



My Patient Took What?

An Update on Drugs of Abuse

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Medical Toxicology Section Chief

Washington University School of Medicine

Disclosures




FAKE

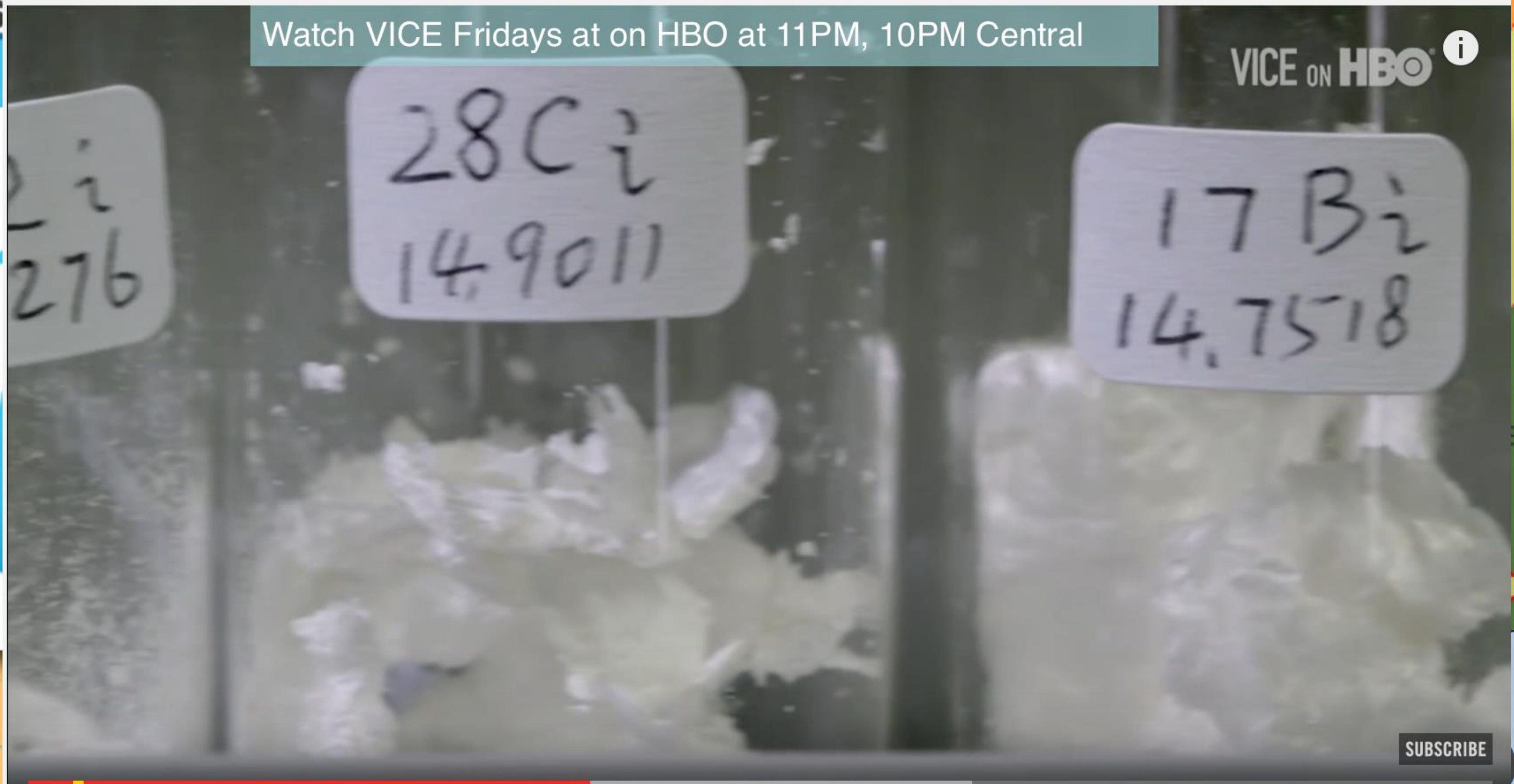
POT





Watch VICE Fridays at on HBO at 11PM, 10PM Central

VICE ON HBO 



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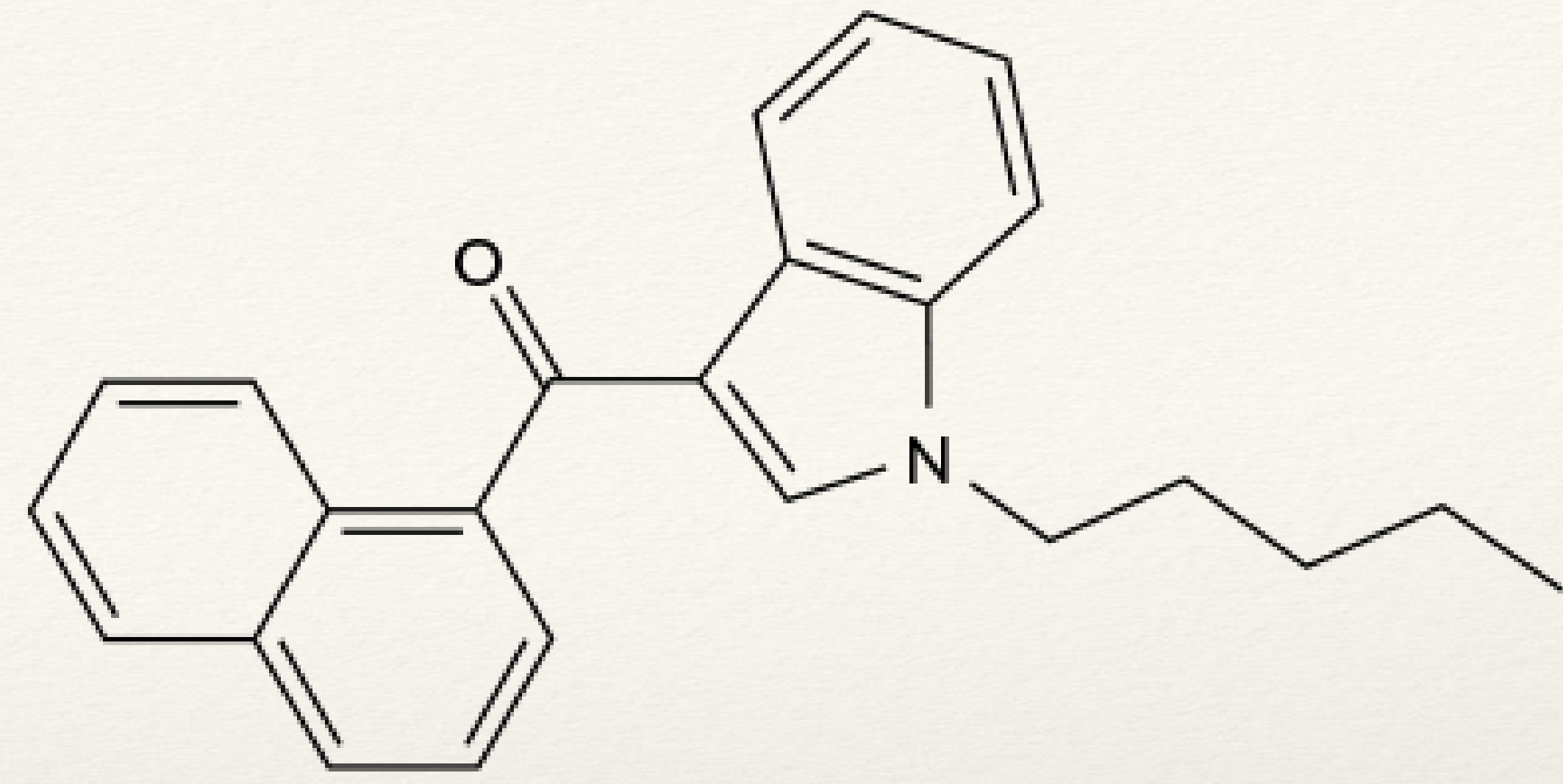
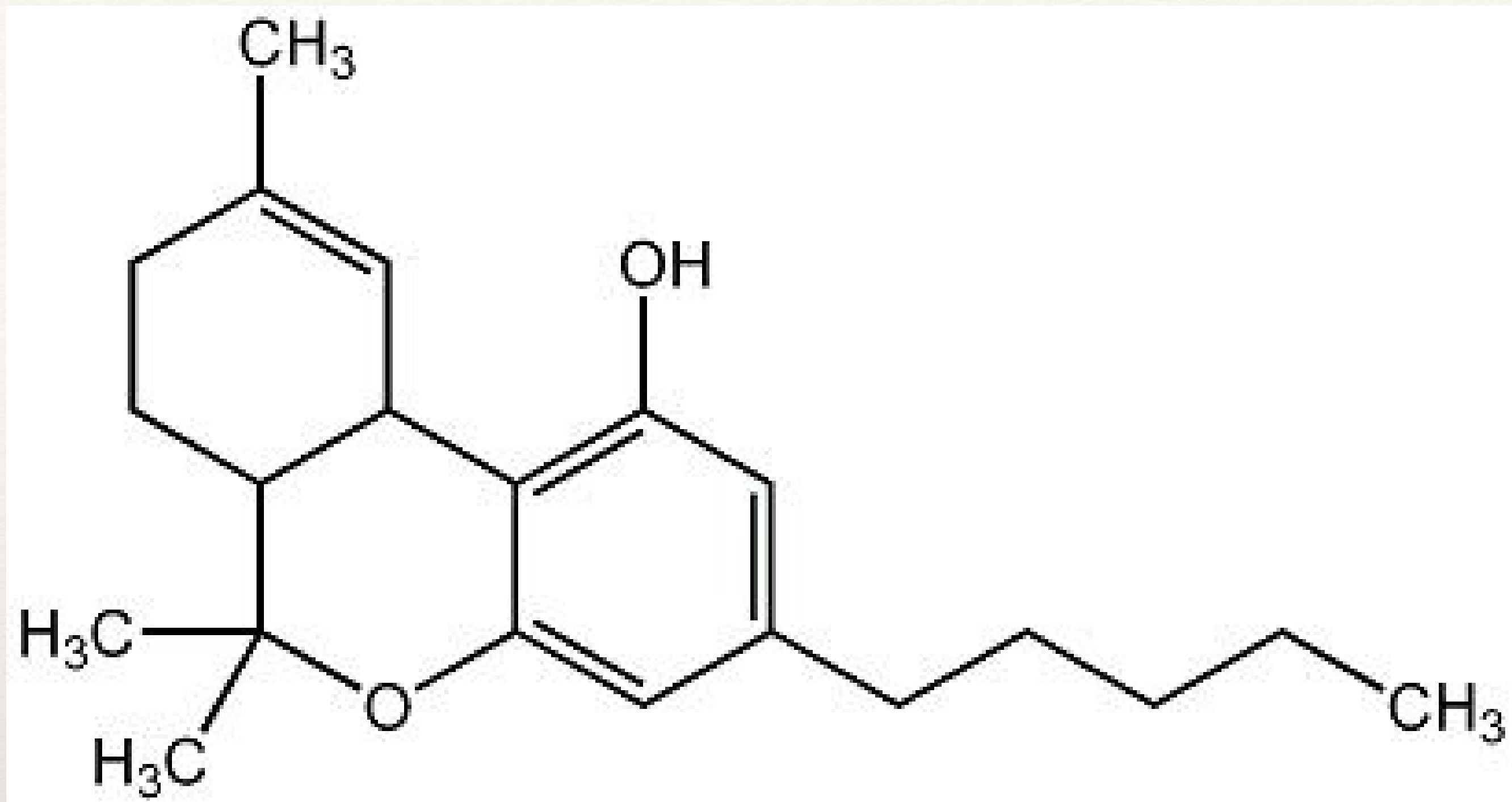
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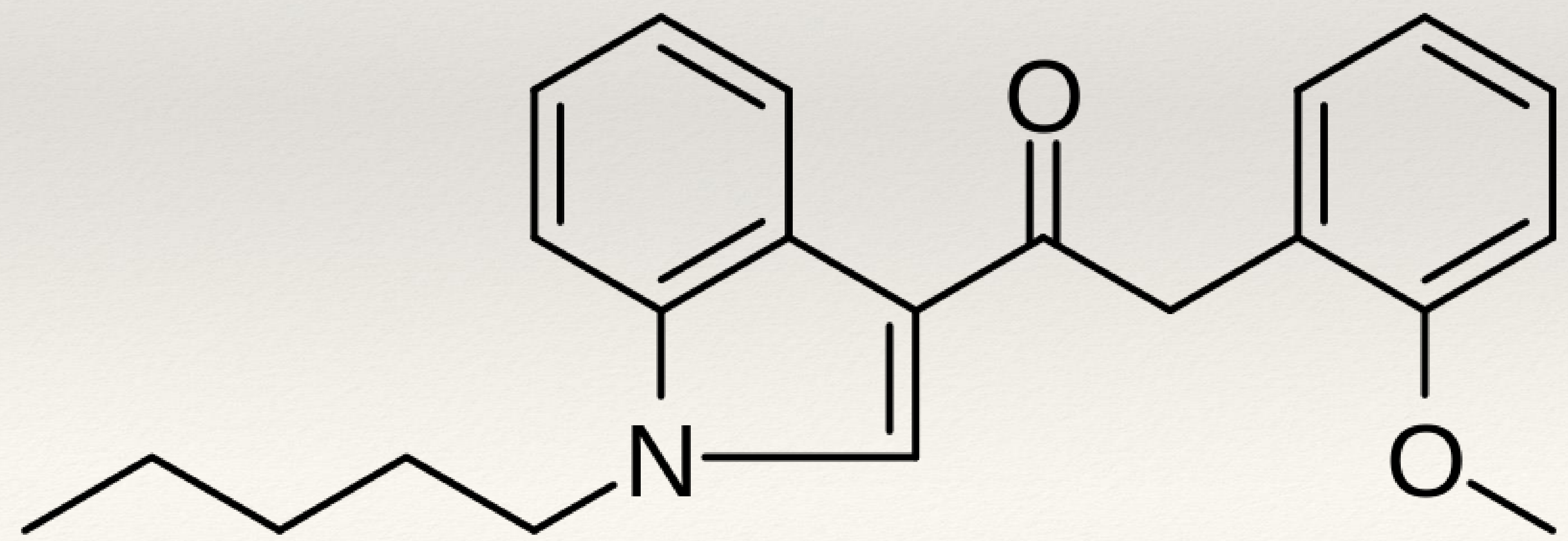
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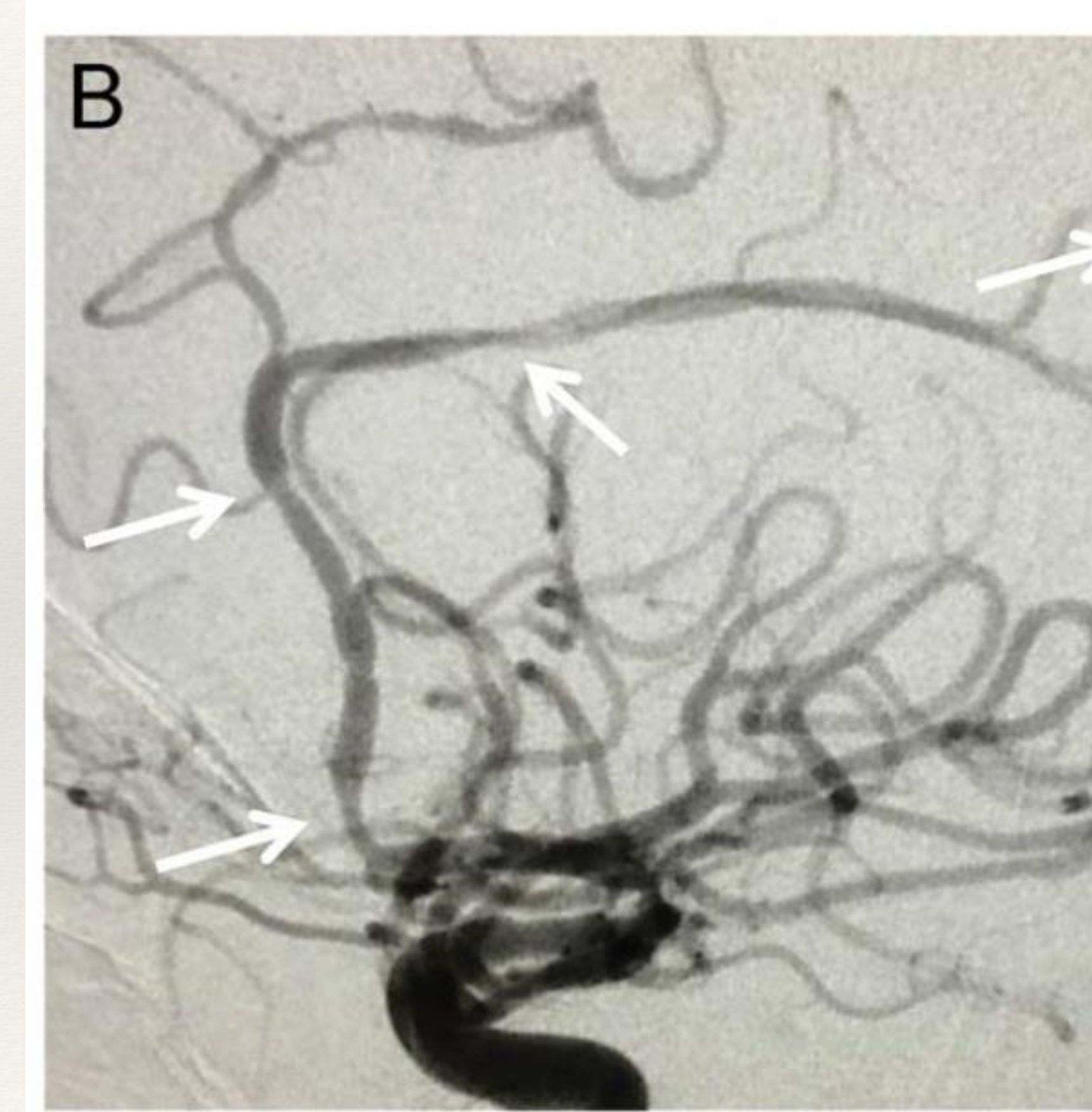
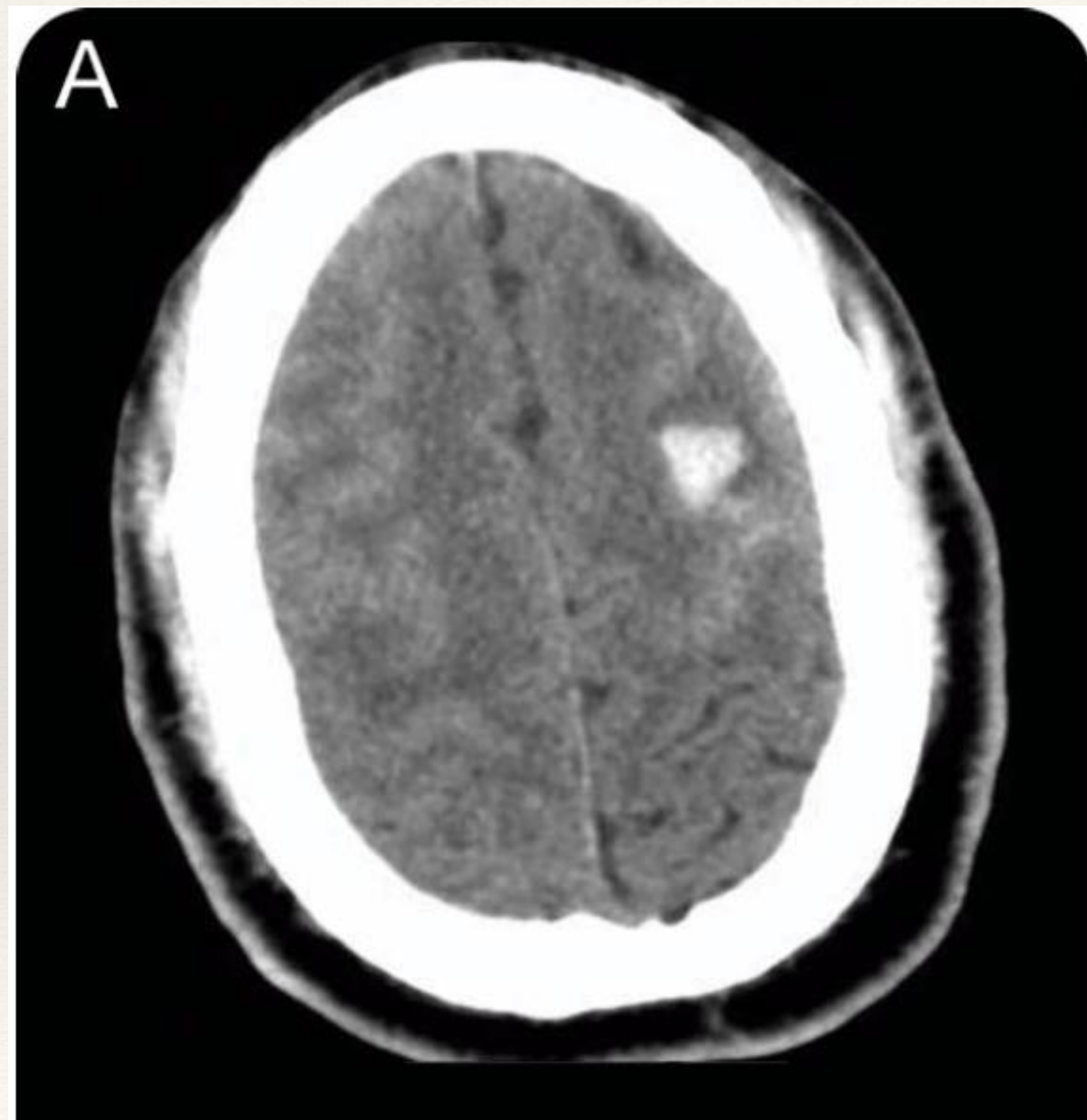
NM 201



Adop...



HEMORRHAGIC STROKE FOLLOWING USE OF THE SYNTHETIC MARIJUANA "SPICE" NEUROLOGY SEPTEMBER 2015



Experts say St. Louis area flooded with synthetic drug overdoses

By Robert Patrick St. Louis Post-Dispatch Feb 19, 2016 (8)



Most popular

- 1 Bernie Sand
- 2 After crash, Iditarod fin

Two deaths, 54 other cases of severe bleeding tied to fake weed in Illinois

By Jacqueline Howard and Marlena Baldacci, CNN

🕒 Updated 6:13 PM ET, Mon April 2, 2018

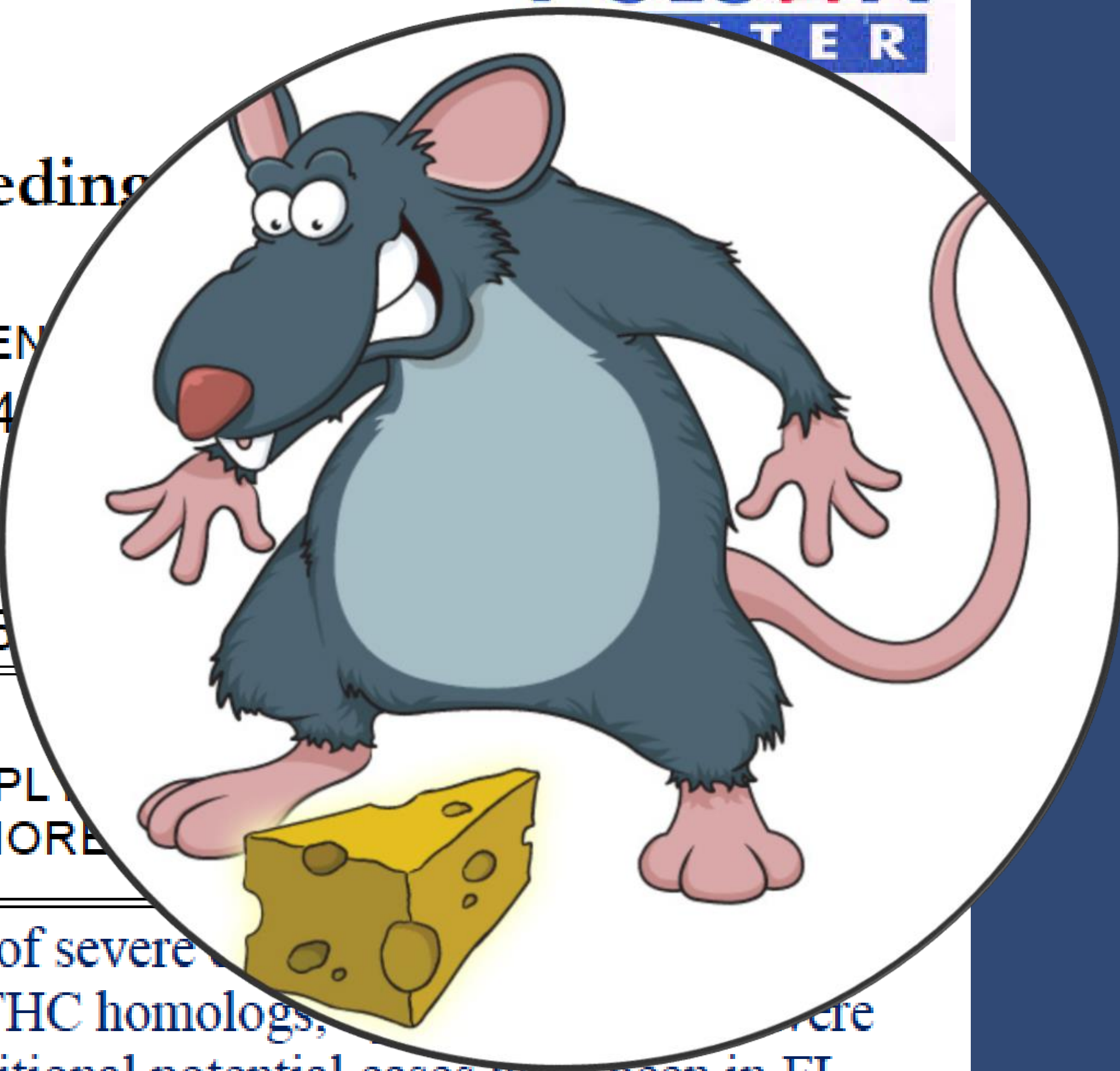


Advertisement



neuropathies and bleeding

FROM: CEN
DATE: 4/4
TOTAL NO.
PHONE
FAX: (6



PHYSICIAN PLEASE REPLY
INFO ATTACHED MORE

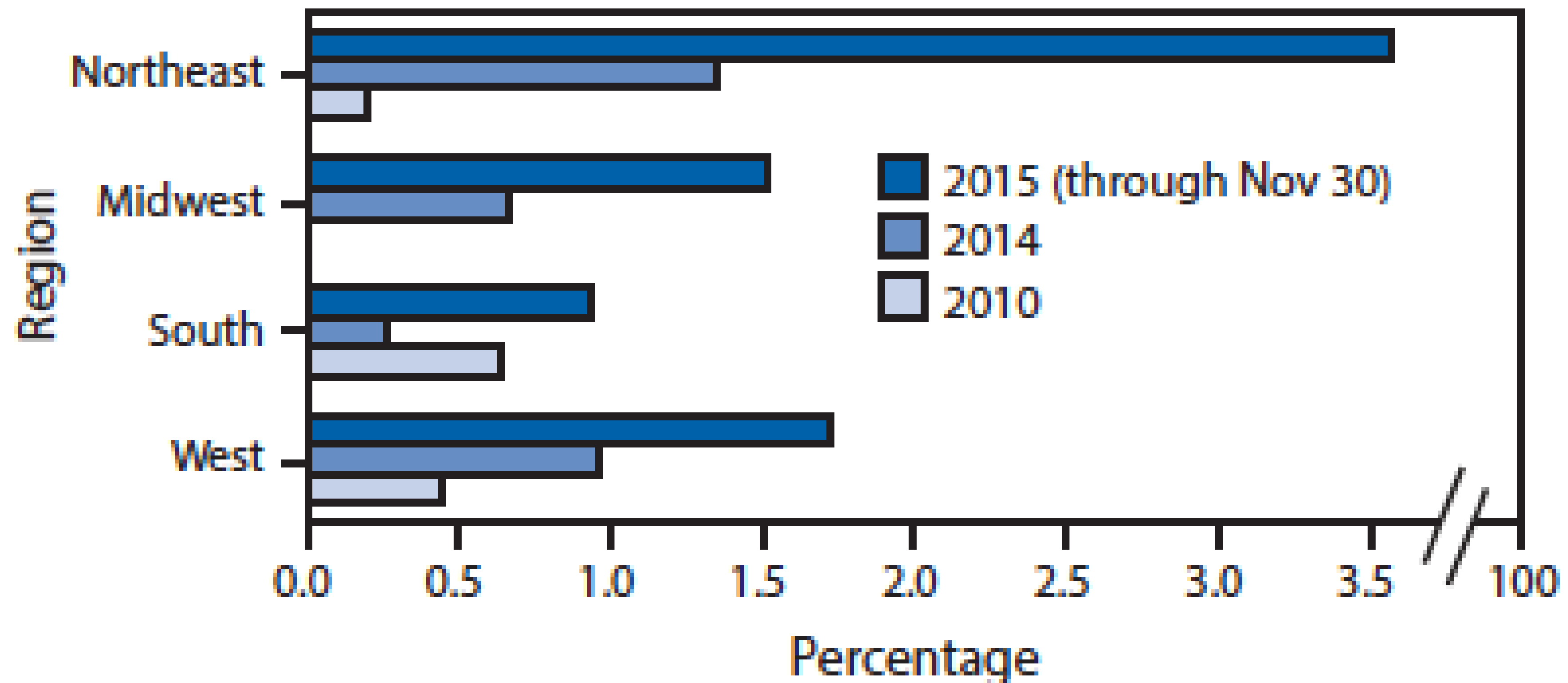
There has been a multistate outbreak of severe cases of the synthetic cannabinoids (THC homologs), with cases in Illinois including 2 deaths. Additional potential cases have been in FL (4), AL (1), CA (1), KY (1), MD (1), MN (2), MO (2), NJ (1), NY (2), NC (2), OK (1), PA (1), TS (2), UT (1), VA (1), WI (1). It appears these cases were due to ingestion of

Acute Poisonings from Synthetic Cannabinoids — 50 U.S. Toxicology Investigators Consortium Registry Sites, 2010–2015

Anne M. Riederer, ScD¹; Sharan L. Campleman, PhD¹; Robert G. Carlson, PhD²; Edward W. Boyer, MD, PhD³; Alex F. Manini, MD⁴; Paul M. Wax, MD^{1,5}; Jeffrey A. Brent, MD, PhD^{1,6}; Toxicology Investigators Consortium (ToxIC)

- 456 patients treated
- Patients 13-18 y/o: 27.4%
- At least 3 deaths

FIGURE 2. Percentage of reported ToxIC* registry cases† caused by synthetic cannabinoids, by U.S. Census region — 2010, 2014, and 2015



Synthetic Cannabinoids

- Constantly changing
- Generally thought of as sympathomimetic
- Can look like anything
- Newest ones seem to be moving west (bleeding)



SSC



Symptoms

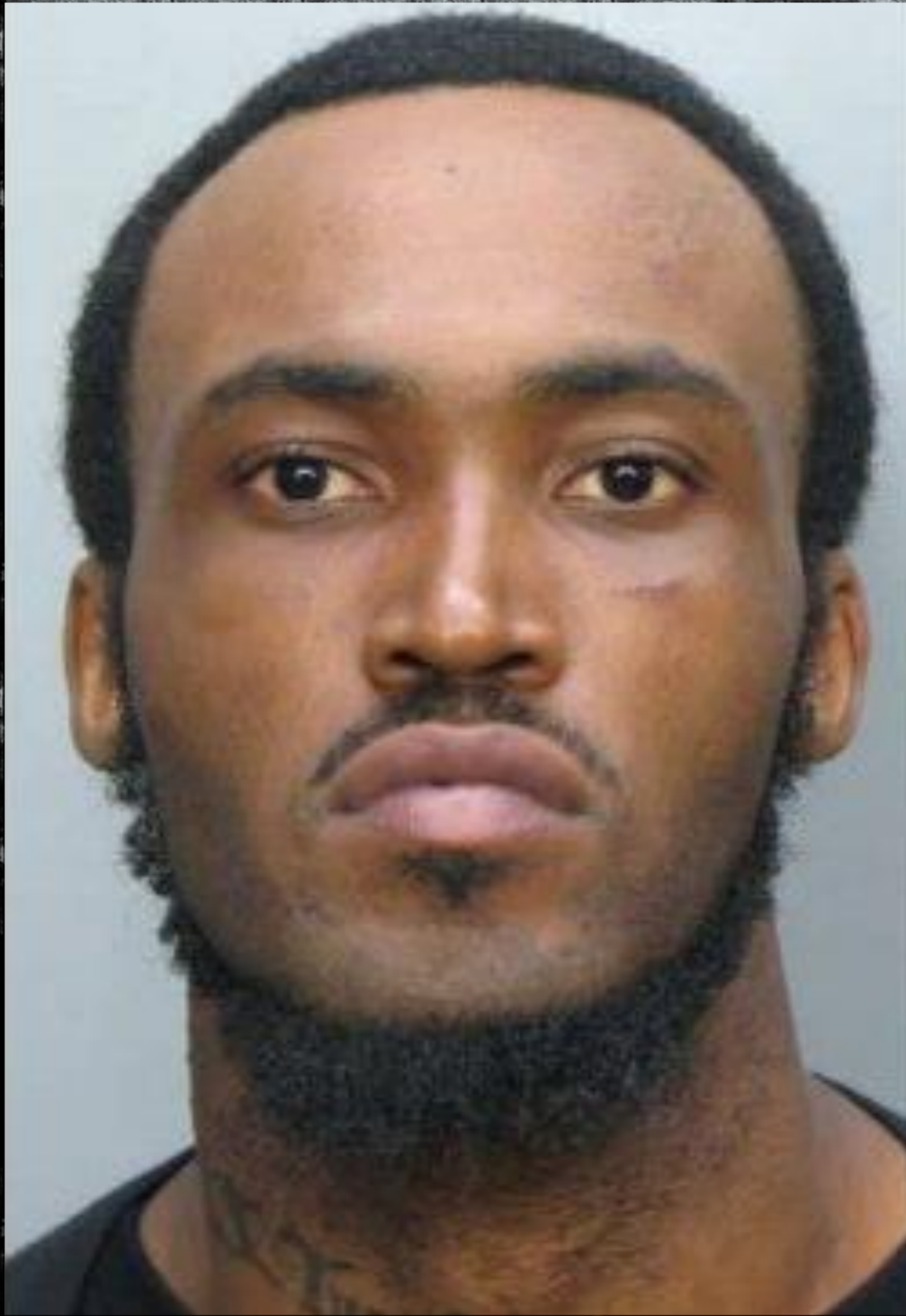
into



News / World

Man eating another man's face may have been caused by 'bath salts,' says doctor

A street drug called "bath salts" that turns users delirious, aggressive and overheated, may have played a role in the bizarre street attack in Miami in which a man had his face cannibalized by another man, says an emergency room doctor.





PARANOIA

That unmistakable feeling everyone is out to get you!

Synthetic Cathinones in Germany

Table 1. Selected clinical characteristics and laboratory parameters of bath salt users.

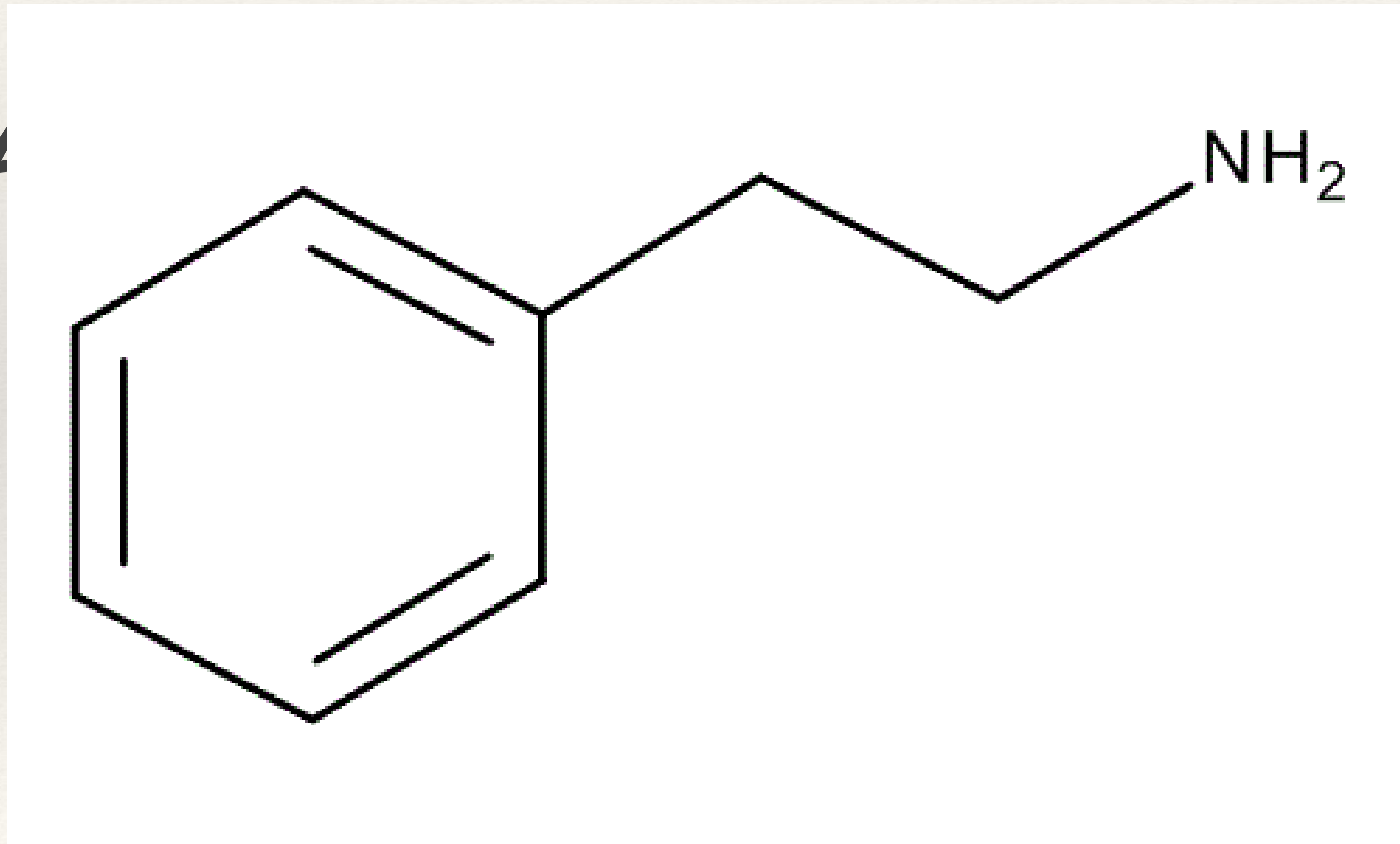
	All patients	Intoxication	Complication
Male (%)	64% (52/81)	65% (39/60)	62% (13/21)
Age (years)	34 (17–49)	33 (17–49)	37 (21–48)
BMI	24 (17–25)	23 (17–25)	24 (19–24)
ICU stay (days)	0 (0–8)	0 (0–8)	0 (0–7)
Total stay (days)	2 (0–65)	1 (0–25)	5 (1–65)
Systolic BP (mmHg)	130 (80–172)	133 (80–172)	116 (92–158)
Heart rate (1/min)	92 (50–140)	92 (51–140)	93 (50–138)
Tachycardia	27% (21/79)	29% (17/59)	20% (4/20)
Temp >38.5 °C	4% (3/67)	4% (2/50)	6% (1/17)
Creatinine (mg/dl)	0.9 (0.5–4.6)	0.9 (0.5–1.7)	0.9 (0.6–4.6)

Synthetic Cathinones in Germany

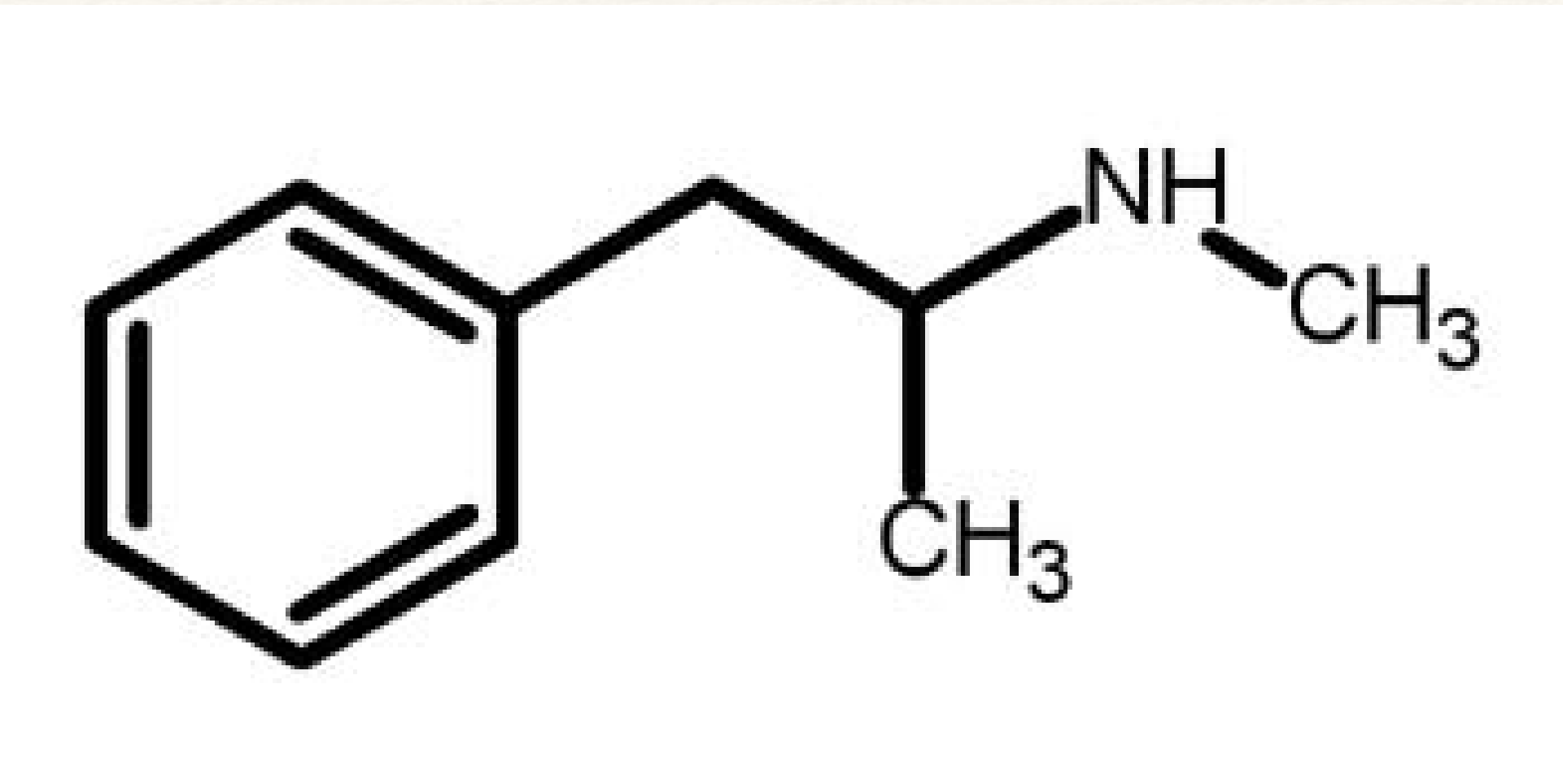
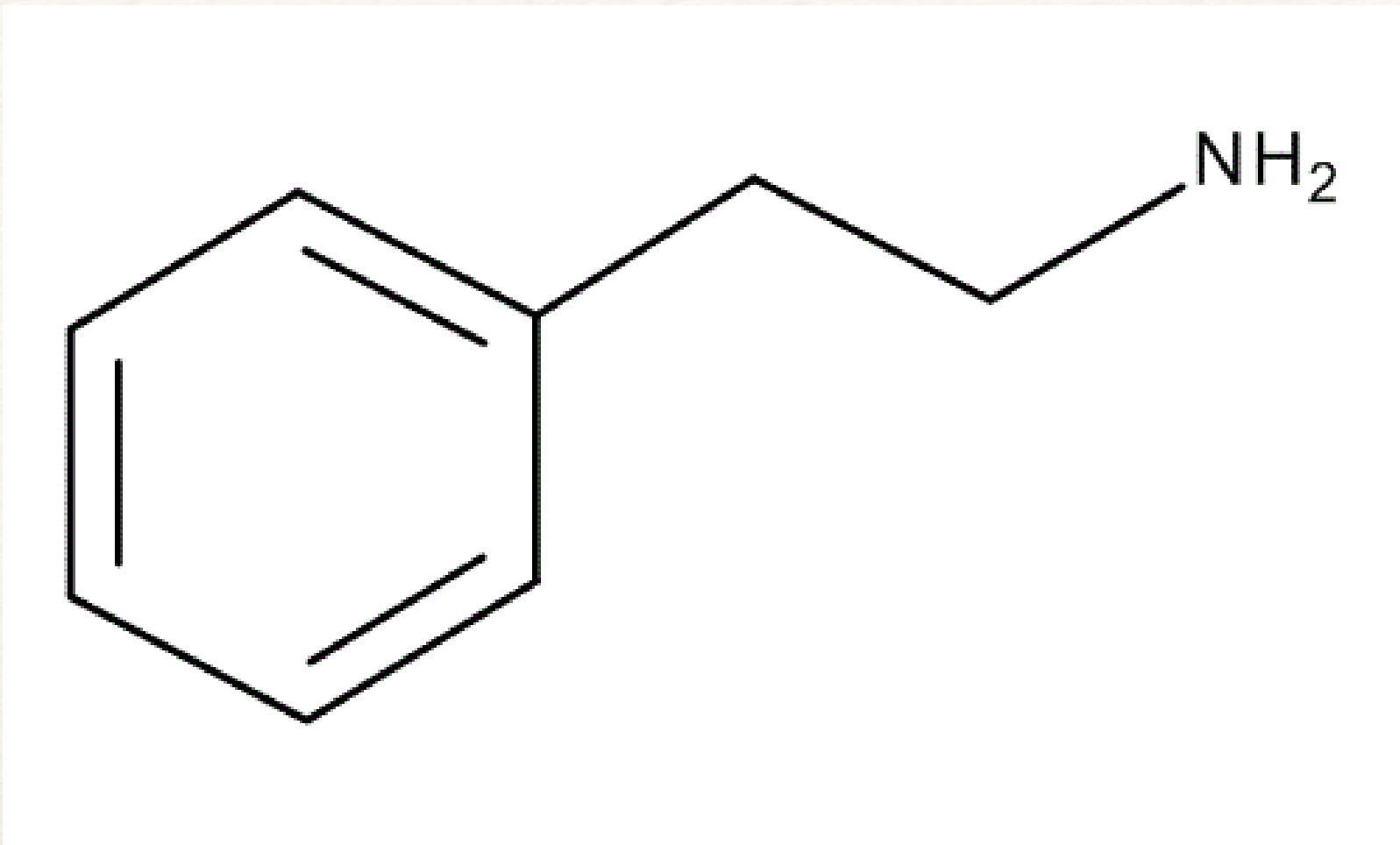
Table 2. Selected clinical and laboratory parameters by cathinone identified – intoxication group only.

	MDPV	Methylone	3MMC	Other
Systolic BP (mmHg)	132 (80–160)	134 (95–165)	125 (100–146)	138 (106–172)
Heart rate (1/min)	100 (56–140)	86 (51–140)	93 (55–106)	78 (59–133)
Tachycardia	9/20 (45%)	4/23 (17%)	2/9 (22%)	2/7 (29%)
Temp >38.5 °C	2/17 (12%)	0/17 (0%)	0/9 (0%)	0/7 (0%)
Creatinine (mg/dl)	0.9 (0.5–1.7)	0.9 (0.6–1.4)	0.75 (0.5–1.1)	1.0 (0.7–1.5)
Glucose (mg/dl)	97 (68–150)	105 (80–153)	102 (66–200)	99 (70–110)
Increased CPK (%)	11/14 (79%)	13/18 (72%)	3/5 (60%)	4/7 (57%)

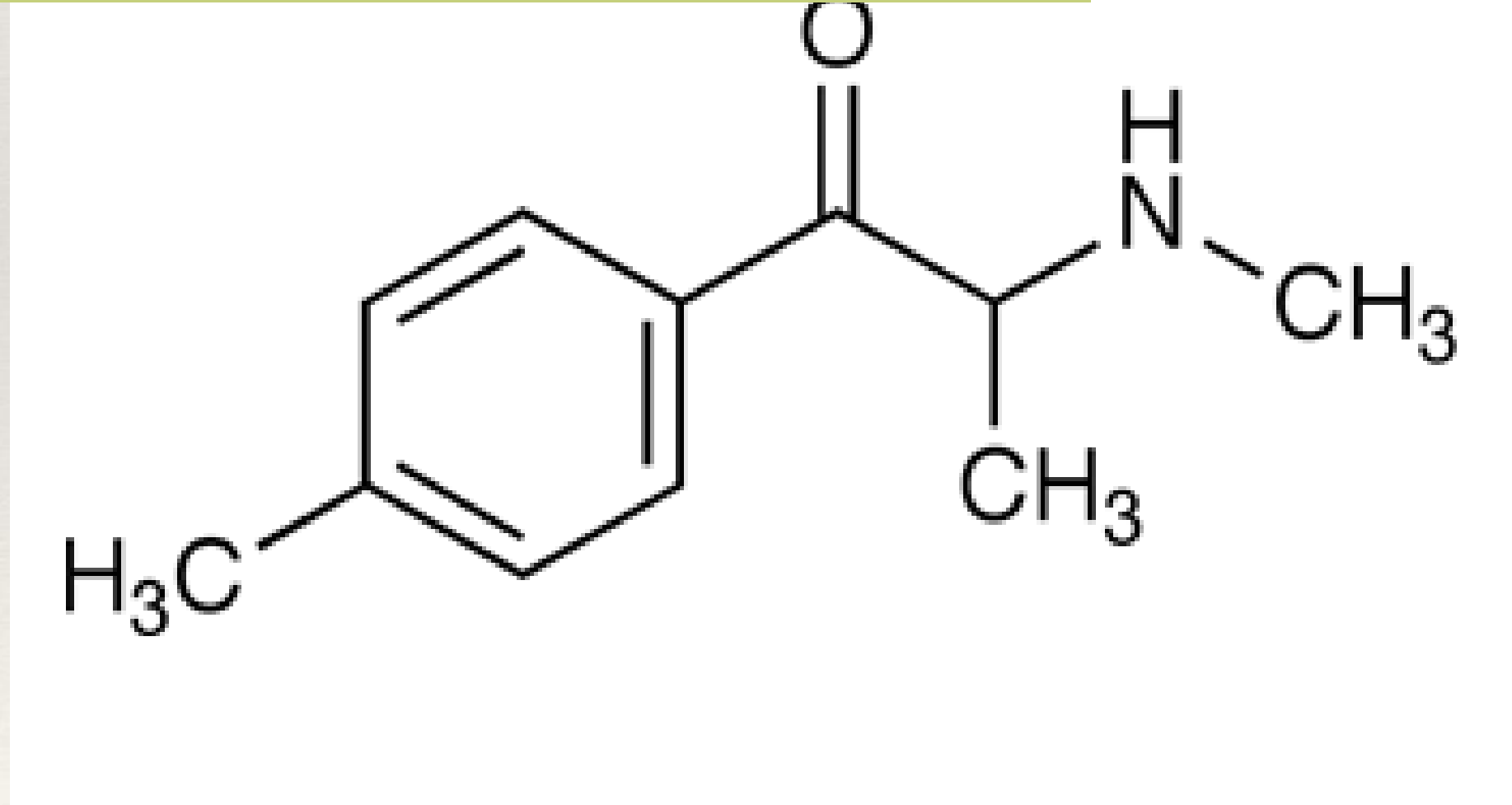
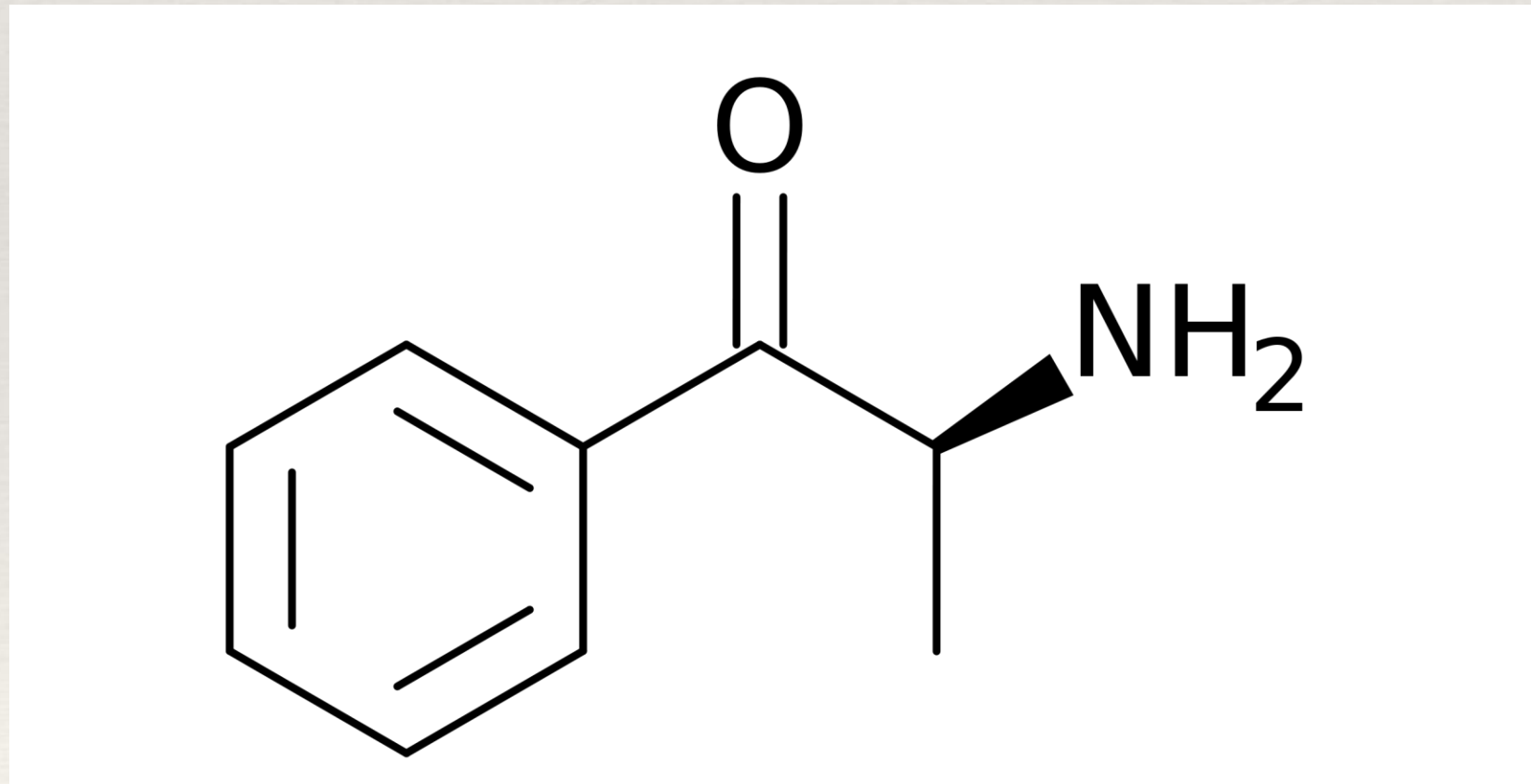
BUT A

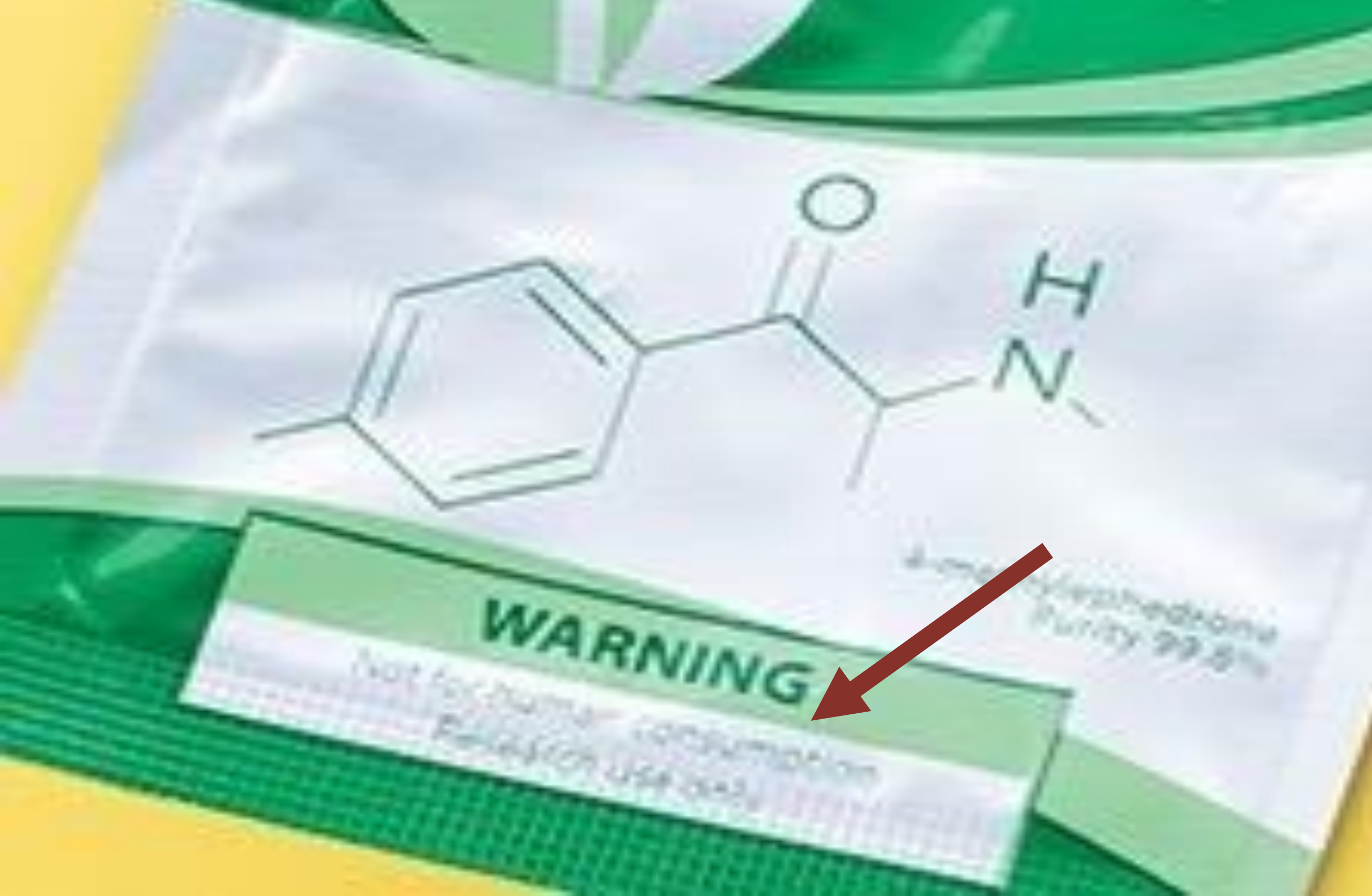


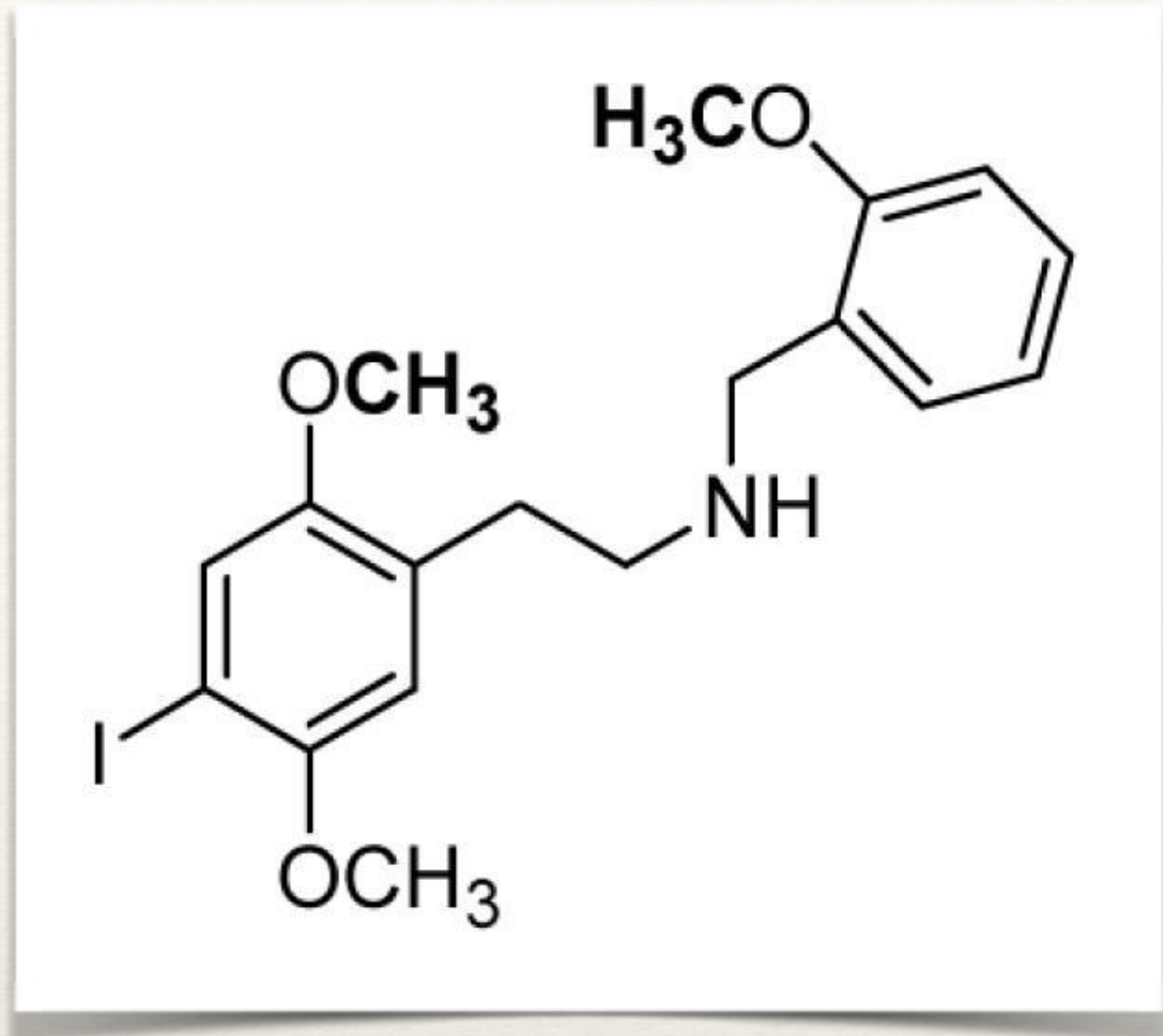
LEGAL???



FEDERAL ANALOG ACT

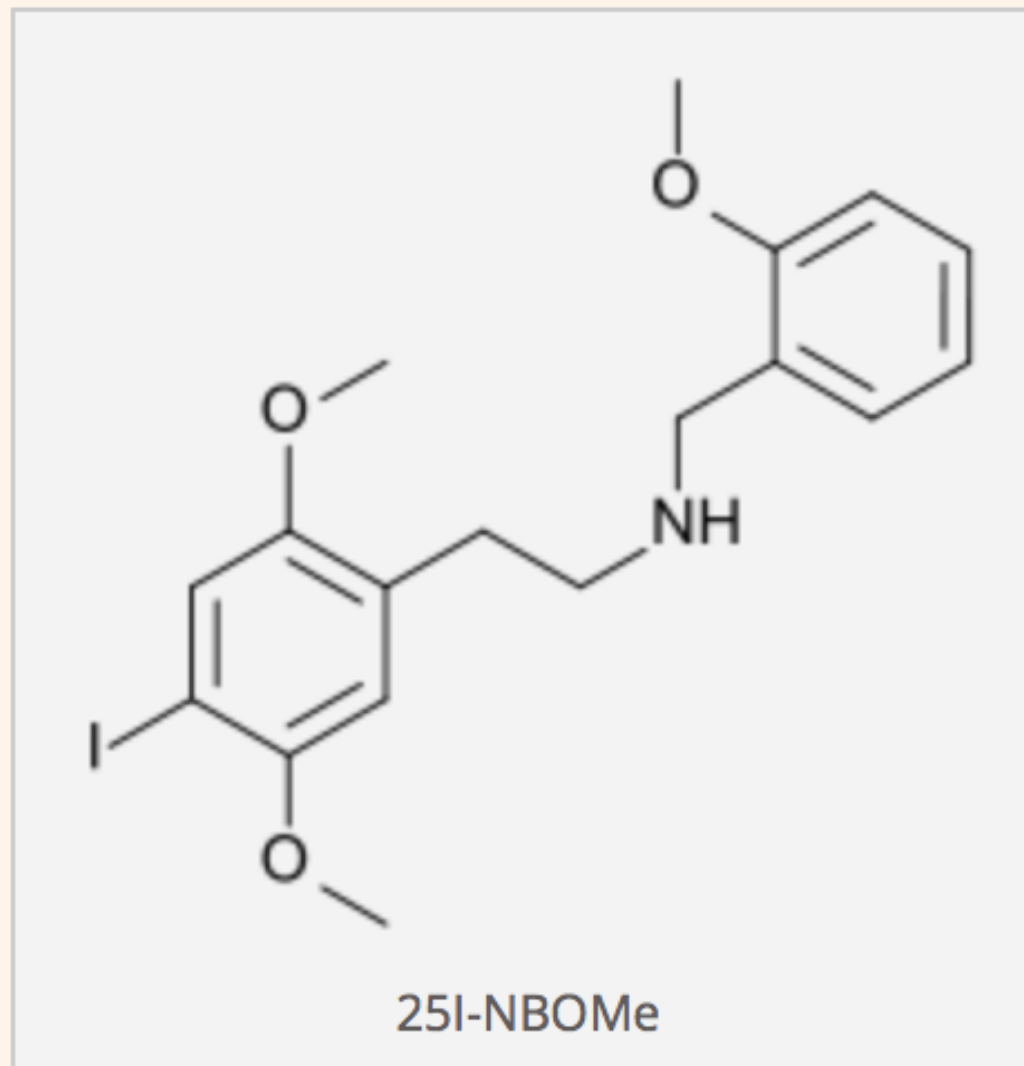






Case report: toxicity from designer drug 25I

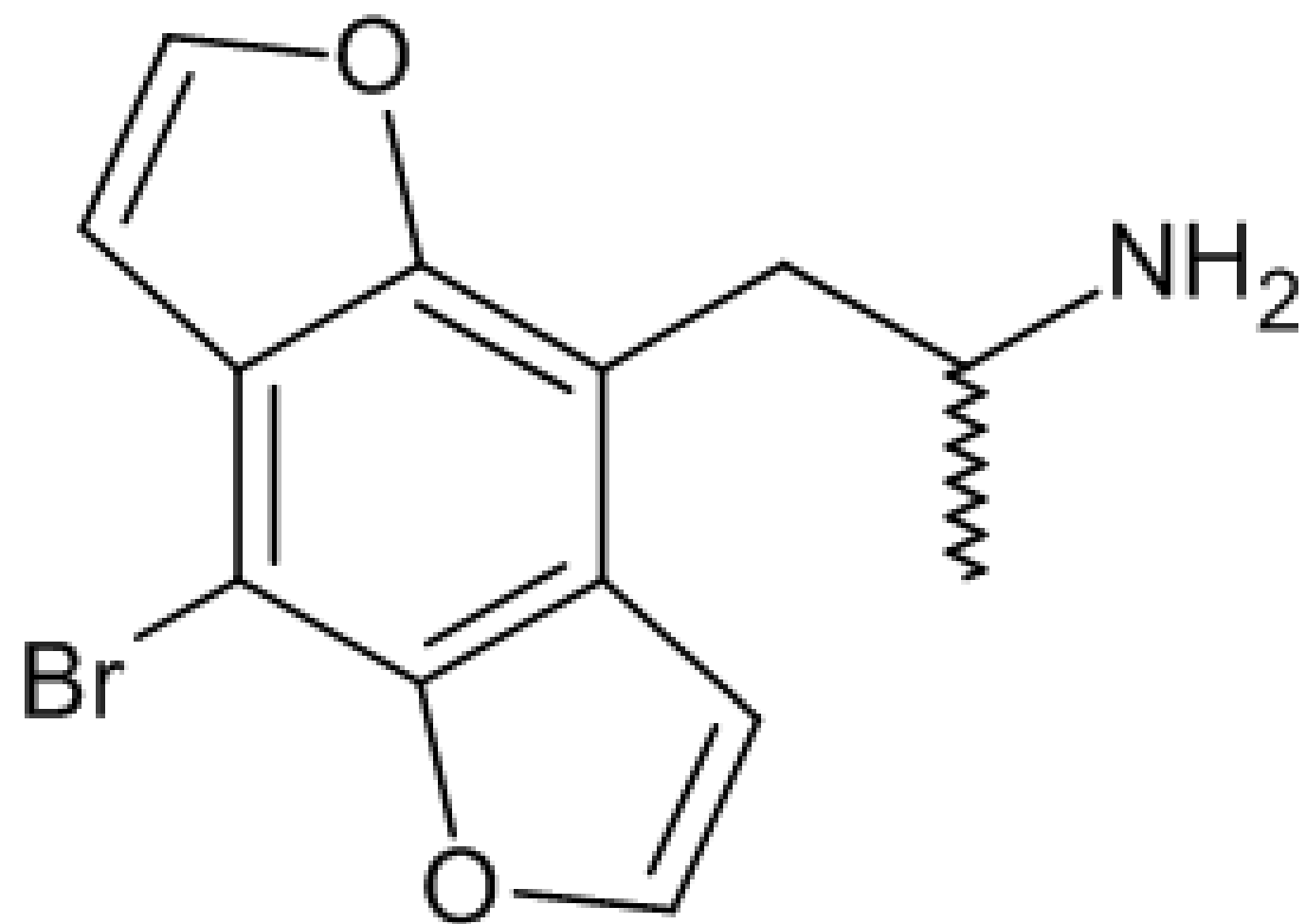
April 29, 2013, 9:55 pm



A case of 25I-NBOMe (25I) intoxication: a new potent 5-HT_{2A} agonist designer drug. Rose SR et al. *Clin Toxicol* 2013;51:174-177.

Abstract

The designer drug 25I-NBOMe is an extremely potent serotonin agonist. Since it is so new, there have been few case reports of toxicity reported in the medical literature. However, there have been several fatalities associated with use of 25I described in the



bromo-dragonFLY

J Med Toxicol. 2009 Dec;5(4):226-9.

Delayed onset of seizures and toxicity associated with recreational use of Bromo-dragonFLY.

Wood DM¹, Looker JJ, Shaikh L, Button J, Puchnarewicz M, Davies S, Lidder S, Ramsey J, Holt DW, Dargan PI.

Author information

Abstract

INTRODUCTION: Many countries have specific legislation, such as the Controlled Substances Act (1970) in the United States

Open/close author information list

Supraventricular tachycardia and acute confusion following ingestion of e-cigarette fluid containing AB-FUBINACA and ADB-FUBINACA: a case report with quantitative analysis of serum drug concentrations

Rex Pui Kin Lam, Magdalene Huen Yin Tang, Siu Chung Leung, Yeow Kuan Chong, Matthew Sik Hon Tsui & Tony Wing Lai Mak

Clinical Toxicology 2017;55(7).



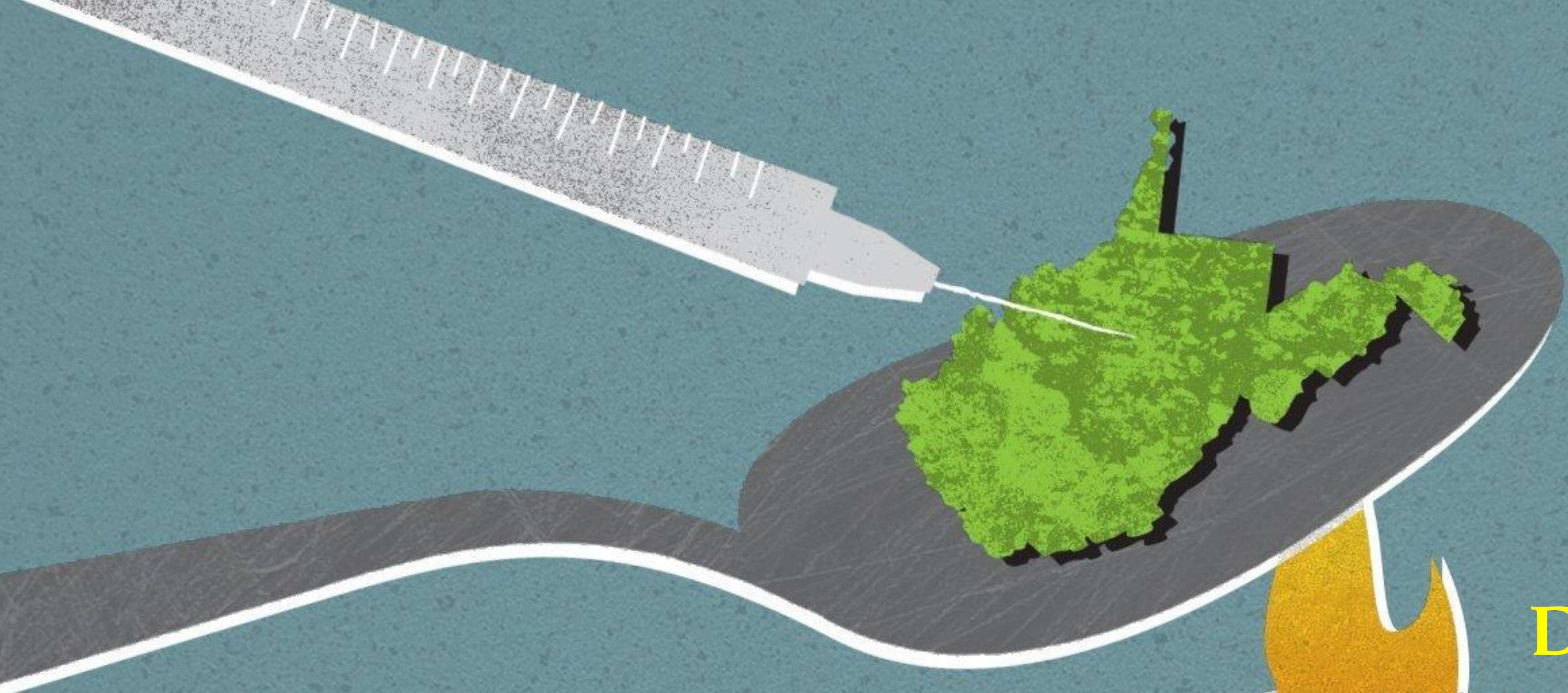
Miscellaneous

■ **Dog attack** — Lower Duck Pond, Lithia Park, Ashland. Police responded to a report of two dogs running loose and attacking ducks at about 11:20 a.m. Sunday.

The officer cited a resident for the loose dogs. The duck refused medical treatment and left the area, according to police records.

Review of Treatments

- Benzos, benzos, and more benzos
- For synthetic cathinones, may need haloperidol (can be psychotic for days)
- Intubation as needed
- For bleeding, vitamin K



Life Expectancy
Decreases for 2nd year
In a Row

58,000 Died in Vietnam War
51,000 Died from AIDS in '95

> 62,000 Died in 2016



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ELBERFELD CO.**

**40 STONE ST
NEW YORK.**

ADDICTION RARE IN PATIENTS TREATED WITH NARCOTICS

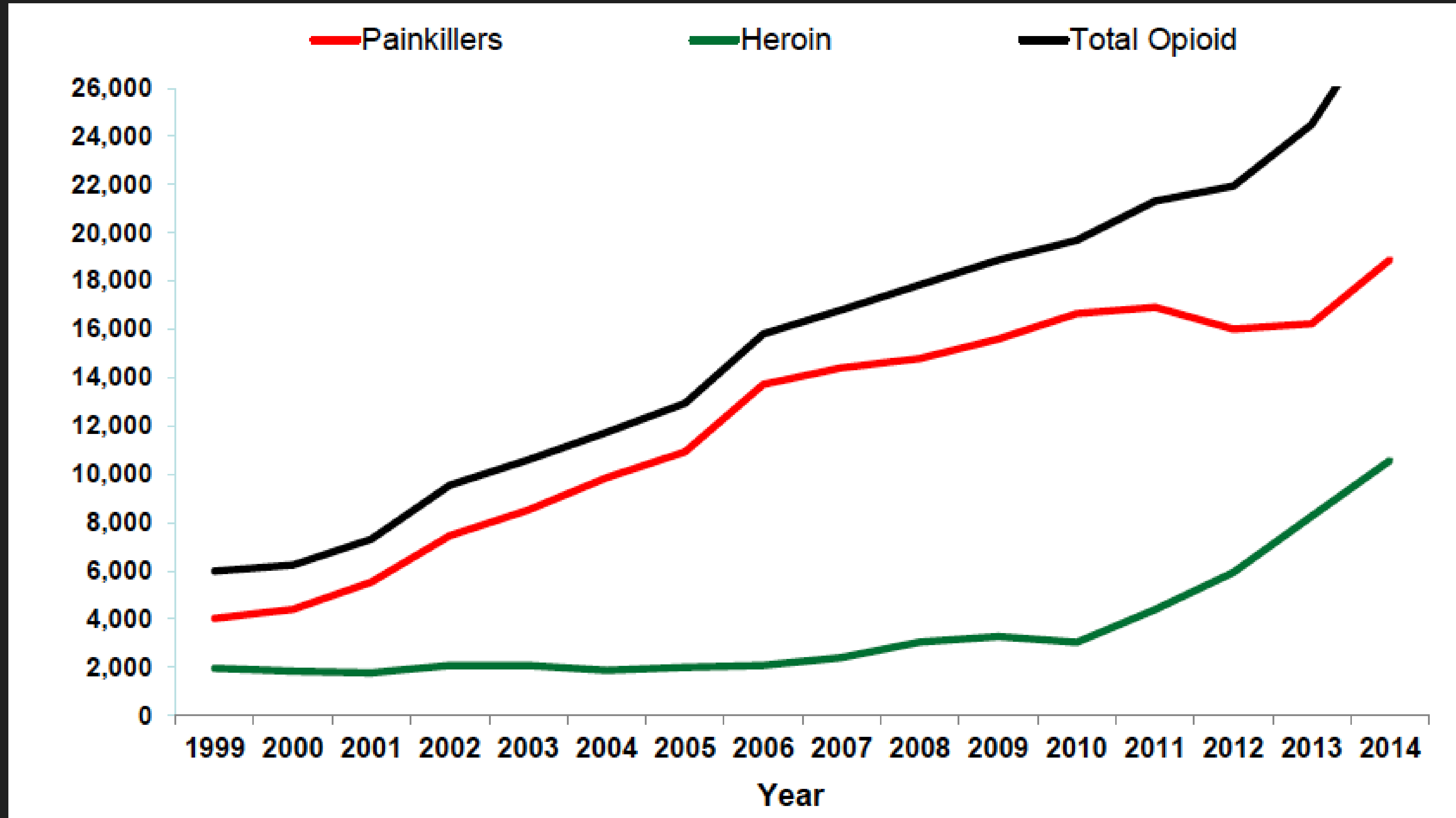
To the Editor: Recently, we examined our current files to determine the incidence of narcotic addiction in 39,946 hospitalized medical patients¹ who were monitored consecutively. Although there were 11,882 patients who received at least one narcotic preparation, there were only four cases of reasonably well documented addiction in patients who had no history of addiction. The addiction was considered major in only one instance. The drugs implicated were meperidine in two patients,² Percodan in one, and hydromorphone in one. We conclude that despite widespread use of narcotic drugs in hospitals, the development of addiction is rare in medical patients with no history of addiction.

JANE PORTER
HERSHEL JICK, M.D.
Boston Collaborative Drug
Surveillance Program
Boston University Medical Center

Waltham, MA 02154

1. Jick H, Miettinen OS, Shapiro S, Lewis GP, Siskind Y, Slone D. Comprehensive drug surveillance. JAMA. 1970; 213:1455-60.
2. Miller RR, Jick H. Clinical effects of meperidine in hospitalized medical patients. J Clin Pharmacol. 1978; 18:180-8.

Opioid Related Overdose Deaths US, 1999-2014

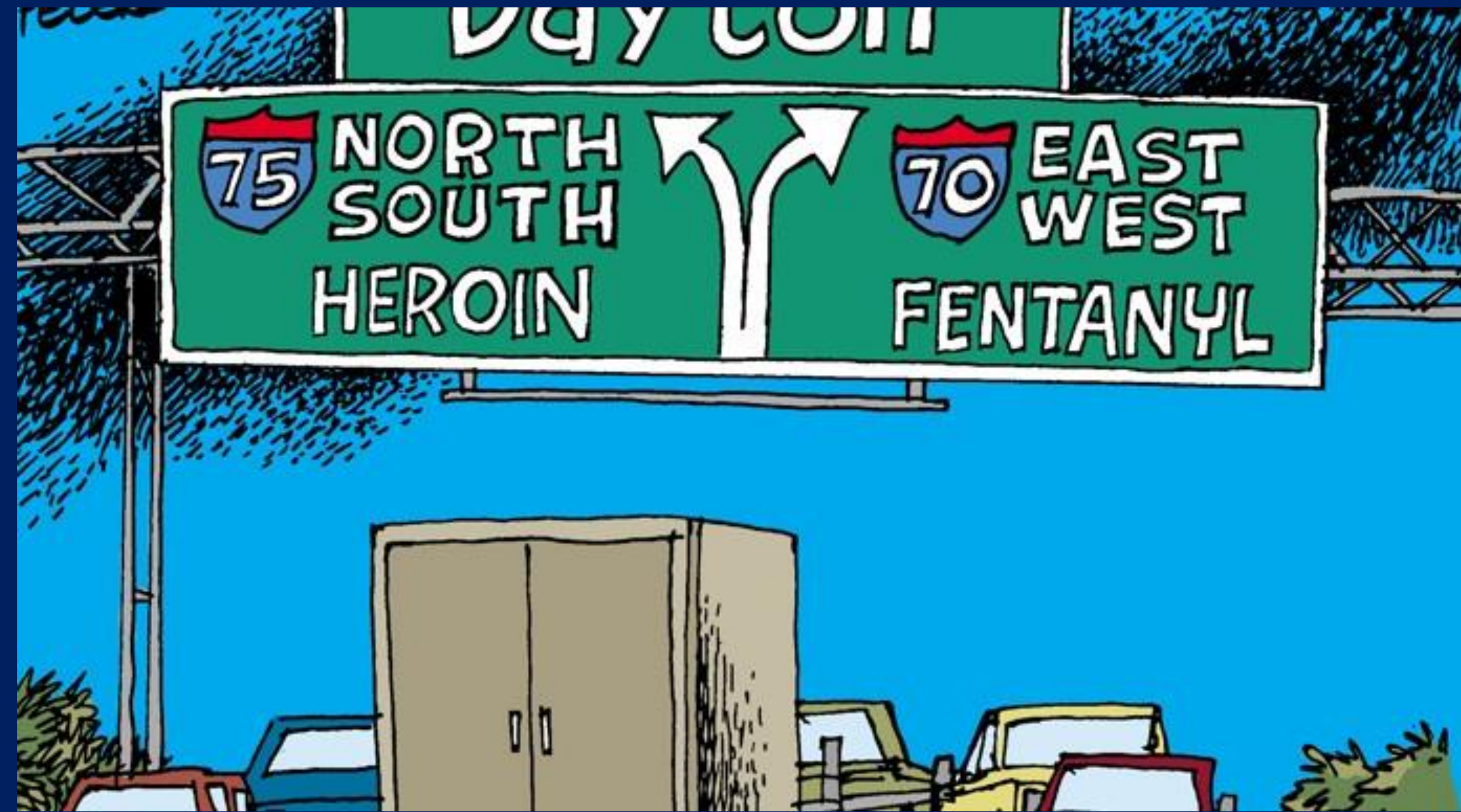


CDC, National Center for Health Statistics System, CDC Wonder.

So What Changed?

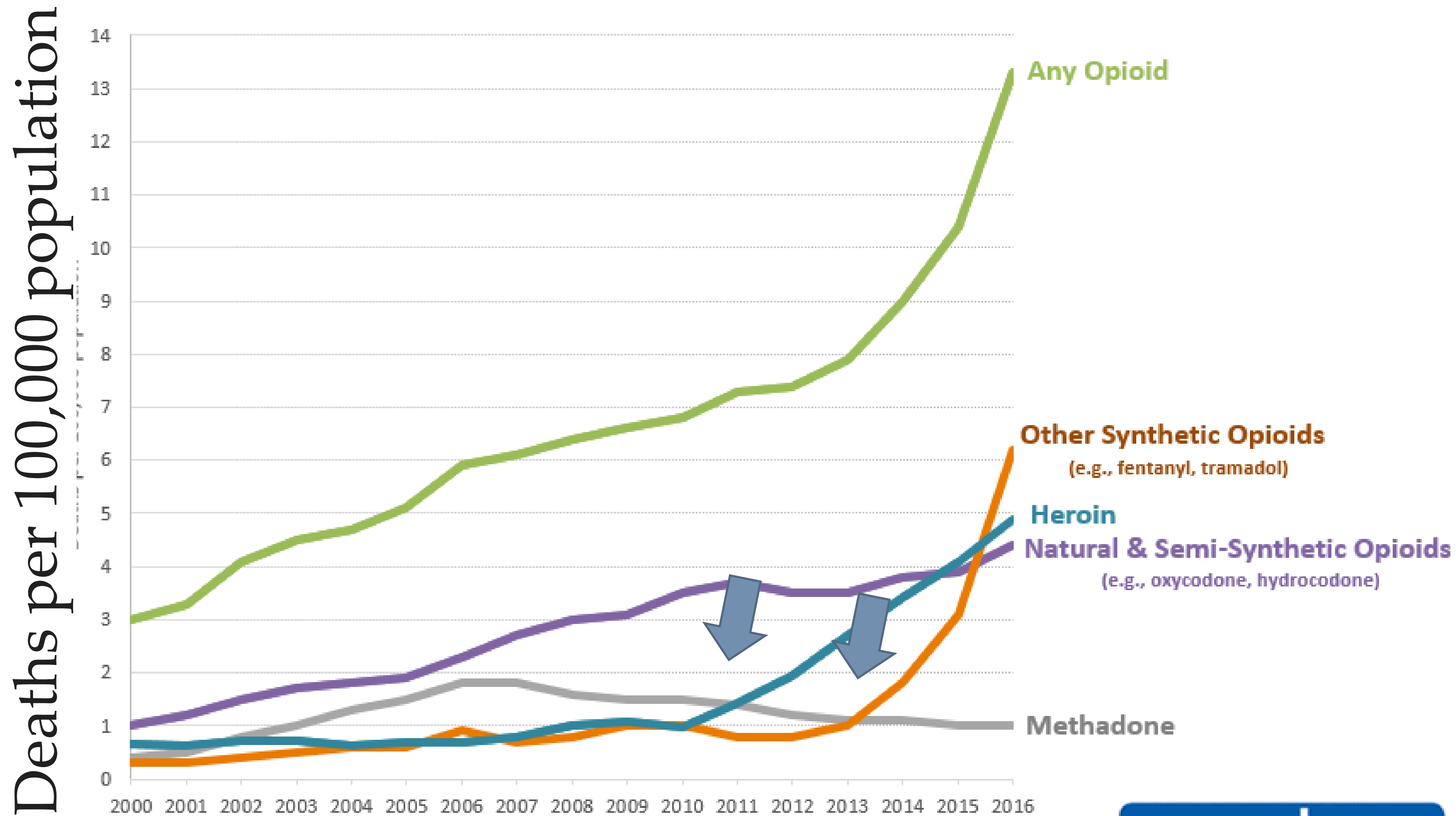
What caused the death rate to increase 29% in one year?

What contributed to average life expectancy falling 2 years in a row



Rhode Island 2013-14: 32% of 165 unintentional deaths were fentanyl related

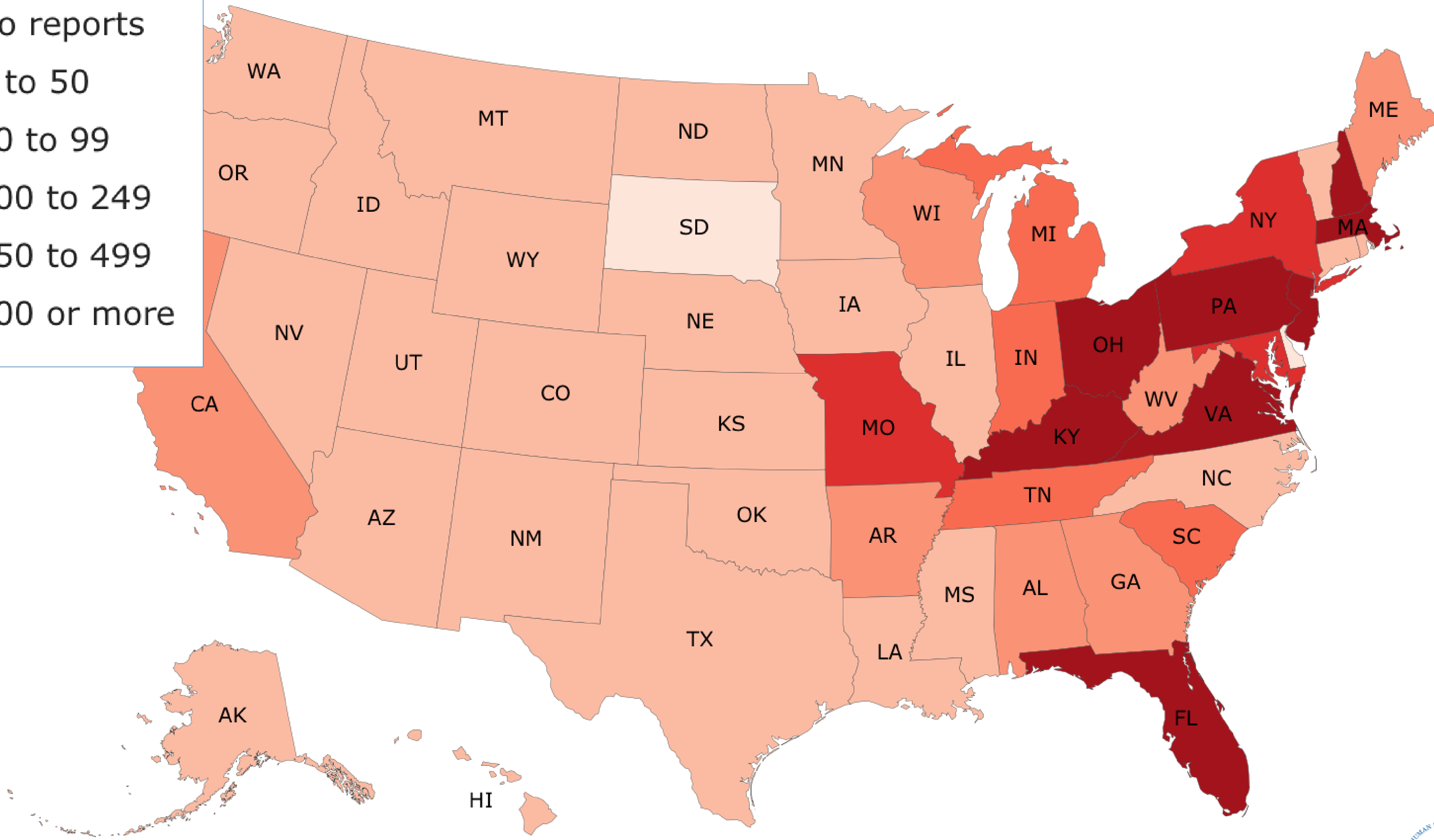
Overdose Deaths Involving Opioids, by Type of Opioid, United States, 2000-2016



2000-2016

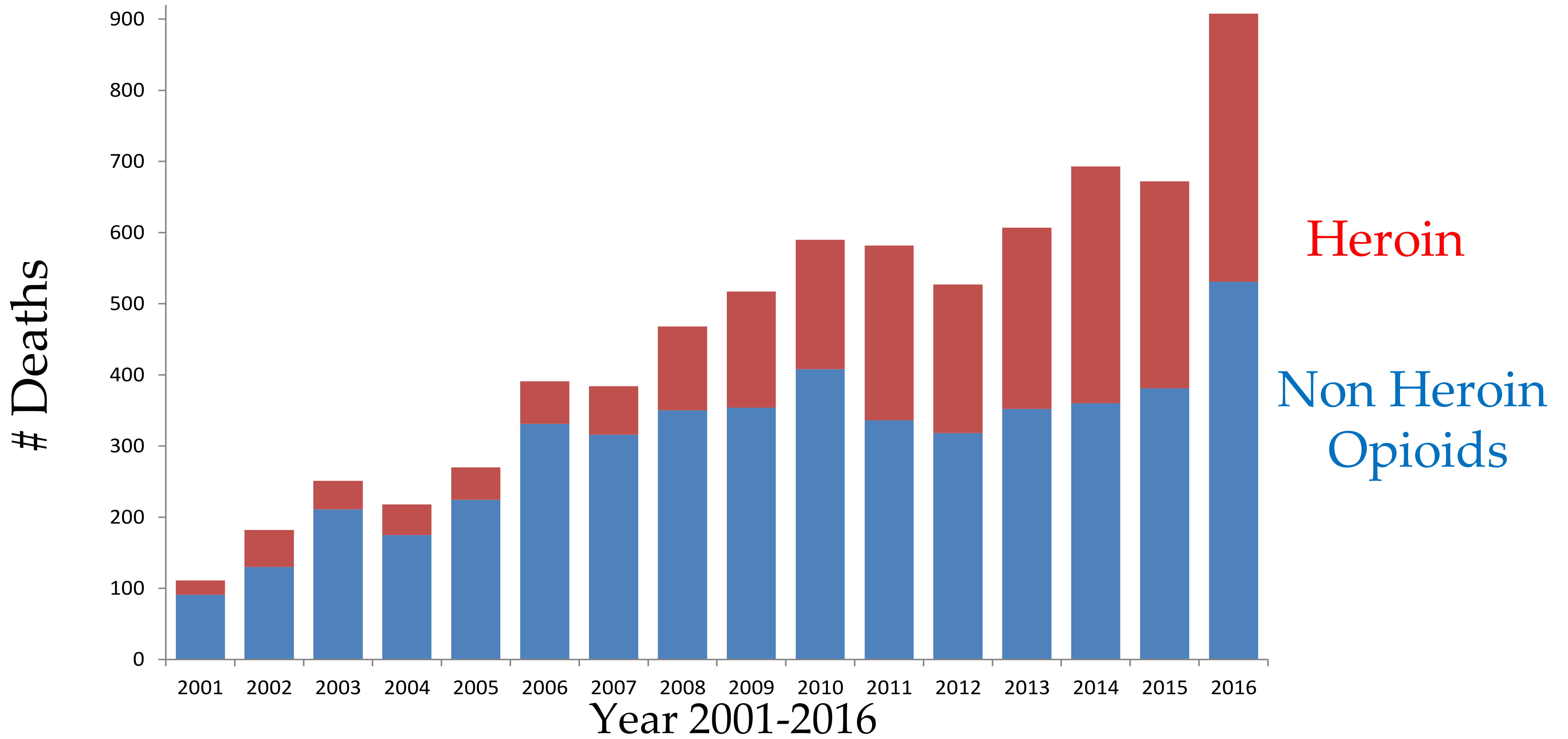
www.cdc.gov
Your Source for Credible Health Information

- No reports
- 0 to 50
- 50 to 99
- 100 to 249
- 250 to 499
- 500 or more



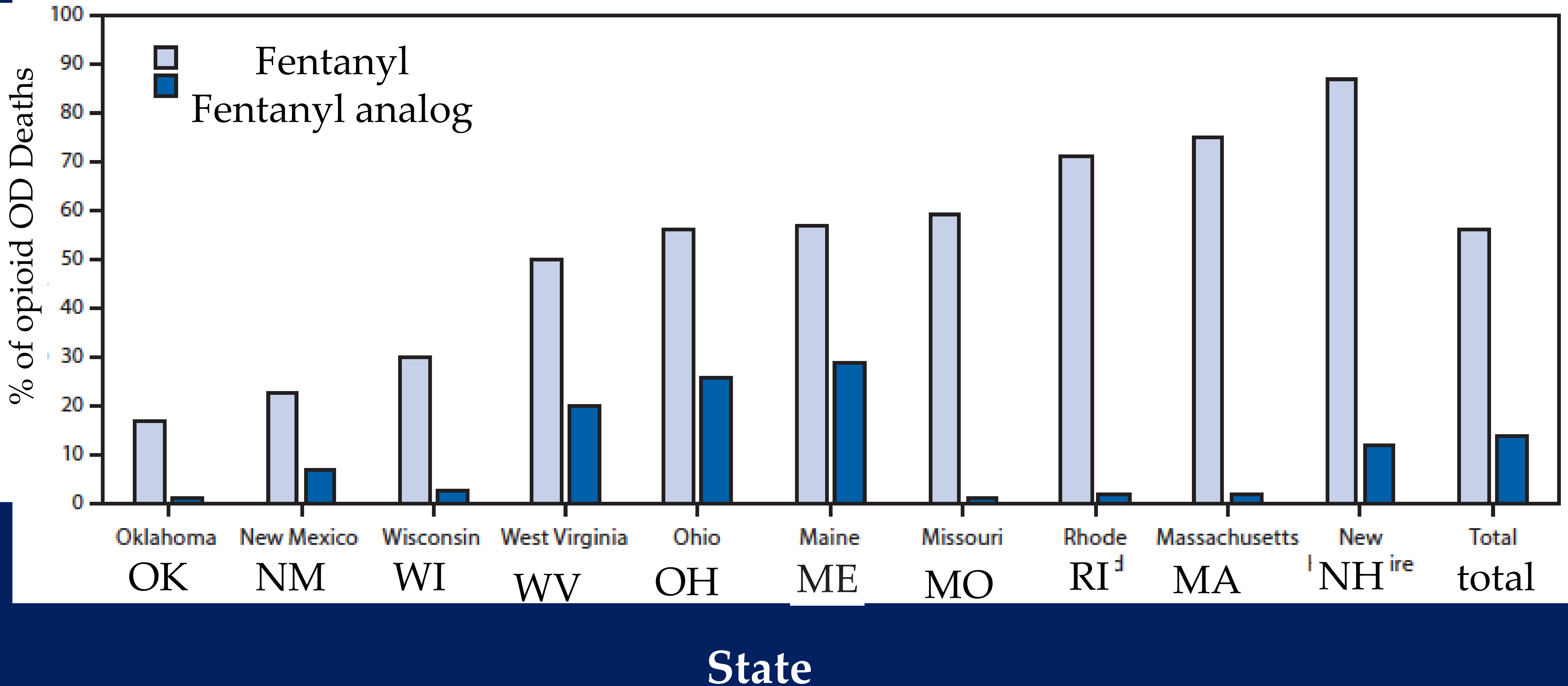
- CT
- DC
- DE
- MD
- NH
- NJ
- RI
- VT





MO Dept of Health and Human Services

Percentage of opioid OD deaths + for fentanyl analogs by state-10 states July-Dec 2016

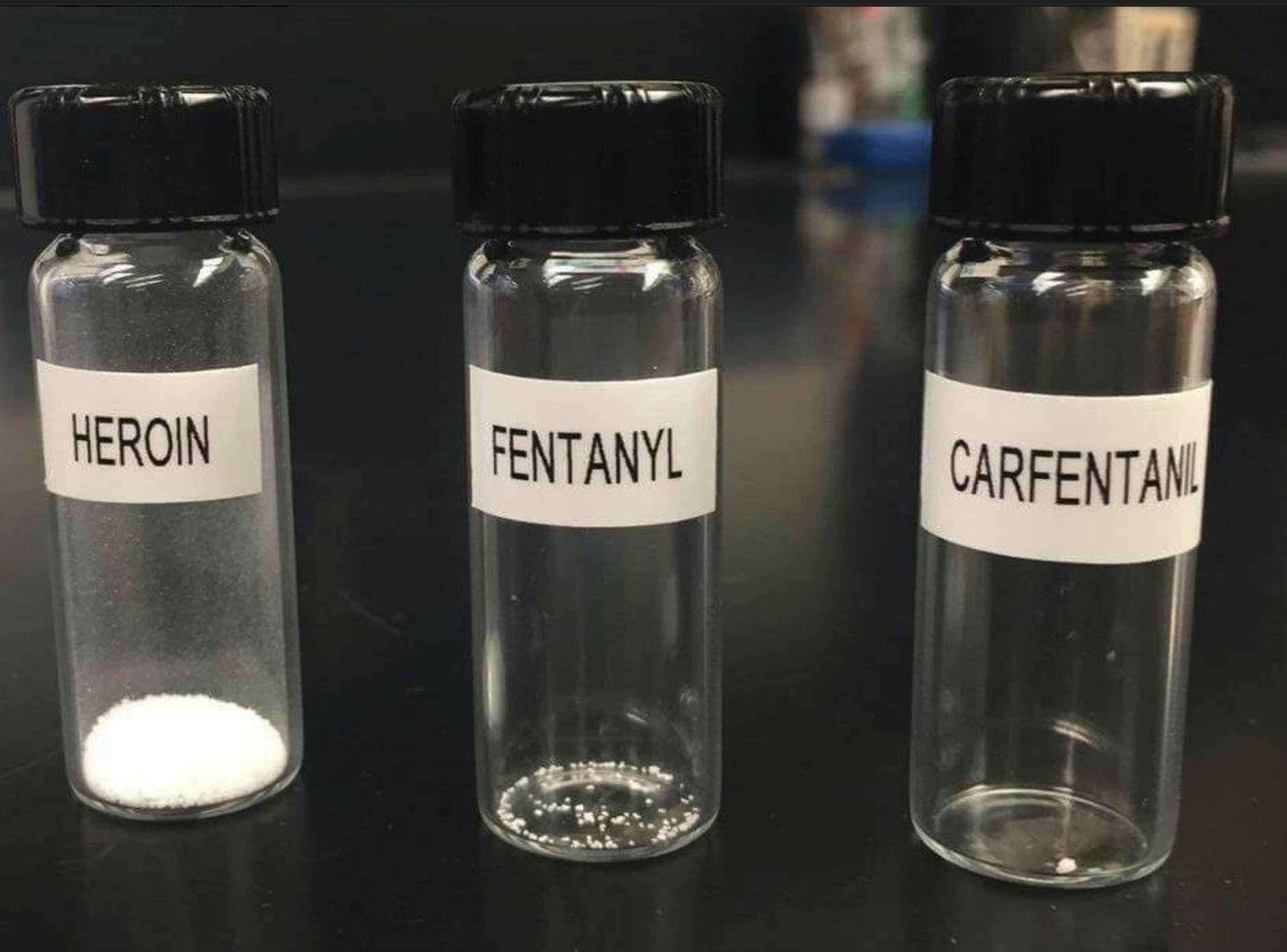


GRAY DEATH HEROIN

ABUSE IN THE UNITED STATES

Resembling chunks of concrete, or concrete mixing powder, grey death is a lethal combination of some of the most deadly opioids known to man





HEROIN

FENTANYL

CARFENTANYL

Research Chemicals & Legal Highs

“Fun with Chemistry”

41 y/o purchased illicit ‘hydrocodone’

- U-47700
- W18 (W1-32)
- MT-45
- AH-7921
- Carfentanil
- Butyrfentanyl
- Acetylfentanyl
- Furanylfentanyl

Table. Serum drug concentrations.

Drug	Serum Concentration, ng/mL		Therapeutic Concentration, ng/mL*
	13 Minutes Postarrival	44 Minutes Postarrival	
Acetaminophen	10,032.8	8,098.4	10,000–20,000
Benzoylcegonine	46.6	36.8	<100
Fentanyl	15.2	11.0	1–2
Gabapentin	350.9	254.4	5,900–21,000
Hydrocodone	107.6	90.1	2–24
Sertraline	15.7	12.7	50–250
U-47700	7.6	6.0	NA [†]

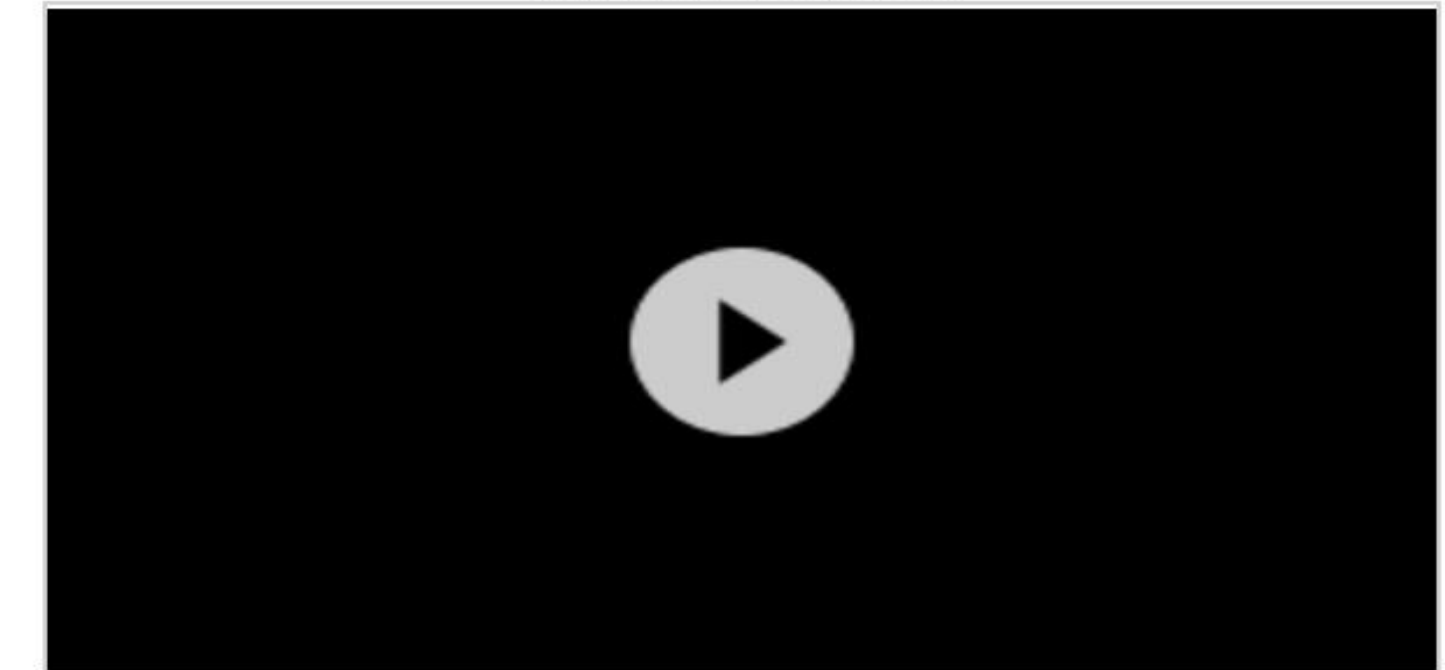
NA, not applicable.

Painkiller fentanyl linked to six deaths and numerous overdoses in Sacramento area




Fentanyl pills (Associated Press)

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Celebration of Arnold Palmer

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In Case You Missed It



Honor, praise, heartache for sheriff's sergeant killed in Lancaster

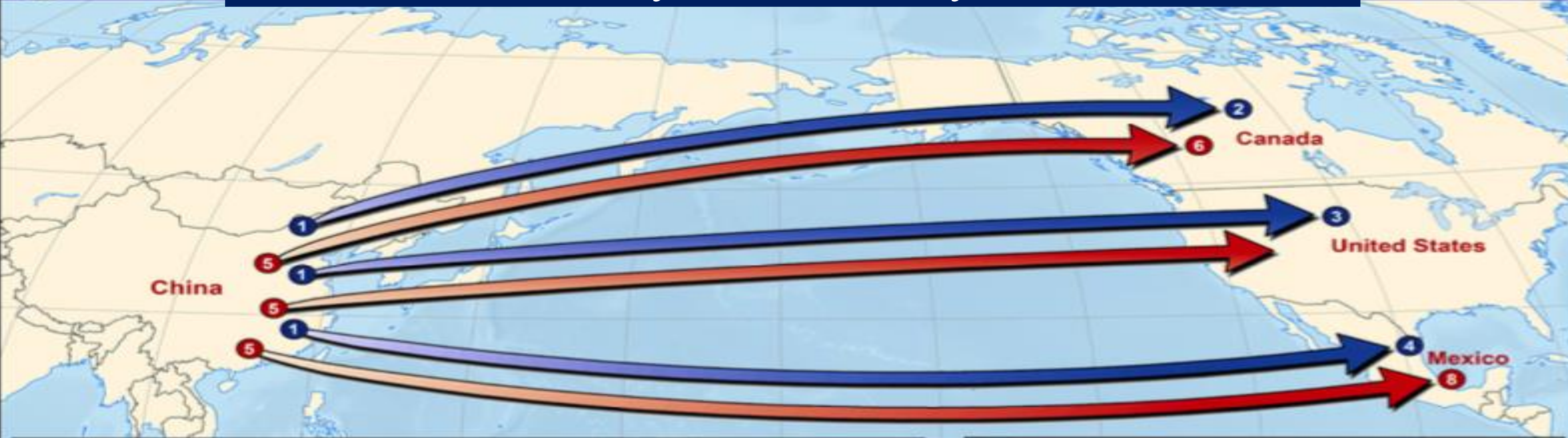


FENTANYL-LACED COCAINE APPEARING IN THE US

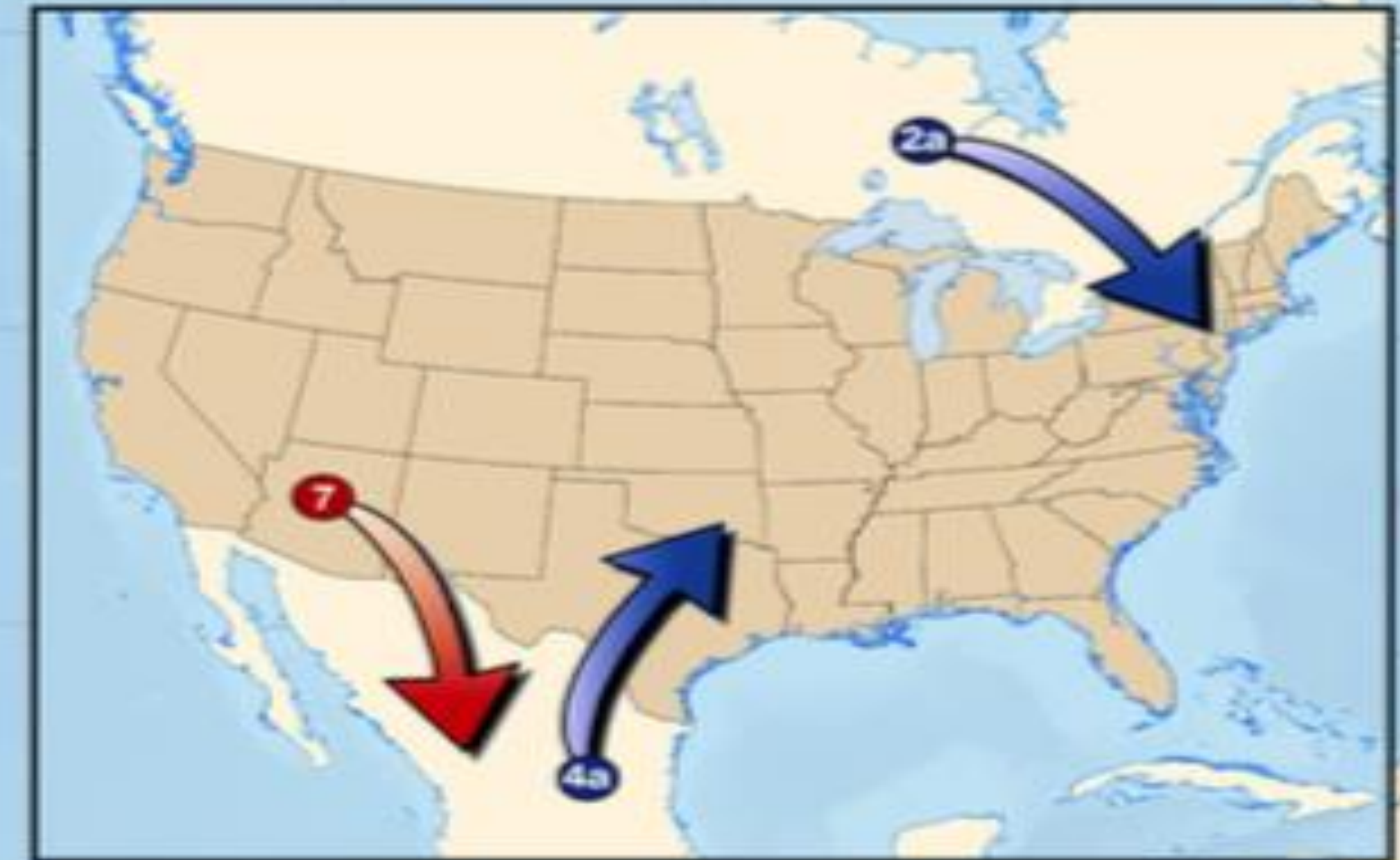
In the midst of an opioid crisis, fentanyl is emerging across the United States resulting in an unprecedented number of overdoses



DEA: Illicit Fentanyl and Fentanyl Precursor Flow



- 1 Fentanyl in powder form and pill presses are shipped via mail services.
- 2 The powder fentanyls are processed and mixed with heroin, or sold as heroin, or pressed into pills and sold in the Canadian drug market.
 - 2a Some fentanyl products are smuggled from Canada into the United States for sale, on a smaller scale.
- 3 The powder fentanyls are processed and mixed with heroin, or sold as heroin, or pressed into pills and sold in the United States drug market.
- 4 The powder fentanyls are cut and diluted for further smuggling, or pressed into counterfeit prescription pills.
 - 4a Diluted powder fentanyls and counterfeit prescription pills containing fentanyl are smuggled from Mexico into the United States.
- 5 Precursors for manufacturing fentanyls are shipped via mail services.
- 6 Precursors are used to manufacture fentanyls in clandestine laboratories.
- 7 Precursors are likely smuggled across the Southwest border into Mexico to manufacture fentanyls.
- 8 Precursors are likely used to manufacture fentanyls in clandestine laboratories.



It's Really Simple Economics!

\$3,000



\$60,000



Willie Eggleston @WillieDoesTox · 9h

T1: Numbers from the DEA...if you were starting a "small business" or worried about your bottom line which would you be illicitly selling? #firesidetox

It's Really Simple Economics!



Source: DEA

Potential Revenue Generated from Fentanyl Pill Sales Using 1 Kilogram of Fentanyl (in USC)

Amount of Fentanyl Per Pill	Price Per Pill		
	\$10	\$15	\$20
1.5 milligrams (666,666 pills)	\$6.6 million	\$9.9 million	\$13.3 million
1 milligram (1 million pills)	\$10 million	\$15 million	\$20 million

Kg of fentanyl: \$1.3 million

Kg of heroin: \$271,000

Criminal Chemistry

Traffickers manufacturing fentanyl often purchase the key ingredient from China, which doesn't regulate its sale. Here's how the chemical building blocks become a highly profitable street drug.



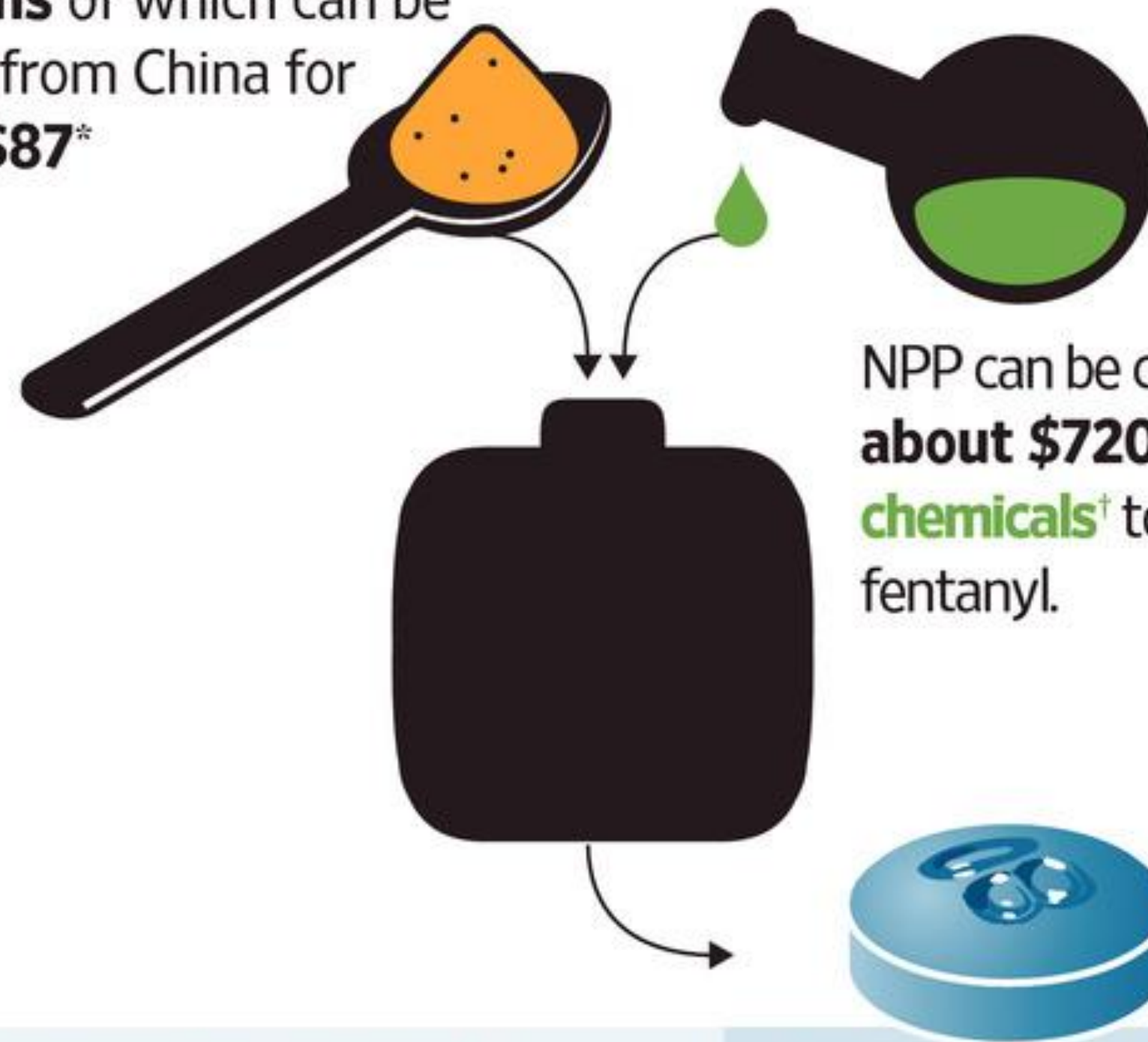
Source: DEA

Amount of
Fentanyl Per

1.5 milligrams
(666,666 pills)

1 milligram
(1 million pills)

The key ingredient is **NPP**,
25 grams of which can be
bought from China for
about \$87*



NPP can be combined with
about \$720 of **other
chemicals†** to produce
fentanyl.

The resulting **25 grams** of
fentanyl cost about **\$810** to
produce...

...and are equivalent to up to
\$800,000 of pills on the black
market.

*Average current price from Chinese suppliers

†Prices from U.S. suppliers

Sources: NES Inc.; Drug Enforcement Administration;
Calgary Police

THE WALL STREET JOURNAL.

Fentanyl Pill
(in USC)

\$20

3.3 million

10 million

It's

ics!

Criminal Chemistry

Traffickers manufacturing fentanyl often purchase the key ingredient from China, which doesn't regulate its sale. Here's how the chemical building blocks become a highly profitable street drug.



Source: DEA

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yl Pill
(SC)

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...and are equivalent to up to \$800,000 of pills on the black market.

1 milligram
(1 million pills)



illion

The resulting 25 grams of fentanyl cost about \$810 to produce...

...and are equivalent to up to \$800,000 of pills on the black market.

*Average current price from Chinese suppliers

†Prices from U.S. suppliers

Sources: NES Inc.; Drug Enforcement Administration; Calgary Police

The Surprising Ease of Buying Fentanyl Online

by Olga Khazan

From: [REDACTED]

From: [REDACTED]

To: [REDACTED]

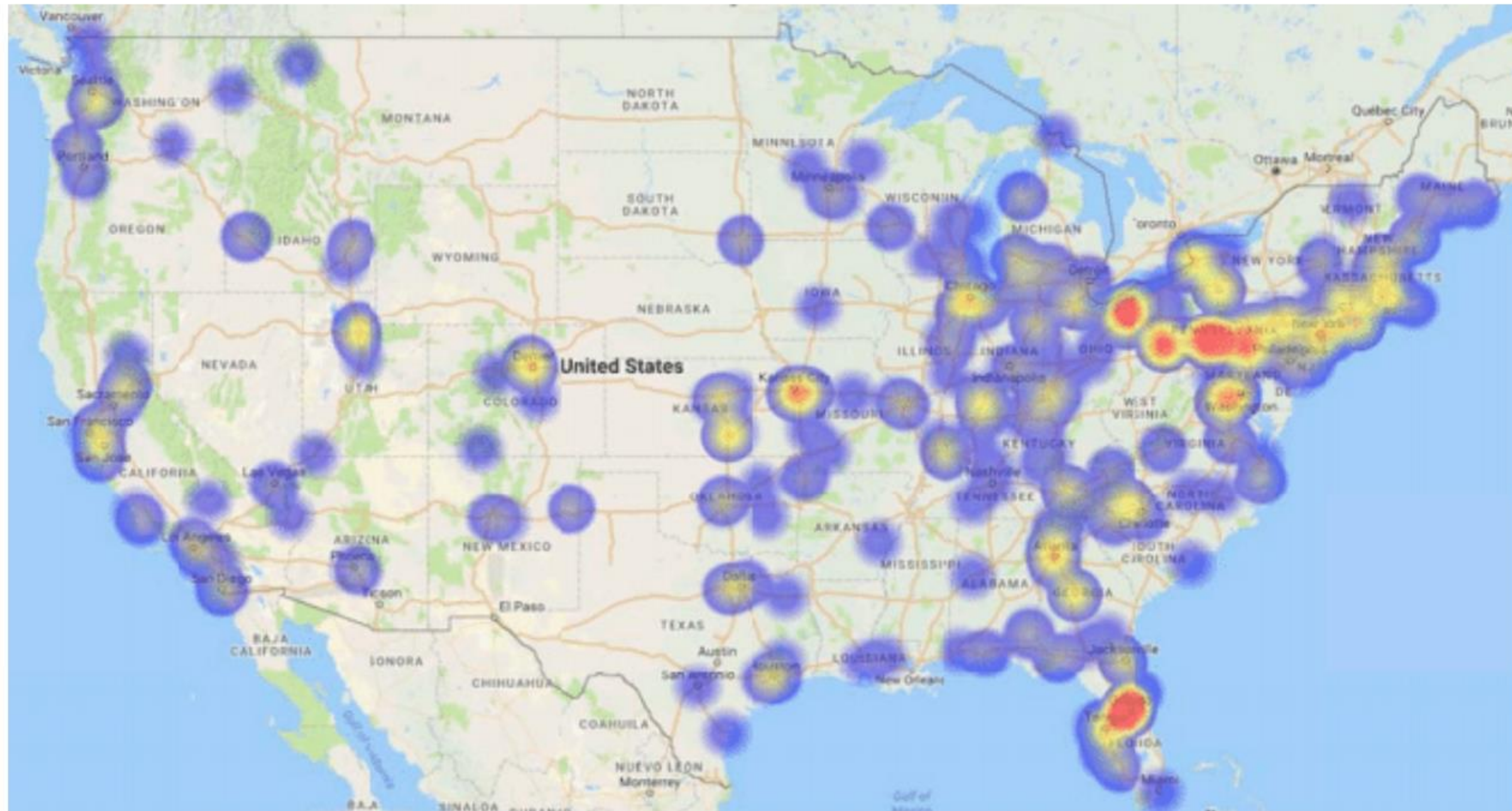
Date: Thu, Jun 15, 2017 at 6:44 PM

Subject: Re:[buy research chemicals online] Message from contact form [no_sync]

Hello [REDACTED], our fentanyl is very good and our client love the quality, we also have powerful opioid like carfentanil. our product quality is 99.8% of purity. and we sale at a very affordable price. we ship from our branch in [REDACTED] so delivery is discrete and secured. what quantity do you plan to order ?

Waiting for your response,
Best regards.

Leo



U.S. locations linked to the online fentanyl dealers studied by the subcommittee ([Senate Subcommittee on Investigations](#))



September 22, 2016
Contact: DEA Public
(202) 307-7977

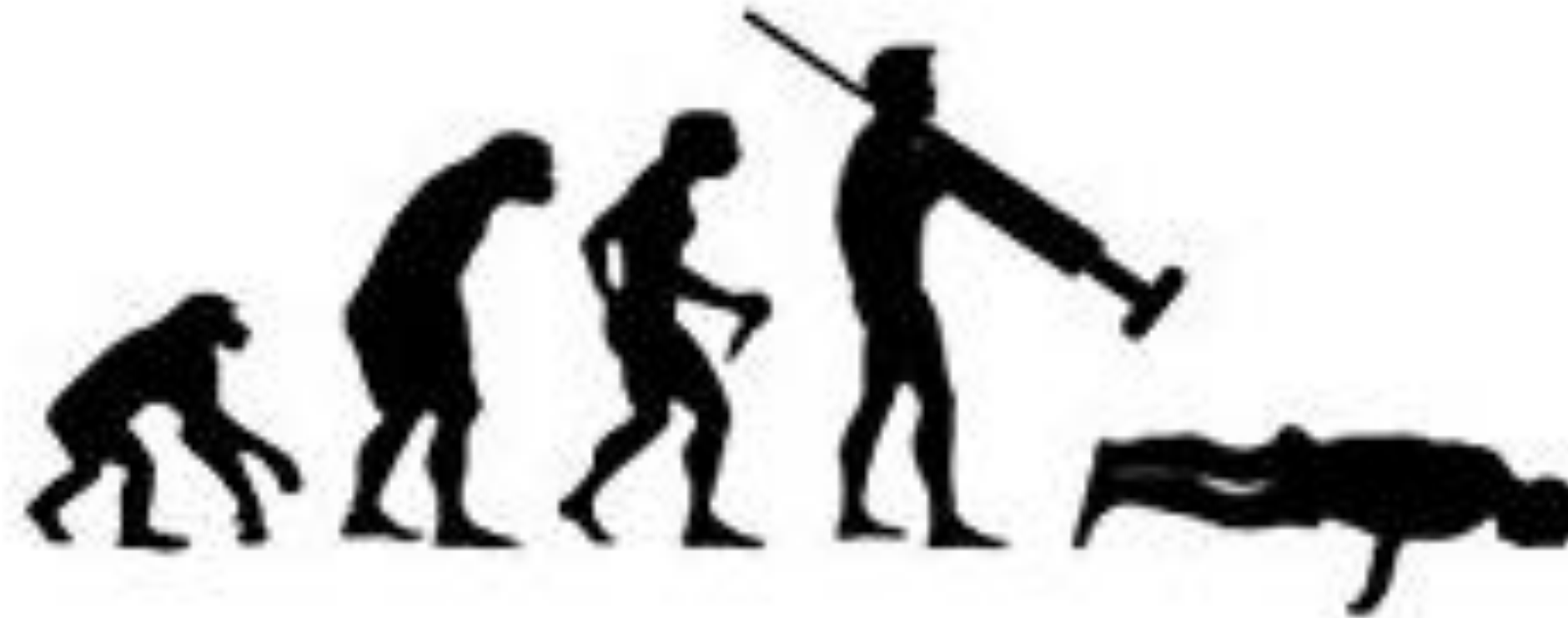
Carfentanil Warning to Police and Public

Dangerous *more potent than morphine and 100 times more potent than fentanyl*

SEPTEMBER 22, 2016 (WASHINGTON) – The U.S. Department of Justice issued a public warning to the public about the safety risks of carfentanil. Carfentanil is a synthetic opioid that is 10,000 times more potent than morphine and 100 times more potent than fentanyl, which itself is 50 times more potent than heroin. DEA, local law enforcement and emergency responders have recently seen the effects of carfentanil, which is linked to a significant number of overdose deaths in various parts of the country. The handling of carfentanil as fentanyl and other fentanyl-like substances is dangerous and can have serious consequences.

“Carfentanil is a danger to our communities.” said Administrator Chuck Rosenberg. “It is a very, very crazy dangerous. Synthetic opioids are very dangerous. We hope our first responders – and the public – are aware of this safety warning. These men and women have remarkably high standards for safety. We hope to be well and healthy.”

Naloxone



Proving Darwin wrong 2mg at a time



Benefits Of Medication Assisted Treatment *For Recovery*

helping *reduce* cravings and withdrawal symptoms

Reduction In Drug-Related Overdose Deaths

Reduction In Disease And Violent Crimes

Improved Treatment Outcomes





shots HEALTH NEWS FROM NPR

TREATMENTS

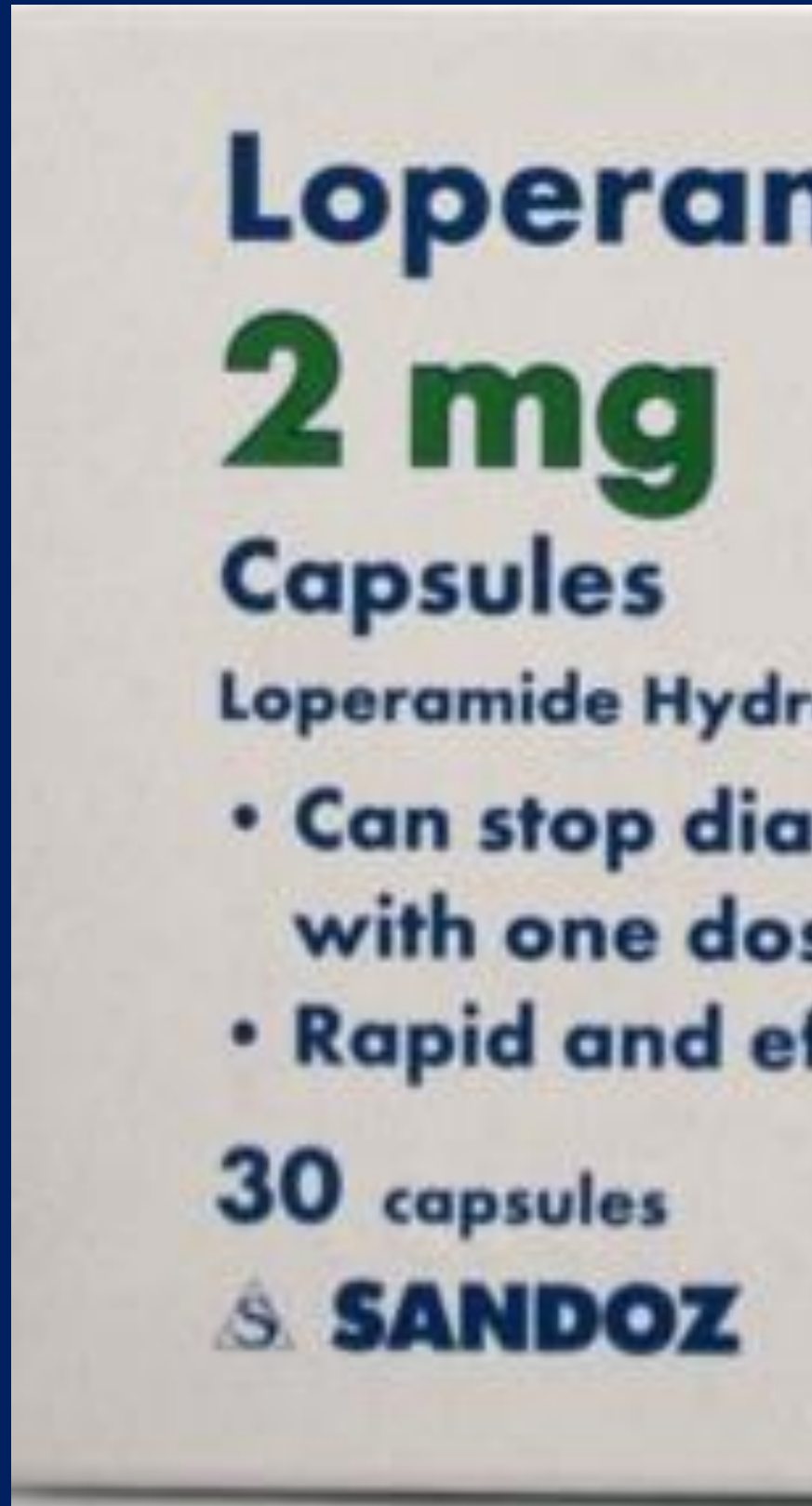


Getting High From This Drug For Diarrhea Can Be Fatal

May 3, 2016 · 4:10 PM ET



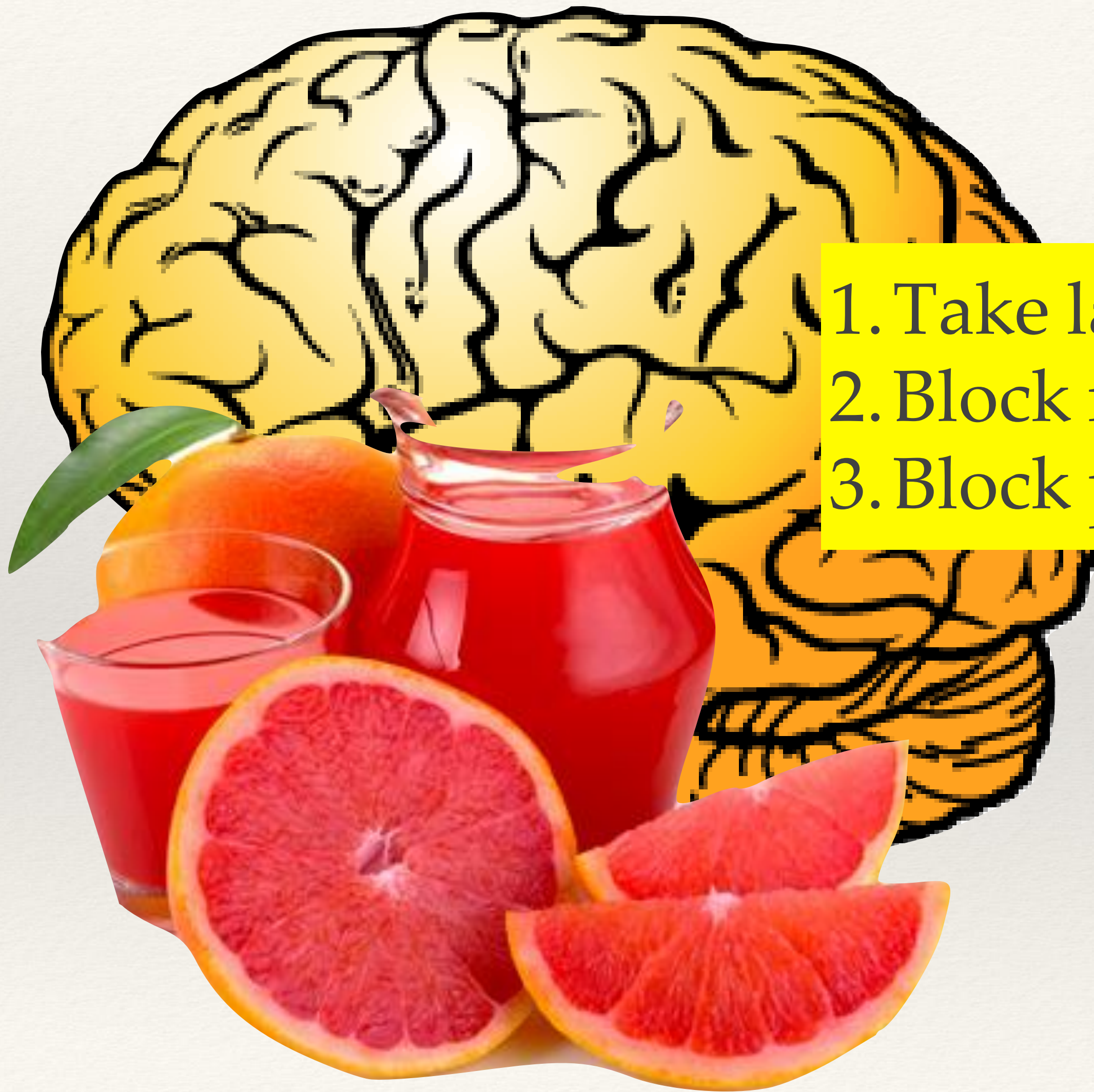
ALISON KODJAK

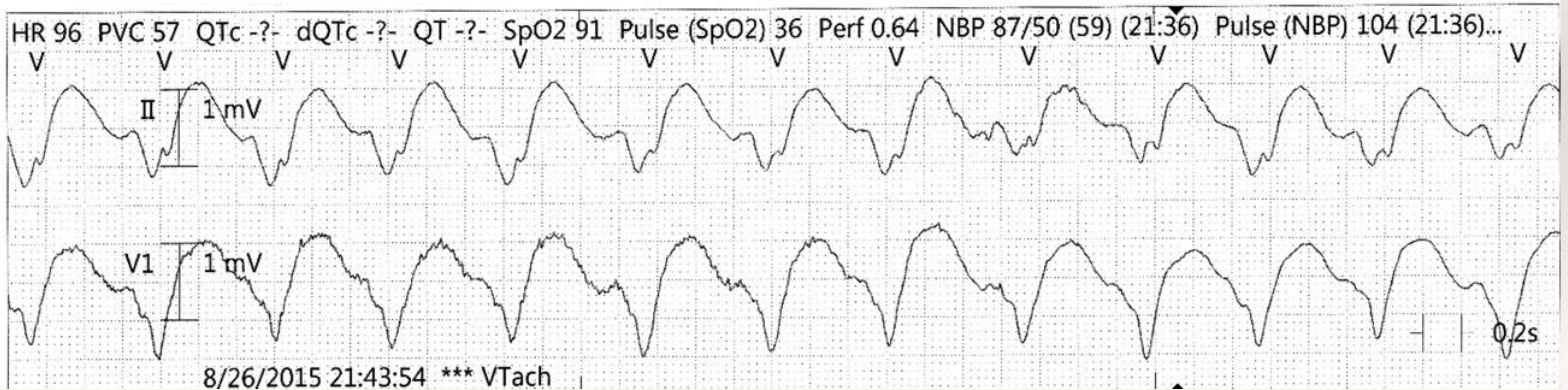
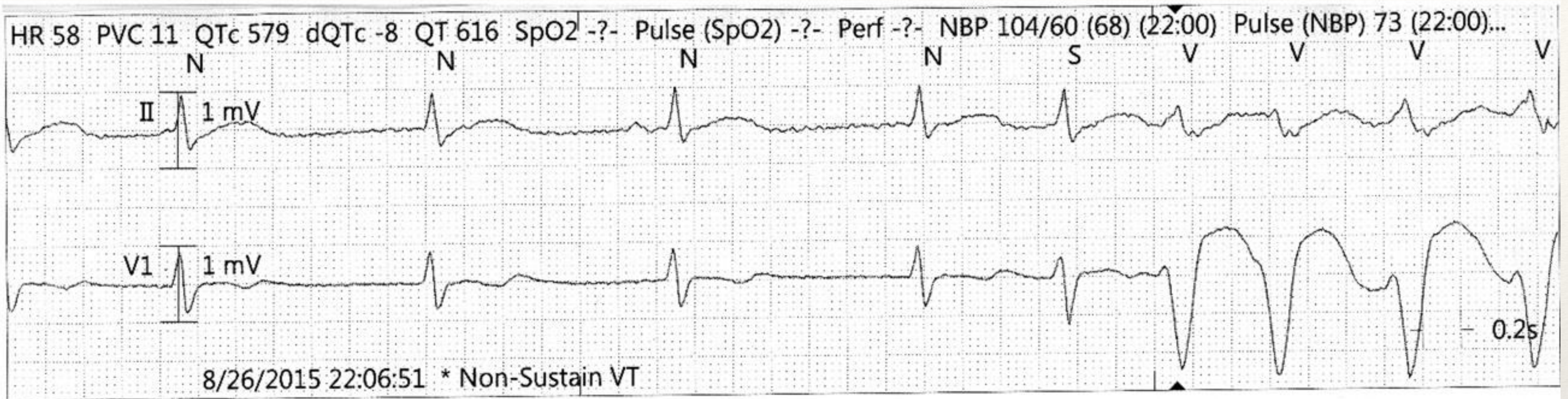


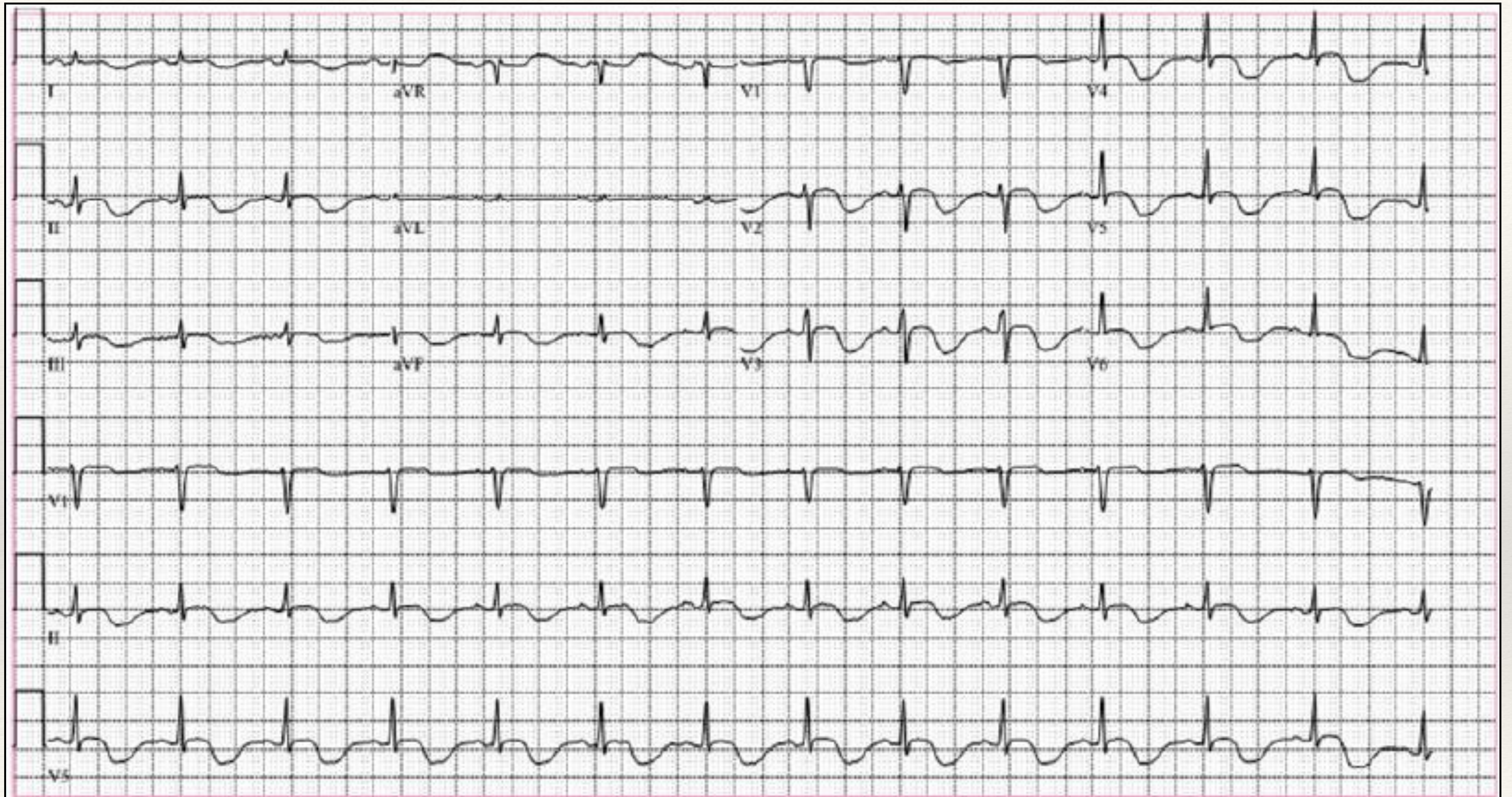
Loperamide

1. Take large amounts
2. Block metabolism
3. Block p-glycoprotein

Lop







Loperamide metabolite-induced cardiomyopathy & QTc prolongation. Clin Tox 2017

Summary

- Synthetic cannabinoids generally cause agitation but presentations can vary
 - Most recent synthetic cannabinoid complication is bleeding
- Neither synthetic cannabinoids or cathinones will turn standard UDS positive
- Latest increase in opioid related mortality due to fentanyl and analogues
 - May need larger doses of naloxone to reverse toxicity
- Incidental skin contact with new designer opioids will NOT get you sick



schwarze@wustl.edu

References

- ◇ Title slide: <https://www.vox.com/2017/11/13/16387320/pain-acceptance-opioid-epidemic-chronic-pain-treatment>
- ◇ name slide background: <http://www.wallpaperbit.com/psychedelic-wallpapers/page-2>
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