

Performance assessment: Benzodiazepine test strips

The purpose of this resource is to share results from a performance assessment conducted by [Ontario's Drug Checking Community](#) of benzodiazepine test strips available for sale and marketed for harm reduction in Canada by [BTNX](#) and [Trimedica](#).

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 and Trimedica benzodiazepine test strips **reported the correct result 92% and 91% of the time, respectively**
- BTNX and Trimedica benzodiazepine test strips **successfully detected ten benzodiazepine-related drugs circulating in Toronto's unregulated drug supply** when this performance assessment was conducted: [alprazolam](#), [bromazolam](#), [clonazepam](#), [desalkylflurazepam](#), [desalkylgidazepam](#), [diazepam](#), [ethylbromazolam](#), [flualprazolam](#), [lorazepam](#), and [nordiazepam](#) – in addition, the BTNX benzodiazepine test strips successfully detected [flubromazolam](#)
- BTNX and Trimedica benzodiazepine test strips **did not detect [etizolam](#)**, which we currently do not find often in the samples we check
- BTNX and Trimedica benzodiazepine test strips **successfully detected bromazolam in the lowest amount we quantified** in the samples included in this performance assessment: as low as 0.08% of a sample
- **Shaking, stirring, or swirling the test strip solution for 30 seconds was not required to produce these results**
- **When instructions to use are closely followed, BTNX and Trimedica benzodiazepine test strips are effective tools for detecting various benzodiazepine-related drugs in the trace amounts that are circulating in Ontario's unregulated drug supply**

Our motivation

In Canada, when test strips are used to check drugs, they are considered consumer products, meaning they are not assessed by Health Canada to determine their safety, effectiveness, or quality prior to being authorized for sale. This is in contrast to test strips used to check urine, which are considered medical devices, and are assessed by Health Canada. In the absence of any regulation of tools and technologies used for community-based drug checking, our public health and safety program assesses and publicly shares information on their performance as part of 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

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

What is most important is that service providers understand that all drug checking tools and technologies have limitations, understand what the limitations of the tools and technologies they use are, and can clearly communicate those limitations to service users.

Our process

This performance assessment included:

- 125 BTNX benzodiazepine test strips (product code BZO-18S3)
- 125 Trimedec benzodiazepine test strips
- 125 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 Trimedec test strips had a cut-off concentration of 300 ng of oxazepam/1 mL of water, which implies they should be able to detect specified benzodiazepine-related drugs in incredibly trace amounts.

The 125 samples of unregulated drugs were collected from people who use drugs (i.e., service users) in Toronto between August 2024 and May 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 125 samples selected by our team for inclusion in this performance assessment, 100 contained benzodiazepine-related drugs and 25 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 Trimedica, 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 benzodiazepine-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.

Shaking, stirring, or swirling the test strip solution for 30 seconds prior to conducting each test was not required to produce these results.

Our findings

	BTNX benzodiazepine test strips	Trimedica benzodiazepine test strips
Benzodiazepine-related drugs detected¹	Alprazolam Bromazolam Clonazepam Desalkylflurazepam Desalkylgidazepam Diazepam Ethylbromazolam Flualprazolam Flubromazolam Lorazepam Nordiazepam	Alprazolam Bromazolam Clonazepam Desalkylflurazepam Desalkylgidazepam Diazepam Ethylbromazolam Flualprazolam Lorazepam Nordiazepam
Lowest amount of benzodiazepine-related drugs detected that we quantified²	0.08% of a sample	0.08% of a sample
Sensitivity³ How often the strips correctly reported a positive result (i.e., a true positive)	90%	89%

Specificity How often the strips correctly reported a negative result (i.e., a true negative)	100%	100%
False negative rate⁴ How often the strips incorrectly reported a positive result as a negative result	10%	11%
False positive rate How often the strips incorrectly reported a negative result as a positive result	0%	0%
Accuracy (or Correctness) How often the test strip result matched the reference (i.e., mass spectrometry) result	92%	91%

¹ Alprazolam, bromazolam, clonazepam, desalkylflurazepam, desalkylgidazepam, diazepam, ethylbromazolam, etizolam, flualprazolam, flubromazolam, lorazepam, and nordiazepam were the benzodiazepine-related drugs found in the samples included in this performance assessment. The BTNX benzodiazepine test strips found flubromazolam, but the Trimedec test strips did not. Neither the BTNX nor Trimedec benzodiazepine test strips found etizolam. Other research by our drug checking colleagues has confirmed the [**BTNX benzodiazepine test strips can detect additional benzodiazepine-related drugs**](#), including etizolam.

² Using high-resolution liquid chromatography-mass spectrometry, we often report the precise amount (or concentration) of bromazolam in the samples we check (we do not currently report this information for alprazolam, clonazepam, desalkylflurazepam, desalkylgidazepam, diazepam, ethylbromazolam, etizolam, flualprazolam, flubromazolam, lorazepam, or nordiazepam). The lowest amount of bromazolam quantified in the samples included in this performance assessment was 0.08% of a sample (0.08% of 10 mg/mL is equal to 0.008 mg/mL or 8,000 ng/mL).

³ The sensitivity of the BTNX and Trimedec benzodiazepine test strips was impacted by false negatives for (i.e., missing) benzodiazepine-related drugs in ten and eleven samples included in this performance assessment, respectively. See note 4 to learn more.

⁴ The BTNX and Trimedec benzodiazepine test strips missed that benzodiazepine-related drugs were present (i.e., reported a false negative) in ten samples included in this performance assessment: three of those

samples contained etizolam, seven contained ethylbromazolam. In addition, the Trimedec strips missed that flubromazolam was present in one sample. Other research by our drug checking colleagues has confirmed the [BTNX benzodiazepine test strips have trouble detecting etizolam](#). We investigated the 7 false negatives for ethylbromazolam by both strips but were unable to determine what caused them. We do not quantify ethylbromazolam so could not confirm if the amount found in those samples was below the strip's cut-off concentration (i.e., limit of detection). We confirmed there were no other obvious trends in the composition of those samples (e.g., high amounts of other drugs or unique combinations of drugs). Understanding why the BTNX and Trimedec benzodiazepine test strips missed ethylbromazolam in those 7 samples requires further research. Flubromazolam is not included in the list of benzodiazepine-related drugs the Trimedec strips can detect, which would explain why it was missed.

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 Ontario's Drug Checking Community: Ontario's Drug Checking Community is a national leader in drug checking service delivery and community-led unregulated drug market monitoring and education. This public health and safety program offers the most precise, timely, and accessible information on the unregulated drug supply to reduce harm and inform evidence-based responses to the worsening toxic opioid supply crisis.

Our program is comprised of a group of members, including collection sites, analysis sites, and a small central team that operates from within St. Michael's Hospital in Toronto.

Our work would not be possible if people who use drugs did not 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.

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