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Illicit Drug Supply 2022: More potent methamphetamine, forms and mixtures of fentanyl and the “Xines” “Xenes”

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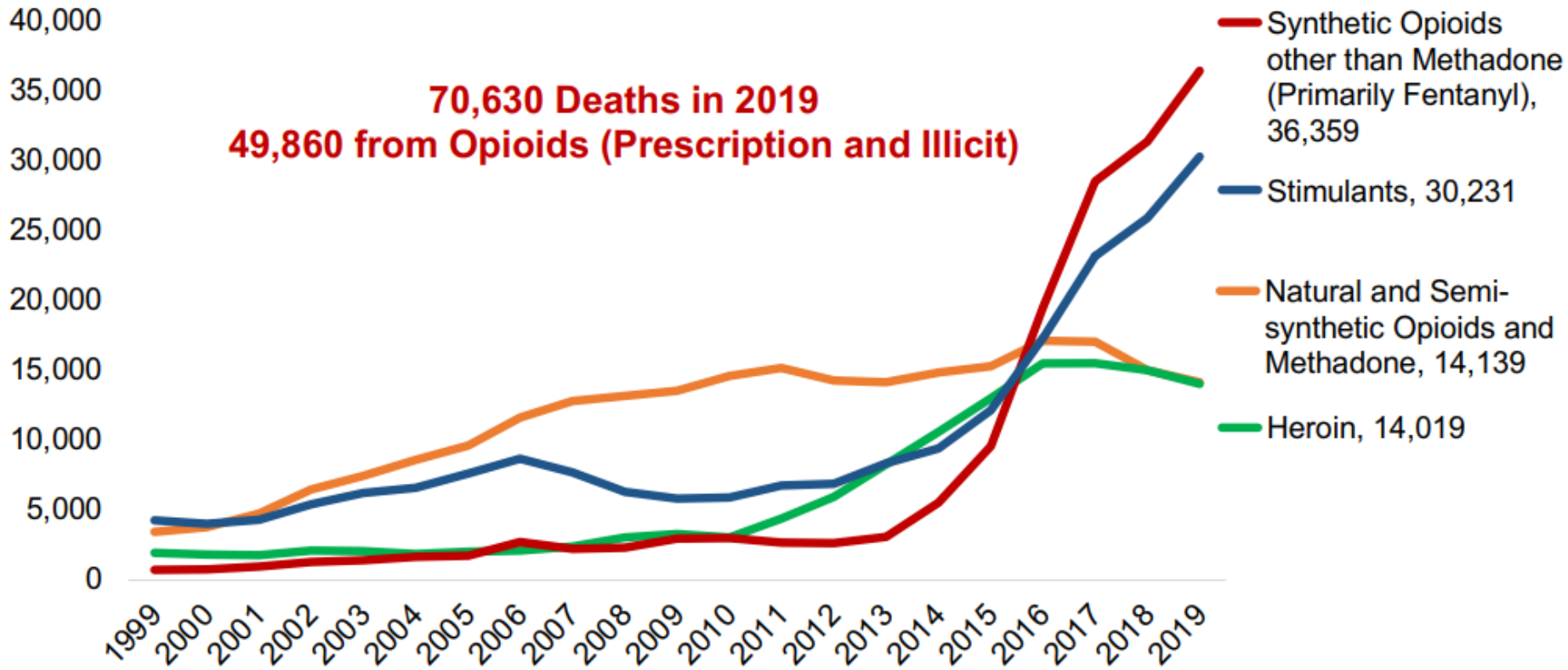
Beyond Prescription Opioids and Heroin

The 2022 drug market

1. Cocaine (with fentanyl)
2. More potent methamphetamine (with and without fentanyl)
3. Fentanyl and analogues
4. Benzimidazole, metonitazene, isotonitazene (opioids)
5. Xylaxine (non-opioid)
6. Gabapentin

Evolution of Drivers of Overdose Deaths, All Ages

Analgesics → Heroin → Fentanyl → Stimulants



Source: The Multiple Cause of Death data are produced by the Division of Vital Statistics, National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), United States Department of Health and Human Services (US DHHS).

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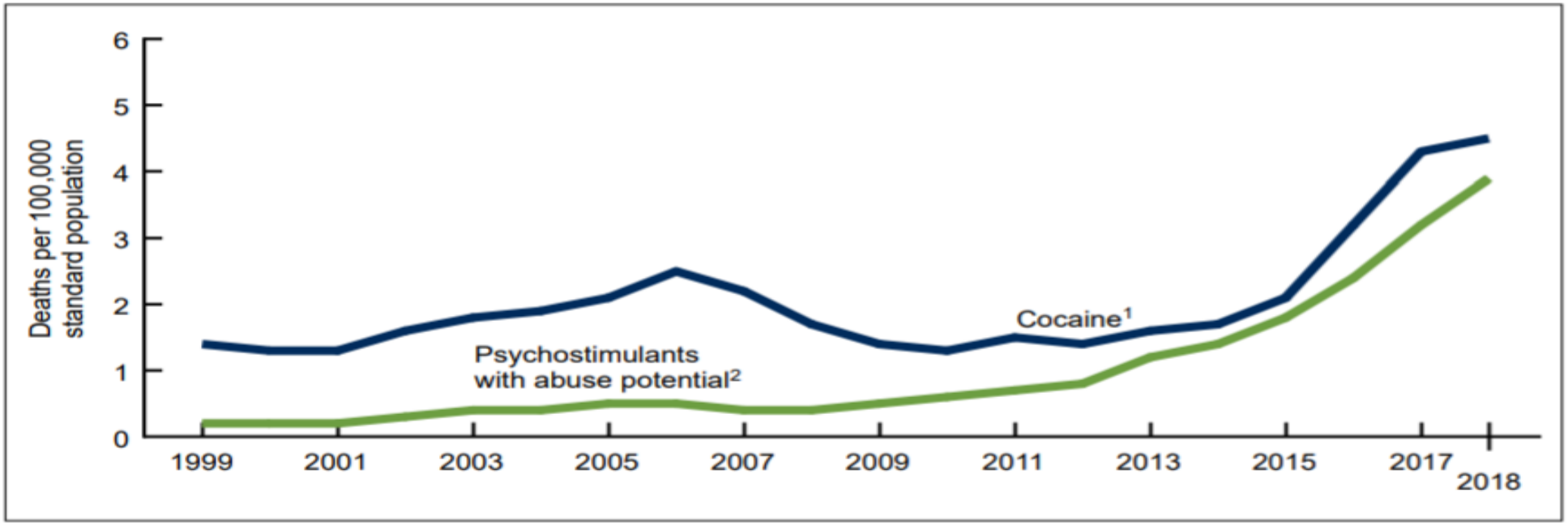
Stimulant Overdose Rates 1999-2018

Figure 4. Age-adjusted drug overdose death rates involving stimulants, by type of stimulant: United States, 1999–2018



[1]Significant increasing trend from 1999 through 2006, decreasing trend from 2006 through 2012, and increasing trend from 2012 through 2018 with different rates of change over time, $p < 0.05$.
[2]Significant increasing trend from 1999 through 2005, 2008 through 2012, and 2012 through 2018 with different rates of change over time, $p < 0.05$.
NOTES: Deaths are classified using the *International Classification of Diseases, 10th Revision*. Drug-poisoning (overdose) deaths are identified using underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. Drug overdose deaths involving selected drug categories are identified by specific multiple-cause-of-death codes: cocaine, T40.5; and psychostimulants, T43.6. Deaths may involve multiple drugs. The percentage of drug overdose deaths that identified the specific drugs involved varied by year, with ranges of 75%–79% from 1999 through 2013 and 81%–92% from 2014 through 2018. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db356_tables-508.pdf#4.
SOURCE: NCHS, National Vital Statistics System, Mortality.

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Steep Rise in Stimulant/Opioid Mortality Rates

Combination of cocaine/opioid mortality from 2007-2019 increased 184% among White people but 575% among Black people

Combination of methamphetamine/opioid mortality during this period rose 3200% among White people and an astounding 16,200% among Black people

Cocaine/opioid mortality rates also rose sharply among Latino/a people and Asian-Americans during this period

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Drug Overdose Deaths* Continue to Increase in 2021

	ALL DRUGS	HEROIN	NAT & SEMI SYNTHETIC	METHADONE	SYNTHETIC OPIOIDS (mainly illicit fentanyl)	COCAINE	OTHER PSYCHO-STIMULANTS (mainly meth)
11/2020*	92,366	13,698	13,667	3,593	56,595	19,953	23,894
5/2021	101,075	11,633	13,909	3,802	64,871	21,235	28,890
11/2021*	106,854	9,504	13,643	3,619	70,420	23,908	32,476
Percent Change 11/20-11/21	**15.7%**	**-30.6%**	**-0.2%**	**0.7%**	**24.4%**	**19.8%**	**36.0%**

*NCHS Provisional drug-involved overdose death counts are PREDICTED VALUES, 12 months ending in select months.

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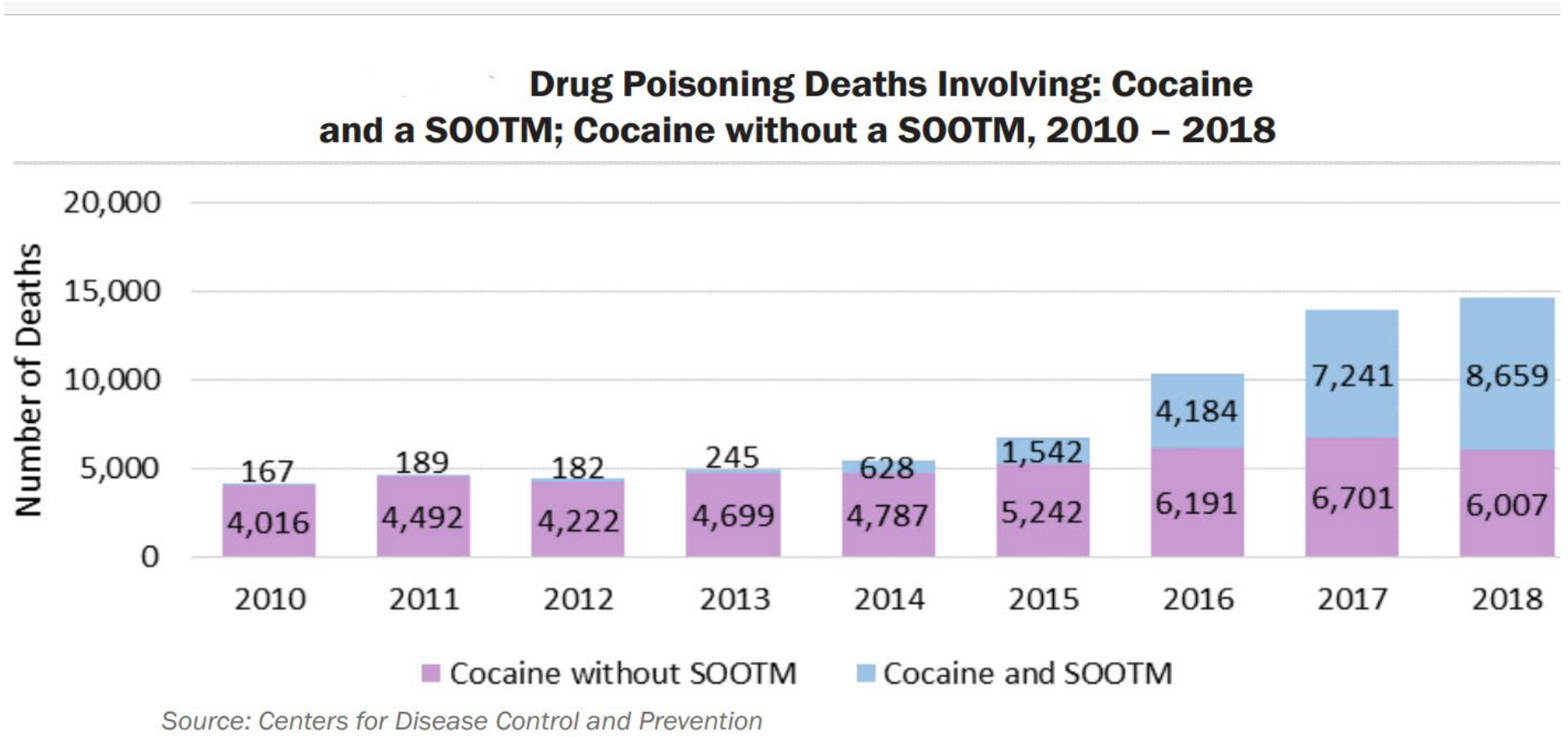
Cocaine Deaths with and without SOOTM



Source: Centers for Disease Control and Prevention

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Colombia cocaine: UN reports record coca crop

BBC Oct 20, 2022

- Colombia has increased its cultivation of coca plants - the main ingredient in the illegal drug cocaine - by 43%, a new UN report says.
- Last year the area of coca cultivation expanded to a vast 204,000 hectares (504,100 acres). Colombia is already the world's largest cocaine producer.
- It is the highest figure since the UN Office on Drugs and Crime (UNODC) began collecting such data in 2001.

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Cocaine Overdose

- As of 2022, the great majority of cocaine overdoses involve fentanyl. If an individual is said to have used cocaine and is now unconscious, it should be assumed they are overdosed with fentanyl as well as cocaine. Respiratory depression requires urgent treatment. Naloxone should be administered as per overdose protocols for fentanyl.

- With high dose cocaine, heart attack and seizure can occur in the absence of fentanyl.

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Methamphetamine 2022: Not Breaking Bad Meth

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Methamphetamine

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Perris, CA, largest domestic meth seizure 2200 pounds on 10/2/20

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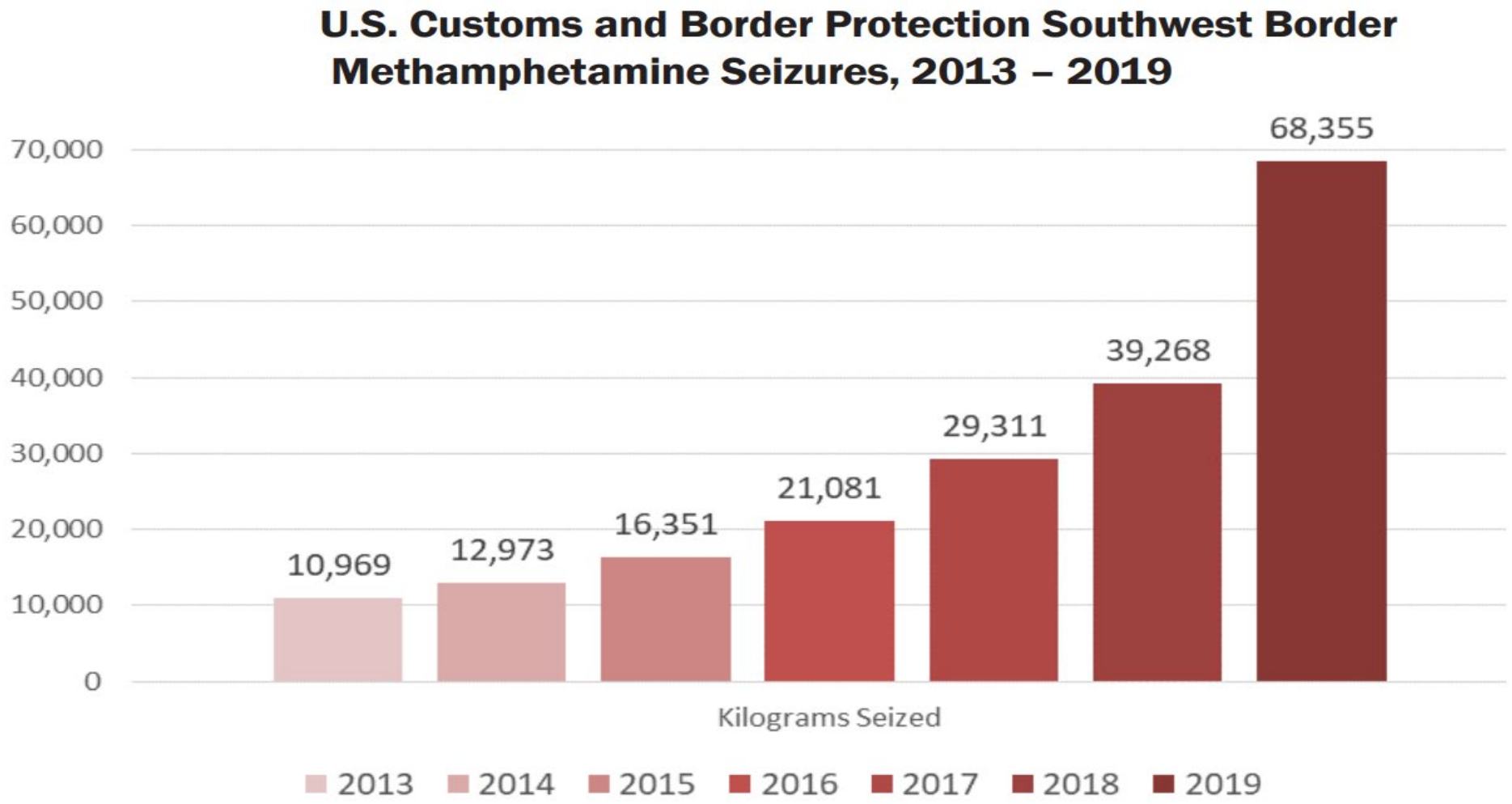
Methamphetamine SW Border Seizures



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Potency and Purity

- **Potency** refers to how much of the drug is needed to produce an effect.
- The shift from ephedrine and pseudoephedrine precursors to phenyl-2-propanone (P2P) has resulted in greater potency.
- A slight difference in the arrangement of the atoms results in greater potency.
- In the make up of MA there can be a d-isomer and an l-isomer. The former results in greater potency which is determined by the proportion of d-isomer in the MA.
- **Purity** refers to how much methamphetamine is present compared to other inert substances.

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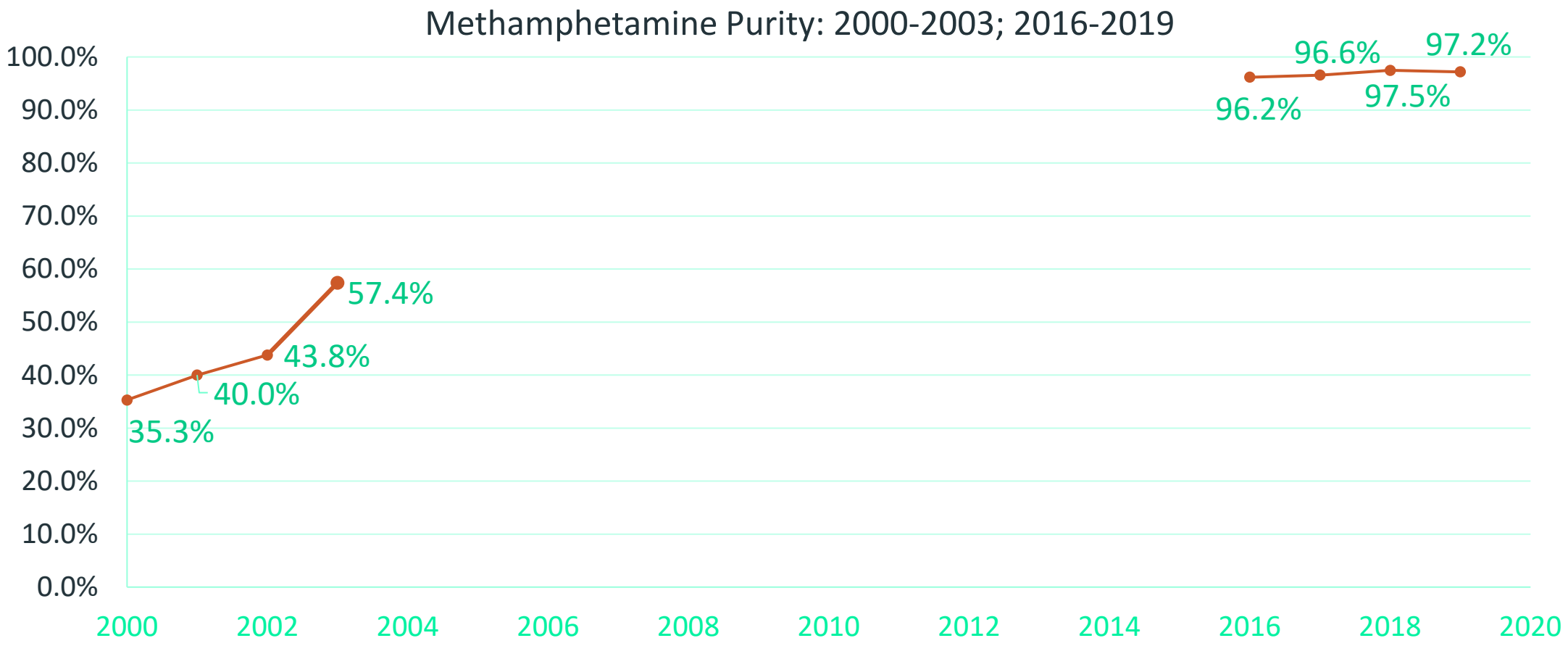
Methamphetamine Purity 2000-2003 and 2016-2019



Sources: The National Threat Assessment, 2005, National Drug Intelligence Center, U.S. Dept. of Justice
DEA Methamphetamine Profiling Program.
National Drug Threat Assessment, 2020. DEA Methamphetamine profiling program.

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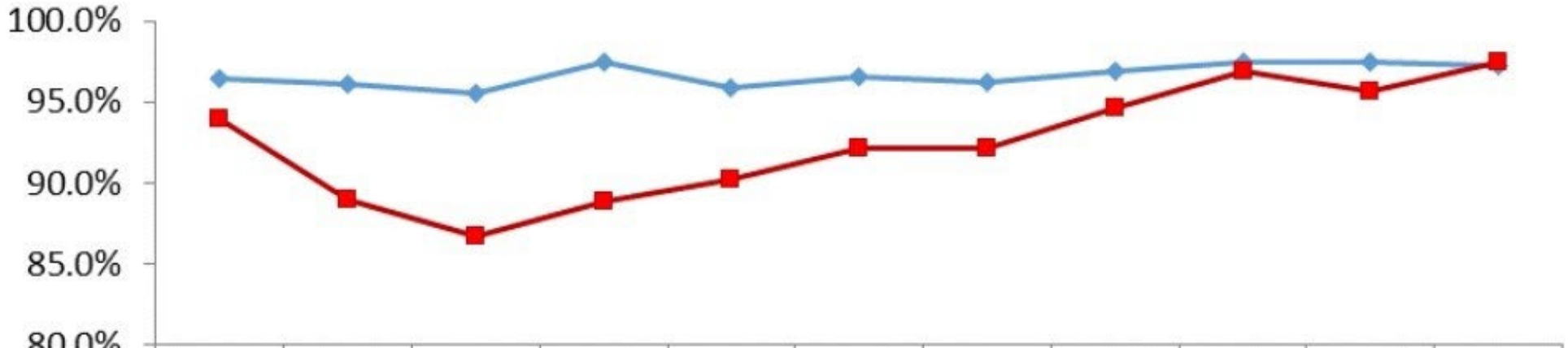
Methamphetamine Purity and Potency



	1st 2014	2nd 2014	1st 2015	2nd 2015	1st 2016	2nd 2016	1st 2017	2nd 2017	1st 2018	2nd 2018	1st 2019
Purity	96.5%	96.2%	95.6%	97.5%	95.9%	96.6%	96.2%	96.9%	97.5%	97.5%	97.2%
Potency	94.0%	89.0%	86.7%	88.9%	90.2%	92.1%	92.1%	94.6%	96.9%	95.6%	97.5%

e: DEA Methamphetamine Profiling Program

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Vermont Overdose Data Oct 2022

Monthly Morbidity and Mortality Report
Vermont Department of Health
October 10, 2022

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Vermont Overdose Oct 2022

What we've seen through July – 68 out of 126 (54%) opioid overdose deaths among VT residents involved stimulants.

Most involved cocaine (N=64, 51%), while methamphetamine has been less common (N=9, 7%).

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Methamphetamine Overdose

In 2022, it should be assumed that a person who overdoses on meth, likely also is experiencing a fentanyl overdose, typically evidenced by decreased respiration (stopped breathing)

- Treat with naloxone using protocols for fentanyl

In some parts of the US there are a significant number of individuals who experience methamphetamine overdose without fentanyl. With a methamphetamine overdose without fentanyl, death can occur from:

Hyperthermia (very high body temperature; eg 107-108 degrees)

Stroke

Cardiac events (eg heart attack, severe hypertension)

It is possible for an individual to have a combined overdose from fentanyl and methamphetamine, requiring treatment for both drugs.

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Fentanyl

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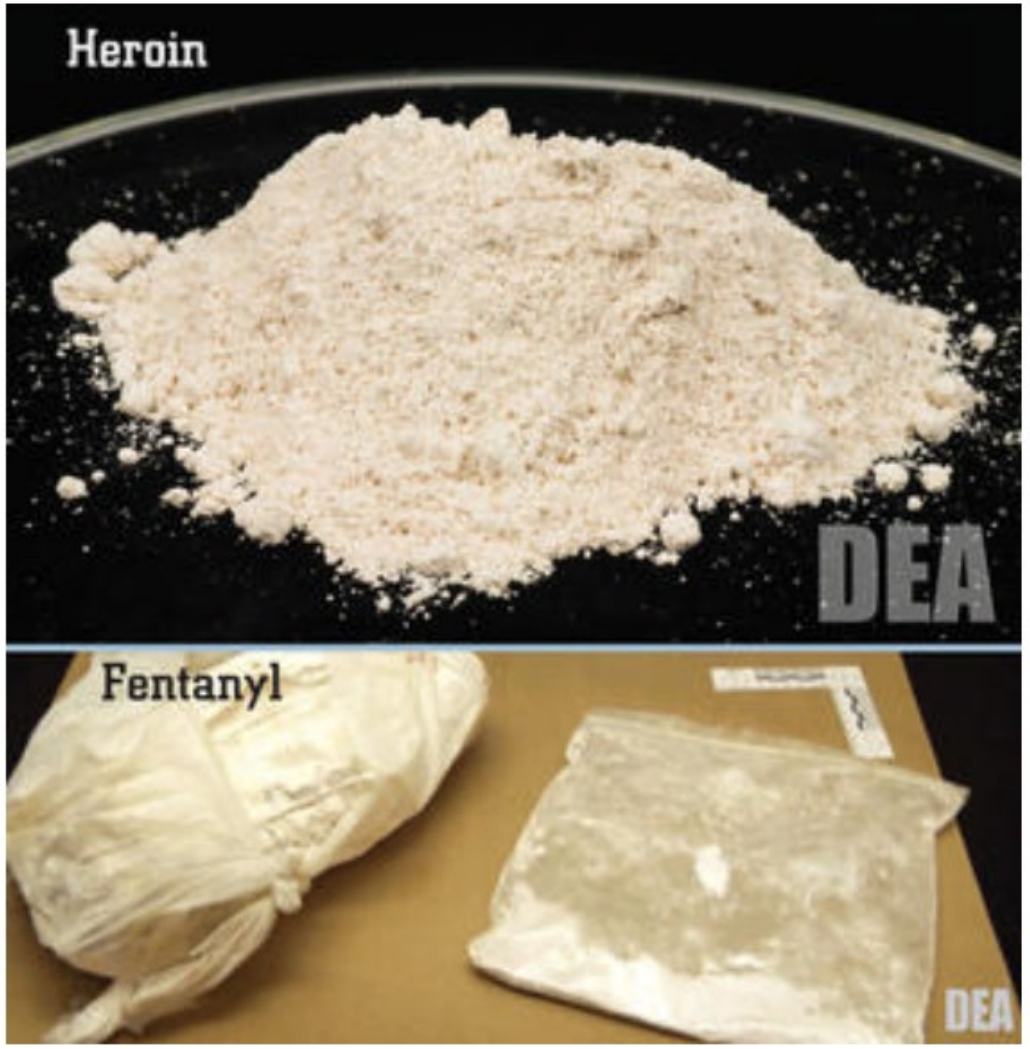
Fentanyl and heroin



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A pencil point of fentanyl

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A lethal dose

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An overview of fentanyl and fentanyl analogs

The chief of medical toxicology at UMass Chan Medical School, Kavita Babu, MD, wrote an article on fentanyl for the Conversation in May 2022.

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Fentanyl Overview

- This synthetic opioid was developed as painkiller for surgery.
- Fentanyl is 50 times more potent than heroin.
- Fentanyl has a specific chemical structure with multiple areas than can be modified to form related compounds with marked differences in potency
- In 2016 some patients who overdosed only had fentanyl in their toxicology reports.

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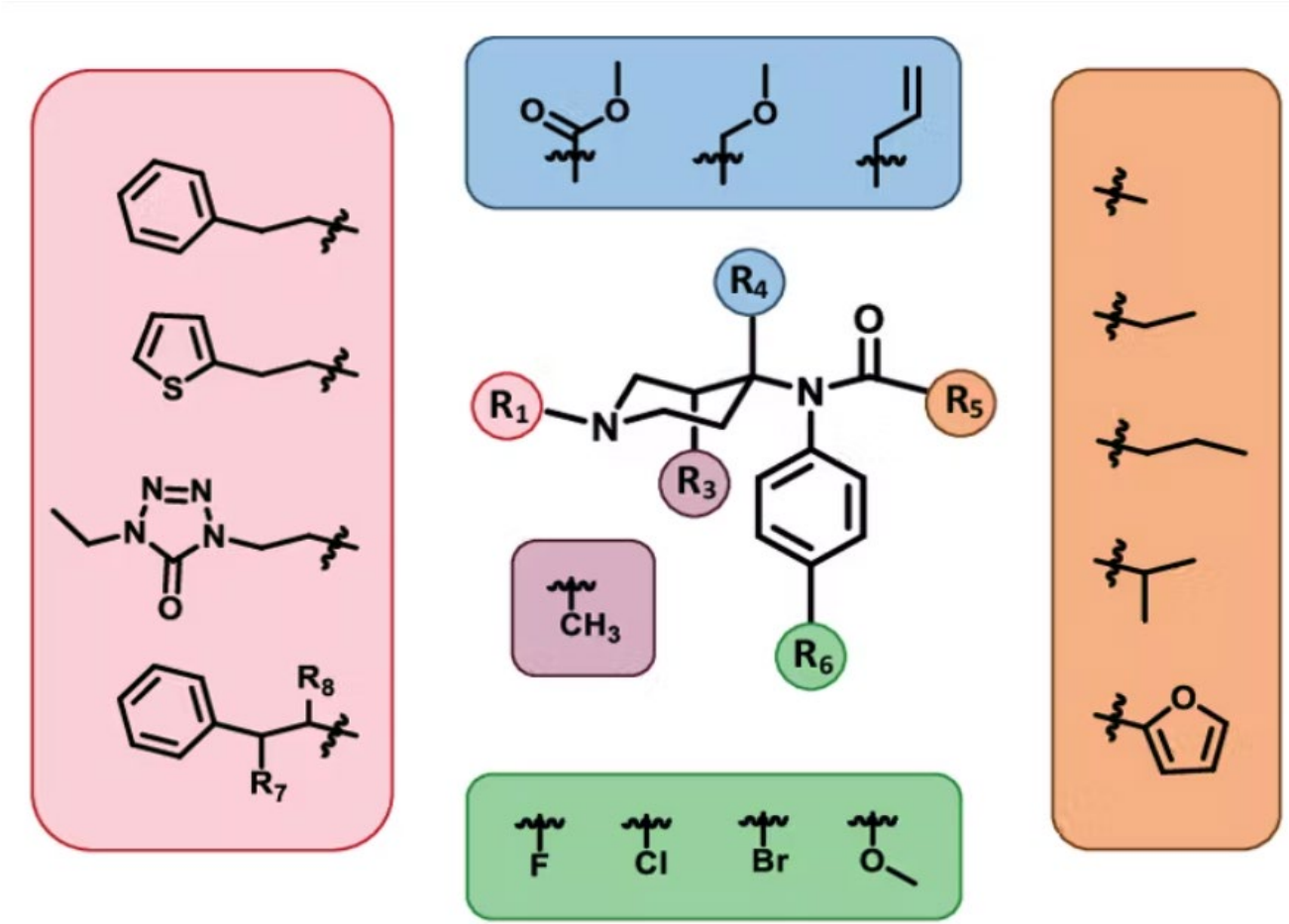
Fentanyl's chemical backbone (the structure in the center) has areas (the colored circles) that can be substituted with the surrounding colored boxes to change its potency. For example, carfentanil is 100 times more potent than fentanyl.



Fentanyl's chemical backbone (the structure in the center) has multiple areas (the colored circles) that can be substituted with different functional groups (the colored boxes around the edges) to change its potency. Christopher Ellis et al., CC BY-

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Overdose and Origins

- From May 2020 to April 2021 more than 100,000 Americans died for a drug overdose.
- 64% of these deaths were due to synthetic opioids like fentanyl.
- Fentanyl is synthesized in China, Mexico and, India and exported to The U.S. as a powder or pressed in pills.
- Fentanyl can be purchased on the dark web and delivered through traditional delivery services including the U.S Postal Service.

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The images of legitimate and fake pills are examples and do not represent the many variations of fake pills. Never trust your own eyes to determine if a pill is legitimate. The only safe medications are ones prescribed by a trusted medical professional and dispensed by a licensed pharmacist.

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Fake “Oxys” M30s

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Fentanyl Packaged as Candy

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Rainbow fentanyl

Rainbow Fentanyl: A Dangerous Trend

Sep 27, 2022

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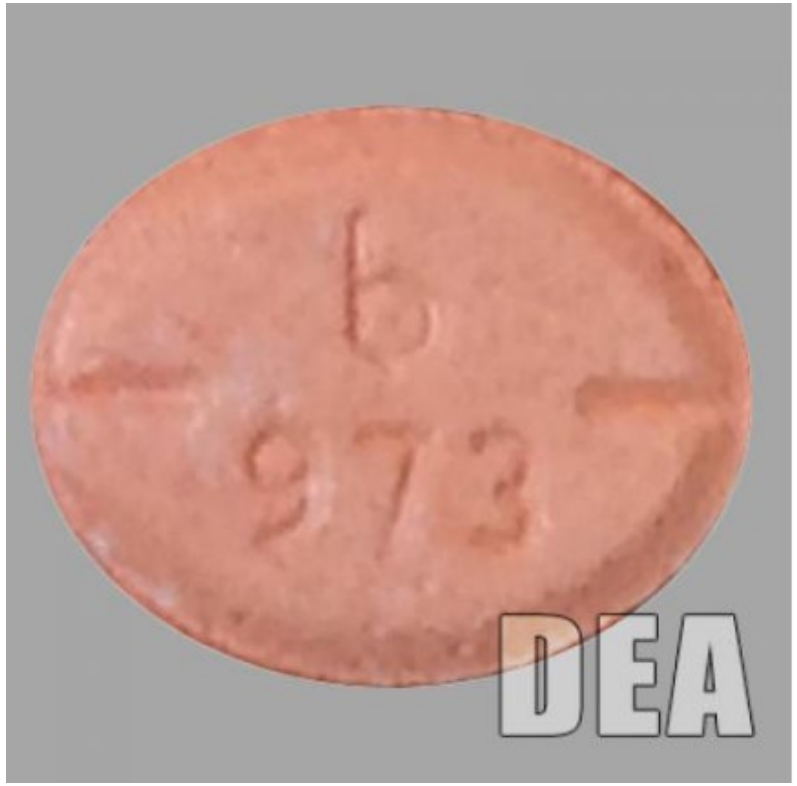
Authentic Adderall



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Fake Adderall

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Overdose Risk and Prevention

- Fentanyl is sold both alone and as an adulterant to allow trafficking of smaller quantities but with no reduction in drug effect.
- Small quantities of fentanyl can be deadly and especially if the user is not aware of the presence of fentanyl.
- Preventing overdose can be helped by distributing naloxone, increasing availability effective treatment such as methadone and buprenorphine, lowering barriers to treatment, and providing fentanyl test strips.

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Guidance on Handling the Increasing Prevalence of Drugs Adulterated or Laced with Fentanyl

2021, National Council for Mental Wellbeing

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The Fentanyl Problem

- Fentanyl and its analogs are the primary drivers of death in the opioid overdose crisis.
- Fentanyl can be used knowingly or unknowingly.
- It has been pressed into counterfeit pills mimicking prescription medicines.
- It is 50 times stronger than heroin.
- Unintended use, particularly by people with no or low opioid tolerance, has resulted in a spike in drug overdose deaths.

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The Fentanyl Problem

- Overdose can occur by ingestion, injection, or inhalation.
- Overdose by fentanyl can not occur by exposure through skin.
- Reversal of fentanyl overdose may require repeated doses of naloxone.
- This paper offers recommendations for remediating the impact of fentanyl.

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Four Principles to Address the Fentanyl Crisis

1. Pursue an incremental approach to behavior change (that is, harm reduction).
   - Goal is reducing risk vs abstinence.
   - Only 20%-30% are in the active stage of change.
2. Emphasize engagement.
   - Programs should offer whatever information or services the potential patient is open to receiving.
   - Encourage return for a follow-up visit.

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Four Principles to Address the Fentanyl Crisis

3. Use integrated care to initiate engagement and treatment.
   - Medical settings and primary care are where initial screening and intervention may occur.
4. Be vigilant for fentanyl as the rule rather than the exception.
   - Clinical staff should assume the street drugs are contaminated with fentanyl and every overdose involves fentanyl.

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Testing for Fentanyl

- Fentanyl test strips (FTS) can detect the presence of fentanyl in drug samples.
- FTS cost is $1.00 per strip.
- Testing is 96% accurate and can detect at least 10 fentanyl analogs.
- The legality of FTS varies from state to state (some states view FTS as illegal drug paraphernalia).

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Testing for Fentanyl

- One study of FTS found 85% of people using illicit drugs wanted to know about the presence of fentanyl.
- Positive changes as a result of tests included:
  - Using a smaller dose.
  - Snorting instead of injecting.
  - Pushing the syringe plunger more slowly to gradually assess drug effect.
  - Having naloxone nearby.
  - Not using the drug.
  - Not using alone.
- There is no evidence that use of FTS has a permissive effect on promoting drug use.

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Duhart Clarke SE, Kral AH, Zibbell JE. Consuming illicit opioids during a drug overdose epidemic: Illicit fentanyls, drug discernment, and the radical transformation of the illicit opioid market. Int J Drug Policy. 2022 Jan;99:103467. doi: 10.1016/j.drugpo.2021.103467. Epub 2021 Oct 15. PMID: 34662847; PMCID: PMC8755588.

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Introduction

- Uncertainty of the presence of fentanyl in opioids has led to some safer practices among people who inject drugs (PWID).
  - Tester shots
  - Micro-dosing
  - Staggering injections with peers
  - Fentanyl test strips
- This qualitative study was to better understand how PWID came to recognize fentanyl by sight, taste, and subjective drug effects in order to prevent overdose.

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Methods

- Study participants were recruited at a needle services program in Greensboro, North Carolina.
- Eligible participants used illicit opioids and injected in the past 7 days.
- Semi-structured, 60-minute, interviews were conducted.

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Results: Physical Sensations

- Participants detected changes to the heroin supply using sensory and subjective drug effects.
- Most (86%) identified 2014 and 2015 as the point when the “heroin” suddenly started to feel different.
- All noted sharp increases in potency.
- The rush was much more intense sometimes to the point of causing panic and anxiety.
- 25% described feeling “pins and needles” on the neck or face (the prickly sensations did not occur with heroin).

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Results: Physical Sensations

- The fentanyl high was described as much briefer (sometimes just minutes) compared to heroin (4 to 8 hours).
- Many described fentanyl as “having no legs.”
  - “If you got something that lasts for more than 10 minutes (after the initial rush) you found some really amazing shit.”
  - “It wears off faster than heroin…so people use a lot more--every fucking 30 minutes to an hour.”
- Fentanyl effects were described as being more like a sedative with tranquilizing effects and periods of unconsciousness.

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Results: Changes in Appearance and Taste

- Participants claimed they could detect fentanyl in “heroin” simply by appearance.
  - Heroin in this area is darkish brown and fentanyl is mainly white or gray.
  - Over time some felt the color factor became less useful as the fentanyl started to be cut to give it a darker appearance.
- Texture also distinguished heroin (granular and rocky) from fentanyl (a fine powder).
- Taste: heroin has a bitter flavor and a vinegary smell; fentanyl tastes sweet and has a medicinal flavor.

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Results: Modifying Drug Preferences

- The prevalence of fentanyl has had the effect of altering drug consumption patterns and preferences particularly the increased use of stimulants.
- 72% reported smoking or injecting cocaine or crack.
- 44% reported using methamphetamine.
- Two approaches to stimulant use were reported:
  - Concurrent use in a single injection (speedball or goofball).
  - Sequential use in separate injections.

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Results: Modifying Drug Preferences

- Participants reported the use of stimulants was related to the extreme sedative effect of fentanyl requiring a counteracting drug.
- “Yeah, as methamphetamine goes now, everybody calls it ice and it’s definitely out there. I would say 8 of 10 people that inject heroin love to do ice because it’s a speedball…Me personally, I like to rush off one and then I wait a while and I like the rush of the other.”
- “…the meth is going to keep you awake, which is important when using fentanyl, since what overdoses you is that you fall asleep and then you stop breathing…”

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Results: Modifying Drug Preferences

- 24% reported using gabapentin to enhance the opioid high and minimize withdrawal symptoms.
- “I love gabapentin. When I was in drug court that’s the only thing I could get away with, and I would get so high off gabapentin. They gave me energy, it just makes me feel good. It enhances the high from dope. It potentiates. And they are dirt cheap, $1.00 apiece.”
- Several reported use as described above, but more reported use to reduce withdrawal symptoms.
- Reported amounts used for withdrawal ranged form 500mg to 2000mg.

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Results: Changing Patterns of Drug Consumption

- All reported using opioids more frequently because of fentanyl's short high.
- The higher number of daily injections resulted in physical harm.
  - " The fact I have to inject more is tearing my veins up. I'm losing sensation in fingers; my legs swell now because I'm using the veins in my legs."
- Some who used opioids and stimulant reported smoking the stimulant to save their veins for injecting opioids.
- Some switched from injecting to smoking or sniffing opioids also.

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Results: Changing Patterns of Drug Consumption

- To reduce overdose risk some injected a “tester shot” which is a smaller amount of drug to test its potency.
- Some avoided using alone.
- Some reported patronizing the same dealer who could be relied on to disclose the type and strength of the product.

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Discussion

- The strong rush and short high reported is consistent with fentanyl's pharmacologic profile as a synthetic opioid with high lipophilicity resulting in a rapid onset of action and short duration of effect.
- The higher frequency of injection increases the number of times per day people are exposed to blood-borne pathogens (e.g., HIV/HCV).
- Mounting evidence that stimulants are used to manage fentanyl-induced sedation suggests that overdose deaths involving fentanyl and stimulants are largely due to intentional mixing rather than an adulterated supply.

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Trecki J, Gerona RR, Ellison R, Thomas C, Mileusnic-Polchan D. *Notes from the Field*: Increased Incidence of Fentanyl-Related Deaths Involving *Para*-fluorofentanyl or Metonitazene — Knox County, Tennessee, November 2020–August 2021. MMWR Morb Mortal Wkly Rep 2022;71:153–155.
DOI: http://dx.doi.org/10.15585/mmwr.mm7104a3

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New Fentanyl Compounds

- Other fentanyl compounds are appearing in heroin, counterfeit pills and in autopsy findings.
- Para-fluorofentanyl was developed through research efforts in the 1960's and classified as a schedule I substance.
- Para-fluorofentanyl is showing up now in seized heroin, counterfeit pills, and autopsy findings.
- Carfentanil (100 times more potent than fentanyl) has been reported in a very few cases in the Midwest.

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New Opioid Class

- Benzimidazole was developed in the 1950's as a new opioid analgesic and is now showing up as a heroin adulterant.
- Metonitazene, an opioid in the benzimidazole class, is also showing up more frequently.

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Benzimidazole-Opioids Other Name: Nitazenes

- Benzimidazole opioids, also known as nitazenes, are a class of synthetic opioids with an unusual structure and often referred as opioid First synthesized in the 1950s as potential analgesic medications, several substances in the class have been identified, the best known being etonitazene. Like other synthetic opioids, benzimidazole opioids bind the mu-opioid receptor and may exhibit potency up to several hundred times that of morphine.
- While several substances in this class have found applications in research, they have never been used in clinical medicine due to their profound risk of respiratory depression and death,[2] and have recently been recognized as emerging drugs of abuse.[3][4][5] Isotonitazine was first identified in samples of illicit drugs, and implicated in opioid overdose deaths in Europe, Canada, and the United States beginning in 2019.[6] Previously known nitazene analogs such as metonitazine and butonitazine, as well as novel nitazenes not previously patented, have since been discovered in toxicologic samples during forensic investigations.[5]

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Metonitazene

- Metonitazene is an analgesic compound related to etonitazene,[2][3] which was first reported in 1957,[4] and has been shown to have approximately 100 times the potency of morphine by central routes of administration,[5] but if used orally it has been shown to have approximately 10 times the potency of morphine.[6]
- Its effects are similar to other opioids such as fentanyl and heroin, including analgesia, euphoria, and sleepiness.[6][7] Adverse effects include vomiting, and respiratory depression that can potentially be fatal.[8] Because of high dependency potential and dangerous adverse effects it has never been introduced into pharmacotherapy

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Isotonitazene “Iso”

- Isotonitazene is a potent synthetic opioid, and it is being abused for its opioidergic effects. The abuse of isotonitazene, similar to other synthetic opioids, has been associated with adverse health effects, including numerous deaths.

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Involvement of New Drugs on Overdose

- In Tennessee the Knox County Regional Forensic Center reported on 770 unintentional overdose deaths.
- 562 (73%) were positive for fentanyl, para-fluorofentanyl, or metonitazene alone or in combination.
- 192 (34%) were positive for fentanyl in the absence of other substances.
- 188 (33%) were positive for fentanyl and methamphetamine.
- 48 (8%) involved para-fluorofentanyl
- 26 (5%) involved metonitazene.

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Medical Providers Should be Aware

- Both para-fluorofentanyl and the benzimidazole opioid, metonitazene contributed to unintentional overdose deaths in eastern Tennessee.
- These substances alone are capable of causing respiratory depression leading to death.
- Naloxone is capable of reversing overdose caused by these substances but additional doses may be necessary when fentanyl and these new substances are involved.

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Xylazine

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Xylazine.

Xylazine is a pharmaceutical drug used for sedation, anesthesia, muscle relaxation, and analgesia in animals such as horses, cattle, and other non-human mammals. Veterinarians also use xylazine as an emetic, especially in cats. It is an analog of clonidine and an agonist at the α_2 class of adrenergic receptor.

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Use of Xylazine in veterinary medicine

Xylazine and it's antidote Tolazoline is an essential tool universally used by veterinarians who work on livestock. Many surgical procedures would not be possible or would be inhumane without such a short term sedative/analgesic. It is extremely effective for bovine, sheep and goats. Administered intravenously or intramuscularly by a veterinarian Xylazine is a systemic anesthetic lasting about an hour. The reversing drug Tolazoline is used to reverse xylazine effects.

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Xylazine has been studied in humans for its potential use as an analgesic, hypnotic, and anesthetic, but these clinical trials were terminated due to **its severe hypotension and central nervous system depressant effects**.

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“For veterinary use only”

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“For horses and cervidae”

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Xylazine information from NIDA

- Also known as “tranq,”[5] xylazine is a central nervous system depressant that can cause drowsiness and amnesia and slow breathing, heart rate, and blood pressure to dangerously low levels.[6,7] Taking opioids in combination with xylazine and other central nervous system depressants—like alcohol or benzodiazepines increases the risk of life-threatening overdose.

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Alexander RS, Canver BR, Sue KL, Morford KL. Xylazine and Overdoses: Trends, Concerns, and Recommendations. Am J Public Health. 2022 Aug;112(8):1212-1216. doi: 10.2105/AJPH.2022.306881. PMID: 35830662; PMCID: PMC9342814.

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Xylazine Overview

- Xylazine is a **non-opioid veterinary anesthetic** and sedative which is approved by the FDA for use in veterinary medicine.
- As recently as 2018 it was rarely seen in the illicit drug market but now it is often found with heroin, fentanyl, and cocaine.
- It is increasingly involved in overdose deaths when combined with opioids.
- There is no specific reversal agent (such as naloxone for opioids) approved for humans.
- The alpha-2 adrenergic antagonist (tolazoline) is a xylazine reversal agent in veterinary medicine.

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Xylazine Prevalence Trends

- Most incidents of xylazine use has been in the Northeast.
- Over the 2-year period prior to 2022 xylazine has more than doubled in prevalence in fatal overdoses in Connecticut.
- Similar increased have been reported in Philadelphia.
- In 2019, 2% of all drug overdose deaths contained xylazine but 67% were in the Northeast.
- In Connecticut in 2019, 71 deaths contained xylazine and fentanyl; in 2020 there were 141 such deaths; in the first 30 weeks of 2021there were 172 deaths with xylazine and fentanyl.

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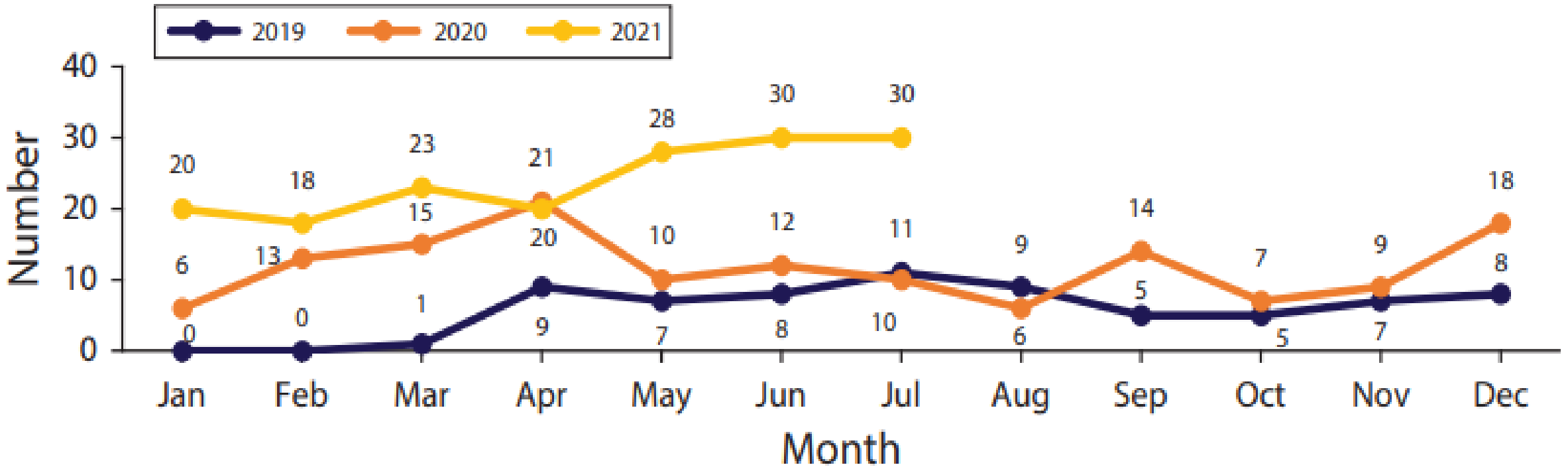
Xylazine Overdose Deaths by Month Connecticut: 2019-2021



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Recommendations

- All cases of suspected drug overdose should include xylazine testing.
- Test kit developers should consider creating xylazine test strips similar to fentanyl test strips.
- The safety and effectiveness of tolazoline as a xylazine reversal agent should investigated.
- Universal harm reduction strategies should be promoted.

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Increasing presence of xylazine in heroin and/or fentanyl deaths, Philadelphia, Pennsylvania, 2010-2019. Inj Prev. (Johnson et al 2021)

- Xylazine is a non-opioid sedative, analgesic, and muscle relaxant used in veterinary medicine and not approved for human use.
- It has been found among people who use drugs in Puerto Rico since the early 2000s and referred to as “anestesia de caballo” (horse anesthetic).
- The Philadelphia Medical Examiner found xylazine in less than 2% of fatal heroin and/or fentanyl overdoses between 2010 and 2015 and an increase to 31% in 2019.

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Results

- Those positive for xylazine were mainly male (76%), between the ages of 35 to 54 (47%), and non-Hispanic white (65%).
- Among 2019 decedents positive for xylazine,
  - 100% were positive for fentanyl,
  - 10% positive for heroin,
  - 12% were positive for methamphetamine,
  - 28% were positive for benzodiazepines,
  - 53% were positive for cocaine.

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Discussion

- Fentanyl has largely replaced heroin in Philadelphia.
- The combination of xylazine and fentanyl may potentiate the desired effect of sedation.
- From 2010 to 2019 benzodiazepines prevalence dropped from 58% to 28% possibly reflecting the preference for xylazine.
- Focus groups reported xylazine made the fentanyl feel like a heroin high (longer and more sedating).
- Xylazine should be included in toxicology testing.

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Monthly Morbidity and Mortality Report
Vermont Department of Health
October 10, 2022

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Xylazine in opioid overdose deaths

2022	Total Opioid Overdose Deaths	Number of Opioid Overdose Deaths Involving Xylazine	Percent of Opioid Overdose Deaths with Xylazine
January	23	4	17%
February	14	7	50%
March	12	4	33%
April	20	4	20%
May	14	3	21%
June	16	4	25%
July	27	12	44%

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Xylazine in an overdose

In the event of a suspected xylazine overdose, experts recommend **giving the opioid overdose reversal medication naloxone** because xylazine is frequently combined with opioids. However, because xylazine is not an opioid, naloxone does not address the impact of xylazine on breathing.

Assistance with breathing can be useful in assisting with an overdose involving xylazine.

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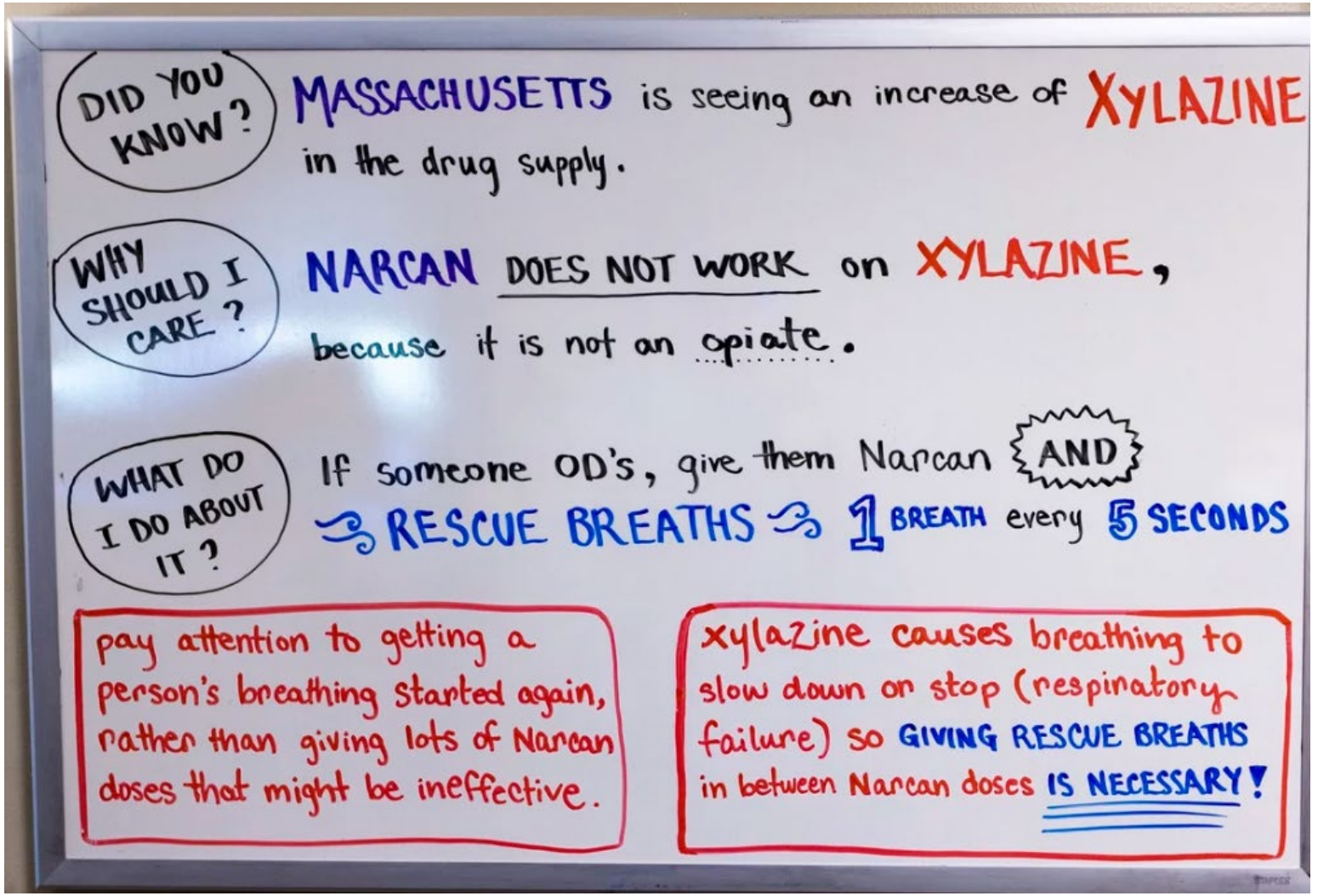
From a Massachusetts clinic



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Xylazine effects

- In humans xylazine can cause hypotension, central nervous system depression, respiratory depression, and bradycardia.
- It also causes open skin ulcers among injectors who may continually inject affected areas for pain relief.

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Xylazine Caused Wounds

- Repeated xylazine use is causing wounds on users' bodies (not solely on injection sites).
- In some cases sores are resulting in amputations.

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Sores at injection sites

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Gabapentin

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Gabapentin

- Gabapentin is a prescription medication known as a gamma aminobutyric acid (GABA) analogue. GABA reduces the excitability of nerve cells (neurons) in the brain, which play a role in seizures and the transmission of pain signals. Gabapentin mirrors the effects of GABA calming excited neurons.
- Gabapentin is in a class of medications called anticonvulsants.

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Gabapentin

- Gabapentin (Neurontin, Gralise, Horizant) is a medicine used to treat partial seizures, nerve pain from shingles and restless leg syndrome. It works on the chemical messengers in your brain and nerves. Gabapentin is from a group of medicines called anticonvulsants.
- **Neurontin (gabapentin)** is used to treat pain you may have from shingles (postherpetic nerve pain). It is also used with other seizure medicines for partial onset seizures in patients 3 years and older.
- **Gralise (gabapentin)** is only used for pain after having shingles (postherpetic nerve pain). It should not be used for any other medical condition.
- **Horizant (gabapentin enacarbil)** is an extended release tablet used to treat restless legs syndrome and for the pain from having shingles (postherpetic nerve pain).

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Gabapentin

- Gabapentin is the seventh most prescribed drug in the U.S.
- It is increasingly implicated in overdoses.
- It is sometimes used to amplify the effects of illicit opioids.

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Gabapentin

- Gabapentin alone is safe but when used with other CNS depressants, there is a risk of respiratory depression and overdose.
- Gabapentin was detected in about 10% of overdose deaths in 2019-2020.
- It was ruled the cause of death in about half of these cases.

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Questions?

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