

# Visualizing fentanyl's swift, dangerous effects on the brain and body

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Credit: CC0 Public Domain

Fentanyl's effects are fast and dangerous.

The highly addictive opioid is the deadliest drug threat in American history. It's linked to more fatalities under age 50 in the country than any other cause of death, including heart disease, cancer and suicide.

It only takes 5 minutes for fentanyl to enter the brain when taken orally, said Therese Kosten, director of the University of Houston's Addiction Research Program. That's about the time it takes to unload a dishwasher or take out the trash.

Fentanyl takes 30 seconds to enter the brain when smoked, about the time it takes to make a bed. As little as 2 milligrams can be fatal, depending on a person's weight and drug history. That's about the weight of 10 to 15 grains of salt, and small enough to fit on a sharpened pencil tip, according to the Drug Enforcement Administration.

Fentanyl is 50 times stronger than heroin and 100 times more powerful than morphine, according to the Centers for Disease Control and Prevention.

It kills hundreds of Texans every year, and those numbers have increased steadily since 2019. Last year, 2,161 Texans died from fentanyl, almost enough to fill the seats in Dallas' Winspear Opera House.

Because fentanyl is often mixed into cocaine, methamphetamines and counterfeit pills, people can take it without knowing. Six out of 10 of the fentanyl-laced fake pills analyzed by the DEA in 2022 contained a potentially lethal dose, the agency said, an increase from 4 out of 10 in 2021.

These pills often look and taste like pharmaceutical pills, making it difficult to identify a fake.

Methamphetamine can also be disguised in fake pills, and the DEA warned in 2021 of a sharp increase in fake prescription pills containing fentanyl and meth. In March, the DEA also warned of an increase in fentanyl mixed with the tranquilizer xylazine.

## How does fentanyl kill?

Fentanyl activates brain pathways that release dopamine, a chemical that can cause pleasure and euphoria, said University of Houston's Colin Haile, who led a team that developed a fentanyl vaccine last year. Other addictive drugs like heroin and cocaine also trigger the release of dopamine.

Fentanyl inhibits neurons in our brain that help stimulate breathing, said Kosten. Unlike other opioids, fentanyl can cause muscle rigidity, tightening chest muscles and making it difficult to breathe.

One of the most dangerous and potentially lethal side effects of fentanyl is [respiratory depression](#): slow, shallow breathing that causes low oxygen levels. An overdose from fentanyl can happen in 15 minutes when smoked or in 20 minutes when taken orally, according to Kosten.

Symptoms of fentanyl consumption include euphoria, dizziness, drowsiness, confusion and nausea, according to the CDC. Signs of [fentanyl](#) overdose include choking or gurgling sounds, falling asleep or losing consciousness and cold or clammy skin. Other signs include pinpoint pupils, weak breathing and blue skin, lips and nails.

## How do I use Narcan?

It can be hard to tell whether a person is overdosing, the CDC says, but if you aren't sure, call 911 immediately and if available, administer naloxone, a life-saving medication that can reverse [opioid overdoses](#). Narcan, one brand of naloxone [nasal spray](#), will soon be sold over the counter at drugstores and grocery chains like CVS, Walgreens and Walmart.

In addition, the CDC recommends keeping the person awake and breathing, laying them on their side to avoid choking and remaining with them until emergency assistance arrives.

Administering the nasal spray takes three steps: Peel, place and press.

- Peel back the packaging and remove the device. Each unit is one dose.
- Place the tip of the nozzle as far as possible in either nostril.
- Press down on the plunger.

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