Gas Station Drugs And Other Adulterants

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Clinical Professor of Emergency Medicine
University of California Los Angeles

Disclosures

- Section editor for Up-To-Date (including kratom health effects)

Senate removes name-brand Narcan requirement, adds back naloxone funding

That's a big victory for Rachel Winograd's team at UMSL, but she cautions the fight isn't over yet.

By **Sarah Fenske**

April 24, 2026 at 5:40 AM

cfsre | NPS DISCOVERY

YEAR IN REVIEW 2025

Purpose: This report provides cumulative up-to-date statistics about the emergence and landscape of novel psychoactive substances (NPS) in the United States based on data developed by the Center for Forensic Science Research and Education (CFSRE)'s NPS Discovery program — a premier open-access drug early warning system utilizing an evidence-based approach to disseminate information for real-time public health and safety action.

Since 2018, NPS Discovery has reported 201 newly discovered NPS in the United States (Figure 1). NPS opioids remain the largest subclass (Figure 2). In 2025, NPS Discovery reported the discovery of 27 NPS for the first time.

Figure 1: Newly discovered NPS reported for the first time since 2018.

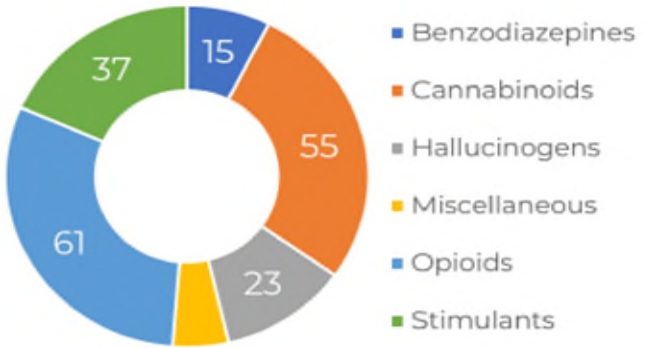
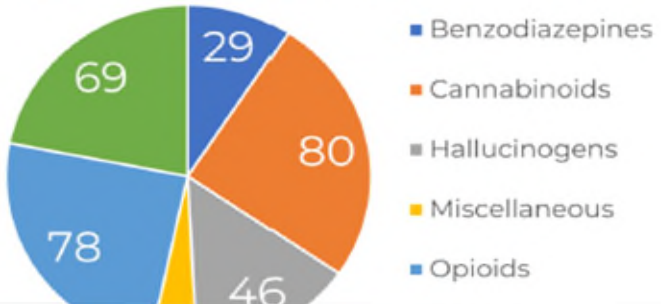
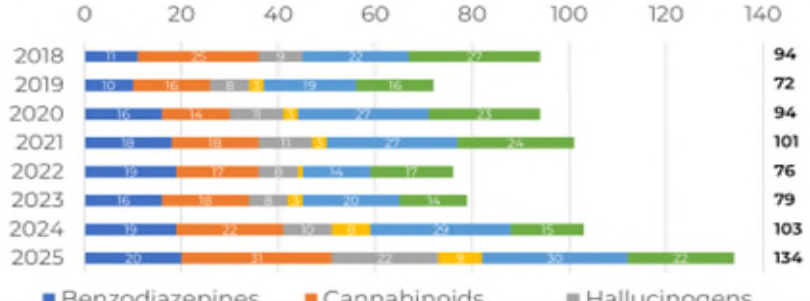


Figure 2: Breakdown by subclass of newly discovered NPS, 2018-2025.

Since 2018, NPS Discovery has identified 315 NPS in tested samples (Figure 3). NPS opioids, stimulants, and cannabinoids represent the largest subclasses observed. In 2025, 134 total NPS were detected (Figure 4).



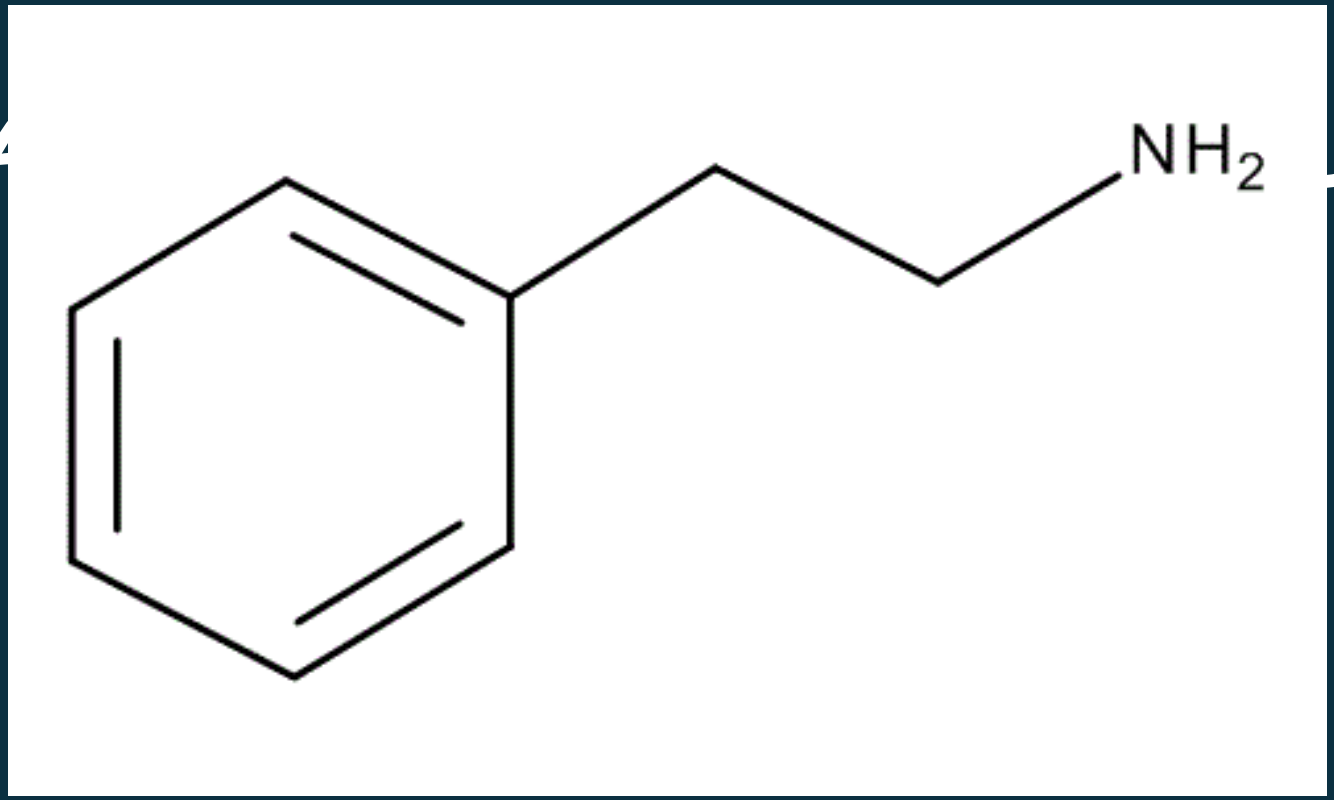



GAS STATION DRUGS

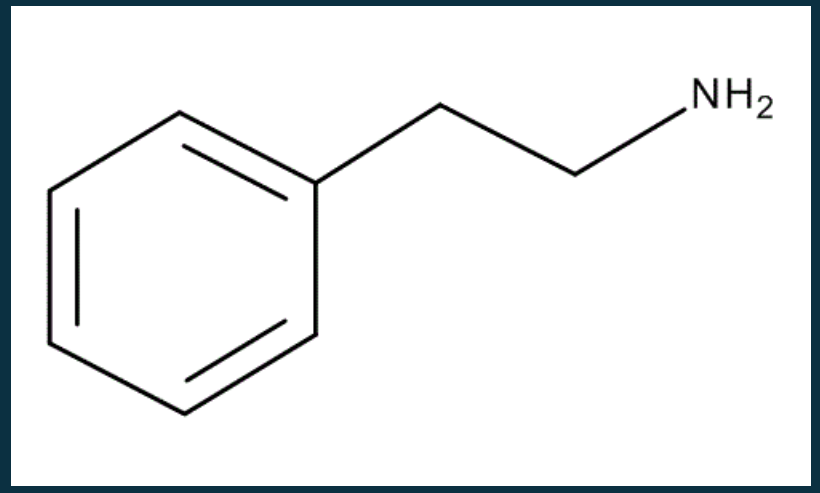
The Federal Analog Act

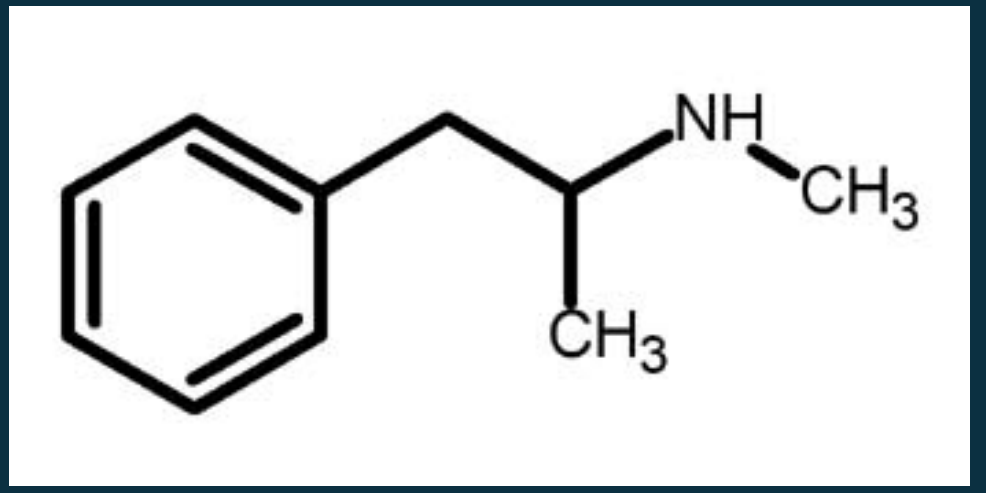
DSHEA

BUT A

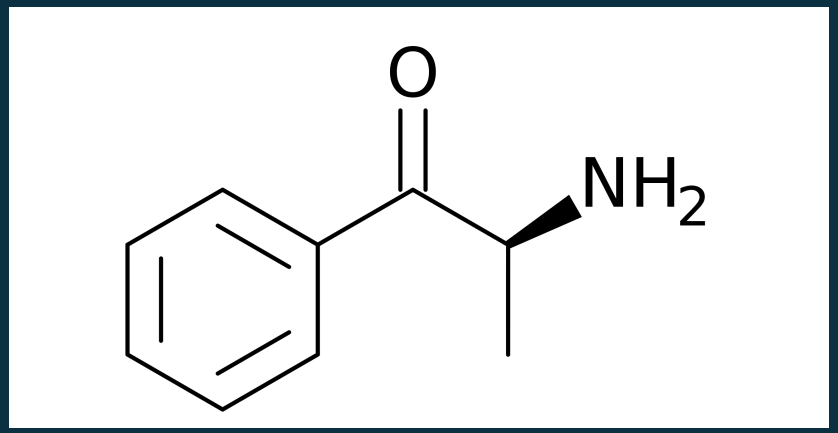


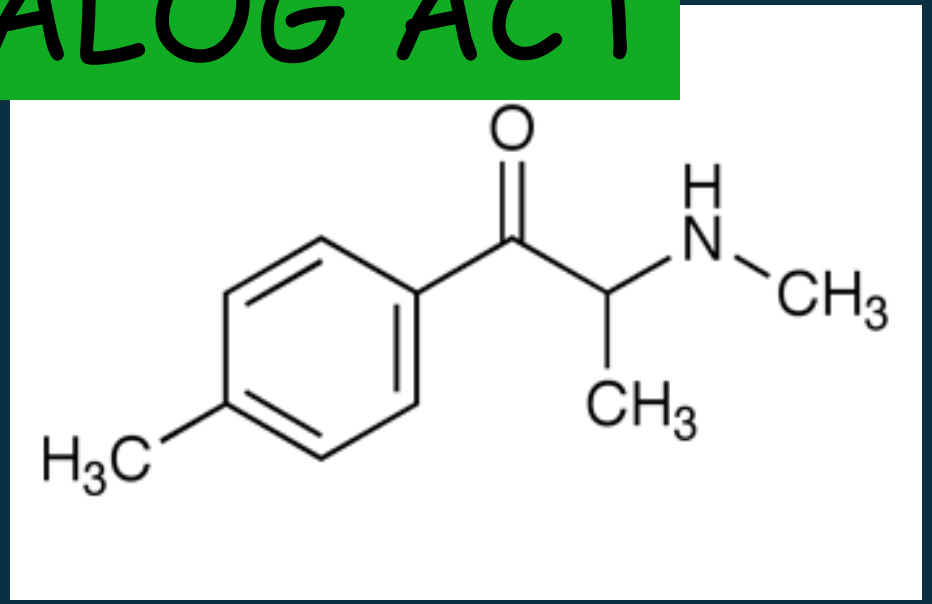
LEGAL???





FEDERAL ANALOG ACT






Mephedrone
PLANT FOOD
19
O
H
N
WARNING
© Alamy


Kats
BOTANICALS
SUPER GREEN
Premium Kratom Powder
600 mg Per Capsule
90 Capsules
100% MITRAGYNA SPECIOSA
Net Contents • 1.9 oz (54 g)
HERBAL SUPPLEMENT
Kats
BOTANICALS
SUPER GREEN
Premium Kratom Powder
600 mg Per Capsule
250 Capsules
100% MITRAGYNA SPECIOSA
Net Contents • 5.29 oz (150
HERBAL SUPPLEMENT

The federal government is actually considering classifying most vitamins and other supplements as drugs. The FDA has already conducted raids on doctors' offices and health food stores.

Could raids on individuals be next?

It's only vitamins...

https://youtu.be/_F_ZZvdHqPM

Dietary Supplement Health and Education Act of 1994

FDA Acts on Dietary Supplements Containing DMHA and Phenibut

CFSAN Constituent Updates

Constituent Update

April 16, 2019

On April 10, 2019, the FDA issued 12 warning letters to companies whose dietary supplement products are in violation of the law.

The FDA issued 9 warning letters to companies whose products are marketed as dietary supplements and labeled to contain DMHA. DMHA has been found in numerous dietary supplement products, often marketed for sports performance and weight loss. The FDA has determined that DMHA is either a “new dietary ingredient” for which the FDA has not received the required New Dietary Ingredient notification or that it is an unsafe food

Content current as of:
04/29/2019

Regulated Product(s)
Dietary Supplements

HEALTH

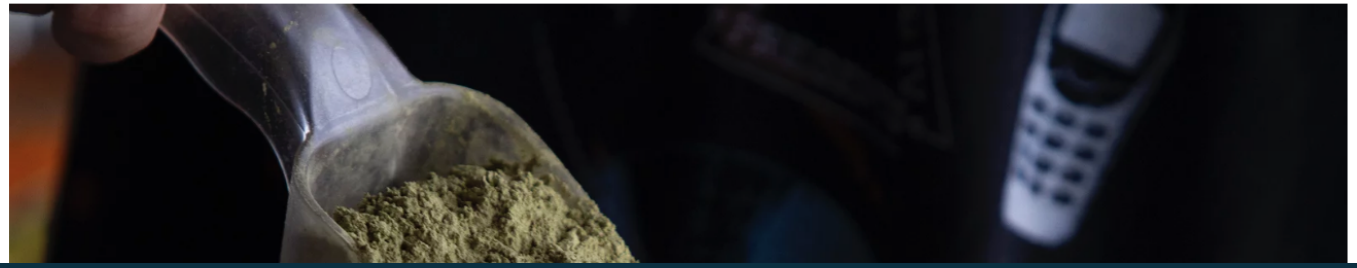
Herbal supplement kratom targeted by lawsuits after a string of deaths

Updated July 24, 2023 · 8:22 AM ET

Heard on Weekend Edition Saturday

By Peter Haden

7-Minute Listen + PLAYLIST



https://www.npr.org/2023/07/08/1186514144/kratom-herbal-supplement-lawsuits-deaths-fda

Dozens of Congressmen Ask DEA No Next Week

Researchers, addicts and politicians say the leaf appears much safer than hard drugs.

By Steven Nelson | Sept. 23, 2016, at 7:20 p.m.

Save | Add us on | Comment

"This significant regulatory action was done without any opportunity for public comment from researchers, consumers and other stakeholders,"
the lawmakers say in the letter to Rosenberg.
"This hasty decision could have serious effects on consumer access and choice of an internationally recognized herbal supplement."

Congress calls out DEA for unilateral move to expand war on drugs

The DEA's decision ... will put a halt on federally funded research and innovation surrounding the treatment of individuals suffering from opioid and other addictions.

—House lawmakers' letter to the DEA

Kratom advocates and drug policy reformers have said the move to ban kratom makes a mockery of the federal government's purported concern about the opioid epidemic. The White House and members of Congress have encouraged doctors to prescribe fewer narcotic painkillers, but the DEA has now moved to criminalize a

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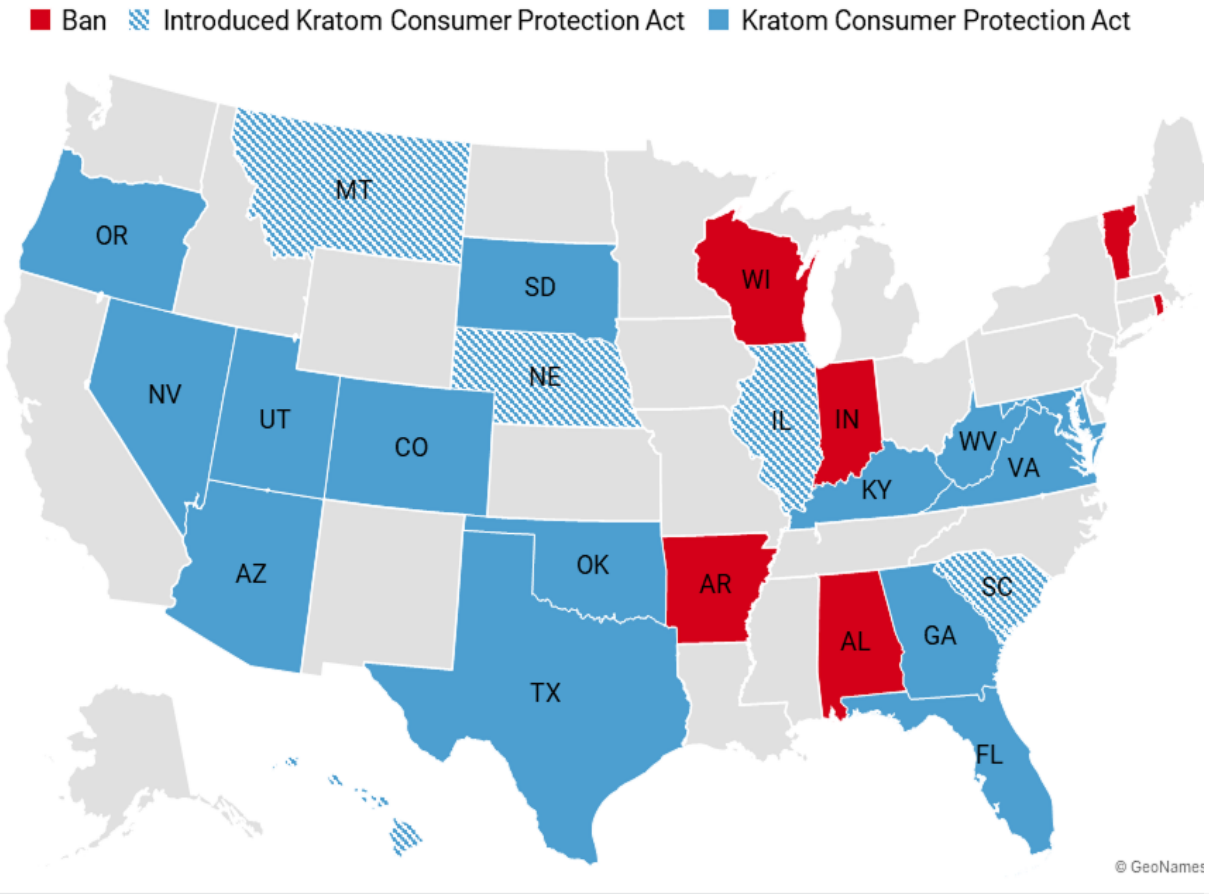
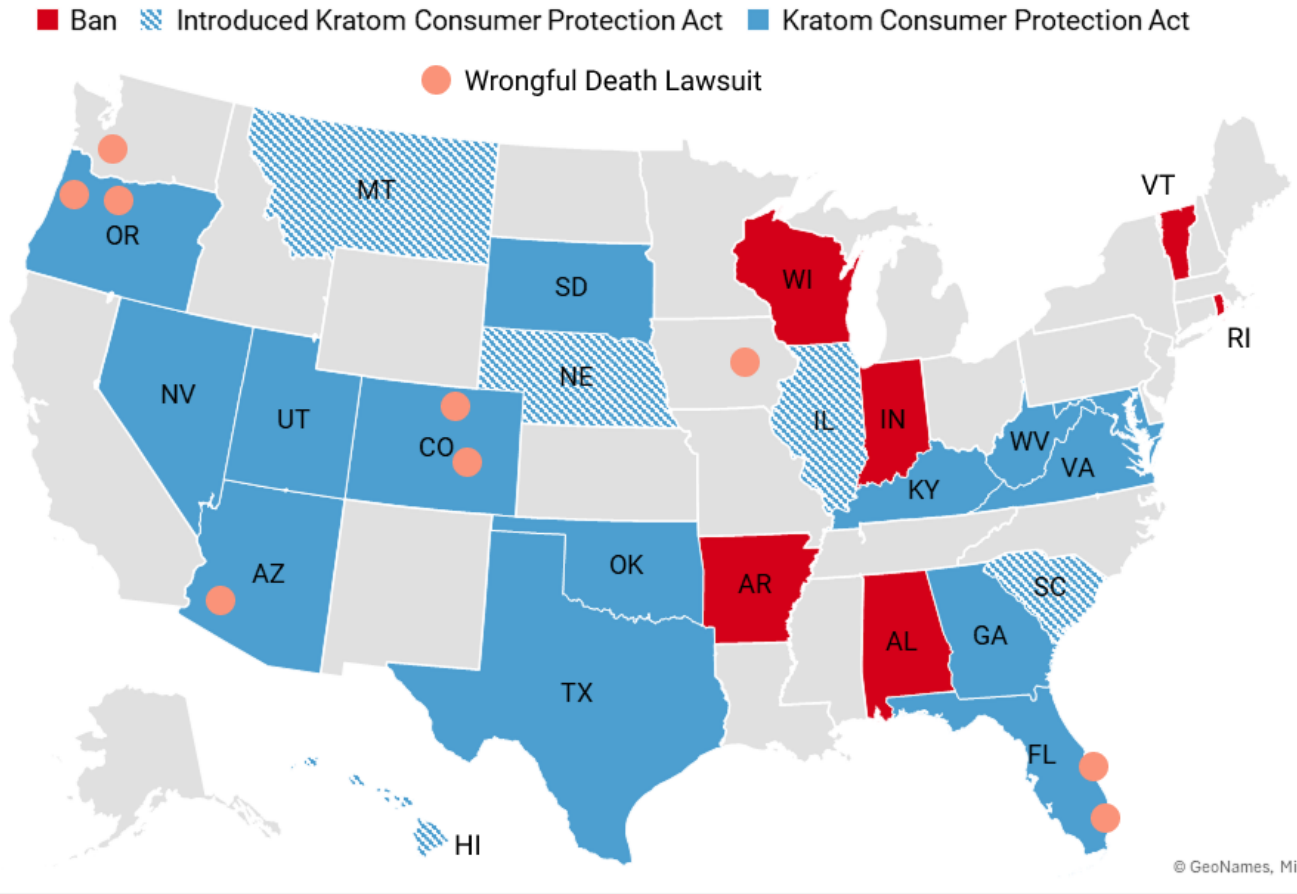
duals

suffering from opioid and other addictions — a significant public health threat," they write.

Select Kratom Legislative Activity



Select Kratom Legislation and Wrongful Death Litigation



MISSOURI INDEPENDENT

HEALTH CARE LEGISLATURE

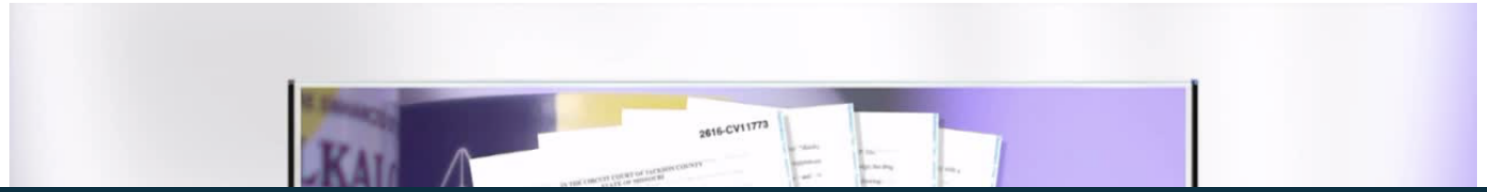
Missouri lawmakers weigh crackdown on kratom products, including ban on 7-OH

The proposal would restrict sales to adults, ban candy-like products and remove concentrated 7-hydroxymitragynine from the market amid addiction concerns

BY: **REBECCA RIVAS** - JANUARY 28, 2026 3:45 PM

Kansas City, Missouri, requires kratom sellers to have separate license; KS bans product, 7-OH derivative

STRONG HIGH WEAK LAWS: The Kansas City Council adopted an ordinance that requires businesses selling kratom to apply for a license, further regulating the product following a 7-OH earlier this year



Meet the Investigators

And So, This Is How We Are Here

KRATOM AT GAS STATIONS

Convenient. Accessible. Worth Knowing.

Kratom, a plant-based supplement used by adults for energy, focus, pain relief, and relaxation, is now widely available at gas stations and convenience stores.

J. Med. Toxicol. (2012) 8:15–32
DOI 10.1007/s13181-011-0202-2

REVIEW ARTICLE

Here Today, Gone Tomorrow…and Back Again? A Review of Herbal Marijuana Alternatives (K2, Spice), Synthetic Cathinones (Bath Salts), Kratom, *Salvia divinorum*, Methoxetamine, and Piperazines

Christopher D. Rosenbaum · Stephanie P. Carreiro · Kavita M. Babu

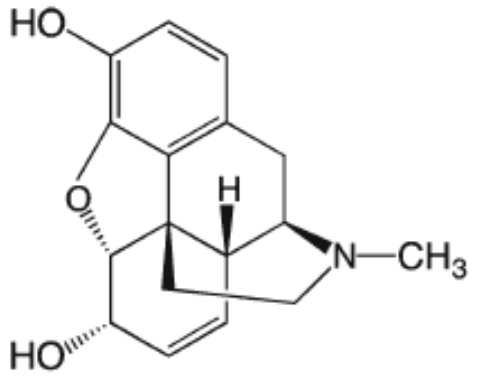
Published online: 25 January 2012


I'm a 28 year military veteran.
PTSD
Degenerative Vertebrae
Chronic Back & Hip Pain
With Kratom I now live an active & pain-free life.
- Clifford Snyder.
www.realvoicesofkratom.org
Real Voices
KRATOM
&
ANXIETY
PTSD/PAIN

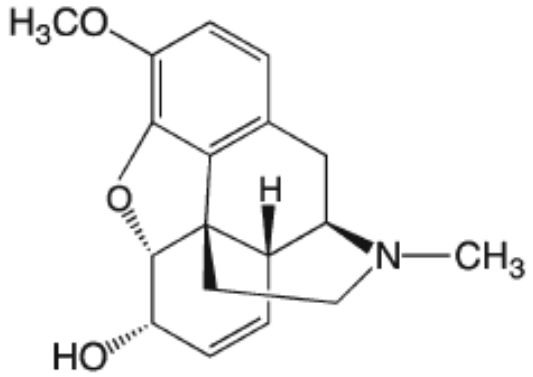
Kratom

- Derived from Korth
- > 40 alkaloids
- Stimulant and Analgesic
- 13 X more potent than morphine
- Brewed, chewed, smoked, ingested
- Reduces withdrawal?

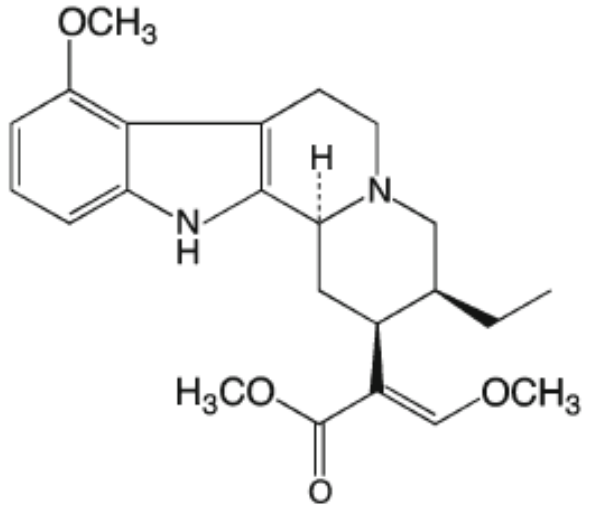
Babu K, et al. Here Today, Gone Tomorrow. JMT. 2012;8:15-32.



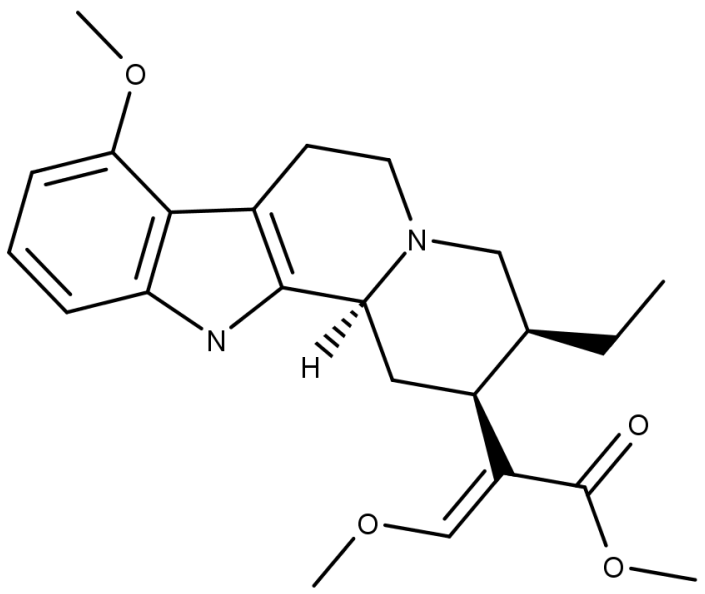
Morphine



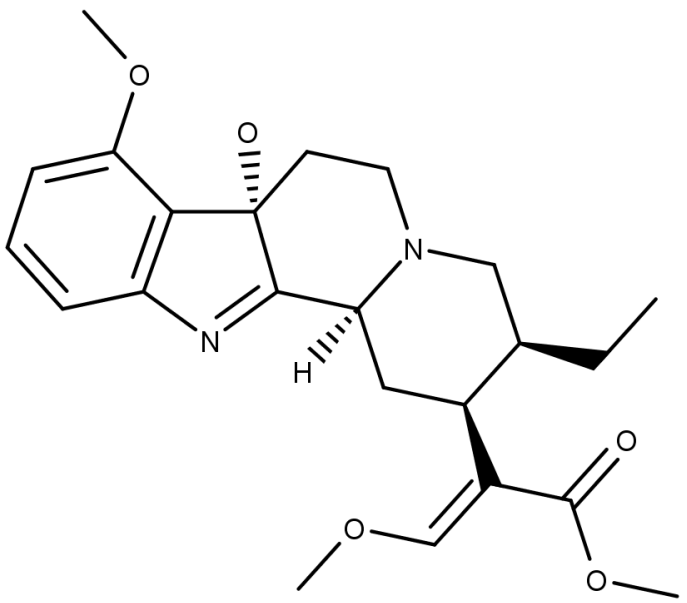
Codeine



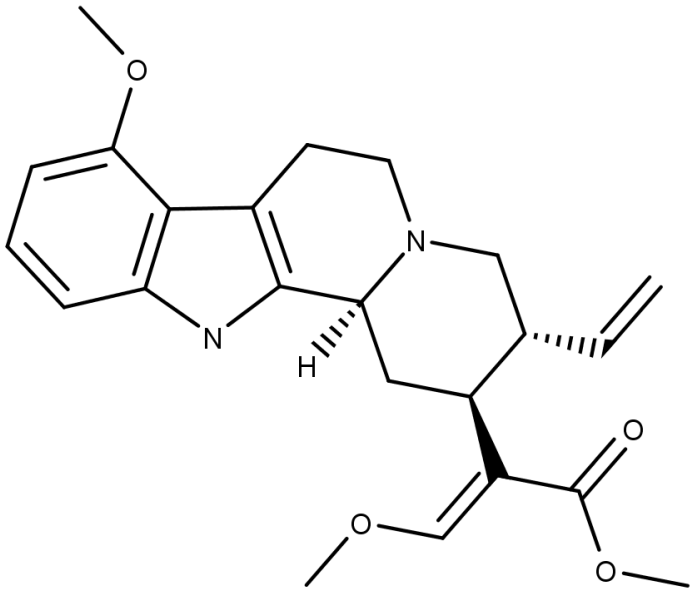
Mitragynine



Mitragynine



7-Hydroxymitragynine



Paynantheine

Normally < 2% of total alkaloid content; <0.05%of dried leaf mass[1]

1. Ponglux D.; Wongseripipatana S.; Takayama H.; Kikuchi M.; Kurihara M.; Kitajima M.; Aimi N.; Sakai S. A New Indole Alkaloid, 7α-Hydroxy-7H-Mitragynine, from Mitragyna Speciosa in Thailand. Planta Med. 1994, 60 (6), 580–581.

WHICH DRUGS ARE UPPERS AND DOWNERS?

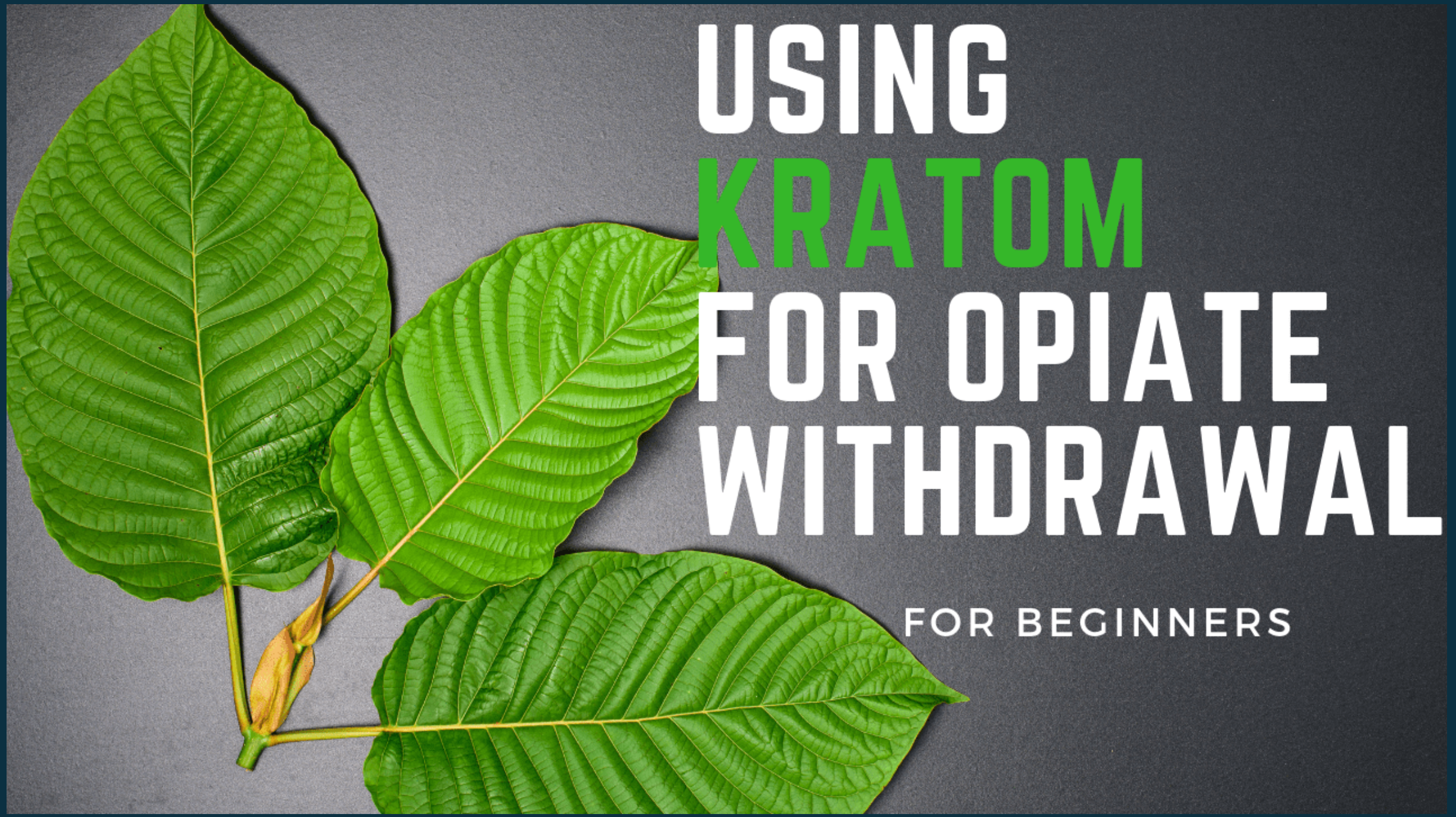
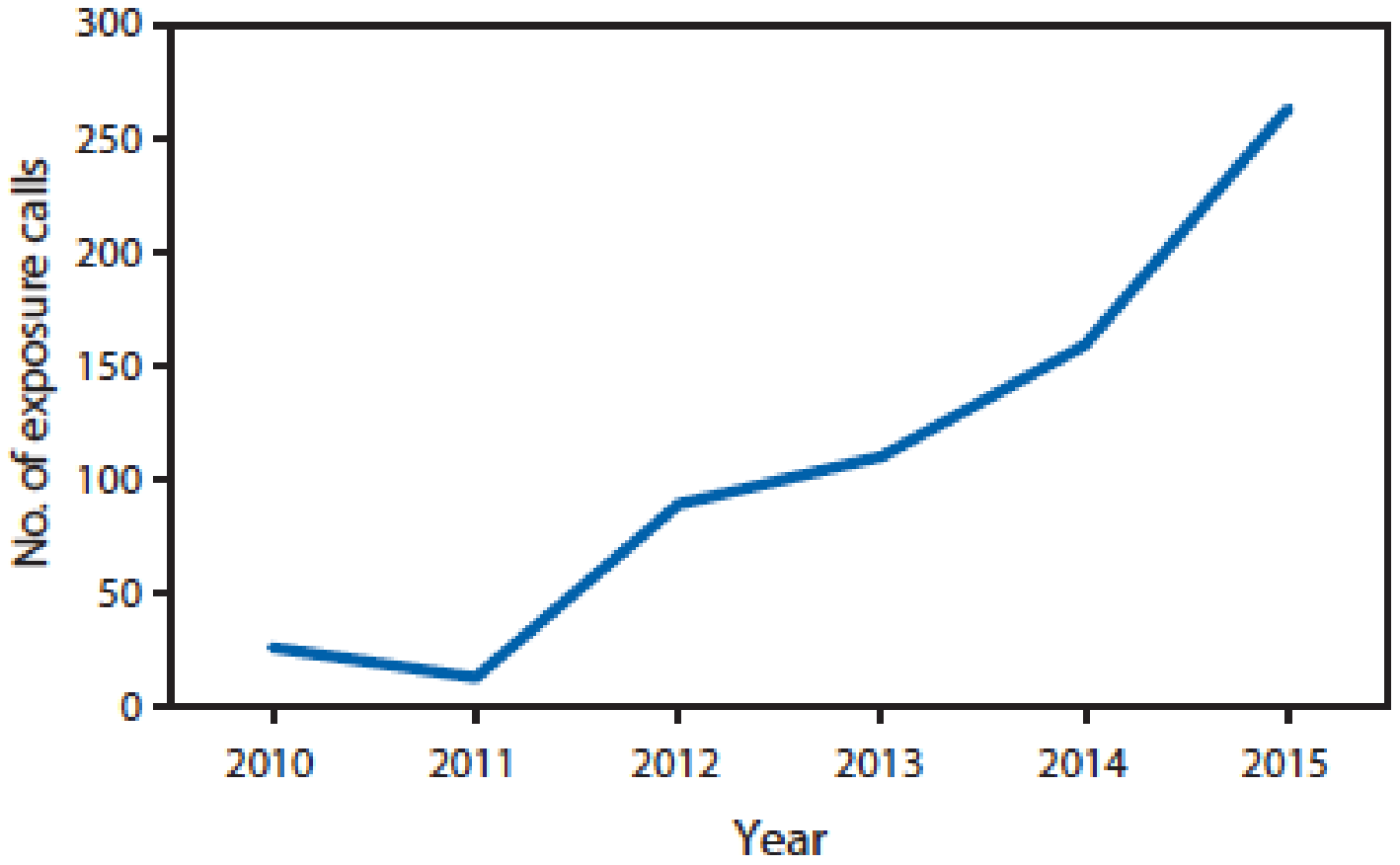

USING
KRATOM
FOR OPIATE
WITHDRAWAL
FOR BEGINNERS

FIGURE. Number of reported exposure calls to poison centers related to kratom use, by year — National Poison Data System, United States and Puerto Rico, January 2010–December 2015

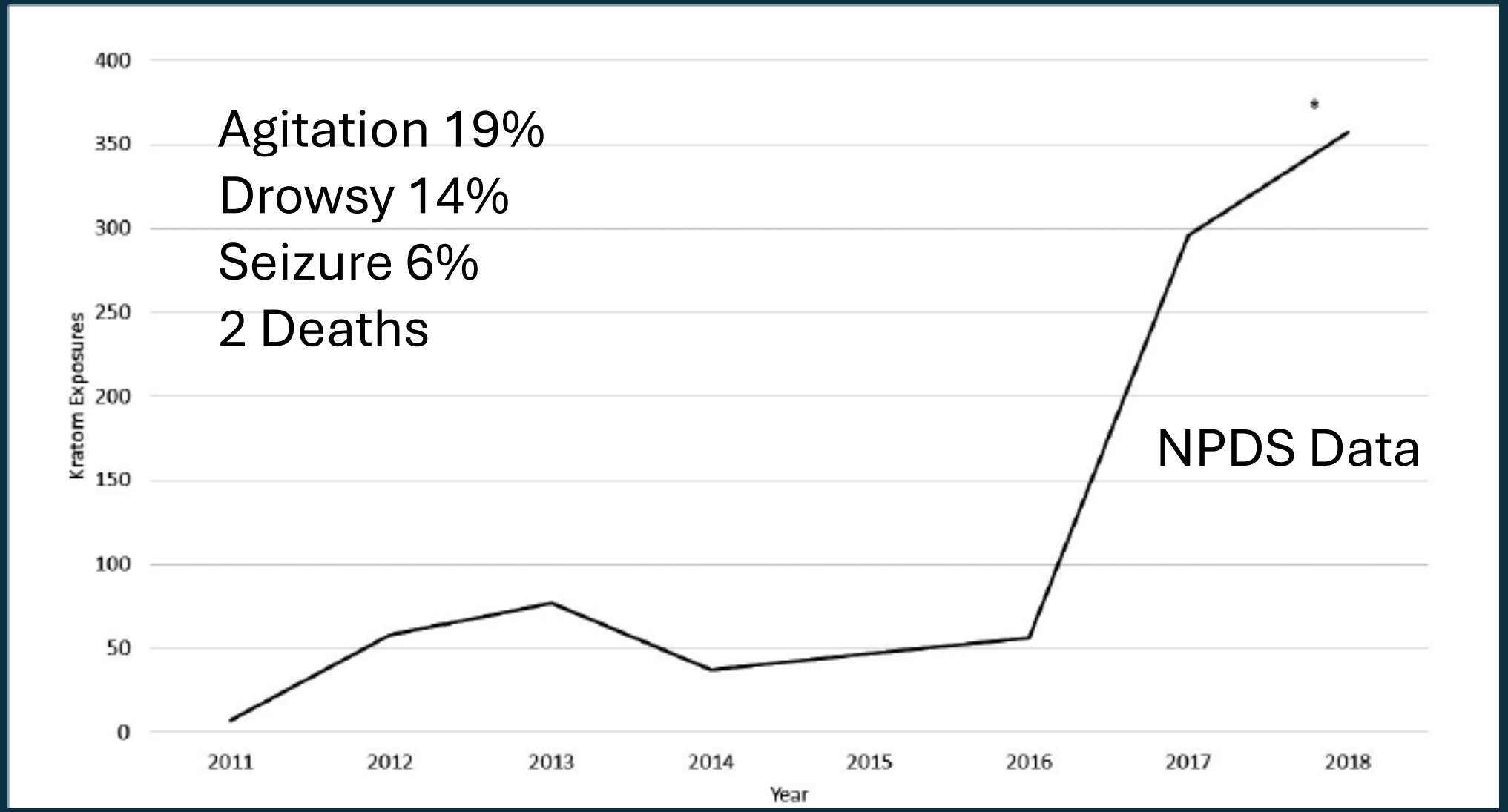


24% agitated

19% drowsy

Anwar et al. Notes from the field. MMWR July 29, 2016, Vol 65, No 29

Kratom Use and Toxicities in the United States



Pharmacotherapy 2019;39(7):775-7.

Notes from the Field: Unintentional Drug Overdose Deaths with Kratom Detected — 27 States, July 2016–December 2017

Weekly / April 12, 2019 / 68(14);326–327

Emily O'Malley Olsen, PhD[1]; Julie O'Donnell, PhD[1]; Christine L. Mattson, PhD[1]; Joshua G. Schier, MD[1]; Nana Wilson, PhD[1] (View author affiliations)

View suggested citation

Kratom (*Mitragyna speciosa*), a plant native to Southeast Asia, contains the alkaloid mitragynine, which can produce stimulant effects in low doses and some opioid-like effects at higher doses when consumed (*1*). Use of kratom has recently increased in popularity in the United States, where it is usually marketed as a dietary or herbal supplement (*1*). Some studies suggest kratom has potential for dependence and abuse (*1*,*2*). As of April 2019, kratom was not scheduled as a controlled substance. However, since 2012, the Food and Drug Administration has taken a number of actions related to kratom, and in November 2017 issued a public health advisory*; in addition, the Drug Enforcement Administration has identified kratom as a drug of concern. During 2011–2017, the national poison center reporting database documented 1,807 calls concerning reported exposure to kratom (*3*). To assess the impact of kratom, CDC analyzed data from the State Unintentional Drug Overdose Reporting System (SUDORS).

CDC funds 32 states and the District of Columbia to abstract into SUDORS detailed data on unintentional and undetermined intent opioid overdose deaths from death certificates and medical examiner and coroner reports, including postmortem toxicology results.† Although kratom is not an opioid, overdose deaths involving kratom (including nonopioid overdose deaths) are included in SUDORS.§ Although

State Unintentional Drug Overdose Reporting System (SUDORS)

152 (0.6%) were kratom positive

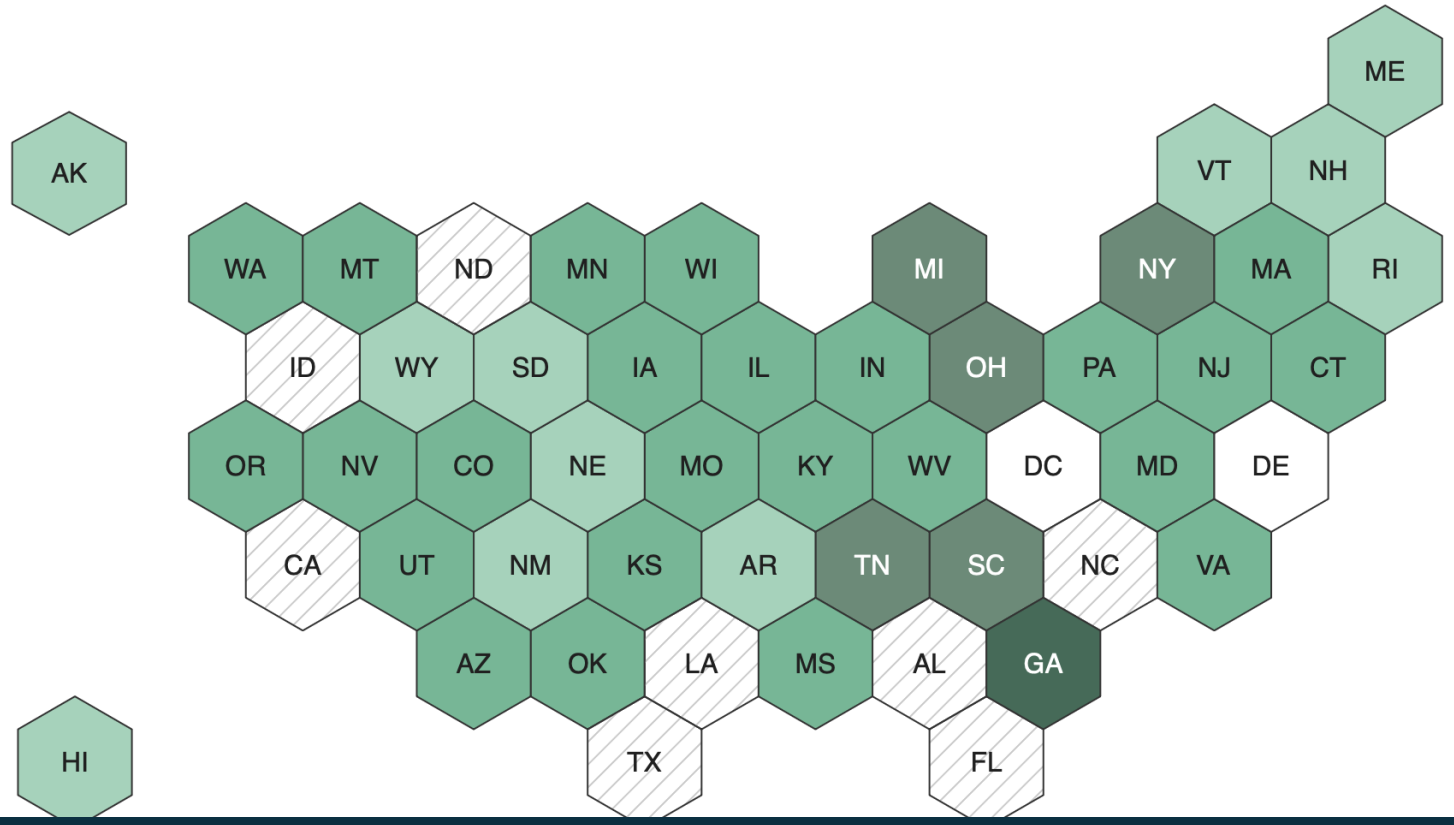
Where were select drugs of interest detected[12] in drug overdose deaths in 2024, *Overall (43 jurisdictions)*?[†]

2024

Kratom/mitragynine

Metric: Count Percent

Overall (43 jurisdictions): 995 deaths

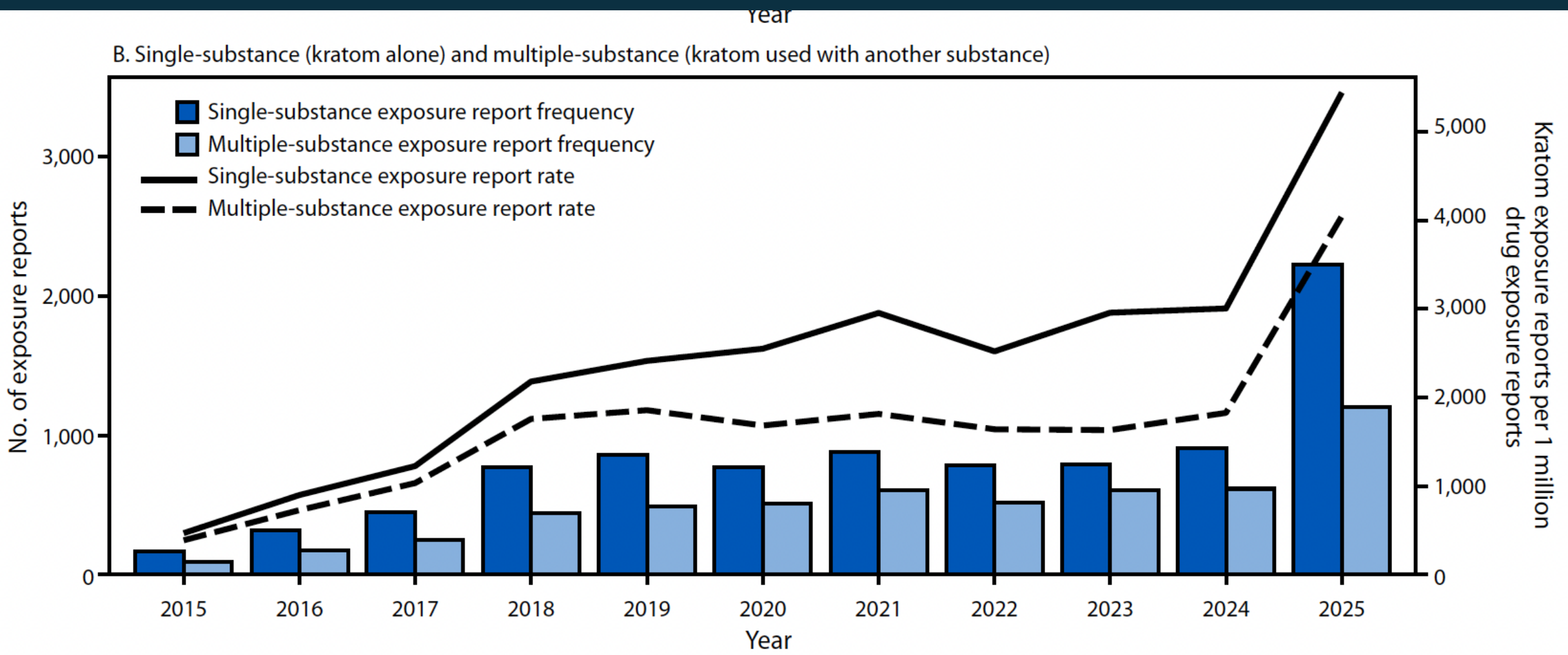


Color Legend

- ≥150 deaths
- 100–149 deaths
- 50–99 deaths
- 10–49 deaths
- 1–9 deaths
- 0 deaths
- Data not available

https://www.cdc.gov/overdose-prevention/data-research/facts-stats/sudors-dashboard-fatal-overdose-data.html

Increases in Kratom-Related Reports to Poison Center , 2015-2025



Hospitalizations increased by 1,200% to 1,300% from 2015-2025

Towers et al. MMWR. 75(11) March 26, 2026

FIGURE 2. Rates* of kratom-related single- and multiple-substance exposure reports to poison centers among persons aged ≥12 years, by sex (A)[†,§] and age group (B)[¶,**] — National Poison Data System, United States, 2015–2025

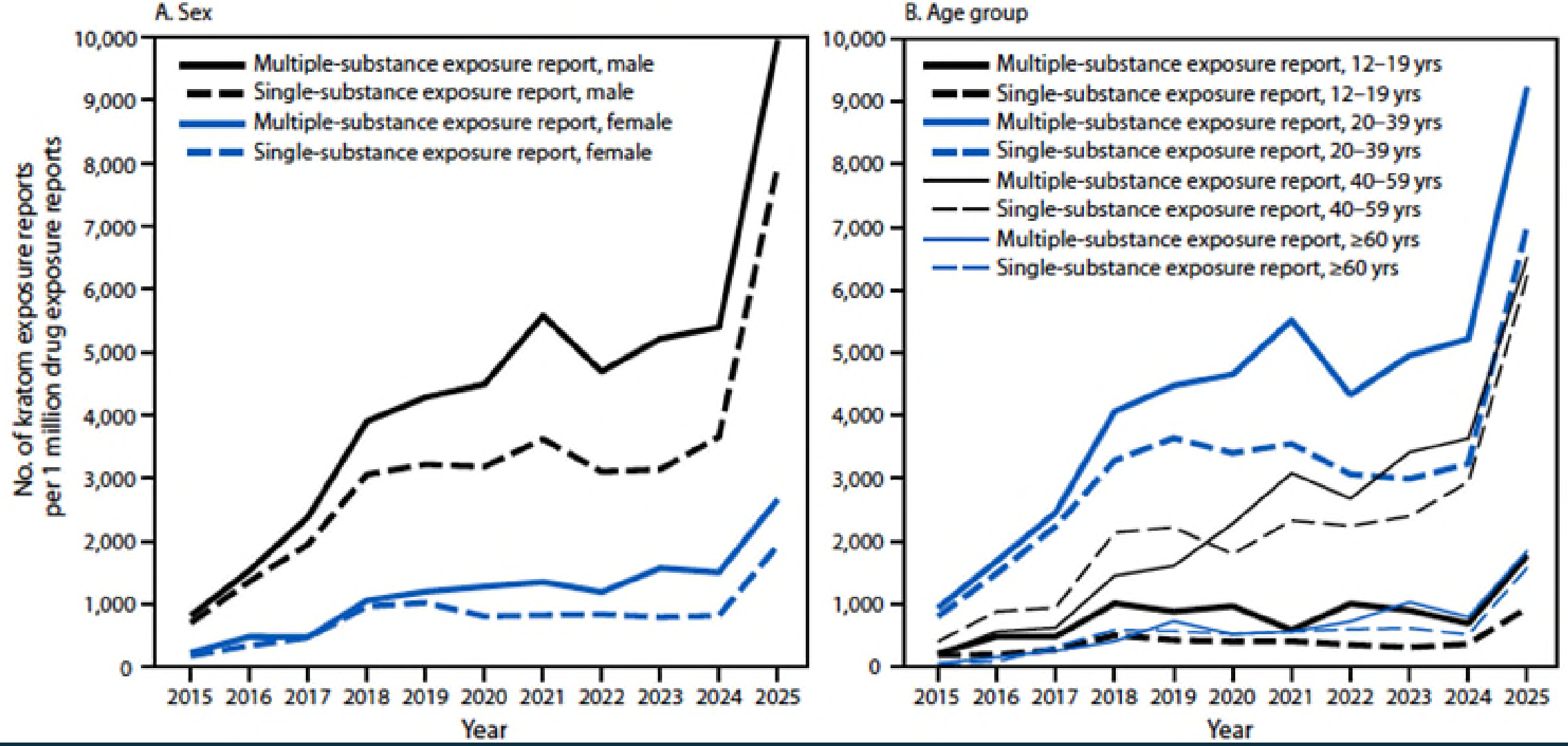


Table 1. *Dose dependent effects of Kratom.*

Kratom use	Dose	Effects
Low to moderate	1-5 grams	Mild stimulant effects that enable workers to stave off fatigue.
Moderate to high	5-15 grams	Opioid-like effects including analgesia, treatment of diarrhea, opioid-withdrawal symptoms, and euphoria.
Very high	Greater than 15 grams	Sedating effects.

Chien et al. Pain Physician 2017;E195-198.

Suspected Adulteration of Commercial Kratom Products with 7-Hydroxymitragynine

Alicia G. Lydecker[1] · Abhisheak Sharma[2] · Christopher R. McCurdy[3] · Bonnie A. Avery[2,3] · Kavita M. Babu[1] · Edward W. Boyer[1]

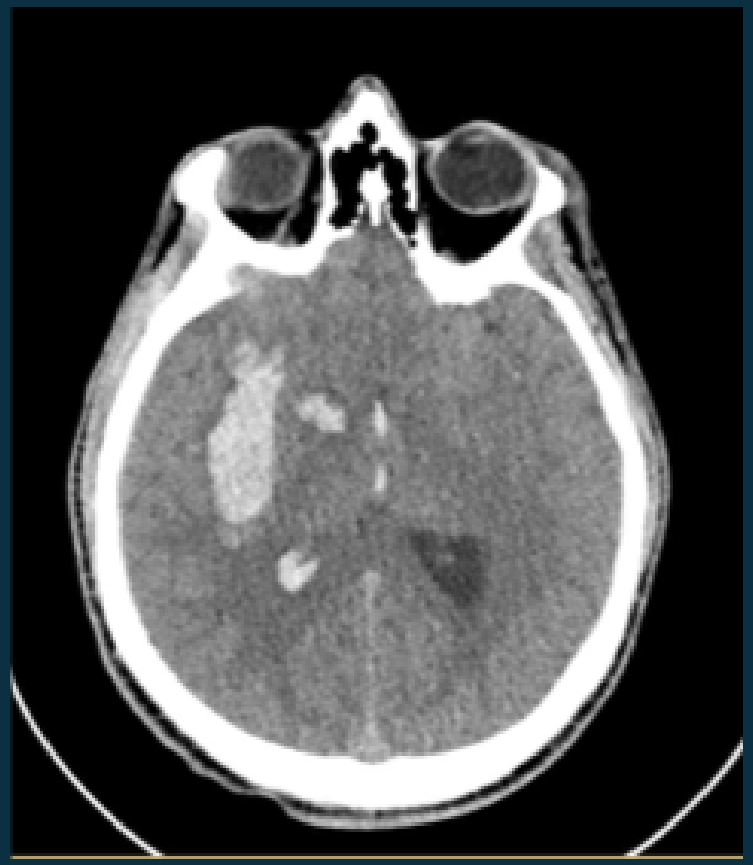
J Med Toxicol 2016;12(4):341-9.

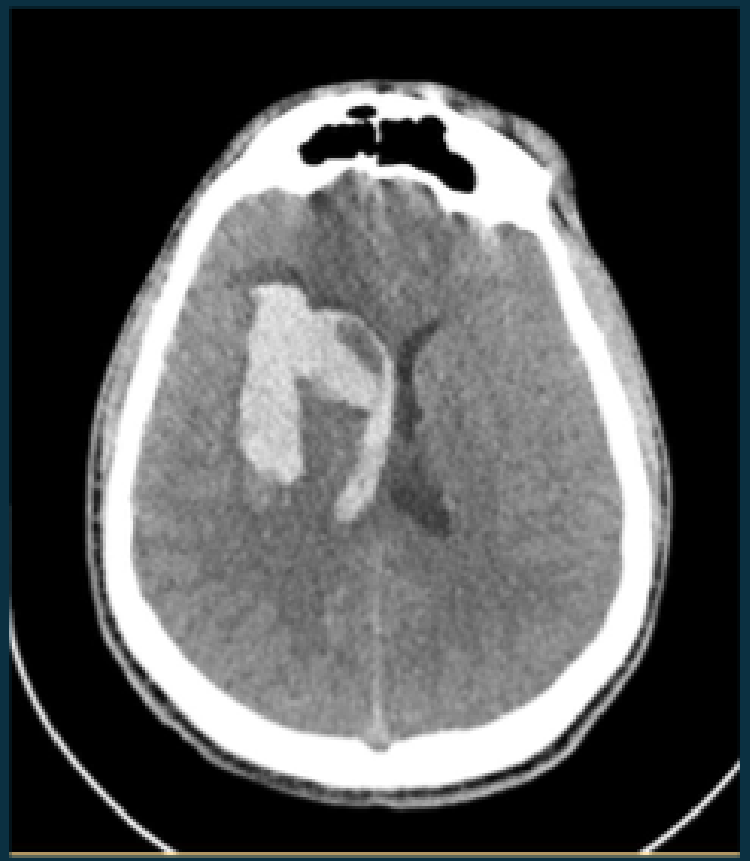
Table 2 Concentration of mitragynine and 7-hydroxymitragynine in naturally occurring Kratom leaf and marketed Kratom supplements

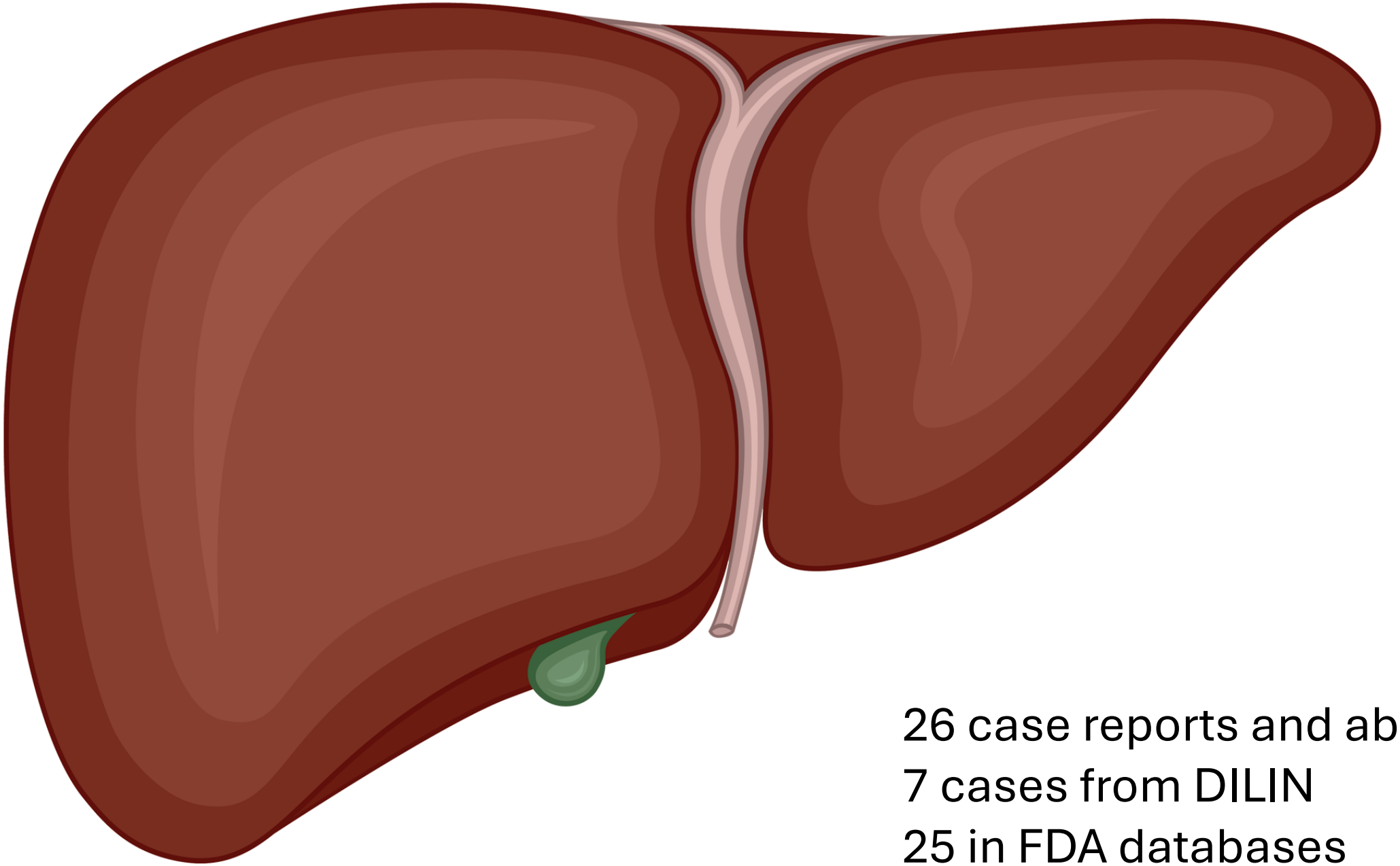
Brand name	Concentration	
	Mitragynine	7-Hydroxymitragynine
Natural Kratom leaf [30]	23.8 μg/mg (range 23.6–24.0)	124.0 ng/mg (114.0–134.0)
Phoria^{tm} Borneo white vein	18.3 μg/mg	593.2 ng/mg
Phoria^{tm} red	18.5 μg/mg	410.8 ng/mg
Phoria^{tm} green	11.7 μg/mg	378 ng/mg
Phoria^{tm} Borneo red vein	14.9 μg/mg	346.2 ng/mg
Phoria^{tm} maeng da kava	10.9 μg/mg	300.8 ng/mg
Phoria^{tm} maeng da blue lotus	9.7 μg/mg	146.7 ng/mg
Phoria^{tm} Borneo green vein	17.5 μg/mg	146.7 ng/mg
Phoria^{tm} regular	19.0 μg/mg	93.0 ng/mg
Kratom shot (liquid formulation)	190.7 ng/μL	2.51 ng/μL
Green vein extra strength (liquid formulation)	396.4 ng/μL	1.96 ng/μL

Spontaneous Intraparenchymal Cerebral Hemorrhage in a Patient Taking Mitragyna speciosa (Kratom)

David Liss, MD, S. Eliza Halcomb, MD, Evan S. Schwarz, MD, Brian Froelke, MD







Schimmel and Dart. Drugs 2020;80:263-83.

26 case reports and abstracts
7 cases from DILIN
25 in FDA databases
27 in internet user forums

Kupferschmidt, 2011 [38]	R ratio 8.0 Hepatocellular	5–90 [+2]	Absent [0]	< 55 [0]	≥ 50% improved > 30 days [0]	None [0]	5–6 in group I [0]
Kapp et al. 2011 [27]	R ratio 1.4 Cholestatic	5–90 [+2]	Absent [0]	< 55 [0]	≥ 50% improved in 180 days [+2]	None [0]	5–6 in group I [0]
Rivera et al. 2011 [44]	No ALP for R ratio						
Kesar et al. 2013 [39]	R ratio 0.5 Cholestatic	≤ 15 from last use [+1]	Absent [0]	< 55 [0]	Corticosteroid/ ursodiol [0]	None [0]	5–6 in group I [0]
Dorman et al. 2015 [28]	R ratio 0.24 Cholestatic	1–90 for second exposure [+2]	Absent [0]	≥ 55 [+1]	Unknown [0]	Time incompatible [0]	5–6 in group I [0]
Arens et al. 2015 [48]	R ratio 7.5 Hepatocellular	< 5 [+1]	Present [+1]	< 55 [0]	Unknown [0]	None [0]	5–6 in group I [0]
Sullivan 2016 [51]	R ratio 3.4 Mixed	5–90 [+2]	Present [+1]	< 55 [0]	≥ 50% improved in 180 days [+2]	Time incompatible [0]	5–6 in group I [0]
Drago et al. 2017 [37]	R ratio 2.7 Mixed	≤ 15 from last use [+1]	Absent [0]	< 55 [0]	≥ 50% improved in 180 days [+2]	None [0]	5–6 in group I [0]
Bernier et al. 2017 [40]	R ratio 1.7 Cholestatic	≤ 15 from last use [+1]	Absent [0]	< 55 [0]	≥ 50% improved in 180 days [+2]	None [0]	Groups I and II [+2]
Shah et al. 2017 [41]	R ratio 1.4 Cholestatic	Insufficient documentation					
Riverso et al. 2018 [29]	R ratio 4.0 Mixed	Insufficient documentation					
Griffiths et al. 2018 [30]	R ratio 4.8 Mixed	5–90 [+2]	Absent [0]	< 55 [0]	Unknown [0]	None [0]	5–6 in group I [0]
Tayabali et al. 2018 [36]	R ratio 2.7 Mixed	Insufficient documentation					
Mousa et al. 2108 [31]	R ratio 8.7 Hepatocellular	5–90 [+2]	Absent [0]	< 55 [0]	N-acetylcysteine [0]	None [0]	5–6 in group I [0]
Mackenzie and Thompson, 2018 [49]	R ratio 8.7 Hepatocellular	5–90 [+2]	Present [+1]	< 55 [0]	Liver transplant [0]	None [0]	5–6 in group I [0]
De Francesco et al. 2019 [50]							
Antony and Lee 2019 [32]	R ratio 0.7 Cholestatic	≤ 15 from last use [+1]	Absent [0]	≥ 55 [+1]	≥ 50% improved in 180 days [+2]	Time incompatible [0]	5–6 in group I [0]
2019, Fernandes et al. 2019 [34]	R ratio 0.7 Cholestatic	5–90 [+2]	Absent [0]	< 55 [0]	Ursodiol [0]	None [0]	5–6 in group I [0]

A Case of Kratom-induced Seizures

Hasnain Afzal [1] , Michael Esang [1] , Sabreen Rahman [1]

1. Psychiatry and Behavioral Sciences, Nassau University Medical Center, East Meadow, USA

Corresponding author: Hasnain Afzal, doctorhasnain@gmail.com

Muacedvic A, Adler JR. Cureus 2020;12(1):e6588

CASE REPORT

Kratom (Mitragynine) Ingestion Requiring Naloxone Reversal

Daniel L. Overbeek, MD
Jonathan Abraham, MD
Brendan W. Munzer, MD

University of Michigan, Department of Emergency Medicine, Ann Arbor, Michigan

Overbeek DL, et al. Clinical Practice and Cases in Emergency Medicine 2019;3(1): 24

Dependence and Addiction?

Table 4. Summary of Reported Withdrawal Symptoms Resulting From Extended Use of Kratom

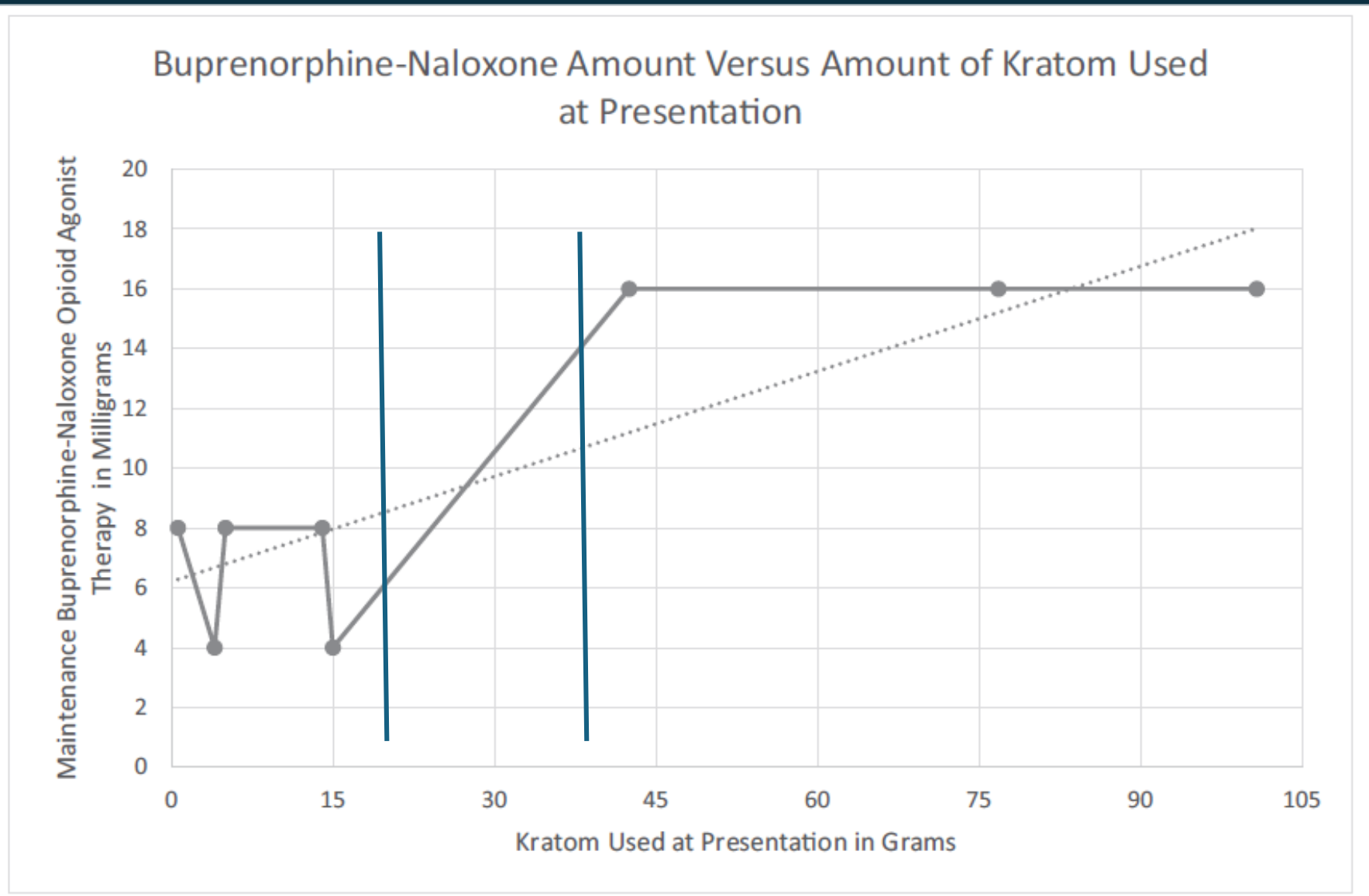
Withdrawal Symptoms	Available Treatment Options
Anxiety and agitation[2,3,13,14,16]	Benzodiazepines, buprenorphine
Nausea,[3,13,16] vomiting,[3,13] diarrhea,[3,13,16] abdominal cramps[3,13]	Nonopioid antidiarrheal
Muscle, body, and joint pain,[3,13,16] nerve pain[29]	Nonsteroidal pain relievers
Insomnia,[13,15,16] sedation,[3] fatigue[15,16]	Buprenorphine and clonidine
Sweating, rhinorrhea, watery eyes[13,15]	Buprenorphine and clonidine
Tremors,[13,16] ataxia,[16] dystonia[16]	Buprenorphine and clonidine
Psychological restlessness,[13] anger,[13] depressed mood,[13] nervousness,[13] increased craving[15]	Buprenorphine and clonidine

Sethi et al. Pri Care Companion CNS Disord 2020;22(1):19nr02507.

Treatment of Kratom Withdrawal and Dependence With Buprenorphine/Naloxone: A Case Series and Systematic Literature Review

Stephanie T. Weiss, MD, PhD and Heather E. Douglas, MD

J Addict Med 2021;15:167-172.



Dots represent each individual patient. The solid line shows the correlation (r = 0.84) between kratom dose used at presentation and dose of buprenorphine at OAT induction.

'Initiating sedative-analgesics'.)

Hepatotoxicity — Treatment of hepatoxicity is cessation of kratom use. Symptoms and biochemical liver tests improve one to two weeks after stopping kratom. Recurrent hepatotoxicity can occur with rechallenge [59,62].

Withdrawal syndrome/use disorder — Many patients with kratom dependence and withdrawal do not seek treatment because withdrawal symptoms are mild and tolerable. In a patient with kratom dependence with moderate to severe withdrawal (similar to opioid use disorder [OUD]), we suggest buprenorphine for treating initial symptoms and for long-term maintenance management. Induction and maintenance doses are typically less than those needed for OUD. In one case series, the maintenance buprenorphine dose was 4 to 8 mg, but 16 mg was needed in patients with heavier kratom use [75]. There are anecdotal reports in some regions of patients needing higher buprenorphine doses; as with other patients with OUD, buprenorphine dosing should be optimized to treat withdrawal symptoms and reduce cravings. Trials supporting specific pharmacologic treatments for kratom withdrawal and dependence do not exist; evidence for buprenorphine is based on case reports and series [75-78]. (See 'Psychiatric, dependence, withdrawal' above and "Opioid use disorder: Pharmacologic management", section on 'Buprenorphine: Opioid partial agonist'.)

Cognitive Enhancement (Nootropic) Supplements

"GAS STATION HEROIN"

Tianeptine

Tianeptine in Dietary Supplements

Information on Select Dietary Supplement Ingredients and Other Substances

FDA considers tianeptine to be a substance that does not meet the statutory definition of a dietary ingredient and is an unsafe food additive.

Under the Federal Food, Drug, and Cosmetic Act (the FD&C Act), dietary supplements must contain at least one “dietary ingredient” but can also contain non-dietary ingredients, subject to applicable requirements. A “dietary ingredient” is a vitamin; mineral; herb or other botanical; amino acid; dietary substance for use by man to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any dietary ingredient from the preceding categories. Non-dietary ingredients intended for use in dietary supplements must be used in accordance with a food additive regulation or be generally recognized as safe (GRAS), unless they meet one of the other listed exceptions to the food additive definition. Because tianeptine does not qualify as a dietary ingredient, is not an approved food additive, is not GRAS, and does not meet any of the other listed exceptions to the dietary supplement definition, it is an unsafe food additive, and dietary supplements containing tianeptine are adulterated under the FD&C Act.

Tianeptine Products Linked to Serious Harm, Overdoses, Death

Consumer Updates

- Animal & Veterinary
- Children's Health
- Cosmetics
- Dietary Supplements
- Drugs
- Food
- Medical Devices

Michigan Becomes First State to Make the Anti-depressant Tianeptine Sodium a Controlled Substance

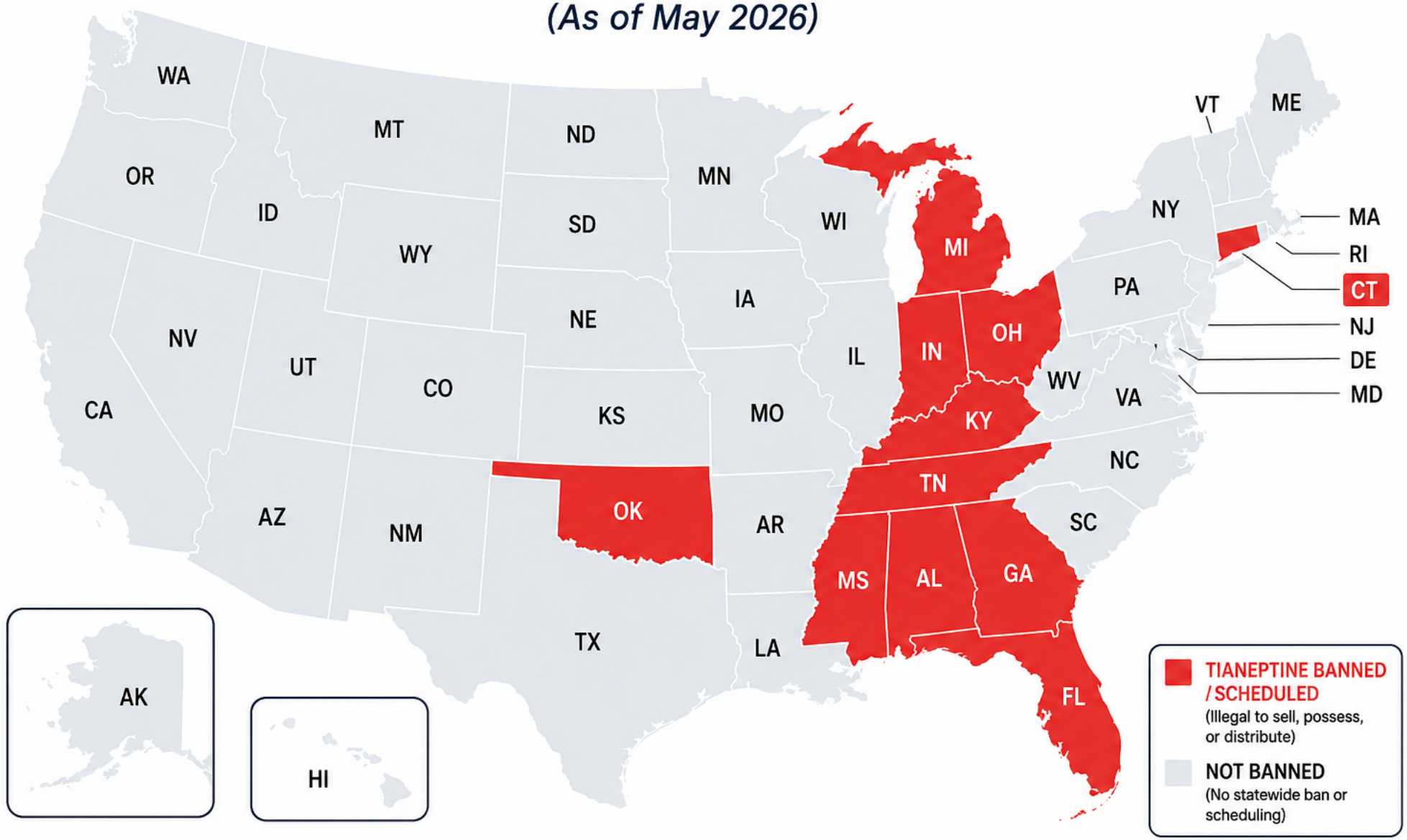
ArborYpsi Law | **April 6, 2018**

Today Michigan signed a new law making the anti-depressant tianeptine sodium into a schedule 2 controlled substance. Tianeptine sodium was previously unlisted as a controlled substance in any state or on the federal level.

https://www.arborypsilaw.com/blog/michigan-becomes-first-state-to-make-the-anti-depressant-tianeptine-sodium-a-controlled-substance/

STATES THAT HAVE BANNED TIANEPTINE

(As of May 2026)

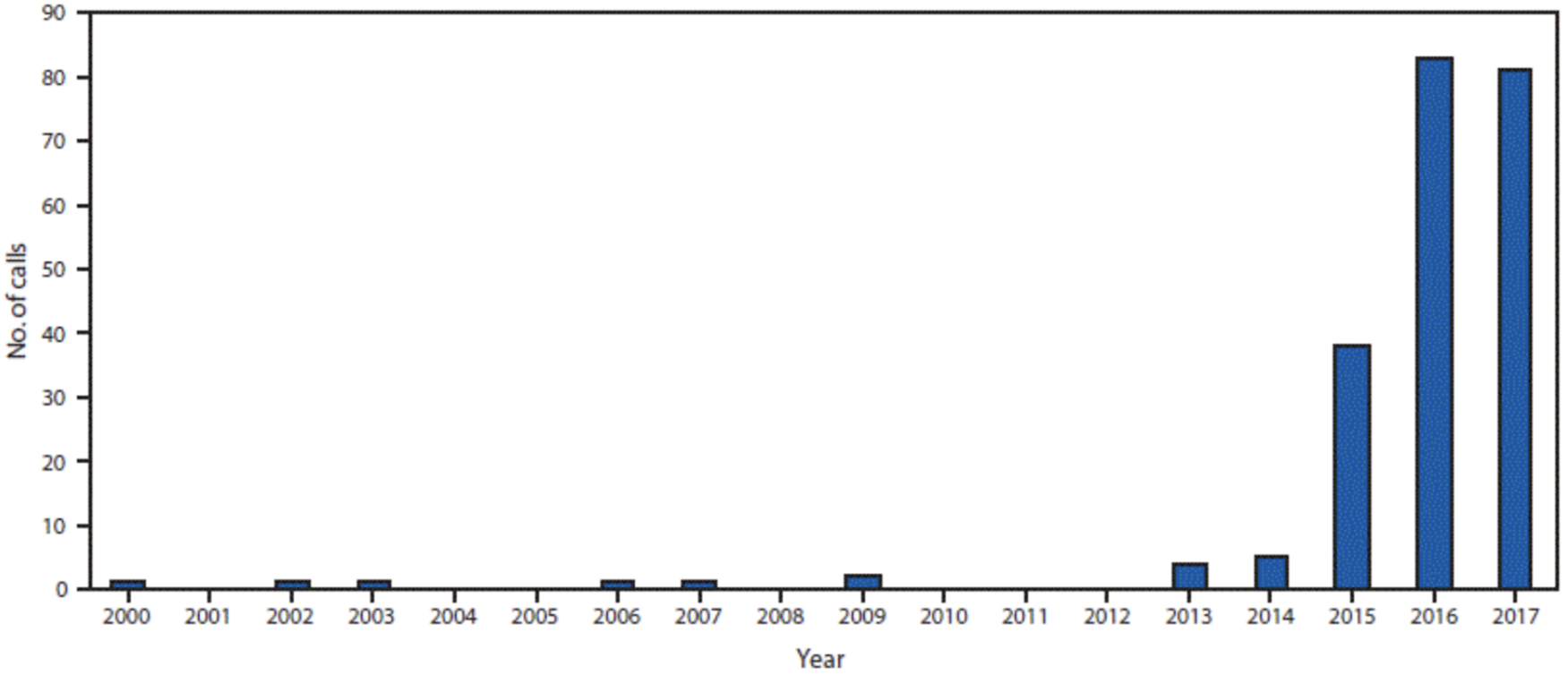


Laws are subject to change. Always check your state's official laws and regulations for the most current information.

Source: State legislation and official government websites, news reports, and public health sources (2023–May 2026)

*Made by ChatGPT

FIGURE. Number of tianeptine exposure telephone calls reported (N = 218) — National Poison Data System, United States, 2000–2017



The figure above shows the number of telephone calls related to tianeptine exposure reported by U.S. poison control centers to the National Poison Data System during 2000–2017.

El Zahran T, Schier J, Glidden E, et al. Characteristics of Tianeptine Exposures Reported to the National Poison Data System — United States, 2000–2017. MMWR Morb Mortal Wkly Rep 2018;67:815–818

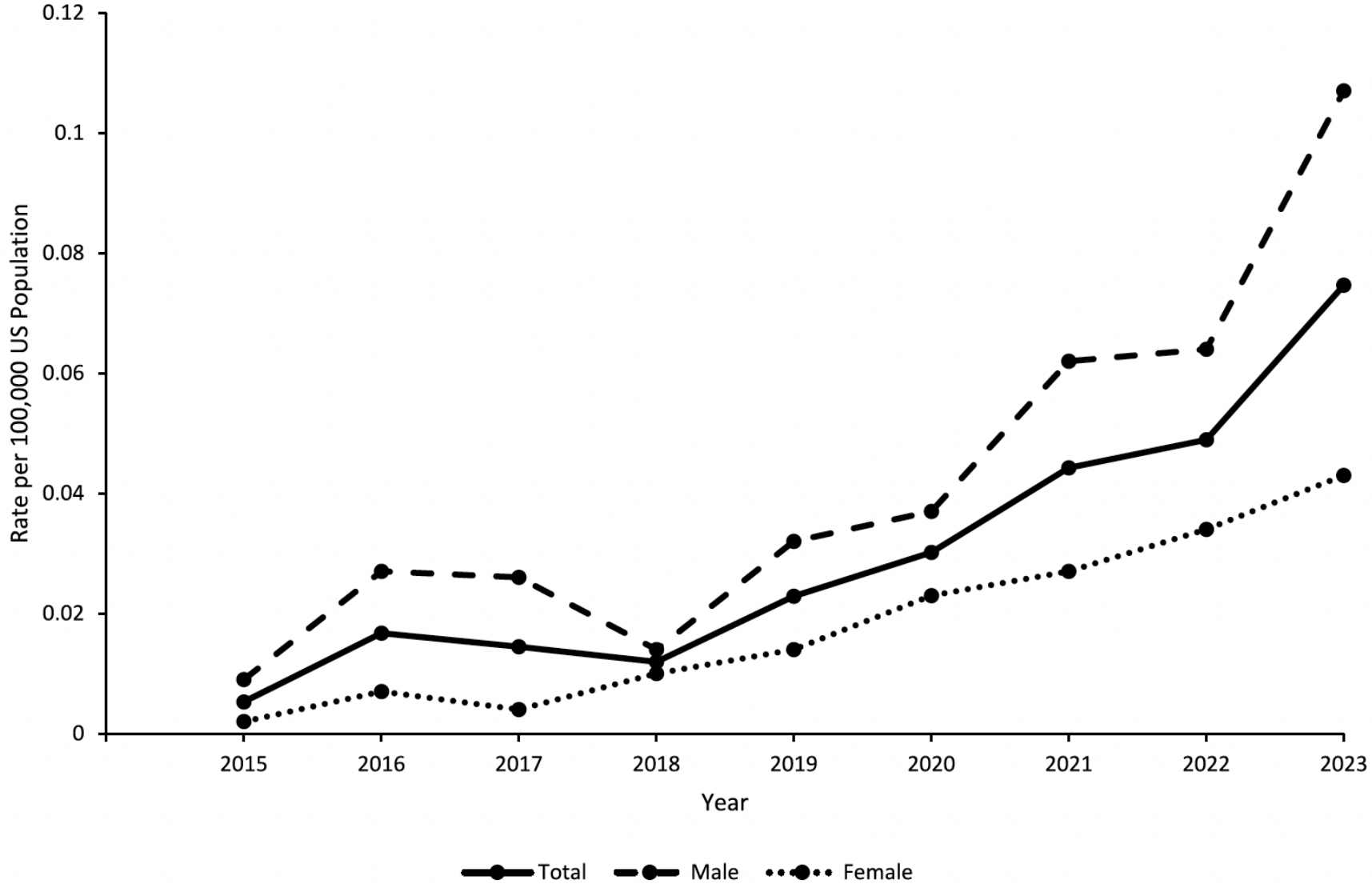


Fig. 1 Annual Rate of Tianeptine Exposures Reported to United States Poison Centers by Sex, National Poison Data System 2015–2023

Quadir M. Journal of Medical Tox 2025;21:30-41.

Tianeptine

This is a special edition dedicated to substance use & misuse. Look for more of these editions as we encounter emerging and growing concerns. Funding support provided by the CDC's Prescription Drug Overdose: Prevention for States program in partnership with the Virginia Department of Health.

Case

A young male intentionally took tianeptine. He became unresponsive and a bystander called EMS and naloxone was administered without success. Upon arrival to the emergency department, the patient was noted to have miosis, sedation, and respiratory depression. He was given two doses of naloxone 0.4 mg intravenous with reversal of sedation and respiratory depression. His urine drug screen was negative. His urine was sent for advanced analytics and found to be positive for tianeptine.

Overview

United States (U.S.) poison centers have seen an increase in calls regarding the use of "gas station dope," otherwise known as tianeptine. Use is particularly high in other regions of the U.S. but Virginia Poison Centers have also received calls pertaining to this emerging substance and it is readily found in stores around the

https://med.virginia.edu/toxicology/wp-content/uploads/sites/268/2023/05/May23-SAM-Tianeptine.pdf


NexGen
XYLAZINE HCl
333 mg/mL
FOR VETERINARY USE ONLY
STERILE MULTIPLE DOSE VIAL
Net Contents: 100 mL
For Intramuscular or Intravenous use
Discard 28 days after initial entry
NC-0107

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."

How to Stay Safer with Xylazine

Xylazine is a powerful veterinary sedative recently found in the Rhode Island drug supply. Xylazine isn't an opioid but can still impact an overdose.

Have naloxone and don't use alone

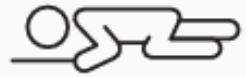
Drugs that have xylazine in them very often have fentanyl, too. Make sure you and your friends carry naloxone. **Make sure someone is around to administer naloxone if you overdose.**

Call 911

If you think that someone is overdosing, call 911 first and administer naloxone until breathing is restored. The Good Samaritan Law provides certain legal protection, whether you have drugs on you or not.

Support breathing

If the person is breathing again but is still sedated, they don't need more naloxone. **Put the person on their side supported by a bent knee.** This will help them breathe.



Treat your wounds and use new supplies

Xylazine can cause severe wounds and ulcers that can lead to an infection. Wounds may occur even if you do not inject or in places where you never injected. It's important to use new supplies and to get medical care for wounds.

For safer drug use supplies, resources, and more information, visit **PreventOverdoseRI.org/xylazine**

PREVENT OVERDOSE RI

Congressional Acts

Text: H.R.1839 — 118th Congress (2023-2024)

All Information (Except T

Listen

There is one version of the bill. Text available as: XML/HTML | XML/HTML (new window) (15KB) | TXT (10KB) PDF (234KB)

Shown Here:
Introduced in House (03/28/2023)

118TH CONGRESS
1ST SESSION

H. R. 1839

To prohibit certain uses of xylazine, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 28, 2023

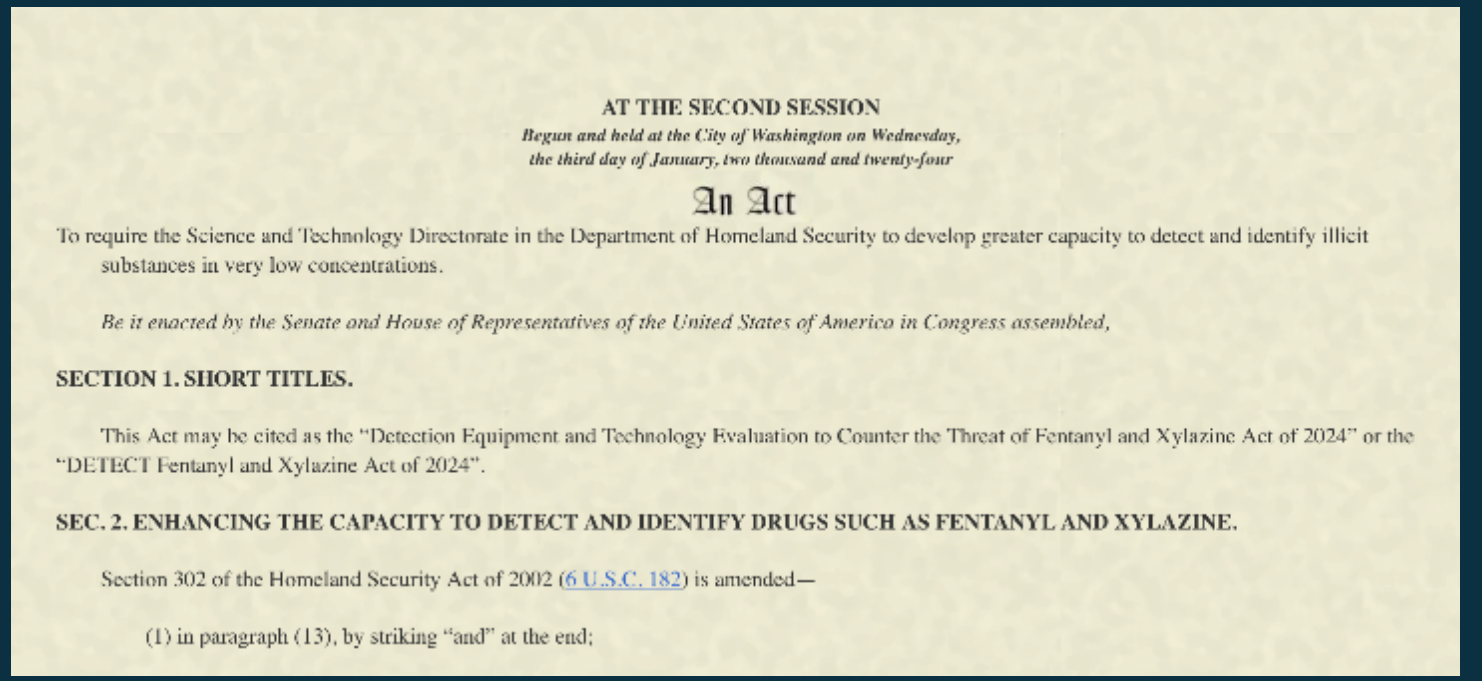
Mr. PANETTA (for himself, Mr. PFLUGER, Mr. RUTHERFORD, Mr. BUCK, Mr. PAPPAS, Mr. BACON, Mr. LARSEN, Mr. VARGAS, Mr. THOMPSON of California, and Ms. HOULAHAN) introduced the following bill; which was referred to the Committee on Energy and Commerce, and in addition to the Committee on the Judiciary, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To prohibit certain uses of xylazine, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Combating Illicit Xylazine Act



AT THE SECOND SESSION

Begun and held at the City of Washington on Wednesday, the third day of January, two thousand and twenty-four

An Act

To require the Science and Technology Directorate in the Department of Homeland Security to develop greater capacity to detect and identify illicit substances in very low concentrations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLES.

This Act may be cited as the "Detection Equipment and Technology Evaluation to Counter the Threat of Fentanyl and Xylazine Act of 2024" or the "DETECT Fentanyl and Xylazine Act of 2024".

SEC. 2. ENHANCING THE CAPACITY TO DETECT AND IDENTIFY DRUGS SUCH AS FENTANYL AND XYLAZINE.

Section 302 of the Homeland Security Act of 2002 (6 U.S.C. 182) is amended—

(1) in paragraph (13), by striking "and" at the end;

Detect Fentanyl and Xylazine Act

And You See It in the Medical Literature, Too

The NEW ENGLAND JOURNAL of MEDICINE

Perspective

JUNE 15, 2023

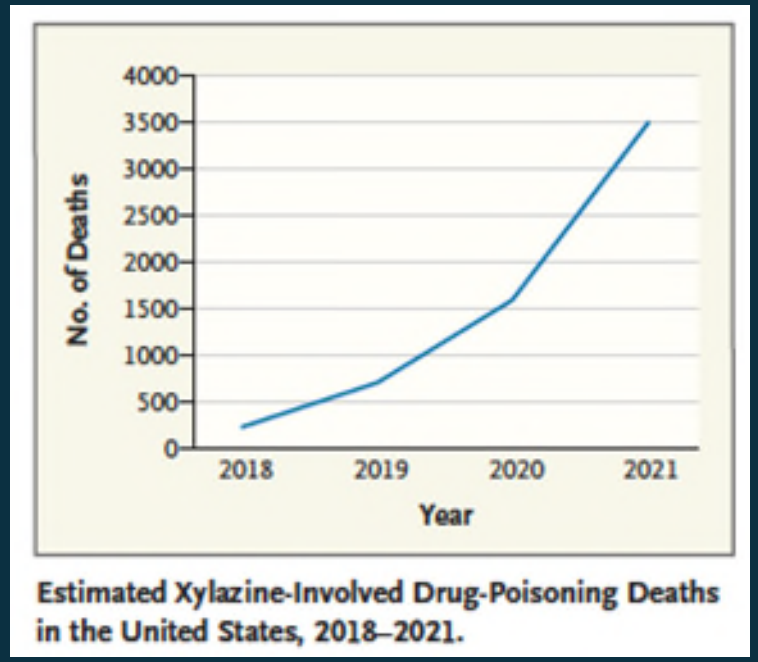
Xylazine — Medical and Public Health Imperatives

Rahul Gupta, M.D., M.P.H., M.B.A., David R. Holtgrave, Ph.D., and Michael A. Ashburn, M.D., M.P.H., M.B.A.

Increasing use of xylazine, most often in combination with other drugs such as fentanyl, is a rapidly growing threat to human health in the United States. Xylazine is an α_2-agonist in the same drug class as clonidine, lofexidine, and dexmedetomidine. It was initially studied for use in humans as an antihypertensive agent, but development for human use was discontinued because of adverse effects. Xylazine tance, heart rate, and blood pressure. Some α_2-agonists are approved for use in humans as antihypertensive agents, for sedation, and for mitigation of opioid-withdrawal symptoms to facilitate abrupt opioid discon- drawal symptoms are not alleviated by the administration of opioids. The severity of such symptoms, combined with uncertainty about effective treatment options, may compel people to continue to use xylazine, since discontinuation without assistance often isn't feasible.

Xylazine appears to have entered the illicit drug supply in the northeastern United States as an additive to fentanyl. It can be

Gupta R. N Engl J Med 2023;388:24.



Estimated Xylazine-Involved Drug-Poisoning Deaths in the United States, 2018–2021.

'FAAX is associated with increasing harm to people living in the United States. Our goal is for the designation of xylazine as an emerging threat and subsequent actions to begin to address this threat before it worsens…'

CLINICAL TOXICOLOGY
2023, VOL. 61, NO. 12, 1013–1016
https://doi.org/10.1080/15563650.2023.2294619

EDITORIAL

Closing the xylazine knowledge gap

In the 1960s, Bayer 1470, an alpha$_2$-adrenergic agonist similar to clonidine, was investigated as an antihypertensive in humans, only to be abandoned because it produced excessive sedation [1]. Extensive testing in animals confirmed this potent sedative effect across multiple species with minimal respiratory depression [1–3], which ultimately led to the marketing of Bayer 1470 as xylazine. For decades, xylazine has been used in veterinary medicine and animal research, and its pharmacology in animals is well defined [4,5]. Advantages in those settings [4,5] include rapid and deep sedation, analgesia, muscle relaxation, near lack of respiratory depression at appropriate doses, ease of administration by multiple routes (intravenous, intramuscular, and subcutaneous [6,7]), ability to be mixed with opioids or ketamine, and reversibility (with drugs such as yohimbine, tolazoline, or idazoxan [4,8]).

The first appearances of xylazine in the illicit drug market were reported in Puerto Rico in the early 2000s [9]. Two decades later, xylazine is increasingly found in illicit drug-related deaths across the United States (US) and often in combination with fentanyl or cocaine [10,11]. In a recent report of drug seizure data from the National Forensic Laboratory Information System [12] only three of the fifty US States reported no xylazine found. Although the vast majority of reports are from the US, other countries have detected xylazine in their local drug supply. Reports from Canada [13], the United Kingdom [14], throughout Europe [15], and Malaysia [16], for example, highlight a global phenomenon. With growing awareness and testing, cases are likely to be reported in many other regions.

including fatal overdoses and
human data support these asser

Although human controlle
hypertension or sedation are
intentional and unintentional t
erinary drug. Hoffmann et al.
with an intentional intramusc
who abruptly developed brady
hyperglycemia. Although end
formed, there was no descript
blood xylazine concentration
centrations allowed the calcula
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some of which are summarize

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xylazine 400 mg resulted in co
bated with a respiratory rate t
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xylazine 200 mg a 19-year-ol
depression requiring endotra
doses nor toxicokinetics are
Ruiz-Colón et al. [24] add an a
ture but also included inhal
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who injected intramuscular xy
ation without respiratory dep
concentration of 0.57 mg/L wa

Information System [12] only three of the fifty US States depression re

Hofman R. Clinical Toxicology 2023;61:12:1013-6.

Medical and Public Health Imperatives of Xylazine

TO THE EDITOR: As Gupta et al. make clear in their Perspective article (June 15 issue),[1] illicit opioids are increasingly being adulterated with xylazine. Although we agree that it is important to be aware of xylazine, we disagree regarding the potential dangers associated with acute overdose.

Gupta et al. state that xylazine intoxication may result in central nervous system depression, hypotension, and bradycardia. Although that's mechanistically true, the doses required to produce sedation in animals (0.5 to 1.0 mg per kilogram of body weight) are typically much greater than those present in adulterated opioids. Thus, it is not clear that xylazine-contaminated opioids will be dangerous acutely.

A recent multicenter study involving patients who presented to U.S. emergency departments with acute toxic effects of opioids noted similar clinical measures in patients with xylazine use and in those without use, but there were significantly lower rates of cardiac arrest and coma among patients who used xylazine.[2] We are not suggesting that xylazine itself is protective, but rather that the acute toxicity of xylazine may be less than that of fentanyl, so the adulteration of opioids with xylazine may not be as dangerous acutely as was initially thought.

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No potential conflict of interest relevant to this letter was reported.

1. Gupta R, Holtgrave DR, Ashburn MA. Xylazine — medical and public health imperatives. N Engl J Med 2023;388:2209-12.
2. Love JS, Levine M, Aldy K, et al. Opioid overdoses involving xylazine in emergency department patients: a multicenter study. Clin Toxicol (Phila) 2023;61:173-80.

DOI: 10.1056/NEJMc2308155

TO THE EDITOR: Gupta and colleagues highlighted xylazine as a public health concern because of its presence as an adulterant in the illicit drug supply, particularly in opioids. Although naloxone effectively reverses opioid overdoses, it is of unproven benefit in overdoses of xylazine, an α_2-agonist. Xylazine-reversal agents are frequently used in veterinary medicine, but none are currently approved for human use.

Atipamezole, a synthetic α_2-antagonist, rapidly reverses xylazine-induced sedation in animals.[1] Small trials in humans showed its effectiveness in reversing the toxic effects of dexmedetomidine, another α_2-agonist commonly used for sedation.[2,3] Atipamezole has promising properties as an antidote, including rapid reversal, the ability to adjust dose, and an acceptable side-effect profile in humans.[2,3]

We think that approval for the use of atipamezole in humans should be reconsidered. Its potential utility extends beyond xylazine to overdoses of other α_2-agonists, namely clonidine and guanfacine, exposures that have become more prevalent in the pediatric population.[4] We antici-

Levine M. N Engl J Med 2023. 389:8.

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

arrival (secondary).
Results: Three hundred and twenty-one patients met inclusion criteria: 90 tested positive for xylazine and 231 were negative. The primary outcome occurred in 37 patients, and the secondary outcome occurred in

Love J. Clinical Toxicology 2023;61(3):173-80.

Drug Overdose Toxico-Surveillance (DOTS) Reporting Program

ToxIC

FDA U.S. FOOD & DRUG ADMINISTRATION

- During 2022-2024, ACMT/ToxIC conducted a sentinel surveillance program to study patients with severe/life-threatening stimulant and opioid overdoses
- 17 institutions (25 hospitals in 14 states)
- Written informed consent obtained for each patient
- Key clinical information from the EMR
- Detailed patient interviews (including current drug use and overdose risk factors)
- Whole blood analysis for > 1200 drugs and metabolites, including regulated pharmaceuticals (qualitative and quantitative)

The DOTS Program was partially funded by the FDA (#75F40122D00028; 75F40123C00184).
The interviews were not funded by FDA and sole responsibility of ACMT/ToxIC.

DOTS Inclusion/Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1) Age ≥ 13 years old	1) Opioid and/or stimulant use not not clearly related to the ED chief complaint (e.g. chest pain, abscess, endocarditis)
2) Opioid, stimulant, or undifferentiated suspected illicit drug overdose with severe or life-threatening toxicity	2) Non-toxicological diagnosis is suspected (an alternative diagnosis is more likely)
3) Availability of either blood collected for study or waste blood	3) Patient is a prisoner or institutional employee

494 Patients Completed Laboratory Testing with Results

300 Patients with blood draw within 4 hours

197 Patients with suspected opioid overdose

Xylazine: 39/197 patients (19.8%)

25/39 (64.1%) > LOQ, 14/39 (36%) < LOQ

Median xylazine: 7.6 ng/ml (IQR 2.3-12.0)

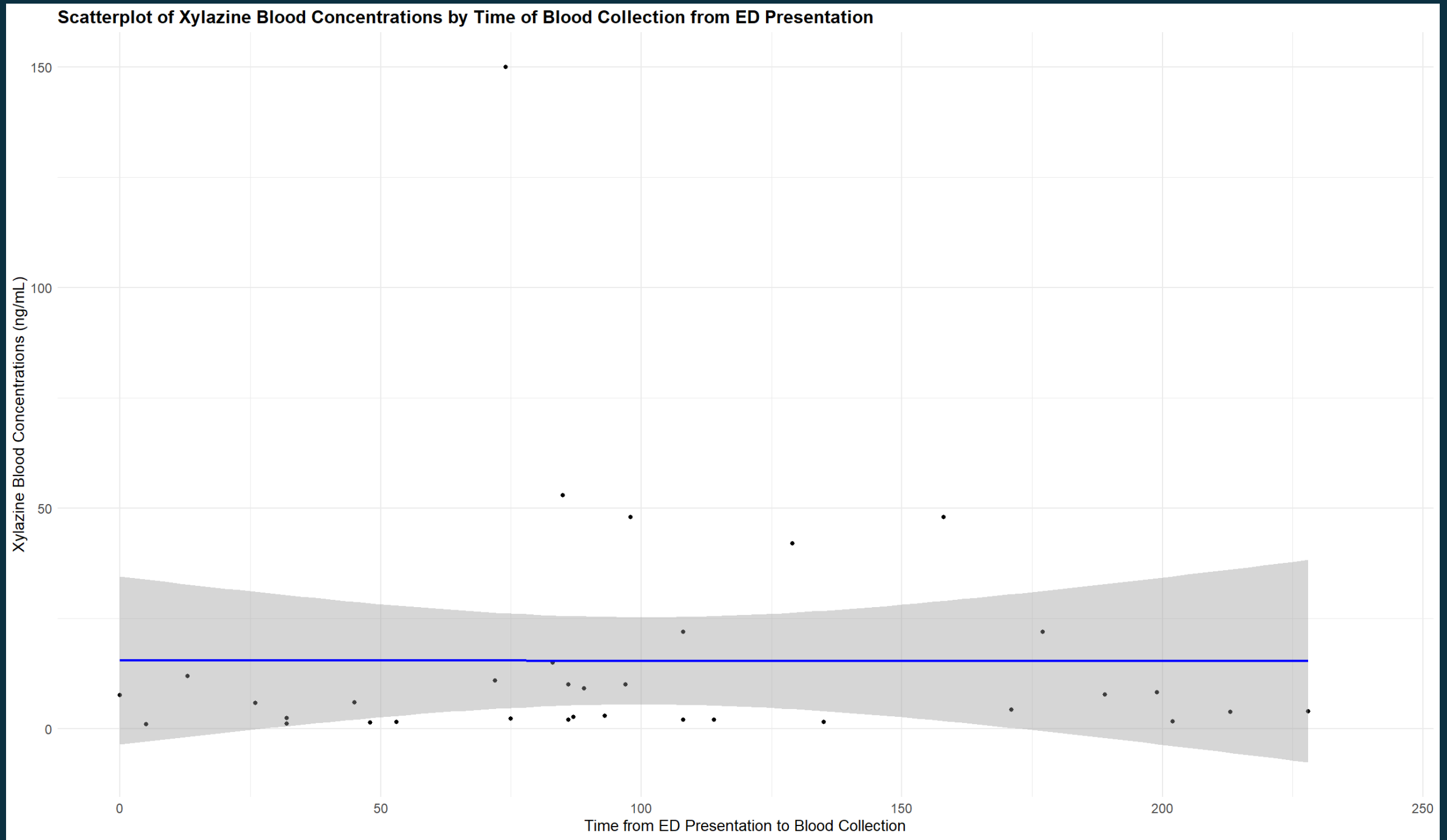

Scatterplot of Xylazine Blood Concentrations by Time of Blood Collection from ED Presentation
Xylazine Blood Concentrations (ng/mL)
150
100
50
0
0
50
100
150
200
250
Time from ED Presentation to Blood Collection

Table 3a. Xylazine, Fentanyl and Clinical Severity: Qualitative Toxicology Results among Patients with an Opioid Overdose Presentation and Blood Drawn within 4 hours, (n=197)

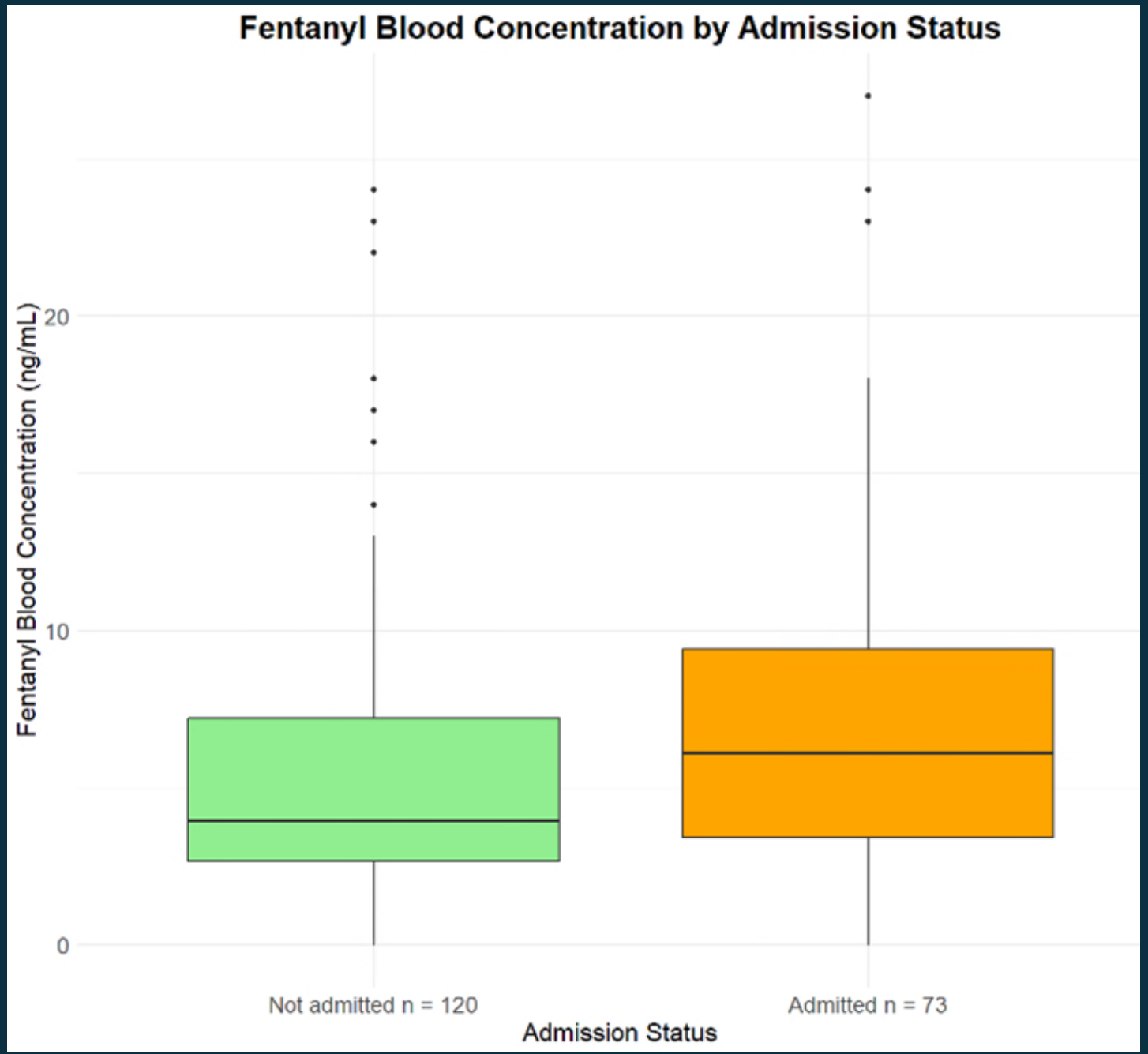
	Intubation		ICU admission*		Any admission**	
	No n=187 (94.9%)	Yes n=10 (5.1%)	No n=167 (86.5%)	Yes n=26 (13.5%)	No n=120 (62.2%)	Yes n=73 (37.8%)
Xylazine, n (%)	n=40 (21.4%)	n=3 (30.0%)	n=36 (21.6%)	n=6 (23.1%)	n=21 (17.5%)	n=21 (28.8%)
Xylazine quantitative concentrations, ng/mL median (IQR)	7.65 (2.33, 13.75)	6.00 (3.75, 9.00)	6.75 (2.25, 11.25)	9.00 (4.90, 19.50)	7.60 (2.05, 12.05)	6.00 (3.00, 12.00)
Patients with quantifiable xylazine AND fentanyl concentrations ng/mL, median (IQR)	n=21 (11.2%)	n=3 (12.5%)	n=19 (82.6%)	n=4 (17.4%)	n=1 (47.8%)	n=12 (52.2%)
Fentanyl Concentrations among those with xylazine	9.00 (3.30 - 17.00)	27.00 (18.45 - 37.50)	9.40 (3.55 - 20.50)	16.45 (8.65 - 29.25)	11.00 (3.15 - 19.00)	9.65 (5.95 - 24.00)

*n=4 missing for admission status.
**Includes observation in the ED.

Xylazine concentrations were NOT associated with clinical outcomes

Median fentanyl concentrations higher in admitted patients:

6.6 ng/ml (IQR 4.3-11.0) vs 4.5 ng/ml (IQR 2.9-8.6) (*p*=0.03)



Conclusions…About Xylazine

Fentanyl concentrations were higher for those who were admitted to the hospital

Xylazine concentrations were not associated with any worse clinical outcomes

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Photo References

- Title page: https://www.narcononus.org/articles/drug-facts/gas-station-heroin-a-drug-to-watch-out-for/
- Naloxone: https://www.stlmag.com/news/missouri-senate-narcan-naloxone-funding/
- John Oliver: https://www.youtube.com/watch?v=mRZqHzDG_c8
- Judge Dred: https://forum.formlabs.com/t/judge-dredd-i-am-the-law-finished/17302
- phenylethamine structure: http://www.merckmillipore.com/INTL/fr/product/2-Feniletilamina,MDA_CHEM-807334
- methamphetamine structure: http://www.bluelight.org/vb/archive/index.php/t-55873.html
- mephedrone: https://tlneuro.wordpress.com/2011/03/23/web-based-survey-on-mephedrone-use/
- Kratom package: https://katsbotanicals.com/product/super-green-kratom-capsules/
- DSHEA: https://healthquestpodcast.com/402-are-your-supplements-really-regulated-and-how/
- Oren Hatch: https://fedsoc.org/bio/orrin-hatch
- Mel Gibson: https://www.wnycstudios.org/podcasts/onlyhuman/articles/five-things-about-the-wild-west-of-dietary-supplements
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