

FENTANYL USE AND ITS IMPACT ON DRUG TESTING

FENTANYL IS A SYNTHETIC OPIOID, WHICH MEANS IT IS NOT DERIVED FROM THE OPIUM POPPY PLANT.

Instead, fentanyl and other synthetic opioids are made entirely in laboratories. It has a high potency at around 80 – 100 times that of morphine which increases the risk of overdose¹. With a low estimated minimum lethal dose of 2 mg, fentanyl can often be the cause of a fatal overdose.



CATEGORY

Narcotic Analgesics



DRUG CLASSIFICATION

Schedule I



MODALITY

Oral tablet and capsule; crushed tablets can be injected



NAMES

Fentanyl, fluorofentanyl, methyfentanyl, carfentanil



SOURCE

Social media, grey/dark web, street



ADDICTION AND WITHDRAWAL

Moderate-to-high risk of physical or psychological dependence. Risk of post-acute-withdrawal syndrome leading to possible psychiatric disorders, depression, anxiety, etc.



DRUG METABOLITE MONITORED

Oral Fluid: fentanyl

Urine:² fentanyl, norfentanyl



AVERAGE DETECTION TIME

Oral Fluid:³ 1-3 days

Urine:² 26 days (longer detection for opioid-dependent individuals)



LETHAL DOSE OF HEROIN VS. A LETHAL DOSE OF FENTANYL⁴

According to the Centers for Disease Control and Prevention (CDC), there were 107,081 drug overdose deaths in 2021. Fentanyl was a significant contributor to this crisis, being responsible for 70,000 of those deaths⁵.

MEDICAL USES

Fentanyl is a powerful opioid painkiller typically prescribed for severe pain management. It is commonly marketed under brand names such as Sublimaze®, Duragesic®, Actiq® and Effentora®¹. The most frequent method of administration is through a transdermal patch, though it can also be administered via nasal sprays and injections, particularly in emergency care settings. Due to its potent euphoric effects and short-term high, fentanyl is frequently misused, leading to significant public health concerns.

EFFECTS

Fentanyl binds to the body's opioid receptors much like other opioids, leading to similar effects such as a euphoric high, hallucinations, drowsiness, confusion and breathing problems. At higher doses, one of the major risks is respiratory depression, which can be fatal. Treatment options for overdose include naloxone and artificial ventilation. Like many opioids, fentanyl has a high potential for addiction and can cause withdrawal symptoms. To minimize these symptoms, fentanyl concentrations should be gradually reduced during the final stages of treatment. The average dose of fentanyl is between 0.1 mg – 0.4 mg at an estimated cost of \$2 per dose on the street⁶.

DETECTION

During single or occasional use, research has shown that short acting opioids such as fentanyl can be detected in urine for up to 72 hours. Chronic fentanyl users have been shown to test positive in urine for 19 days for fentanyl and 26 days for norfentanyl. In comparison, the detection window in oral fluid has been reported between 1-3 days making the matrix suitable for detecting recent use of fentanyl.

FENTANYL USE AND ITS IMPACT ON DRUG TESTING INFORMATION SHEET

RECENT TRENDS

- Rainbow fentanyl
- Prescription drugs laced with fentanyl
- Fentanyl-laced with xylazine
- Availability of fentanyl analogues



RAINBOW FENTANYL^{7,8}

First emerging in 2022, Rainbow fentanyl is a fentanyl with a candy-like appearance specifically designed to appeal to young adults and children. Due to the increased reports of overdose deaths in younger populations, the Drug Enforcement Agency (DEA) issued an official warning about any fentanyl tablets that are bright in color. Rainbow fentanyl can appear in multiple forms such as pills, powder or chalk and just a couple of examples can be seen in the above image.

PRESCRIPTION DRUGS LACED WITH FENTANYL^{9,10}

In addition to the warnings around Rainbow fentanyl, a growing concern is also the availability of prescription drugs laced with fentanyl. A safety alert was first issued by the DEA in 2021 due to a 430% increase in counterfeit pills since 2019. Two out of every five pills contained a potentially lethal dose of 2 mg per tablet. These counterfeit pills are often marketed as genuine prescription drugs such as oxycodone, hydrocodone or alprazolam. By 2022, the DEA shared that 6 out of 10 fentanyl-laced counterfeit prescription drugs contained a lethal dose of fentanyl.

FENTANYL-LACED WITH XYLAZINE¹¹

Fentanyl-laced with xylazine, also known as “tranq,” is a particularly dangerous combination. Xylazine is a powerful sedative approved for veterinary use, and when mixed with fentanyl, it significantly increases the risk of fatal overdoses due to the increase in effects of severe respiratory depression and sedation. This is reflected in data published by the CDC in June 2022, where 11% of all fentanyl overdoses also contained xylazine.

FENTANYL ANALOGUES¹²

In addition to fentanyl itself, the use of fentanyl analogues has significantly increased. These analogues are compounds structurally similar to fentanyl but varying in potency and strength. For instance, carfentanil, a synthetic opioid and fentanyl analogue, is about 100 times more potent than fentanyl, making overdoses occur rapidly. Conversely, acetyl fentanyl is much less potent than fentanyl but is still detected in overdose cases.

Data presented by Abbott from laboratory samples analyzed between 2019 and 2023 showed that the most prevalent analogues detected are:

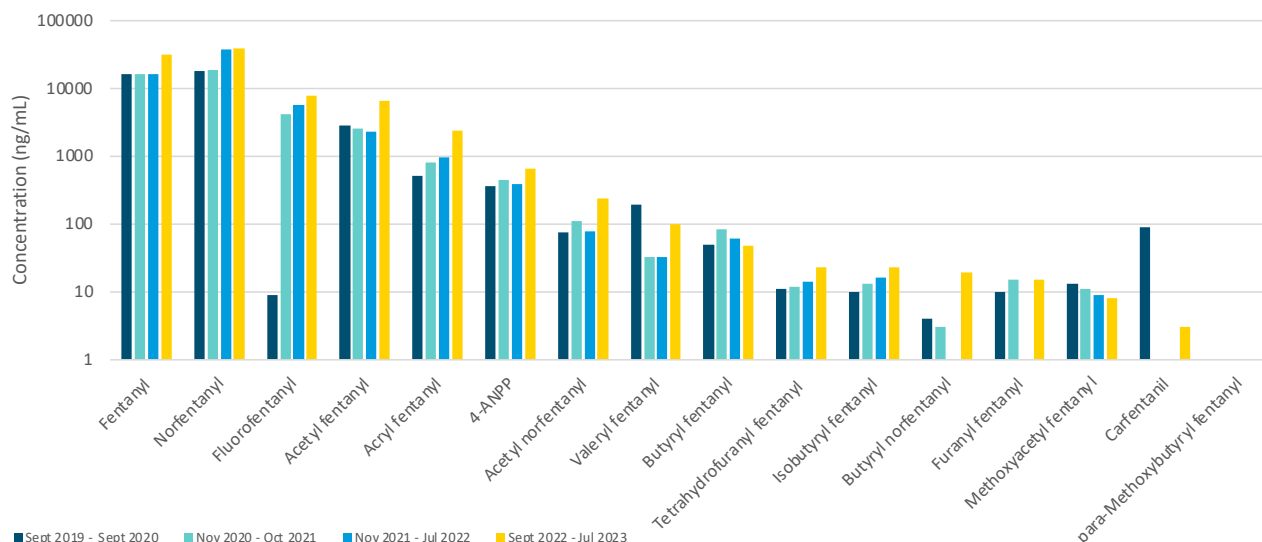
- Fluorofentanyl
- Acetylfentanyl
- Acryl fentanyl
- 4-ANPP
- Acetyl norfentanyl
- Valeryl fentanyl

While many samples tested positive for fentanyl analogues, fentanyl and norfentanyl were by far the most prevalent.

CONCLUSION

Fentanyl's potency and widespread misuse underscore its critical role in the ongoing opioid crisis. To combat its devastating impact, it is essential to integrate fentanyl monitoring into testing programs, enabling timely detection and intervention. With this proactive approach, alongside public health measures, we can take meaningful steps toward addressing this pressing challenge.

FENTANYL PREVALENCE



Positive fentanyl and fentanyl analogue samples (data from Abbott Laboratory between Sept 2019 – Jul 2023)

REFERENCES

1. National Institute for Health and Excellence, Fentanyl, British National Formulary – available online <https://bnf.nice.org.uk/drug/fentanyl.html> [accessed November 2024]
2. Urine Detection Window: Huhn AS, Hobelmann JG, Oyler GA, Strain EC. Protracted renal clearance of fentanyl in persons with opioid use disorder. *Drug Alcohol Depend.* 2020 Sep 1;214:108147. doi: 10.1016/j.drugalcdep.2020.108147. Epub 2020 Jul 2. PMID: 32650192; PMCID: PMC7594258.
3. Oral fluid: Kelly Francisco da Cunha, Karina Diniz Oliveira, Marilyn A Huestis, Jose Luiz Costa, Screening of 104 New Psychoactive Substances (NPS) and Other Drugs of Abuse in Oral Fluid by LC -MS-MS, *Journal of Analytical Toxicology*, Volume 44, Issue 7, September 2020, Pages 697 -707.
4. Bond, Allison, 2016, Why fentanyl is deadlier than heroin, in a single photo, New Hampshire State Police Forensic Lab, available from <https://www.statnews.com/2016/09/29/why-fentanyl-is-deadlier-than-heroin/> [accessed December 2024]
5. Center for Disease Control (CDC), Provisional Drug Overdose Death Counts– available online <https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm>
6. Talchekar, Anjali, 2023, How much does Fentanyl cost on the Street?, *Addiction Resource.net*, available from <https://www.addictionresource.net/cost-of-drugs/prescription/fentanyl/?form=MG0AV3> [accessed December 2024]
7. DEA, 2022, DEA Warns of Brightly-Colored Fentanyl Used to Target Young Americans, available from <https://www.dea.gov/press-releases/2022/08/30/dea-warns-brightly-colored-fentanyl-used-target-young-americans> [accessed November 2024]
8. Los Angeles County Sheriff's Department, 2022, Fentanyl packaged in Candy, available from <https://lasd.org/fentanyl-packaged-in-candy/> [accessed December 2024]
9. DEA Public Safety Alert, 2021, Sharp Increase in fake prescription pills containing fentanyl and meth, available from <https://www.dea.gov/alert/sharp-increase-fake-prescription-pills-containing-fentanyl-and-meth> [accessed December 2024]
10. DEA Public Safety Alert, 2022, DEA Laboratory Testing Reveals that 6 out of 10 Fentanyl-Laced Fake Prescription Pills Now Contain a Potentially Lethal Dose of Fentanyl, available from <https://www.dea.gov/alert/dea-laboratory-testing-reveals-6-out-10-fentanyl-laced-fake-prescription-pills-now-contain?form=MG0AV3> [accessed December 2024]
11. Mbabazi, Kariisa et al, 2023, Illicitly Manufactured Fentanyl–Involved Overdose Deaths with Detected Xylazine – United States, January 2019–June 2022, *CDC Morbidity and Mortality Weekly Report (MMWR)*, 72(26); 721-727
12. Abbott Webinar, 2023, Fentanyl: The crisis continues a decade later, available from <https://gateway.on24.com/wcc/eh/2935169/lp/4285777/fentanyl-the-crisis-continues-a-decade-later> [accessed November 2024]

CONTACT AN ABBOTT REPRESENTATIVE TOXICOLOGY.ABBOTT

© 2025 Abbott. All rights reserved. All trademarks referenced are trademarks of either the Abbott group of companies or their respective owners. RDX-25000398 v1 04/25

