Partnership for a Drug-Free New Jersey
In Cooperation with the Governor's Council on Substance Use Disorder and the NJ Dept. of Human Services

OPIOID EDUCATION FOUNDATION OF AMERICA

OFFICE OF ALTERNATIVE & COMMUNITY RESPONSES

NJCARES.gov
New Jersey Coordinator for Addiction Responses and Enforcement Strategies

Opioids and Synthetics: What We Need to Know

January 29, 2026

Partnership for a Drug-Free New Jersey
In Cooperation with the Governor's Council on Substance Use Disorder and the NJ Dept. of Human Services

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Other members of the care team will receive a certificate of participation.

Additional Continuing Education Credit

EMT

This webinar has been approved by NJ OEMS for 1 EMT Elective CEU.

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- You must apply to receive continuing education credit. It will not be sent to you just for attending this webinar.

- WHERE CAN YOU FIND THE LINK TO APPLY FOR CREDIT?
  - The last slide of this webinar
  - The chat at the end of the program
  - The follow-up email you will receive tomorrow

- The poll at the end of today's webinar IS NOT the evaluation for continuing education credit. The evaluation will be available through the link mentioned above.

- The links will be active for 30 days after today's event.

PA Planner Dean Barone discloses that he serves on the speakers bureaus of Ethicon and Johnson & Johnson. All other planners, faculty, and reviewers have no relevant financial relationships to disclose. All relevant financial relationships have been mitigated.

Featured Presenter

Lewis S. Nelson, MD, MBA
Professor, Department of Emergency Medicine
Dean and Chief of Health Affairs
Schmidt College of Medicine at Florida Atlantic University

Partnership for a Drug-Free New Jersey
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Opioids & Synthetics: What We Need to Know

Fentanyl(s) - Medetomidine – Emerging Substances

Lewis S. Nelson, MD, MBA
Professor, Department of Emergency Medicine
Dean and Chief of Health Affairs
Schmidt College of Medicine at Florida Atlantic University

No financial disclosures

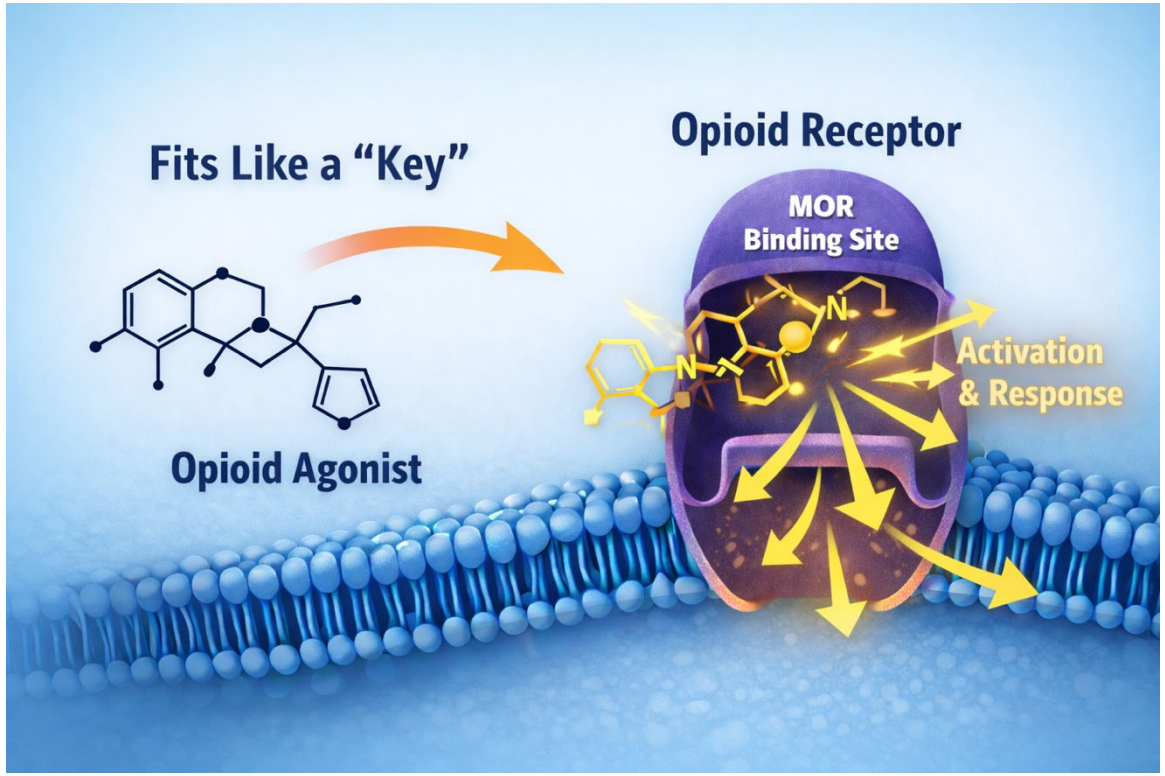
Learning objectives

At the conclusion of this presentation, the learner should be better able to:

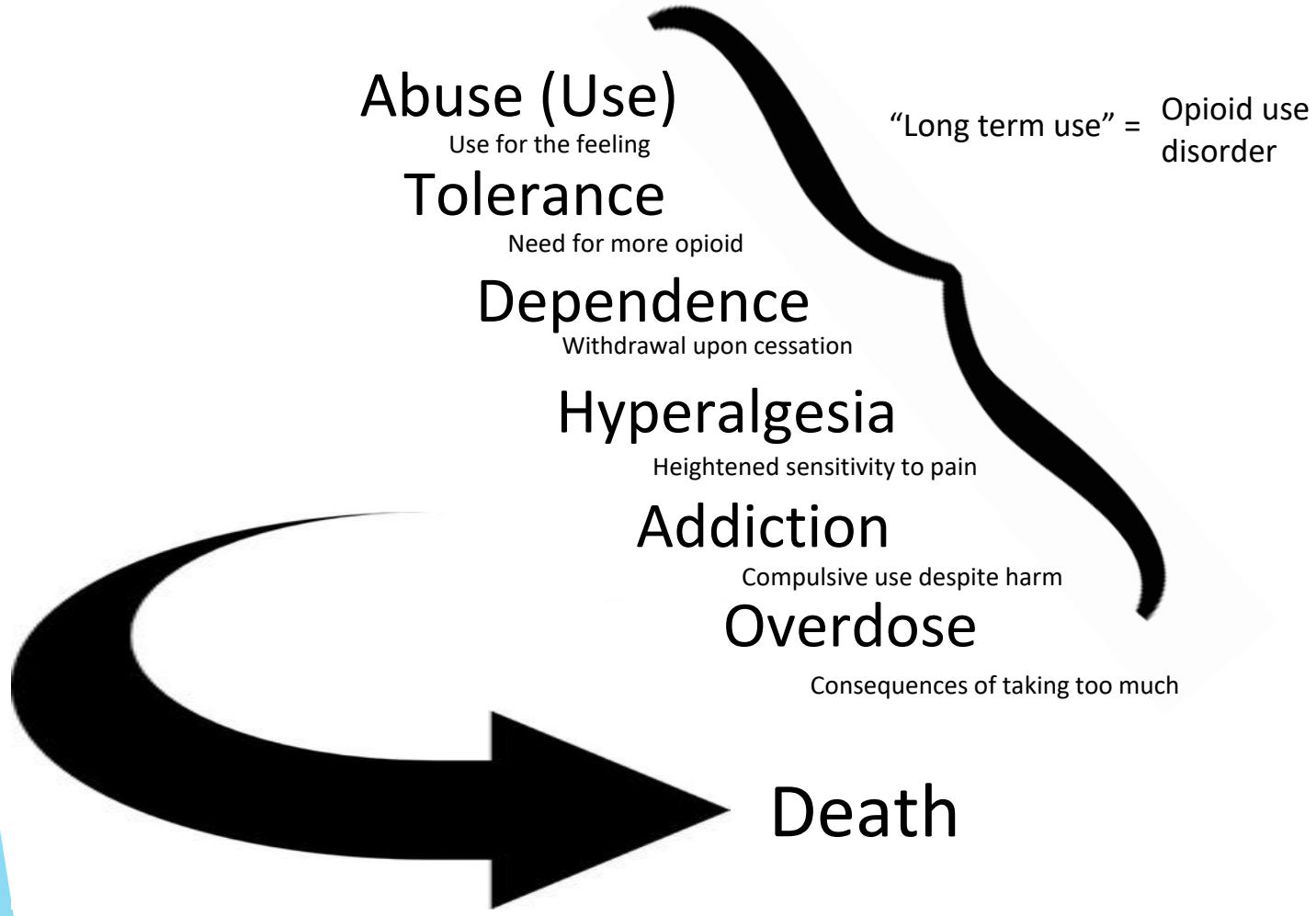
- Define synthetic opioids and identify examples
- Describe the rise in synthetic opioid use and overdoses, including emerging substances
- Work with the care team to identify prevention and treatment methods specific to synthetic opioids

Thou hast the keys of Paradise, oh just, subtle, and mighty opium!

Thomas De Quincey, Confessions of an English Opium-Eater, 1821



Consequences of ANY opioid use



"Long term use" = Opioid use disorder

TABLE 36–3 Criteria for Opioid Use Disorder[3]

A problematic pattern of opioid use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:

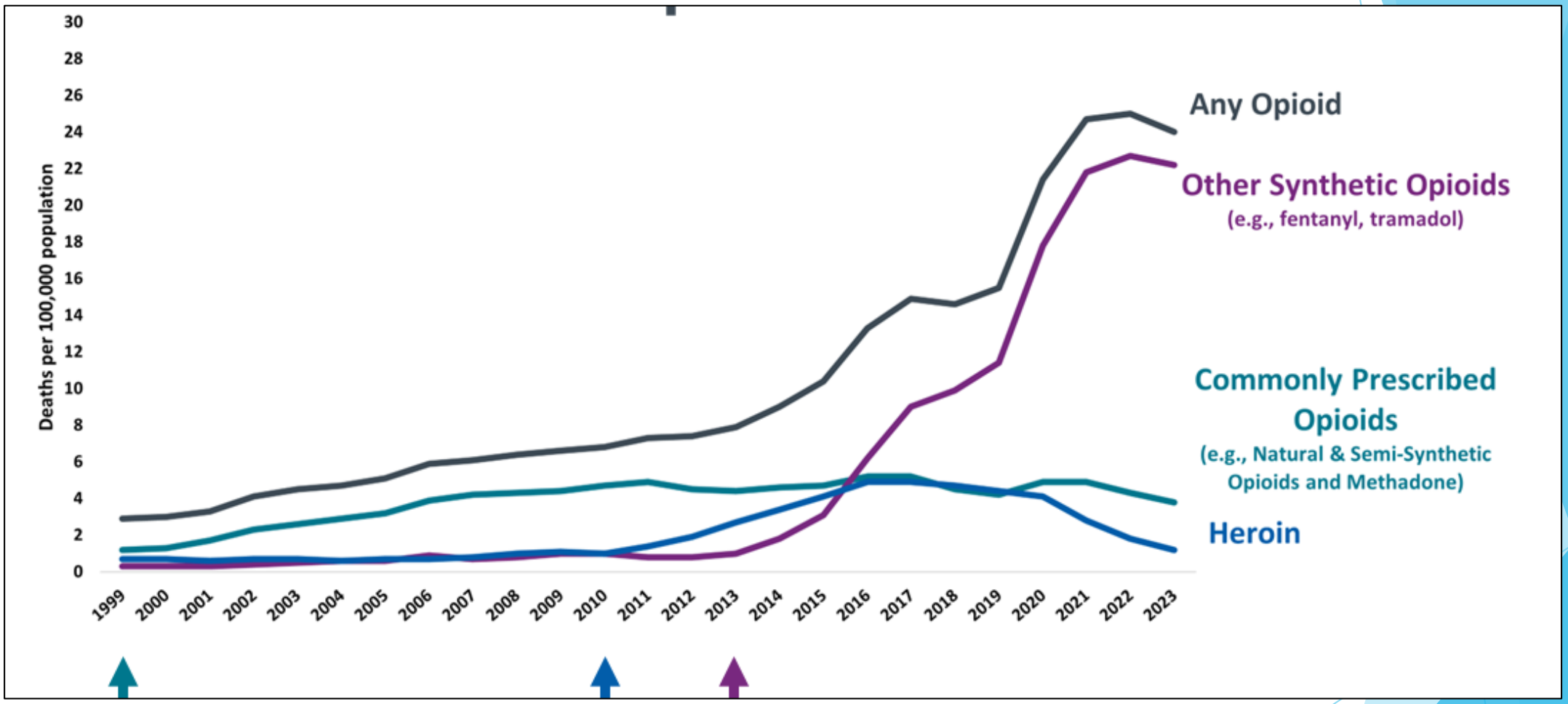
1. Opioids are often taken in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful efforts to cut down or control opioid use.
3. A great deal of time is spent in activities necessary to obtain the opioid, use the opioid, or recover from its effects.
4. Craving, or a strong desire or urge to use opioids.
5. Recurrent opioid use resulting in a failure to fulfill major role obligations at work, school, or home.
6. Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids.
7. Important social, occupational, or recreational activities are given up or reduced because of opioid use.
8. Recurrent opioid use in situations in which it is physically hazardous.
9. Continued opioid use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. Tolerance, as defined by either of the following:
    - A need for markedly increased amounts of opioids to achieve intoxication or desired effect
    - A markedly diminished effect with continued use of the same amount of an opioid

Note: This criterion is not considered to be met for those taking opioids solely under appropriate medical supervision.

11. Withdrawal, as manifested by either of the following:
    - The characteristic opioid withdrawal syndrome (refer to Criteria A and B of the criteria set for opioid withdrawal).
    - Opioids (or a closely related substance) are taken to relieve or avoid withdrawal symptoms.

-Diagnostic and Statistical Manual of Mental Disorders (DSM-5)
-Nelson LS, Howland MA, Lewin NA, et al. Goldfrank's Toxicologic Emergencies, 11th Edition. 2019.

The Three Waves of the Opioid Crisis



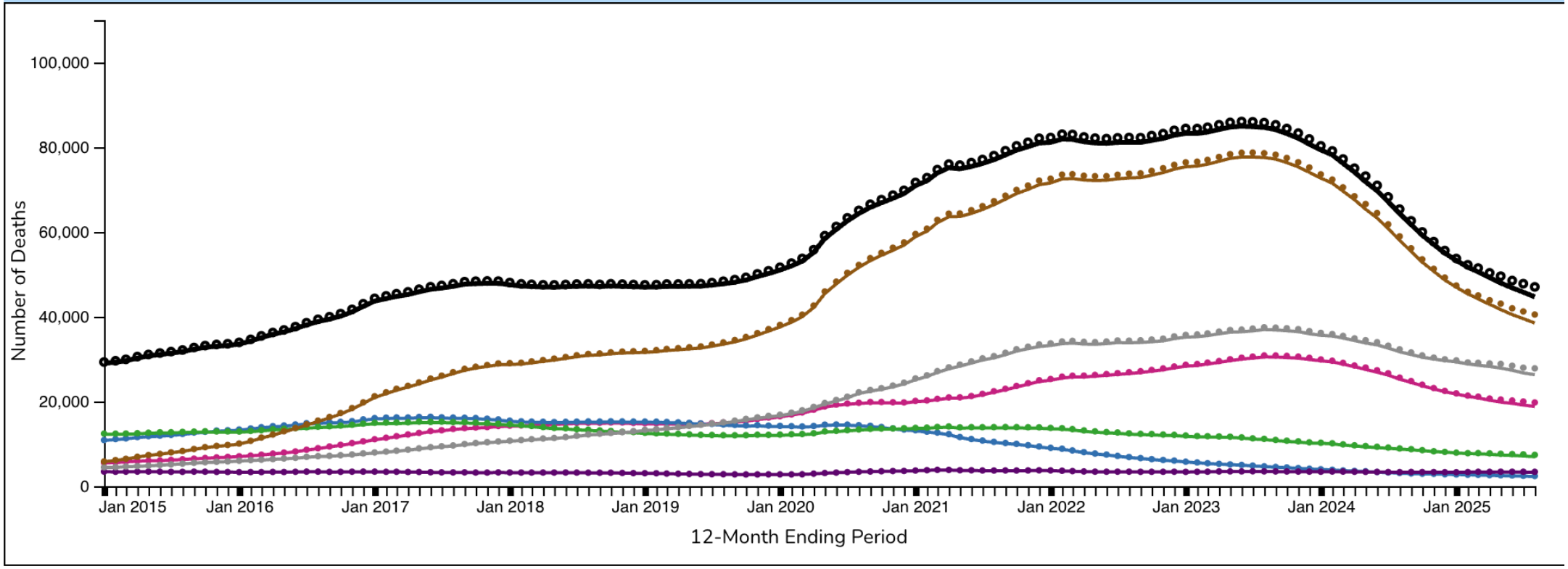
Oxycodone ER (OC) [1997]

Heroin & Reformulated OC [2010]

Fentanyl [2013]

NCHS Data Brief, March 2025

Figure 2. 12 Month-ending Provisional Number of Drug Overdose Deaths by Drug or Drug Class: United States



Legend for Drug or Drug Class

- Cocaine (T40.5)
- Heroin (T40.1)
- Methadone (T40.3)
- Natural & semi-synthetic opioids (T40.2)
- Opioids (T40.0-T40.4,T40.6)
- Psychostimulants with abuse potential (T43.6)
- Synthetic opioids, excl. methadone (T40.4)

---- Reported Value

O Predicted Value

https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm

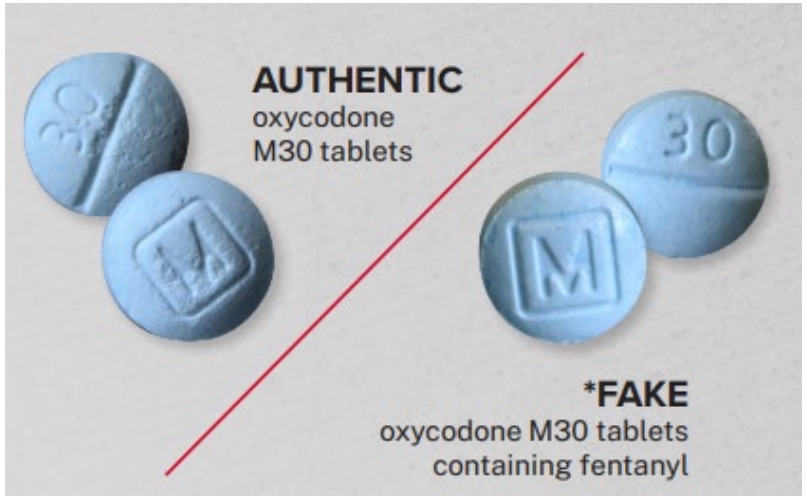
Fentanyl is no more dangerous than any other opioid… when dosed "correctly"

Dose

Number of mg of substance taken

Potency

Number of mg/kg to have a specific effect

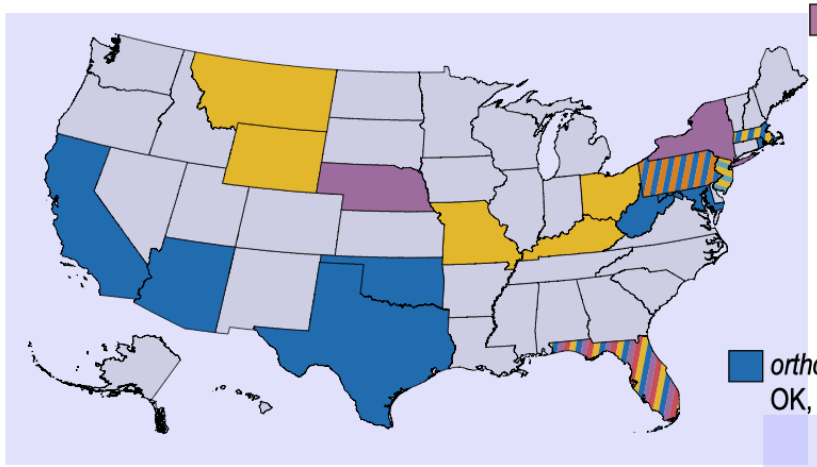


NFLIS DRUG SNAPSHOT

NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

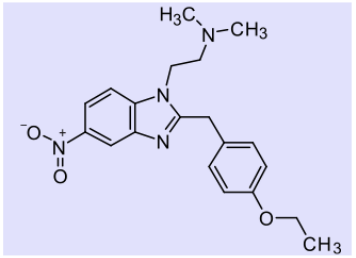
MARCH 2025

Newly Reported Substances: The following is a selection of substances reported to NFLIS-Drug for the first time between January 1, 2025, and March 31, 2025.

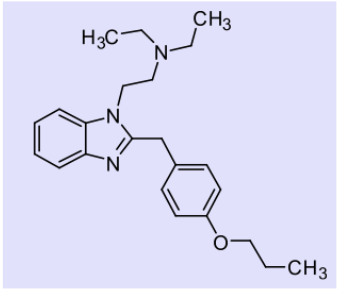


States in which each new substance was identified are noted in parentheses following the chemical name.

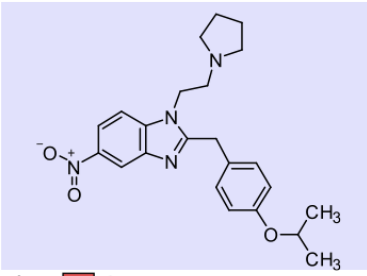
N,*N*-Dimethylamino Etonitazene (FL, NE, NY)



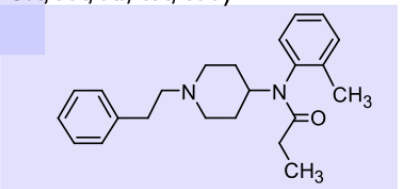
Protodesnitazene (PA)



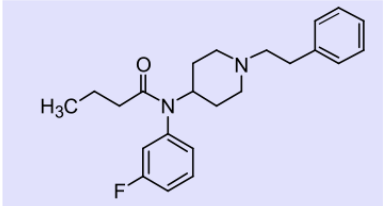
N-Pyrrolidino Isotonitazene (FL, KY, MA, MO, MT, NJ, OH, WY)



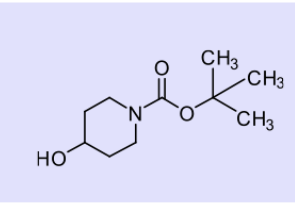
ortho-Methylfentanyl (AZ, CA, FL, MA, MD, OK, PA, RI, TX, WV)



meta-Fluorobutyryl fentanyl (NJ)



1-Boc-4-hydroxypiperidine (FL)



Snapshot of Drug Reports Received by NFLIS-Drug

These tables present the top drugs in each category that drug laboratories received, analyzed, and reported to NFLIS-Drug between January 1, 2025, and March 31, 2025. (Percentages are of all reports in the same period.)

Nitazenes	71	(0.14%)
Protonitazene	45	(0.09%)
Metonitazene	7	(0.01%)
N-Pyrrolidino Etonitazene	5	(0.01%)
N-Pyrrolidino Protonitazene	3	(0.01%)
Other	11	(0.02%)

Benzodiazepines	809	(1.61%)
Alprazolam	425	(0.85%)
Bromazolam	157	(0.31%)
Clonazepam	142	(0.28%)
Diazepam	28	(0.06%)
Lorazepam	22	(0.04%)

Fentanyl and Fentanyl-Related Compounds[1]	6,249	(12.45%)
Fentanyl	5,713	(11.38%)
Fluorofentanyl[2]	388	(0.77%)
Methylfentanyl[2]	49	(0.10%)
Carfentanil	48	(0.10%)
Acetylfentanyl	38	(0.08%)

Other CNS Depressants	1,900	(3.78%)
Heroin	1,230	(2.45%)
Oxycodone	473	(0.94%)
Ketamine	197	(0.39%)

[1] Precursors not included
[2] All isomers included

Dose Makes The Poison

“What is there that is not poison? All things are poison and nothing [is] without poison. Solely the dose determines that a thing is not a poison”

aka PARACELSUS (1493-1541)

Xylazine & Medetomidine facts

Veterinary sedatives
- Alpha-2a adrenergic agonist

Similar to clonidine but less “imidazoline”
- Muted bradycardia and hemodynamic effects

A sedative with minimal respiratory depression
- Does not directly impact overdose death

Medetomidine is a racemic mixture
- Dexmedetomidine, active enantiomer used clinically

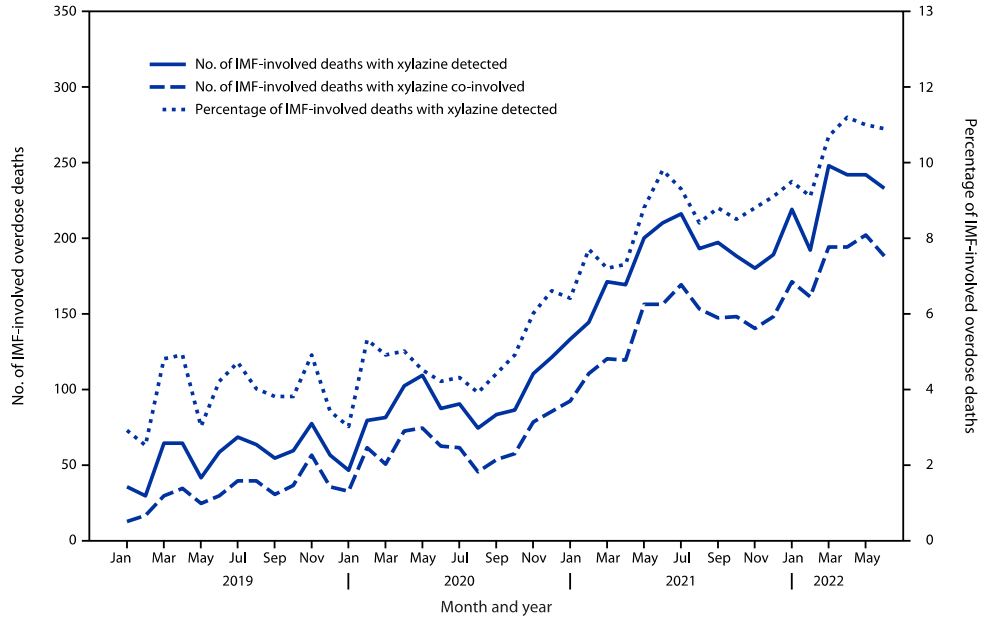
Not an opioid
- Not reversed by naloxone

Morbidity and Mortality Weekly Report

Illicitly Manufactured Fentanyl–Involved Overdose Deaths with Detected Xylazine — United States, January 2019–June 2022

Mbabazi Kariisa, PhD[1]; Julie O'Donnell, PhD[1]; Sagar Kumar, MPH[1]; Christine L. Mattson, PhD[1]; Bruce A. Goldberger, PhD[2]

FIGURE 1. Number and percentage of drug overdose deaths involving* illicitly manufactured fentanyls,† by month and xylazine detection or co-involvement — State Unintentional Drug Overdose Reporting System, 21 jurisdictions,§ January 2019–June 2022



MMWR Morb Mortal Wkly Rep. 2023 Jun 30;72(26):721-727

U.S. Department of Justice
Drug Enforcement Administration

PUBLIC SAFETY ALERT

DEA Reports Widespread Threat of Fentanyl Mixed with Xylazine

WASHINGTON - The U.S. Drug Enforcement Administration is warning the American public of a sharp increase in the trafficking of fentanyl mixed with xylazine. Xylazine, also known as "Tranq," is a powerful sedative that the U.S. Food and Drug Administration has approved for veterinary use.

> ***"Xylazine is making the deadliest drug threat our country has ever faced, fentanyl, even deadlier," said Administrator Milgram. "DEA has seized xylazine and fentanyl mixtures in 48 of 50 States. The DEA Laboratory System is reporting that in 2022 approximately 23% of fentanyl powder and 7% of fentanyl pills seized by the DEA contained xylazine."***

Opioid overdoses involving xylazine in emergency department patients: a multicenter study

Table 2. Clinical outcomes in xylazine vs. control patients.

Clinical outcome variables	Xylazine ($n = 90$)	Xylazine absent ($n = 231$)	*P*-Value
Cardiovascular outcomes			
Received CPR	4 (4.4%)	33 (14.3%)	**0.013**
Bradycardia	2 (2.2%)	4 (1.7%)	0.77
Pulmonary outcomes			
Intubated within 4 h	2 (2.2%)	13 (5.6%)	0.193
Non-invasive positive pressure within 4 h	1 (1.1%)	4 (1.7%)	0.689
Any ventilatory support within 4 h	3 (3.3%)	17 (7.4%)	0.182
Intubated after 4 h	2 (2.2%)	11 (4.8%)	0.298
Non-invasive positive pressure after 4 h	2 (2.2%)	2 (0.9%)	0.327
Any ventilatory support after 4 h	4 (4.4%)	13 (5.6%)	0.67
Central nervous system outcomes			
Coma within 4 h	24 (26.7%)	87 (37.7%)	0.063
Coma after 4 h	12 (13.3%)	35 (15.2%)	0.682
Overall outcomes			
Death	1 (1.1%)	5 (2.16%)	0.528
Discharged from the ED	59 (65.6%)	147 (63.6%)	0.528
ICU Admissions	11 (12.2%)	39 (16.9%)	0.30
Miscellaneous			
Length of hospitalization (h); median (IQR)	10 (5–28)	9 (5–36)	0.806
Total naloxone dose (mg)	3.68 (1.3–4.05)	2.8 (2–4.1)	0.448

Abbreviations: IQR, interquartile range; CPR, cardiopulmonary resuscitation; ED, emergency department; ICU, intensive care unit. The bold values indicate variables that are statistically significant ($P < 0.05$).
*Percentage of entire cohort.

Love JS. Clin Toxicol 2023;61:173-180

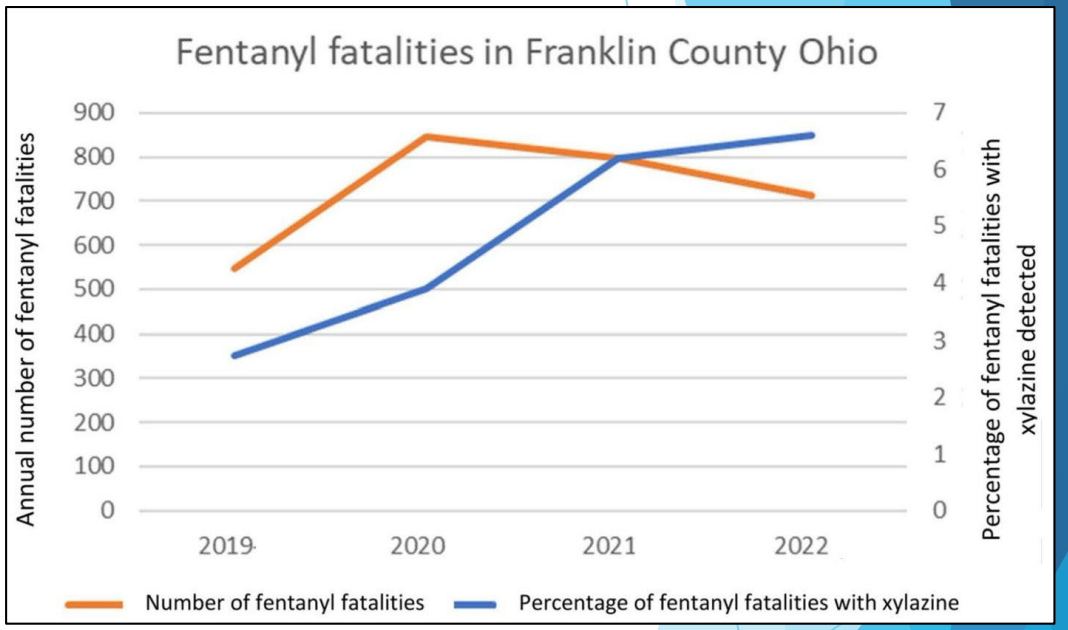
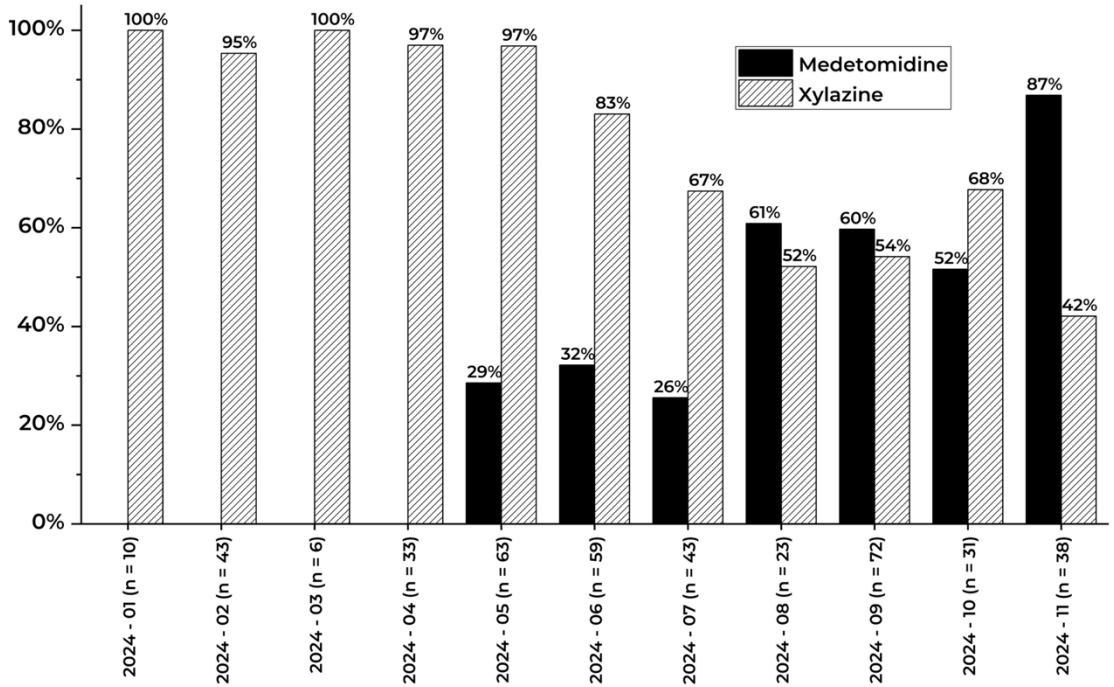


Figure 1. Annual number of fentanyl-associated fatalities and percentage of cases with xylazine detected. Franklin County, Ohio, 2019-2022

Hays HL, et al.. Clin Toxicol. 2024 Jan;62(1):26-31.

Department of Public Health
CITY OF PHILADELPHIA

Philadelphia Department of Public Health
Division of Substance Use Prevention and Harm Reduction



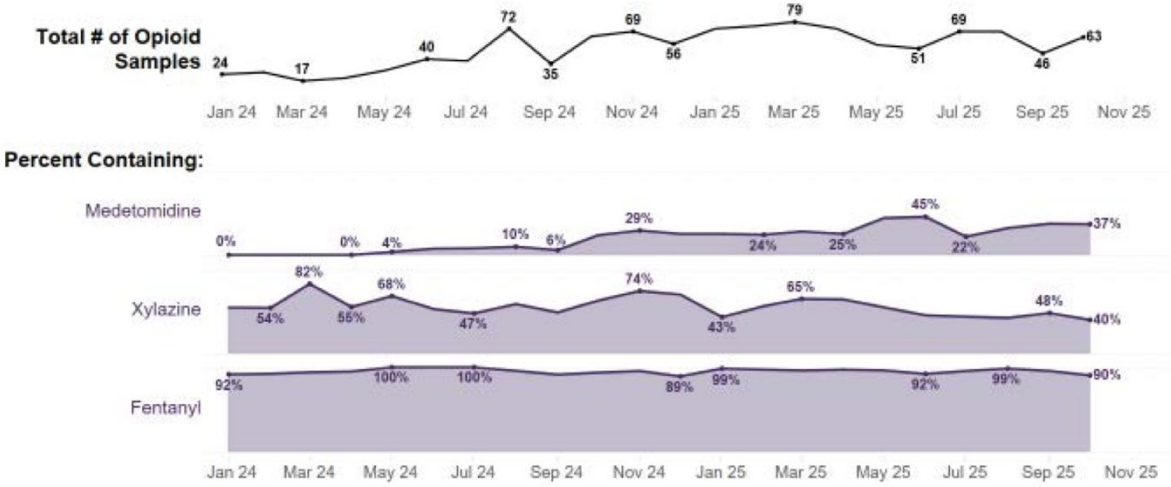
MEDETOMIDINE BRIEF

NEW YORK STATE | Department of Health

Medetomidine in New York

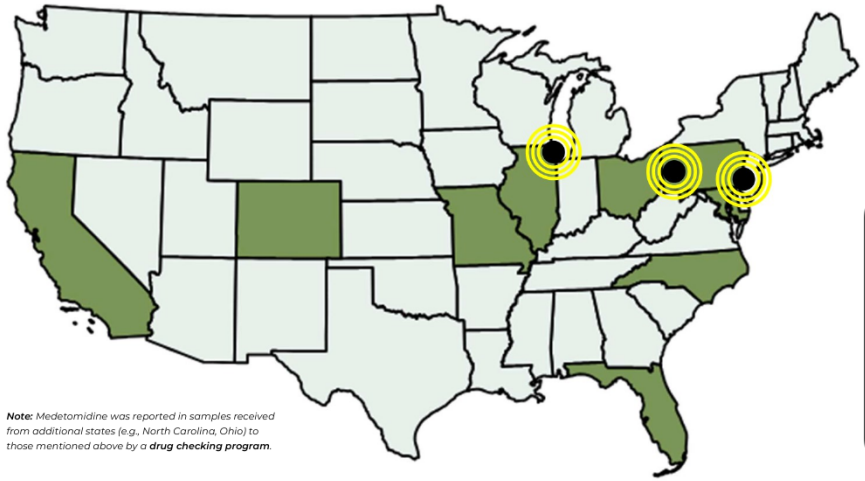
New York State Drug Checking Programs first identified medetomidine in a sample provided in May of 2024. By October of 2024, over 23% of opioid samples collected contained medetomidine. Data shows that medetomidine was detected in 37 percent of opioid samples in the month of October 2025 (xylazine was detected in 40 percent of opioid samples).

NEW YORK'S STREET DRUG SUPPLY



Source: New York State Community Drug Checking Program, December 2025. Data are preliminary and subject to change.

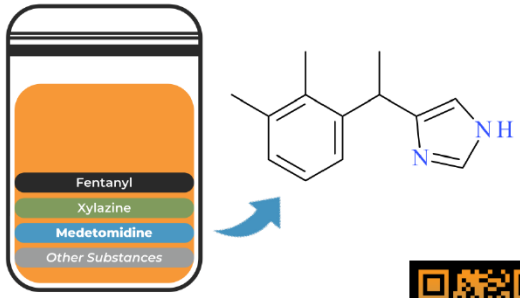
TIMEFRAME	DESCRIPTION OF MEDETOMIDINE IDENTIFICATIONS AND OVERDOSE EVENTS
Late 2022	Medetomidine begins appearing more regularly in the **Maryland** drug supply, following its first detection in July 2022. Medetomidine is commonly identified alongside fentanyl, xylazine, and other substances.
Mid-to-Late 2023	Medetomidine is sporadically identified in toxicology specimens collected from patients presenting to emergency departments after suspected opioid overdose (confirmed to not be administered). Overdose events originated from **Missouri, Colorado, Pennsylvania, California, and Maryland**. Medetomidine is commonly detected with fentanyl.
January 2024	An **alert** is issued out of **Toronto, ON**, about the emergence of medetomidine in the drug supply. This is followed by increased positivity in subsequent weeks and months, as medetomidine is found alongside fentanyl in suspected opioid products and commonly in combination with xylazine and other substances.
Early 2024	Medetomidine detections increase in drug materials and toxicology specimens originating from western Canada, including **Vancouver, BC**, commonly alongside fentanyl and other opioids.
Late April 2024	Medetomidine first appears in drug products in **Philadelphia, PA**, causing a large scale outbreak of overdoses and adverse events. Medetomidine is identified alongside fentanyl and xylazine.
Early May 2024	Medetomidine first appears in a drug product in **Pittsburgh, PA**, associated with overdoses and adverse events. Medetomidine is identified alongside fentanyl and xylazine.
Early May 2024	Medetomidine first appears in drug products in **Chicago, IL**, causing a large scale outbreak of overdoses and adverse events. Medetomidine is identified alongside fentanyl and xylazine, or alongside heroin without xylazine.



Note: *Medetomidine was reported in samples received from additional states (e.g., North Carolina, Ohio) to those mentioned above by a* ***drug checking program****.*

◂ GEOGRAPHICAL DISTRIBUTION OF MEDETOMIDINE EMERGENCE

Medetomidine has been identified across several states in the U.S. and Canada, and is recently being observed in severe overdose outbreaks in major metropolitan areas.



ACKNOWLEDGEMENTS: This report was prepared by Alex Krotulski, Jen Shinefeld, Chris Moraff, Taylor Wood, Sara Walton, Josh DeBord, Max Denn, Alexis Quinter, and Barry Logan at the Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation. The authors acknowledge scientists and staff for their involvements and contributions, as well as our many collaborators in public health agencies, clinical institutions, harm reduction organizations, and beyond for their cooperation in assessing drug outbreaks.

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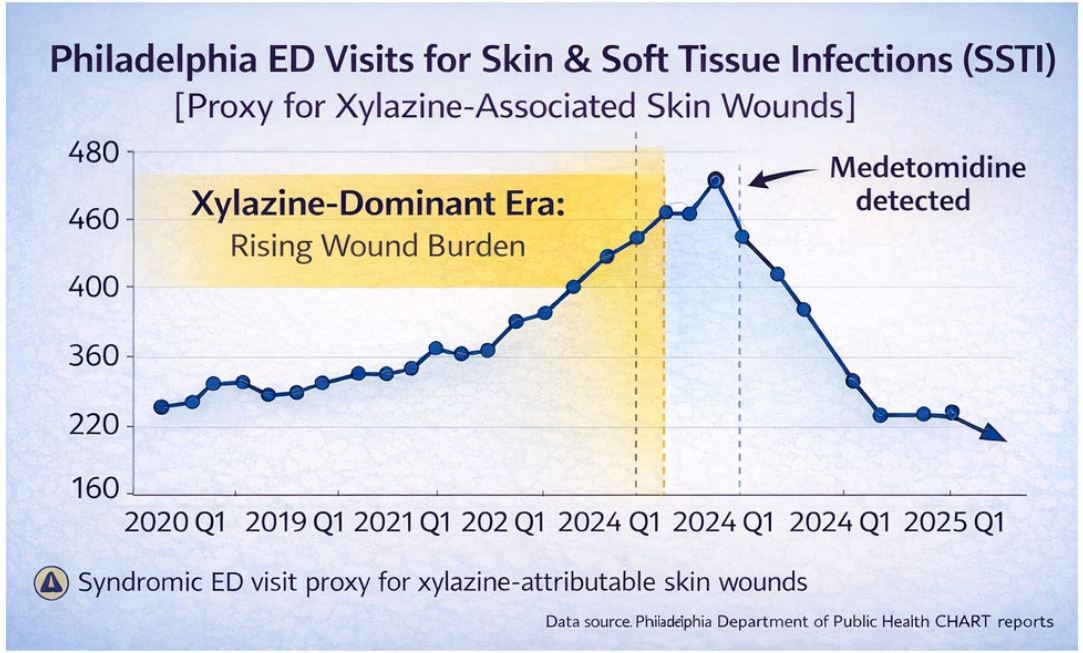
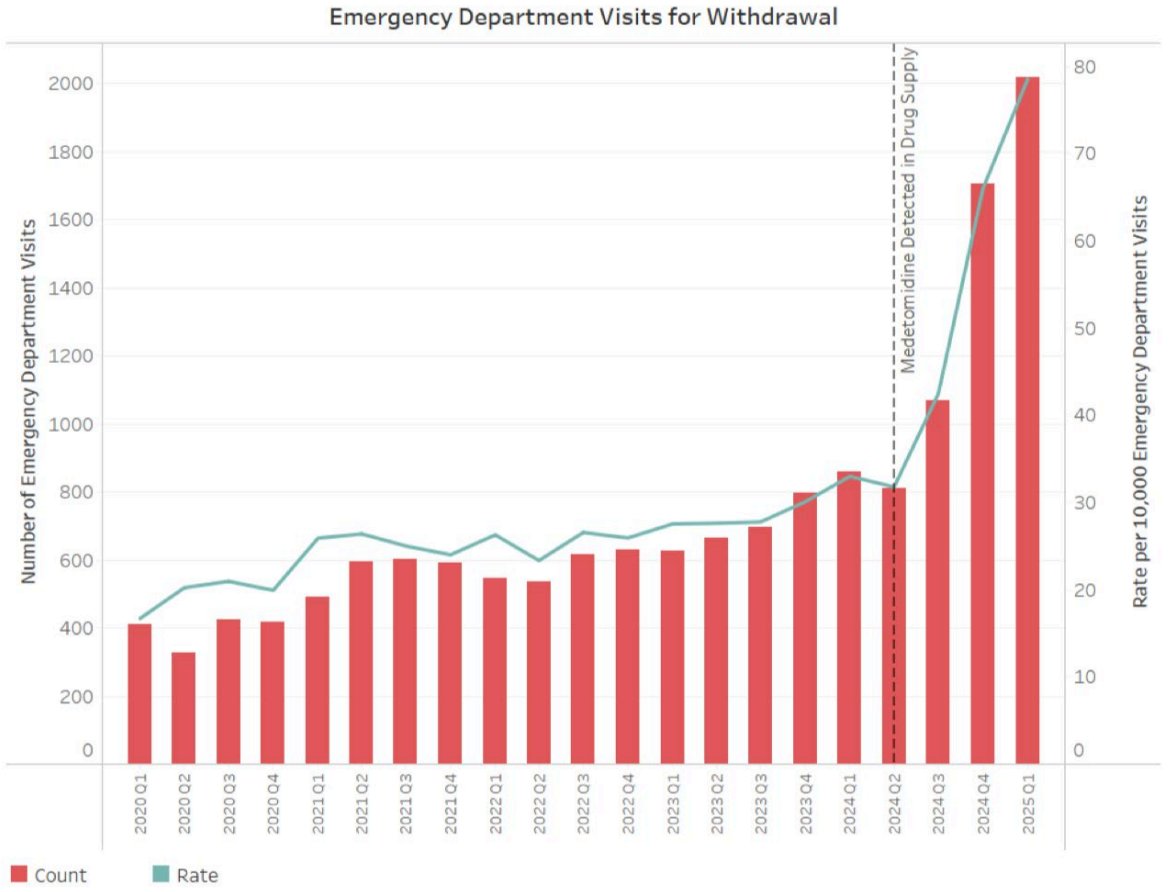
ADDITIONAL INFORMATION: Contact npsdiscovery@cfsre.org or visit www.npsdiscovery.org

SUGGESTED CITATION: Krotulski, AJ; Shinefeld, J; Moraff, C; Wood, T; Walton, SE; DeBord, JS; Denn, MT; Quinter, AD; Logan, BK. (2024) Medetomidine Rapidly Proliferating Across USA — Implicated In Recreational Opioid Drug Supply & Causing Overdose Outbreaks, Center for Forensic Science Research and Education, United States.





Volume 10, Number 1 April 2025
Department of Public Health
Palak Raval-Nelson, PhD, MPH
Health Commissioner
CHART

Suspected Medetomidine Withdrawal Syndrome Among Fentanyl-Exposed Patients — Philadelphia, Pennsylvania, September 2024–January 2025

Samantha Huo, MD[1,2]; Kory London, MD[3]; Lauren Murphy, MD[4,5]; Emily Casey, PharmD[6]; Philip Durney, MD[7]; Maya Arora[2]; Rita McKeever, MD[4,5]; Abriana Tasillo, MD[3]; Dennis Goodstein, PharmD[8]; Brendan Hart, MD, PhD[4]; Jeanmarie Perrone, MD[1,2,5]

Medetomidine, a synthetic alpha-2 adrenoreceptor agonist, is a new drug adulterant that was detected in 72% of illegal opioid samples tested in Philadelphia, Pennsylvania, during the last 4 months of 2024. During the same period, detection of xylazine (previously the most common adulterant) decreased from 98% to 31% of samples (*1*), and health care providers at hospitals in Philadelphia noticed an increasing number of hospitalized patients with a severe drug withdrawal syndrome distinct from fentanyl and xylazine withdrawal, characterized by profound autonomic dysfunction, such as severe hypertension and tachycardia. This report aims to increase awareness of the presence of medetomidine in the illegal opioid supply, characterize the emerging medetomidine withdrawal syndrome, and describe measures to provide effective patient care for this life-threatening syndrome.

TABLE. Characteristics of patients hospitalized with combined opioid and suspected medetomidine withdrawal syndrome — three health systems, Philadelphia, Pennsylvania, September 2024–January 2025

Characteristic	No. (%) Health system A (n = 55)	Health system B (n = 48)	Health system C (n = 62)	Total (N = 165)
Age, yrs, median (IQR)	37 (33–45)	38 (35–41)	38 (32–45)	**38 (33–43)**
Sex				
Female	12 (22)	20 (42)	17 (27)	**49 (30)**
Male	43 (78)	28 (58)	45 (73)	**116 (70)**
Race and ethnicity*				
Black or African American, non-Hispanic	6 (11)	6 (13)	15 (24)	**27 (16)**
White, non-Hispanic	44 (80)	34 (71)	25 (40)	**103 (62)**
Hispanic or Latino	5 (9)	0 (—)	18 (29)	**23 (14)**
Other	0 (—)	8 (17)	4 (7)	**12 (7)**
Clinical findings and hospital course				
Maximum heart rate (beats per minute), median (IQR)	144 (125–155)	136 (118–156)	148 (140–157)	**145 (132–156)**
Maximum systolic blood pressure (mm Hg), median (IQR)	191 (172–211)	196 (171–224)	200 (185–215)	**195 (175–215)**
Maximum diastolic blood pressure (mm Hg), median (IQR)	111 (103–123)	127 (109–137)	131 (119–143)	**122 (109–136)**
Treated with dexmedetomidine	51 (93)	35 (73)	51 (82)	**137 (83)**
Intubation/Mechanical ventilation	12 (22)	11 (23)	16 (26)	**39 (24)**
Admitted to intensive care unit	49 (89)	44 (92)	57 (92)	**150 (91)**
Disposition				
Home	15 (27)	28 (58)	32 (52)	**75 (45)**
Patient-directed discharge	14 (26)	13 (27)	25 (40)	**52 (32)**
Residential drug treatment	14 (26)	7 (15)	0 (—)	**21 (13)**
Law enforcement custody	12 (22)	0 (—)	5 (8)	**17 (10)**

* Persons of Hispanic or Latino (Hispanic) origin might be of any race but are categorized as Hispanic; all racial groups are non-Hispanic.

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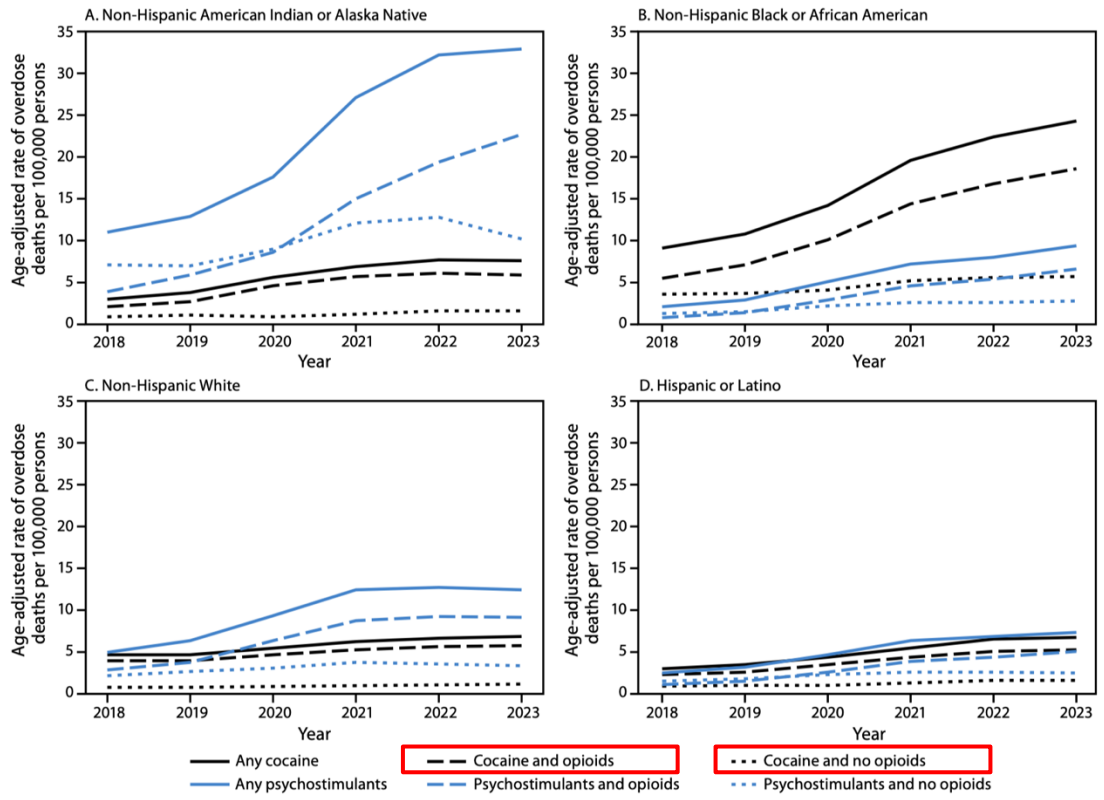
Drug Overdose Deaths Involving Stimulants — United States, January 2018–June 2024

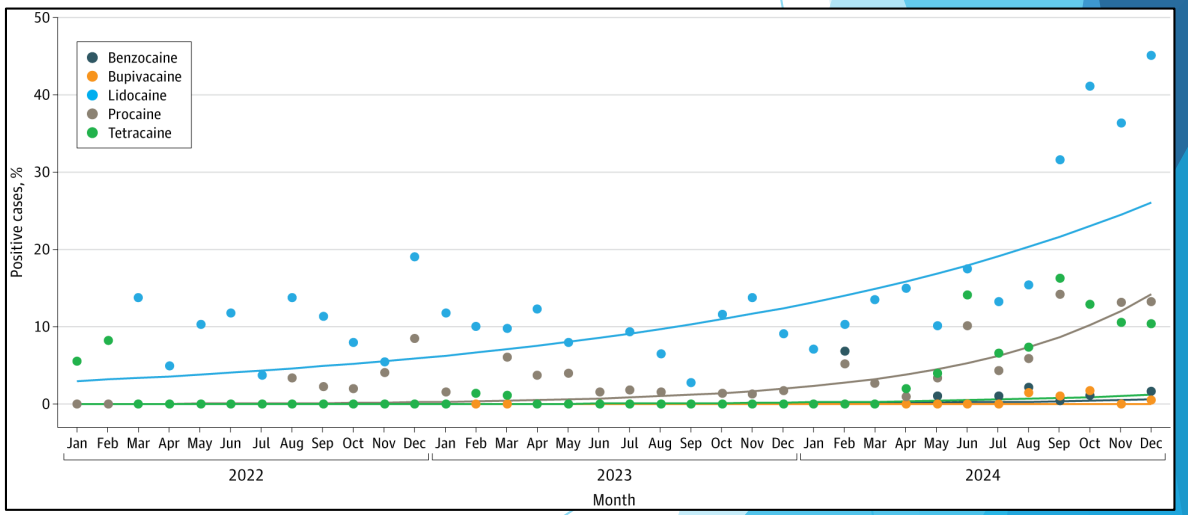
Lauren J. Tanz, ScD[1]; Kimberly D. Miller, MPH[1]; Amanda T. Dinwiddie, MPH[1]; R. Matt Gladden, PhD[1]; Alice Asher, PhD[1]; Grant Baldwin, PhD[1]; Brandon Nesbit, MPH[1]; Julie O'Donnell, PhD[1]

FIGURE 2. Age-adjusted rates* of overdose deaths† involving stimulants and co-involving opioids,§,¶ by race and ethnicity and year of death — National Vital Statistics System, United States, 2018–2023**



Local Anesthetics Adulterating the Illicit Fentanyl Supply

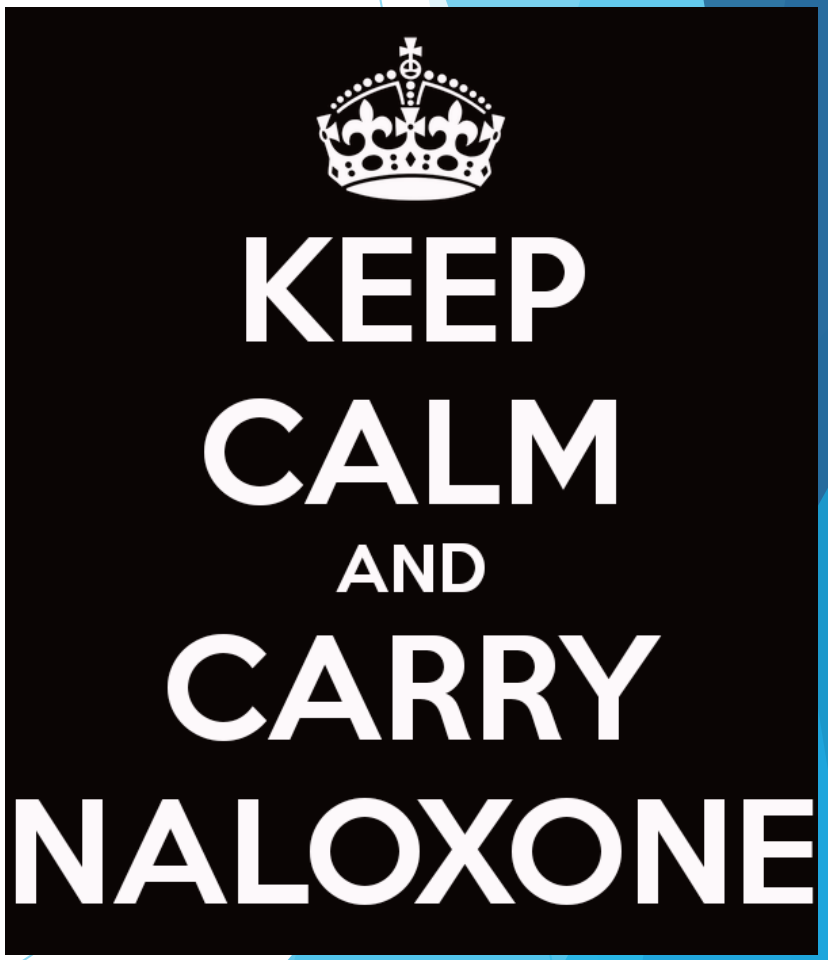
Joseph J. Palamar, PhD; Joshua S. DeBord, PhD; Alex J. Krotulski, PhD; Bruce A. Goldberger, PhD



JAMA Psychiatry. 2025 Aug 1;82(8):755-756

Naloxone does not reverse the effects of xylazine or medetomidine, yet it is the drug of choice

Remember we are treating the fentanyl not the adulterant!



NB: Opioid dose or potency is a rare factor in naloxone failure

Reasons people do not "wake up" after naloxone

- Hypoxia
- Hypercarbia
- Co-intoxication
  - Alcohol
  - Adulterants
- Trauma
- Infection

NB: This is NOT the correct endpoint for naloxone's success….breathing is.

Naloxone does not reverse the effects of xylazine or medetomidine, yet it is the drug of choice

Remember we are treating the fentanyl not the adulterant!

- Continue to focus on naloxone availability
- Update EMS/ED pathways for naloxone partial- or non-response overdoses: prolonged monitoring, airway readiness, hemodynamic support.
- Educate the public: rescue breathing, recovery position, and calling 911 remain critical even after naloxone.

Harm reduction

- Education
- Naloxone distribution/prescribing
- Fentanyl testing strips
- Syringe exchange
- Safe consumption sites

Addiction management

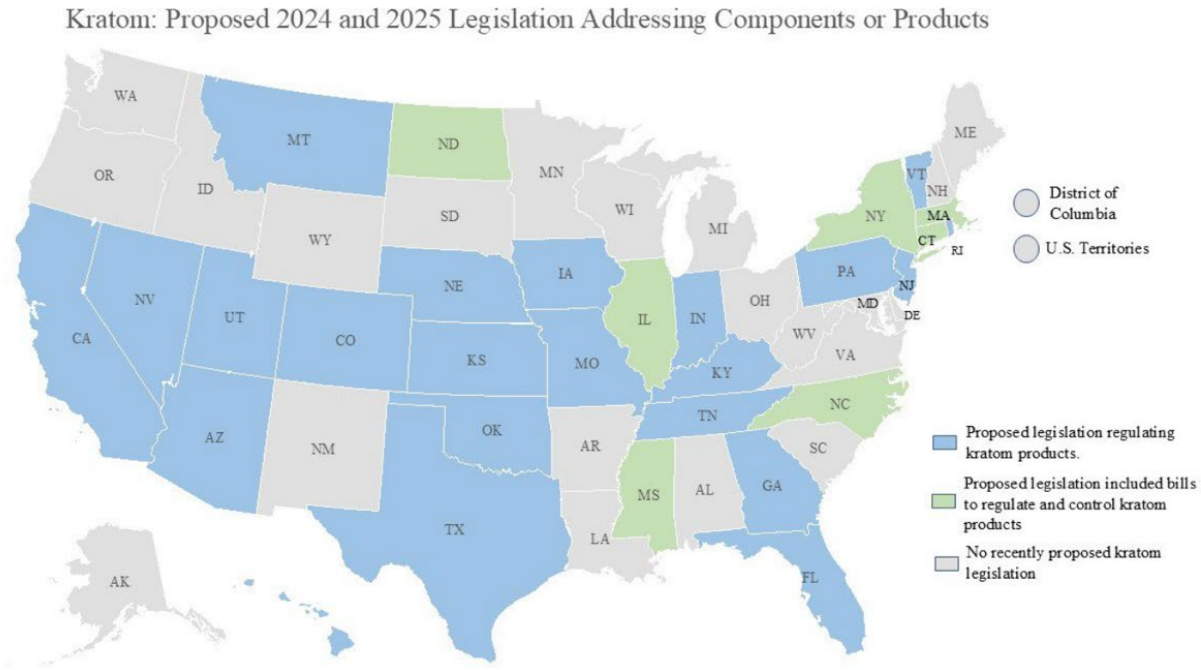
- Screening
- Reducing barriers
  - Telehealth
  - Recovery coaches/Navigators
- Medication for opioid use disorder
  - Buprenorphine
  - Methadone

Epi - Public Health

- Track overdose and withdrawal presentations (ED + inpatient)
  - Linkage to care
- Expand drug checking (FTIR/Raman + confirmatory)
  - Share epidemiological results
- Coordinate across NY/NJ/PA for cross-border signals (e.g., lab reporting, poison centers, medical examiners).

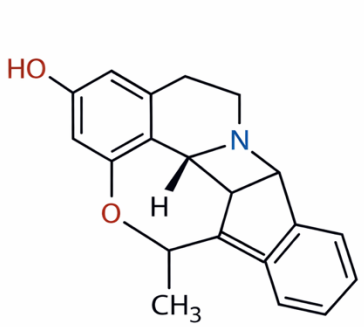
Mitragyna speciosa ("kratom")

- Tropical tree native to Southeast Asia; dozens of indole alkaloids
- Sold as powders, capsules, extracts, shots, and (increasingly) 7-OH concentrates
- Used for pain, mood/anxiety, fatigue, and self-treatment of opioid withdrawal or opioid use disorder
- Not FDA-approved
  - Unregulated: product variability and adulteration are central safety concerns

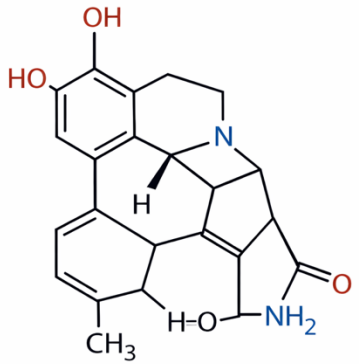


Why 7-OH changes the clinical picture

- 7-Hydroxymitragynine is naturally occurring in kratom at low levels, but can be concentrated or synthesized
- Potent μ-opioid receptor agonist (~10 x morphine)
- May be sold as standalone “7-OH” products or added to kratom extracts
- Standard UDS typically negative
- Withdrawal syndrome seems to be increasingly consequential



Morphine



7-Hydroxymitragynine

Clinical management

ED/Acute management

- Supportive care
- Naloxone for respiratory depression
- Consider LFTs/CK/ECG based on presentation
- Consult Poison Center or medical toxicology

Withdrawal

- As for opioid withdrawal
- Symptomatic tx: antiemetics, antidiarrheals, NSAIDs; consider clonidine/lofexidine
- Buprenorphine (case series)
- Addiction medicine referral and harm-reduction counseling

Summary

- An opioid is an opioid is an opioid
  - There are subtle but important pharmacological differences
- The opioid crisis (which remains somewhat iatrogenic) is primarily related to fentanyl(s)
- Naloxone can reverse opioid overdose (and prevent death)
  - Buprenorphine or methadone are critical to long-term survival
- Xylazine remains and medetomidine is increasingly prevalent
  - The main implication of the latter is withdrawal
- Kratom, and more concerningly 7-OH, should be watched.

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Partnership for a Drug-Free New Jersey
In Cooperation with the Governor's Council on Substance Use Disorder and the NJ Dept. of Human Services

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