v2 | April 2026

Performance assessment: Fentanyl test strips

The purpose of this resource is to share results from a performance assessment conducted by **Ontario's Drug Checking Community** of fentanyl test strips available for sale and marketed for harm reduction in Canada by **BTNX** and **Trimedic**.

This performance assessment used samples of drugs collected from the unregulated (or "street") drug supply and followed practices used by community agencies to check drugs using test strips.

Summary of our findings

- BTNX (1.0) and Trimedic fentanyl test strips **reported the correct result 97% and 95% of the time, respectively**
- BTNX (1.0) and Trimedic fentanyl test strips **successfully detected the four fentanyl-related drugs most commonly circulating in Toronto's unregulated drug supply** when this performance assessment was conducted: **fentanyl**, **para-fluorofentanyl**, **ortho-methylfentanyl**, and **carfentanil**
- BTNX (1.0) and Trimedic fentanyl test strips **successfully detected fentanyl-related drugs in the lowest amount we quantified** in the samples included in this performance assessment: as low as 0.06% of a sample
- In line with existing research, **MDMA, methamphetamine, and levamisole caused false positives for fentanyl** by BTNX (1.0) and/or Trimedic test strips – however, **false positives for fentanyl could be corrected by following best practices of the drug checking community to add 10 times more water to those samples**
- **When instructions to use are closely followed, BTNX (1.0) and Trimedic fentanyl test strips are effective tools for detecting various fentanyl-related drugs in the trace amounts that are circulating in Ontario's unregulated drug supply**

Our motivation

A variety of tools and technologies are used for community drug checking, including test strips, portable and laboratory-based instrumentation. At this time, there is no perfect drug checking tool or technology:

- All have limitations, particularly when it comes to checking drugs most likely to contribute to overdose and related harms (i.e., those bought or got as unregulated opioids)
- All have trade-offs in terms of ease of use, quality of results, turnaround times for results, and cost

It is critical that service providers understand that all drug checking tools and technologies have limitations, understand what the limitations of the tools and technologies they use (or intend to use) are, and can clearly communicate those limitations to service users.

Observing gaps in this understanding and the information available to our community, our public health and safety program assesses and publicly shares findings on the performance of tools and technologies used for community drug checking. This work is in line with our commitment to:

- Ensuring service user safety
- Supporting community agencies to deliver the best possible drug checking service
- Accurate monitoring of the unregulated drug supply and education on drug market trends
- Addressing inequities experienced by people who use drugs in our health and social systems

Our process

This performance assessment included:

- 128 **BTNX fentanyl test strips** (1.0, product code FYL-18S7)
- 128 **Trimedic fentanyl test strips**
- 128 samples of unregulated (or "street") drugs that had already been checked as part of our provincial public health and safety program using mass spectrometry technologies

Both the BTNX and Trimedic test strips had a cut-off concentration of 200 ng of fentanyl/1 mL of water, which implies they should be able to detect specified fentanyl-related drugs in incredibly trace amounts.

The 128 samples of unregulated drugs were collected from people who use drugs (i.e., service users) in Toronto between August 2024 and June 2025 by **our collection site members**. Collected samples were analyzed by our analysis site members (the clinical laboratory at the **Centre for Addiction and Mental Health** or **St. Michael's Hospital**) using **gold standard technologies that are validated for overdose prevention drug checking**, including gas chromatography- or high-resolution liquid chromatography-mass spectrometry.

Mass spectrometry results are considered the "reference result," which test strip results were compared to. Of the 128 samples selected by our team for inclusion in this performance assessment, 90 contained fentanyl-related drugs and 38 did not (as per the reference result).

Samples had been turned into solutions with a concentration of 10 mg of drug/1 mL of methanol for mass spectrometry analysis. As a first step in preparing samples for this performance assessment, we evaporated the methanol, returning each sample to a powder. Following the instructions provided by BTNX and Trimedic, we again turned each sample into a solution with a concentration of approximately 1 mg of drug/1 mL of water (equivalent to approximately 5 mg of drug/5 mL of water).

Both test strips were dipped into each solution, one at a time, allowing about 15 seconds for the solution to be absorbed by the strip. The strip was then removed from the solution and set aside on a flat clean surface to await results. Results for specified fentanyl-related drugs were positive or negative. None of the test strips used reported an invalid result. Results were recorded and compared to the reference result.

Our findings

	BTNX (1.0) fentanyl test strips	**Trimedic fentanyl test strips**
Fentanyl-related drugs detected[1]	Carfentanil Fentanyl Ortho-methylfentanyl Para-fluorofentanyl	Carfentanil Fentanyl Ortho-methylfentanyl Para-fluorofentanyl
Lowest amount of fentanyl-related drugs detected that we quantified[2]	0.06% of a sample	0.06% of a sample
Sensitivity How often the strips correctly reported a positive result (i.e., a true positive)	100%	100%
Specificity[3] How often the strips correctly reported a negative result (i.e., a true negative)	89%	84%
False negative rate How often the strips incorrectly reported a positive result as a negative result	0%	0%

False positive rate[4] How often the strips incorrectly reported a negative result as a positive result	11%	16%
Accuracy (or Correctness) How often the test strip result matched the reference (i.e., mass spectrometry) result	97%	95%

[1] Fentanyl, para-fluorofentanyl, ortho-methylfentanyl, and carfentanil were the fentanyl-related drugs found in the samples included in this performance assessment. Other research by our drug checking colleagues has confirmed the **BTNX fentanyl test strips can detect additional fentanyl-related drugs**.

[2] Using high-resolution liquid chromatography-mass spectrometry, we often report the precise amount (or concentration) of fentanyl, para-fluorofentanyl, and/or ortho-methylfentanyl in the samples we check (we do not currently report this information for carfentanil). The lowest amount of fentanyl or para-fluorofentanyl quantified in the samples included in this performance assessment was 0.06% of a sample (0.06% of 10 mg/mL is equal to 0.006 mg/mL or 6,000 ng/mL). The lowest amount of ortho-methylfentanyl quantified in the samples included in this performance assessment was 0.21% of a sample (0.21% of 10 mg/mL is equal to 0.021 mg/mL or 21,000 ng/mL). Other research by our drug checking colleagues has confirmed the **BTNX fentanyl test strips can detect fentanyl as low as 130 ng/mL** in unregulated drug samples (i.e., in much more trace amounts than we quantified and are currently finding in Toronto's unregulated fentanyl supply).

[3] The specificity of the BTNX (1.0) and Trimedic strips was impacted by false positives for fentanyl caused by MDMA, methamphetamine, or levamisole present in those samples. As per note 4, we were able to correct the false positive results by adding 10 times more water to those samples. Correcting the false positives would also improve the specificity of both BTNX (1.0) and Trimedic fentanyl test strips to 100%.

[4] Two samples containing MDMA and two samples containing levamisole caused false positives for fentanyl by the BTNX (1.0) strips. Three samples containing MDMA, two samples containing levamisole, and one sample containing methamphetamine caused false positives for fentanyl by the Trimedic strips. Research by our drug checking colleagues found that **MDMA and methamphetamine, as well as diphenhydramine (Benadryl), in high amounts can cause false positives by fentanyl test strips**. **BTNX has shared that those drugs (as well as levamisole and others) can cause false positives for fentanyl by their 1.0 fentanyl test strip**. In the absence of a quantitative method for MDMA, methamphetamine, or levamisole, we are unable to determine precisely how much of these drugs were in the samples with a false positive result.
To minimize the risk of MDMA, methamphetamine, and/or diphenhydramine (Benadryl) causing false positives by fentanyl test strips, **our drug checking colleagues suggest further diluting samples** to a

concentration of 5 mg of drug/50 mL of water (i.e., adding about 10 times more water). When the BTNX (1.0) or Trimedic strips reported a false positive for fentanyl, we added 10 times more water and re-checked the sample. Doing so corrected the false positive result: a true negative for fentanyl was reported, improving the false positive rate for both the BTNX (1.0) and Trimedic fentanyl test strips to 0% (and, as per note 3, also improving the specificity to 100%).

BTNX has released a new version (2.0) of their fentanyl test strip, with advertised improvements such as a reduced likelihood of MDMA, methamphetamine, levamisole, as well as diphenhydramine (Benadryl) and lidocaine, causing a false positive for fentanyl. **We will assess BTNX's 2.0 fentanyl test strips at a later time**.

Learn more

Education is crucial for understanding when to use test strips, how to use test strips, and what test strip results mean. You may also be interested in:

- Other **resources on drug checking tools and technologies** developed by our program
- The British Columbia Centre on Substance Use Drug Checking Program's **test strip training and resources**
- **Ontario Harm Reduction Distribution Program** resources (please email **info@ohrdp.ca** to request)

We are committed to ensuring our public health and safety program adds value to the communities it serves. If you have any questions, comments, or feedback about this resource or our program, please contact hello@drugchecking.community.

This performance assessment was undertaken by Meera Bissram, Dr. Sarah Delaney, Raisa Iffat, Karen McDonald, Claire Snelgrove, Dr. Cristiana Stefan, and Hayley Thompson. This resource was reviewed by Jason Sereda and our colleagues at the Ontario Harm Reduction Distribution Program.

About us: Ontario's Drug Checking Community is a national authority and primary source of timely and comprehensive data on Canada's unregulated drug supply. This public health and safety program, which is the provincial expansion of **Toronto's Drug Checking Service**, analyzes samples of drugs and used drug equipment donated by people who use drugs with **gold standard mass spectrometry technologies** at the Centre for Addiction and Mental Health (Clinical Laboratory and Diagnostic Services) or St. Michael's Hospital (Department of Laboratory Medicine). Technologies used and methods developed from checking tens of thousands of the most complex samples are the best currently available to communities in Ontario for checking unregulated opioids. This is critical because the contamination and unpredictability of the unregulated opioid (and, specifically, fentanyl) supply continues to be the primary driver of fatal and non-fatal drug poisoning, among other harms. The **program's findings** are translated and publicly available to prevent drug-related harm and inform evidence-based responses to the ongoing toxic opioid supply crisis, which include prevention, harm reduction, treatment and recovery, and community safety efforts.

Acknowledgements: We acknowledge the members of our communities that have lost their lives – both in the ongoing toxic opioid supply crisis and long before.

We acknowledge that racialized communities and survivors of colonization are disproportionately impacted by the toxic opioid supply crisis.

We acknowledge that we operate on Indigenous land, which is home to many diverse First Nations, Inuit, and Métis peoples. Our program is coordinated from Toronto, which is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee, and the Wendat peoples.

We know that many of the samples we check are linked to fatal or non-fatal overdose, as well as adverse health events – we acknowledge the people and pain behind the data we share.

We acknowledge that our work is only possible – and we only have access to this data – because people who use drugs donate their drugs to our program in an effort to reduce the harms associated with using unregulated substances and facilitate community-led drug market monitoring and education. We are incredibly fortunate to be trusted by people who use drugs throughout the province.

We acknowledge our collection sites, which are community agencies that are deeply committed to bettering the lives of people who use drugs, have existing and trusting relationships with people who use drugs, and truly understand what is means to provide care and reduce harm. We acknowledge that almost all of our samples have been collected by supervised consumption sites. We acknowledge the collection sites lost by our program due to the closure of their supervised consumption service.

Contact us: A small central team operates from within the Drug Checking Unit at MAP Centre for Urban Health Solutions, Unity Health Toronto. **We are committed to ensuring our public health and safety program adds value to the communities it serves. If you have any questions, comments, or feedback, please get in touch**.

(website) **www.drugchecking.community** | (email) **hello@drugchecking.community** | (IG) **@drugchecking**