

B20 High Concentrations of Illicit Stimulants and Cutting Agents Cause False Positives on Fentanyl Test Strips

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Learning Overview: The goal of this presentation is to educate fentanyl test strip users and harm reduction workers of the possibility of false positives when illicit stimulants and cutting agents are present in high concentrations. Attendees will become familiar with possible interference concentrations and procedures on proper sample dilutions to avoid false positives.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing quantitative evidence of known illicit stimulants and common cutting agents that could be present in opioid and/or fentanyl samples and how their presence in samples could lead to false positives when using immunoassay Fentanyl Test Strips (FTS).

The evolution of the opioid epidemic has caused a series of opioid-related overdose deaths that can mainly be attributed to fentanyl combined with various illicit substances. Although the use of FTS has increased since the beginning of the epidemic, its role as a harm reduction technique has not been well established. Typical street samples are prepared for analysis using FTS by either filling a baggie or cooker with water to dissolve the sample prior to dipping a strip in the solution. Previous research fails to include common stimulants and cutting agents that could lead to the possibility of false positives in FTS. Due to the varying concentrations of cutting agents in street drugs, if the dilution of the raw sample is not enough, it could result in a too-concentrated sample that could cause a false positive on the test strip.

BTNX Inc.'s 20ng/mL immunoassay Rapid Response Fentanyl Test Strips were obtained and tested against four different pharmaceuticals (diphenhydramine, alprazolam, gabapentin, and naloxone buprenorphine) and three illicit stimulants (cocaine HCl, methamphetamine, and 3,4-Methylenedioxymethamphetamine [MDMA]) in concentrations from 20mg/mL to 0.2mg/mL. The FTS testing pad is divided into two sections: the control area and the test area where two bars indicate a sample negative for fentanyl and a single bar indicates a positive for fentanyl sample.

By eye, FTS with cocaine, alprazolam, gabapentin, and naloxone buprenorphine were negative even at the highest concentrations. FTS testing bands with methamphetamine, MDMA, and both diphenhydramine capsules and tablets did not appear when the analyte was in high concentrations (>2mg/mL). These samples could be read as false positives. The control and testing bands on the FTS were then quantitatively measured and compared to a threshold set by a fentanyl standard. The integrated intensities of test bands from solutions of cocaine, Deionized (DI) water, and tap water (which should all be negative for fentanyl) appeared well above the fentanyl threshold. The integrated intensities of the test bands from moderately concentrated samples of methamphetamine, MDMA, diphenhydramine capsules, and diphenhydramine tablets were below the fentanyl threshold, consistent with the visual false positive results. At or above these concentrations, the FTS is likely to produce a false positive result.

In conclusion, fentanyl test strips are commercially available and successful at detecting fentanyl to the specified limit of detection and can be a valuable tool for harm reduction efforts. Users should be aware that when potential drug adulterants are in high concentrations, the FTS can give a false positive result.

Fentanyl Test Strip, Stimulant, Cutting Agent