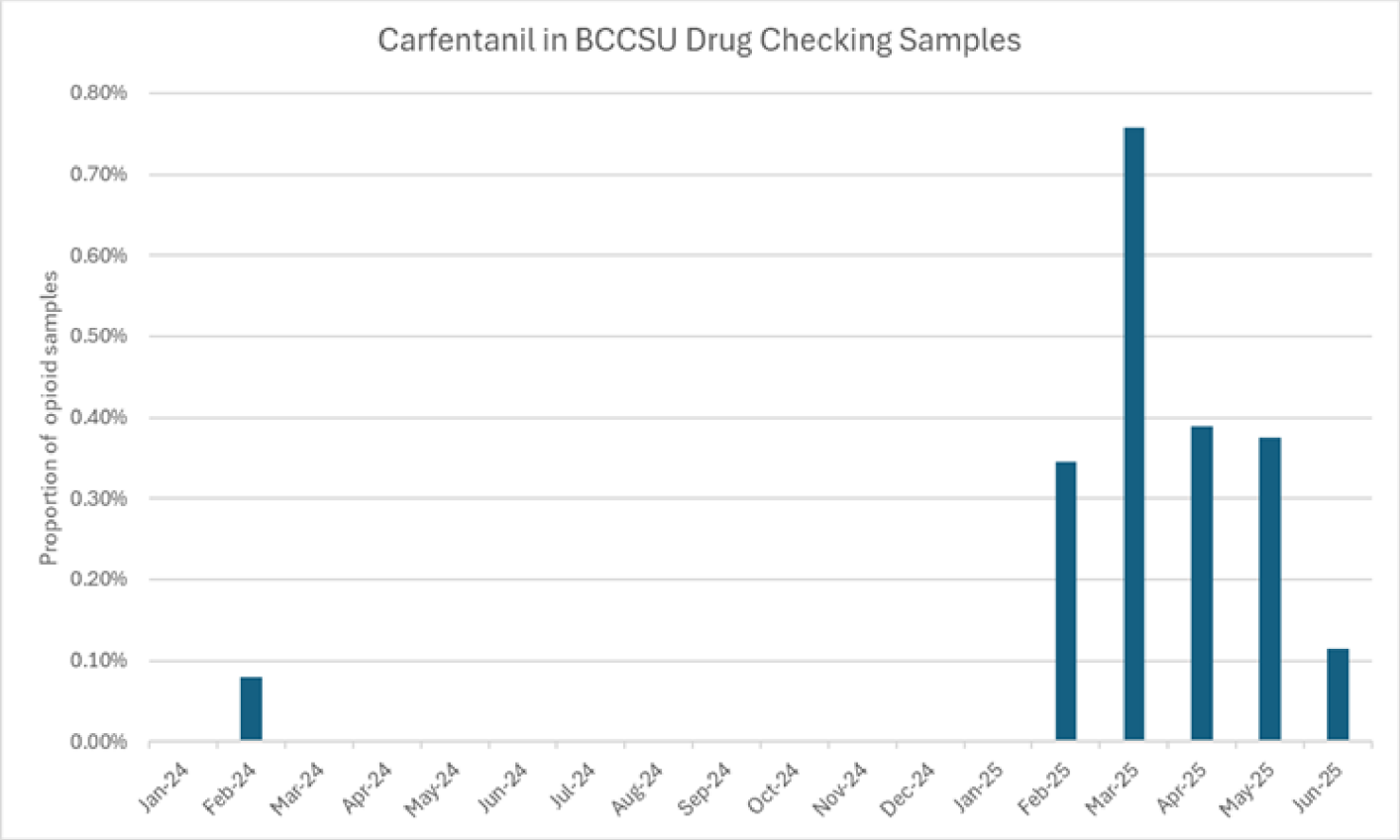
With thanks to the BC Centre on Substance Use, Substance Drug Checking, and the Drug Analysis Service for sharing data for this bulletin, and to the members of the Drug Overdose Alert Partnership for assistance in data interpretation.

Drug checking

In February to June 2025, the BC Centre on Substance Use (BCCSU) drug checking program reported 21 samples with carfentanil detected, compared to only one sample in the period January 2024 to January 2025. Although this is **a substantial increase in carfentanil-containing samples at drug checking sites**, samples with carfentanil detected are still a small proportion of total opioid-containing samples (<1%) (Figure 1). Samples were clustered in the Fraser Health region and there was some clustering within visits (meaning some detections are most likely in related samples from the same person).

Note that BCCSU reports on drug checking sites which use FTIR and test strips as their primary technologies. FTIR cannot detect carfentanil if it is present in a concentration below the detection limit (~5%). When carfentanil is detected by FTIR, this means the sample is extremely potent. While test strips are more sensitive, they may still miss carfentanil if present in very low concentrations. They also cannot differentiate between fentanyl and its analogues, and only provide binary results (yes vs. no) if they are present.

Figure 1. Carfentanil in BC Centre on Substance Use drug checking opioid samples, January 2024 – June 2025.



Substance Drug Checking, which serves Vancouver Island and conducts confirmatory testing with paper spray mass-spectrometry for drug checking sites across the province, has also reported an increase in carfentanil. Figure 2 shows carfentanil detections in opioid-positive samples on Vancouver Island from January 2021-June 2025, and Figure 3 shows month by month trends in 2025. Carfentanil detections declined steadily from 2021 to 2024, and increased again in 2025, particularly in May and June.

Figure 2. Carfentanil detections in Substance Drug Checking expected opioid samples (Vancouver Island sites), January 2021 – June 2025.

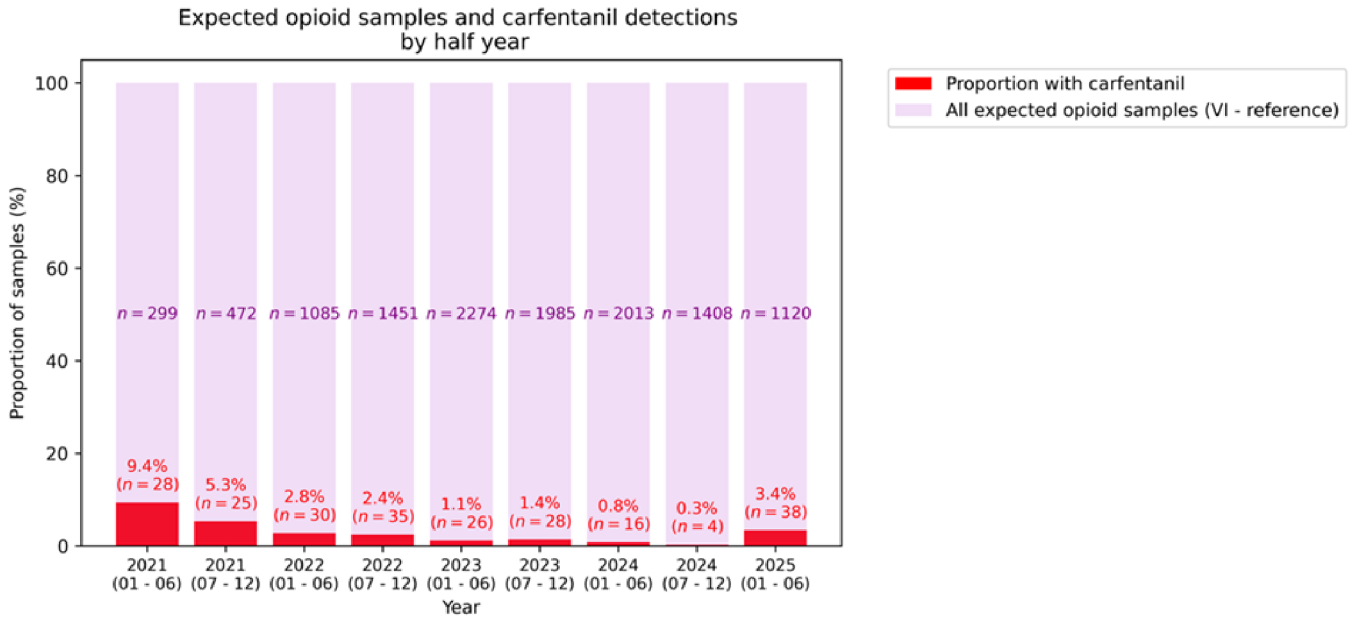


Figure 3. Carfentanil detections in Substance Drug Checking expected opioid samples (Vancouver Island sites), January – June 2025.

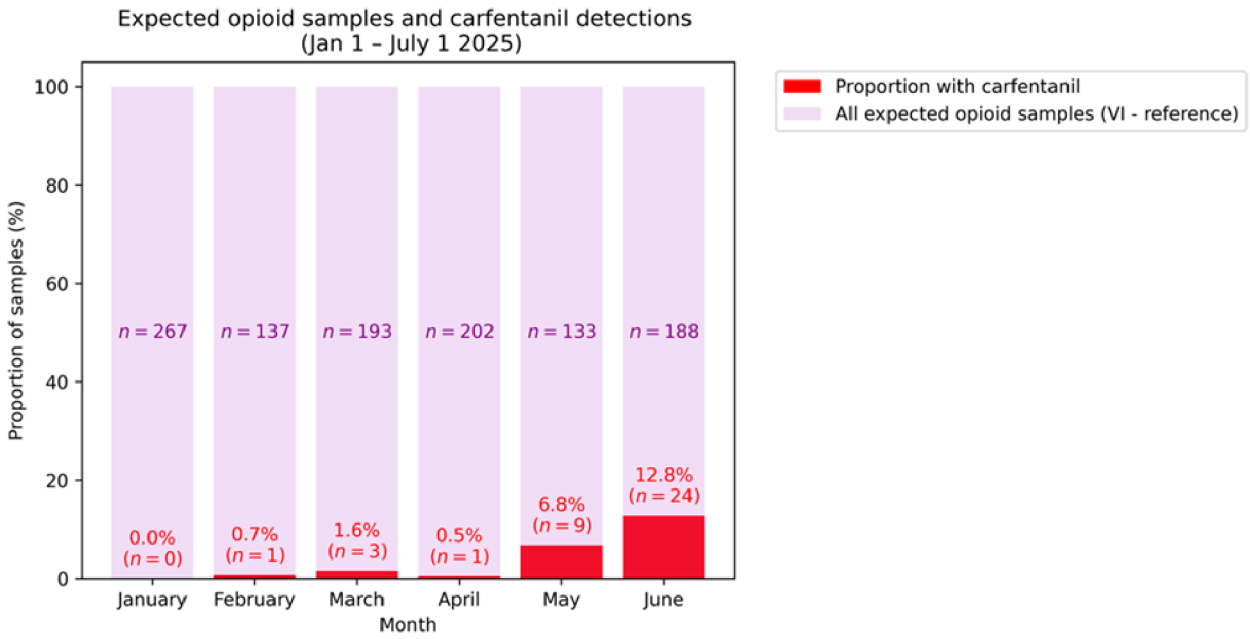
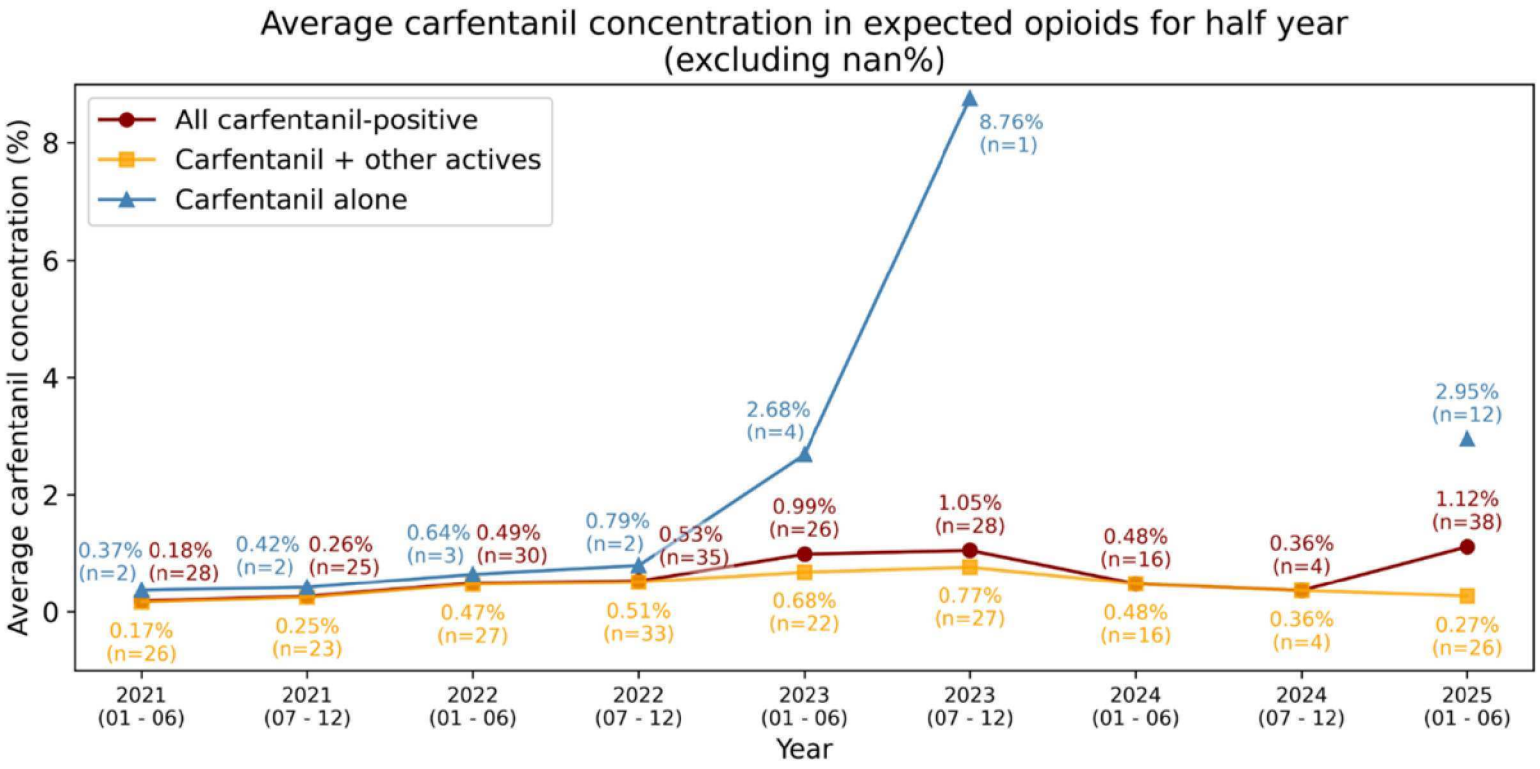


Figure 4 shows the concentration of carfentanil at Substance Vancouver Island sites, stratified by whether other substances were present in the sample. Most carfentanil-positive samples tested by Substance contained other active ingredients. Samples containing carfentanil alone had higher concentrations of carfentanil than mixed samples, suggesting the carfentanil-alone samples may represent samples that have not yet been cut and prepared for street-level sale.

In the samples containing other active ingredients, the concentration of carfentanil increased from 2021 to 2023, then declined. The average concentration of this type of sample in 2025 was 0.27%.

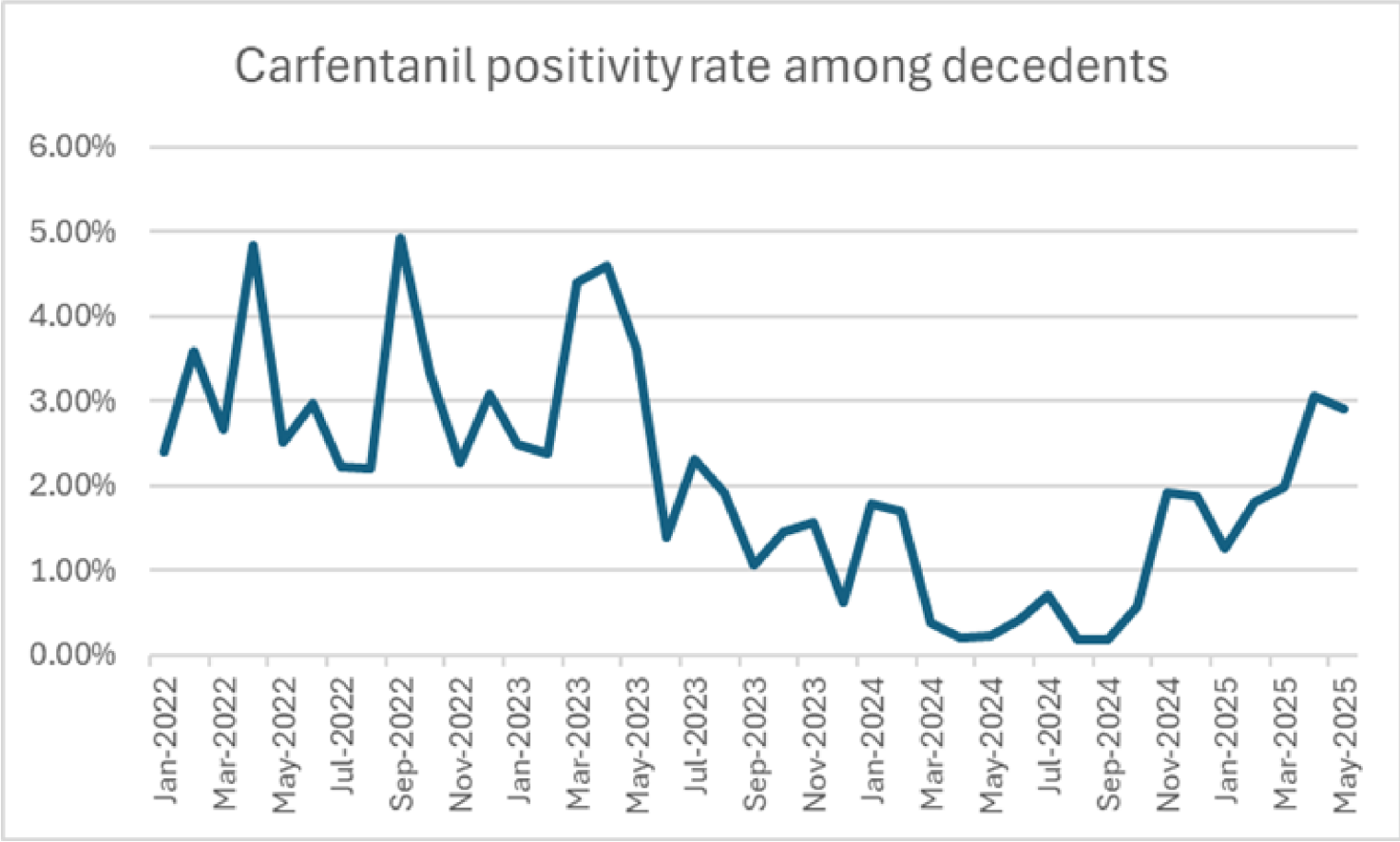
Figure 4. Average carfentanil concentration in Substance Drug Checking samples (Vancouver Island samples), January 2021 – June 2025.



Post-mortem toxicology

Among people who have died from unregulated drug poisoning, **carfentanil detections rebounded starting in November 2024** (Figure 5) after having decreased since June 2023, and then further decreased in mid-2024. In April and May 2025, the number of carfentanil detections was the highest seen since May 2023. Note that the presence of a drug does not necessarily indicate that it caused or contributed to death. Cause and manner of death are determined by the investigating coroner based on the totality of evidence, of which toxicology testing is but one component.

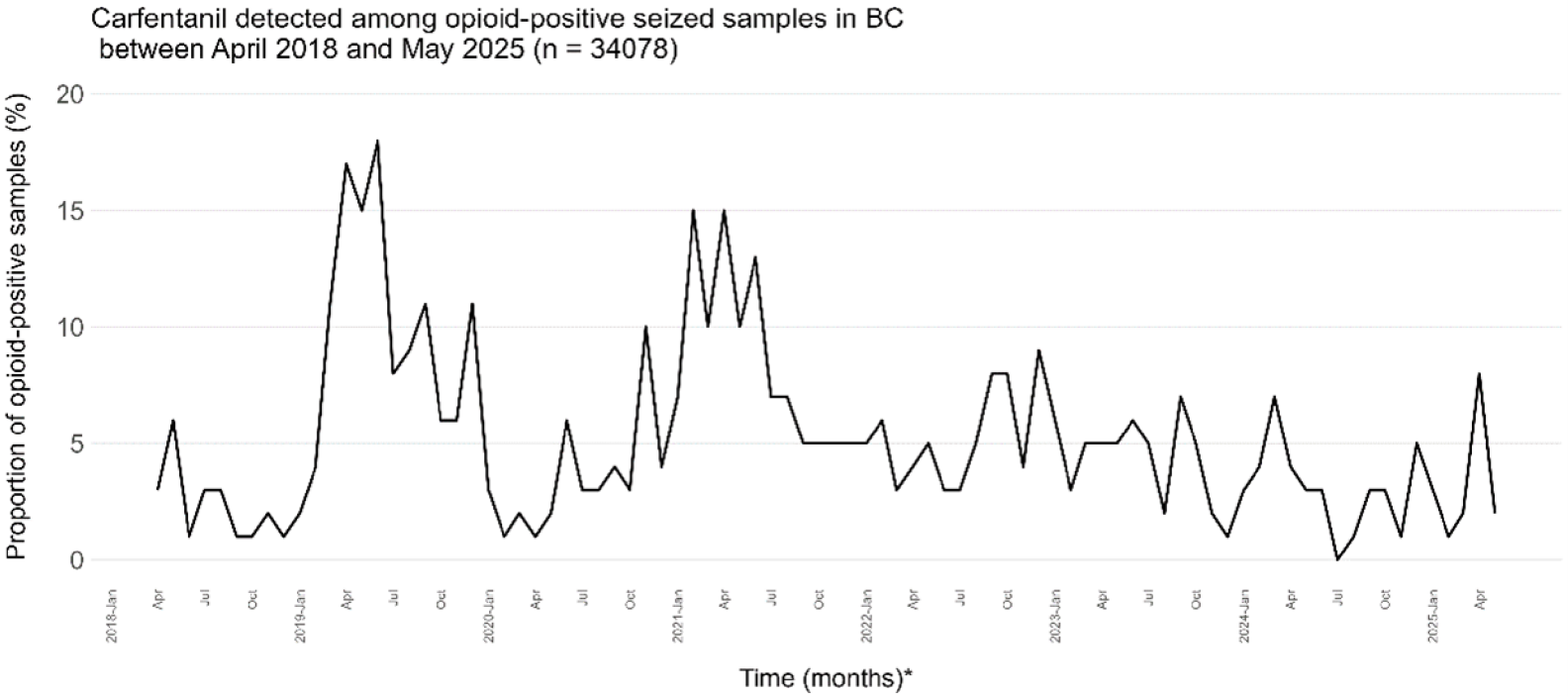
Figure 5. Carfentanil in BC Coroners Service post-mortem toxicology samples, January 2022 – May 2025.



Law enforcement seizures

There has been a slight increase in the detection of carfentanil among opioid-positive samples submitted by law enforcement to the Health Canada Drug Analysis Service (DAS) laboratory – from 2.3% of opioid-positive samples in 2024 to 5.2% of opioid-positive samples in Jan-Mar 2025. Absolute numbers are small and should be interpreted with caution – samples submitted to the DAS laboratory may not be representative of what is available at street-level both because the substances have been seized, and because they may not yet have been cut for sale. The proportion of opioid-positive samples containing carfentanil was highest in 2019 and declined substantially in late 2021 (Figure 6). Data from the DAS laboratory are less timely than drug checking results – DAS data are subject to multiple possible delays including time from law enforcement seizure to lab submission, and delay between submission and reporting of results. Data from samples submitted to the DAS laboratory should be monitored closely in coming months.

Figure 6. Carfentanil detected in opioid-positive samples seized by law enforcement and submitted to the Drug Analysis Service laboratory, April 2018 – May 2025.



* Date samples were received. Data may differ from those presented by Health Canada who report using date of lab results.

At present, carfentanil most commonly occurs in samples with other opioids. Of the 25 samples tested at the Drug Analysis Service laboratory in June 2025 that were found to contain carfentanil, 22 (88%) contained another opioid. Twenty-one (84%) contained fentanyl, and five (20%) contained a different fentanyl analogue (some samples contained multiple analogues). Five contained heroin, though these may have been multiple samples from a single seizure event. **Co-occurrence of carfentanil and other opioids means that the vast majority of samples could appear to contain a lower potency opioid if they were tested with FTIR or fentanyl test strips.**

Neighbouring jurisdictions

Alberta saw a substantial increase in carfentanil in post-mortem toxicology in 2025, with 59% of acute accidental drug poisoning deaths involving carfentanil compared to 10% in 2024. At the same time, the death rate has increased slightly in Alberta (26.0 deaths/100,000 person years in 2025 YTD vs. 24.2 deaths/100,000 person years in 2024) and is the highest ever recorded in Edmonton, where carfentanil prevalence is highest (72.9 deaths/100,000 person years)[5].

Data from Washington State law enforcement shows a very low number of cases involving carfentanil in the period 2017-2023 (0-1 cases/year in that period). Then in 2024, 18 cases were reported, and 4 were reported in the first quarter of 2025. In comparison, 264 cases in the first quarter of 2025 were positive for fentanyl[6]. This indicates that the prevalence of **carfentanil in Washington State is low but increasing.**

References

1. Halifax, J.C., Lim, L., Ciccarone, D. et al. Testing the test strips: laboratory performance of fentanyl test strips. Harm Reduct J 21, 14 (2024). https://doi.org/10.1186/s12954-023-00921-8
2. Hayes, K.L., Lieberman, M. Assessment of two brands of fentanyl test strips with 251 synthetic opioids reveals “blind spots” in detection capabilities. Harm Reduct J 20, 175 (2023). https://doi.org/10.1186/s12954-023-00911-w
3. Leen JLS, Juurlink DN. Carfentanil: a narrative review of its pharmacology and public health concerns. Can J Anaesth. 2019 Apr;66(4):414-421. English. doi: 10.1007/s12630-019-01294-y. Epub 2019 Jan 21. Erratum in: Can J Anaesth. 2019 May;66(5):625. doi: 10.1007/s12630-019-01310-1. PMID: 30666589.
4. Delcher, C., Shin, E., Iyer, A., Johnson, T.K., Winokur, A.D., Goldberger, B.A. Another carefentanil fatal outbreak in Florida? Drug and Alcohol Dependence. 2025 Jul; 275. doi.org/10.1016/j.drugalcdep.2025.112784.
5. Government of Alberta. Substance use surveillance data. https://www.alberta.ca/substance-use-surveillance-data. Accessed July 16, 2025.
6. University of Washington. Addictions, Drug & Alcohol Institute. New and emerging drugs in state crime lab evidence: Quarter 1 & 2 2025. https://adai.washington.edu/WAdata/new&emerging_cases.htm#timeTrends. Accessed July 16, 2025.