



The Rise of Poly-Substance Overdose Deaths

May 25, 2023

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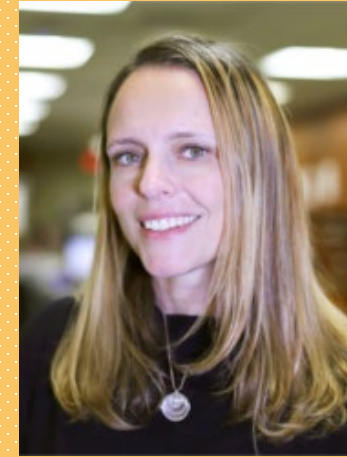
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- **The link will also be provided in the chat at the end of the program.**
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Featured Presenters



Andrew L. Falzon, MD
Chief State Medical Examiner
State of New Jersey

Dr. Andrew L. Falzon was appointed Chief State Medical Examiner for the State of New Jersey in July 2015. In this role, he oversees the death investigation system in New Jersey, with regulatory authority of the ten County Medical Examiners' Offices and with direct operational oversight of the two state-run Regional Medical Examiner Offices in Newark and Woodbine. A native of Malta, Dr. Falzon graduated from the University of Malta Medical School in 1986. He is board-certified in Anatomic, Clinical and Forensic Pathology. During his tenure as Chief State Medical Examiner, the office has significantly expanded its staff and established a new website and data dashboard. The latter provides statistics on many classifications of death, including drug-related deaths in near real-time which has assisted the fight against the opioid crisis.



Rachel Haroz, MD, FAACT
Associate Professor, Department of Emergency
Medicine, Cooper Medical School of Rowan University,
Division Head of Toxicology and Addiction Medicine,
and Medical Director at the Center for Healing

Dr. Rachel Haroz is Associate Professor in the Department of Emergency Medicine at Cooper Medical School of Rowan University, Division Head of Toxicology and Addiction Medicine, and Medical Director at the Center for Healing. She is board-certified in emergency medicine, medical toxicology and addiction medicine, obtaining her BA in biology from Brandeis University, her MD from Tufts University and completing a residency in emergency medicine and fellowship in medical toxicology. Dr. Haroz helped build and now staffs the outreach clinic at the Urban Health Institute at Cooper University Hospital in Camden, an addiction medicine specialty clinic dedicated to treating patients with substance use disorders and patients with HIV.



Andrew L. Falzon, MD
Chief State Medical Examiner
State of New Jersey



**The Partnership For A
Drug-Free New Jersey**
In Cooperation with the Governor's Council on Alcoholism
& Drug Abuse and the NJ Dept. of Human Services

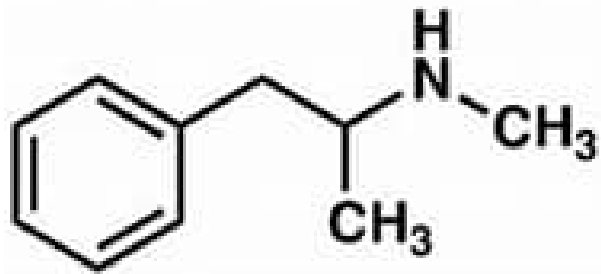
Drug-Related Death Data: Deaths Associated with Methamphetamine Use

STATE OF NEW JERSEY
DEPARTMENT OF
HEALTH

OFFICE OF THE CHIEF
STATE MEDICAL
EXAMINER



Methamphetamine



Methamphetamine's Psychological effects

- Produces a rapid *Intense "Rush," or Euphoria* after which user becomes extremely alert, active, energetic and restless with enhanced sexual desire, arousal, and sexual pleasure (may last anywhere from 6-24 hours)
- *Suppresses Appetite* leading to malnourishment from extended time without eating
- *Anxiety and paranoia* for the next craving lead to craving for sugary substances and excessive teeth grinding
- *Homicidal/Suicidal ideations*
- *Sensory Hallucination/Psychosis* (i.e. – bug crawling sensation under skin) results in *excessive itching/scratching*. Leading to sores on skin

Methamphetamine's Physiological effects

- Produces a dramatic increase in heart rate and blood pressure
- Irregular heartbeats (arrhythmias) are also common
- Vasoconstriction causes higher blood pressure in many parts of the body, including the brain
- Chronic use can cause inflammation of the lining of the heart
- Other effects include headaches, decreased appetite, trembling, chest pain, increased respiration, hyperthermia and insomnia. These are more pronounced when taken in conjunction with alcohol, cocaine, heroin or cannabis



SKIN

Acne worsens
Skin “picking”
Excessive sores



FACIAL MUSCULATURE AND FAT

Body consumes excessive
muscle tissue causing
hollowed out appearance



TEETH AND GUMS

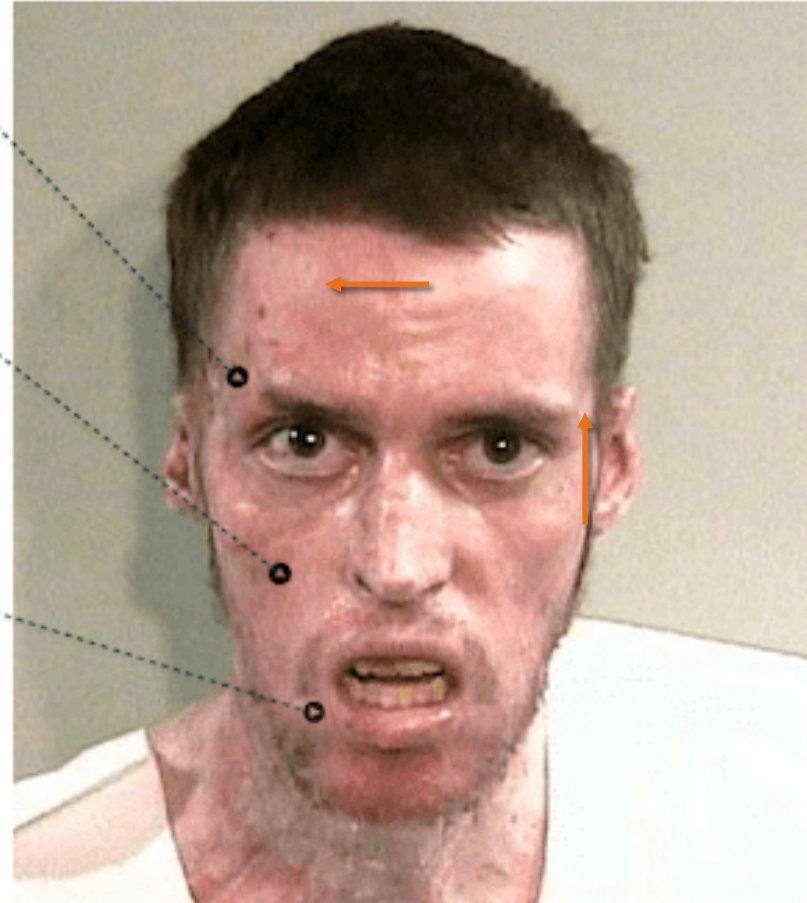
“Meth Mouth”
Chemical substance decays
gums and enamel on teeth

Saliva production decrease

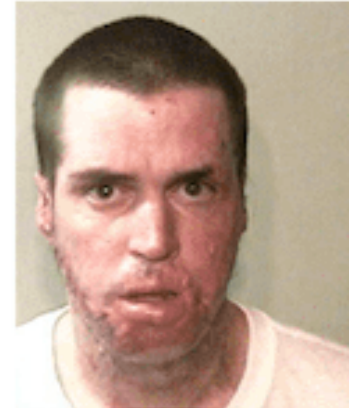
Teeth shrinkage appearance



INCREASING ESTIMATED AGE



3 AGE: 25



2 AGE: 25

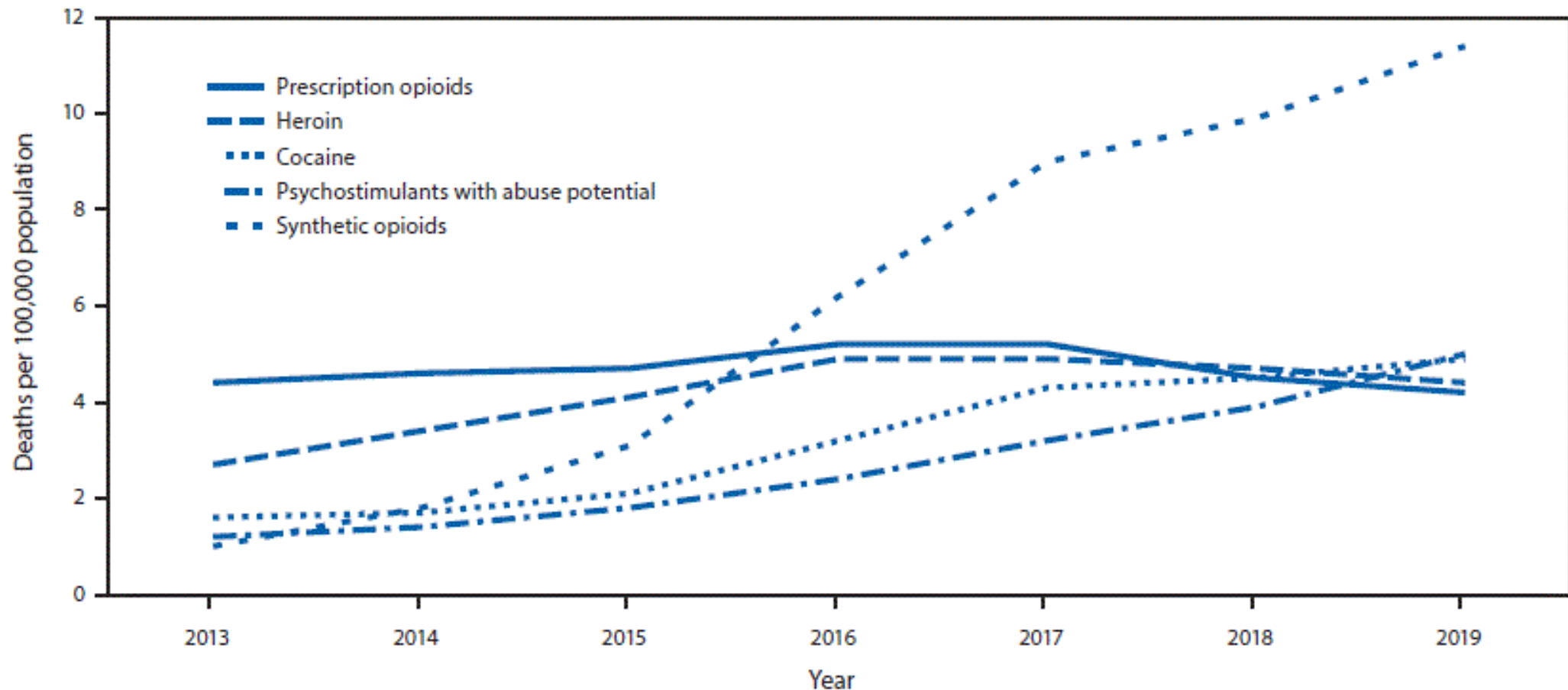


1 AGE: 23

Methamphetamine Users

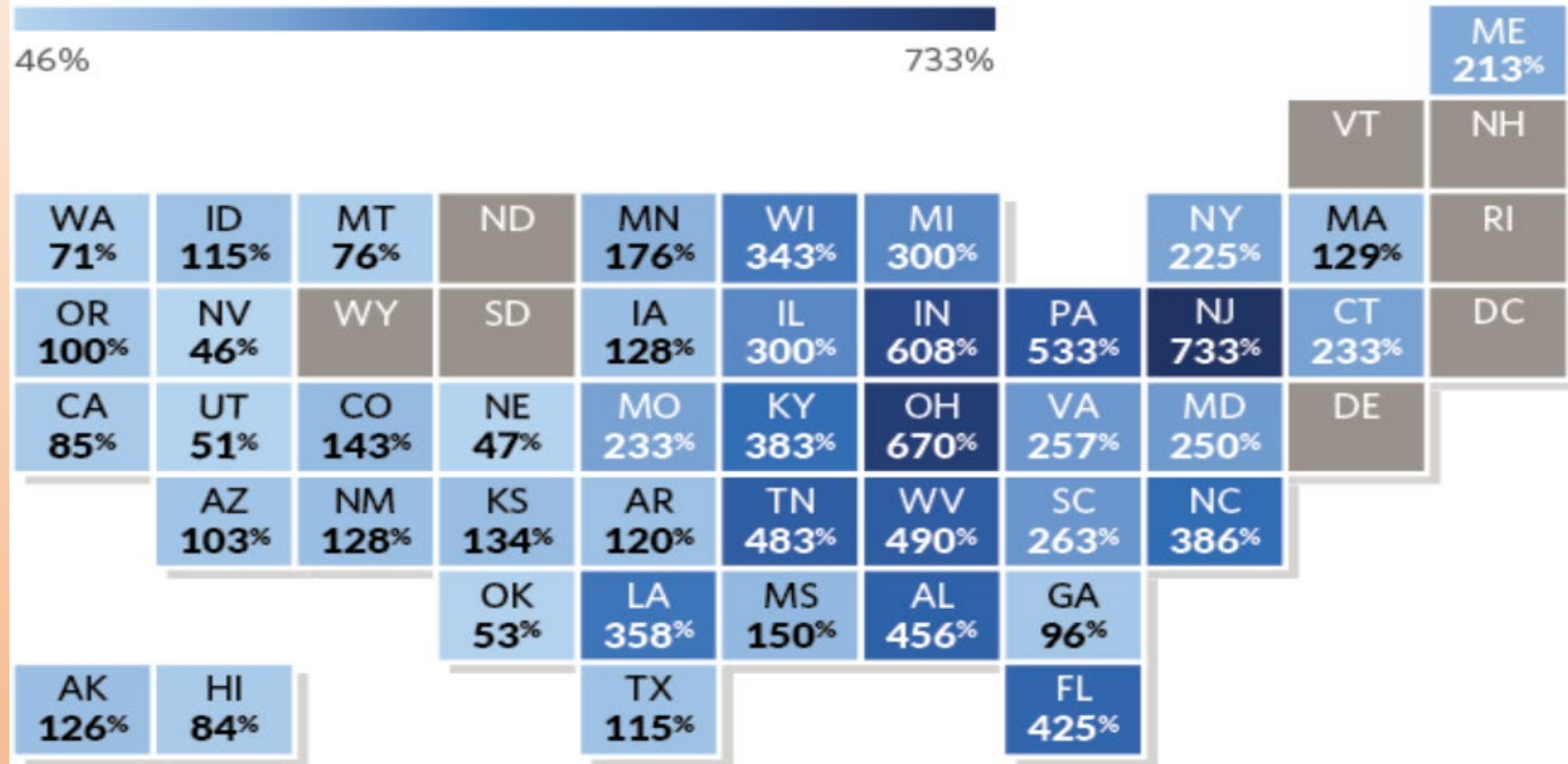
Methamphetamine's Physical Effects

Drug overdose deaths: United States 2013-2019



Methamphetamine Death Rate Doubled Over 5 Years in More Than 60% of States

Percent change in states with available data, 2015-2019



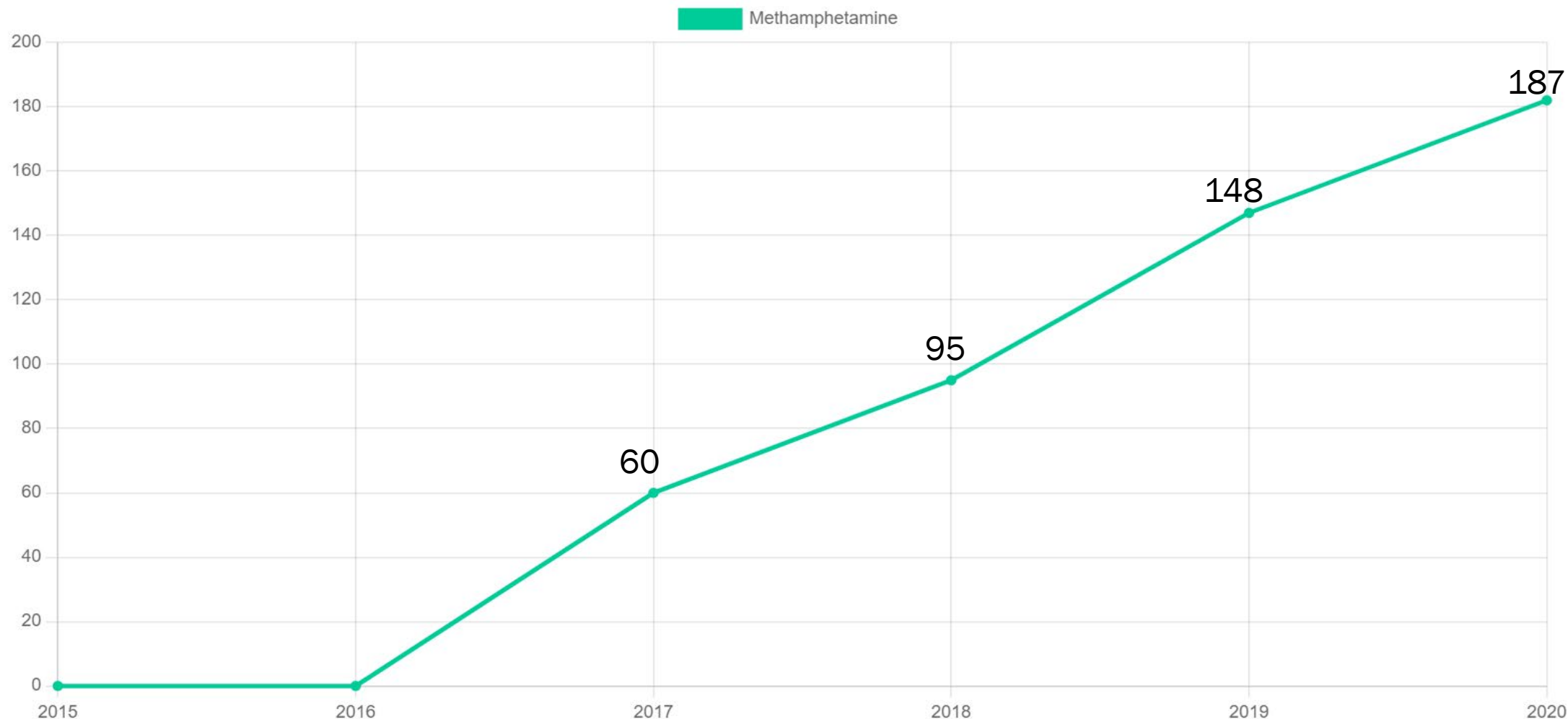
■ No data

Note: Figures include the 43 states that reported data for 2015 and 2019.

Source: Centers for Disease Control and Prevention and National Center for Health Statistics, "CDC WONDER Database, Multiple Cause of Death" (1999-2019), (March 4, 2021), <https://wonder.cdc.gov/mcd-icd10.html>

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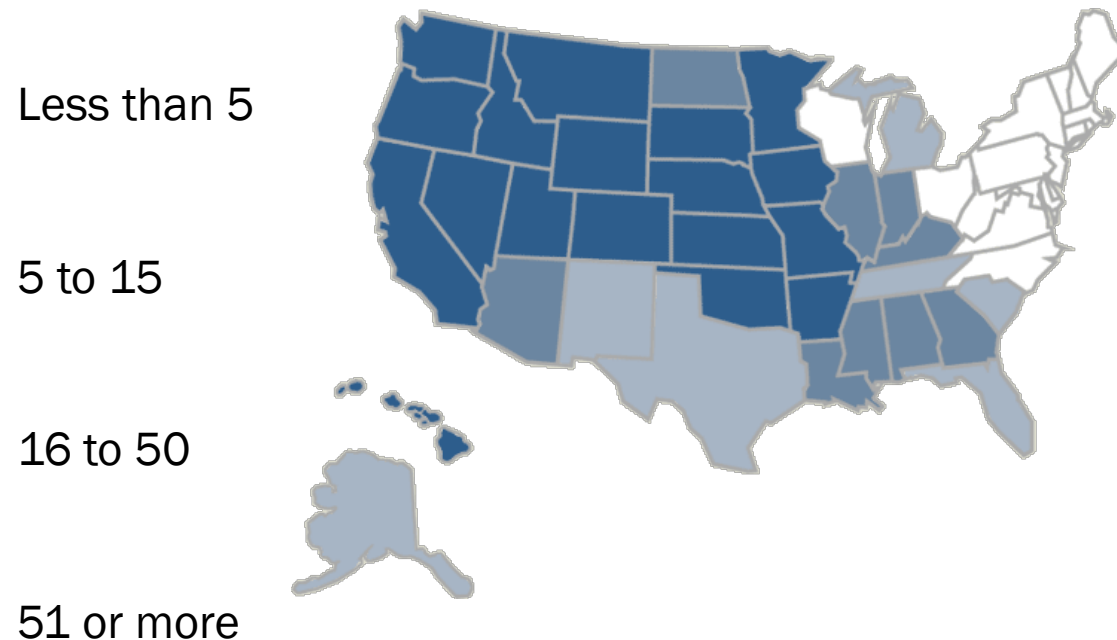
NJ Methamphetamine-Related Deaths



Note* Some of the data will display "0" due to data not being recorded that year for that specific substance. i.e **Ethanol, Benzodiazepine and Methamphetamine overdoses were not recorded until 2017. This does not mean overdoses resulting in death due to these specific substances did not occurring at that time, just the data was not collected.*

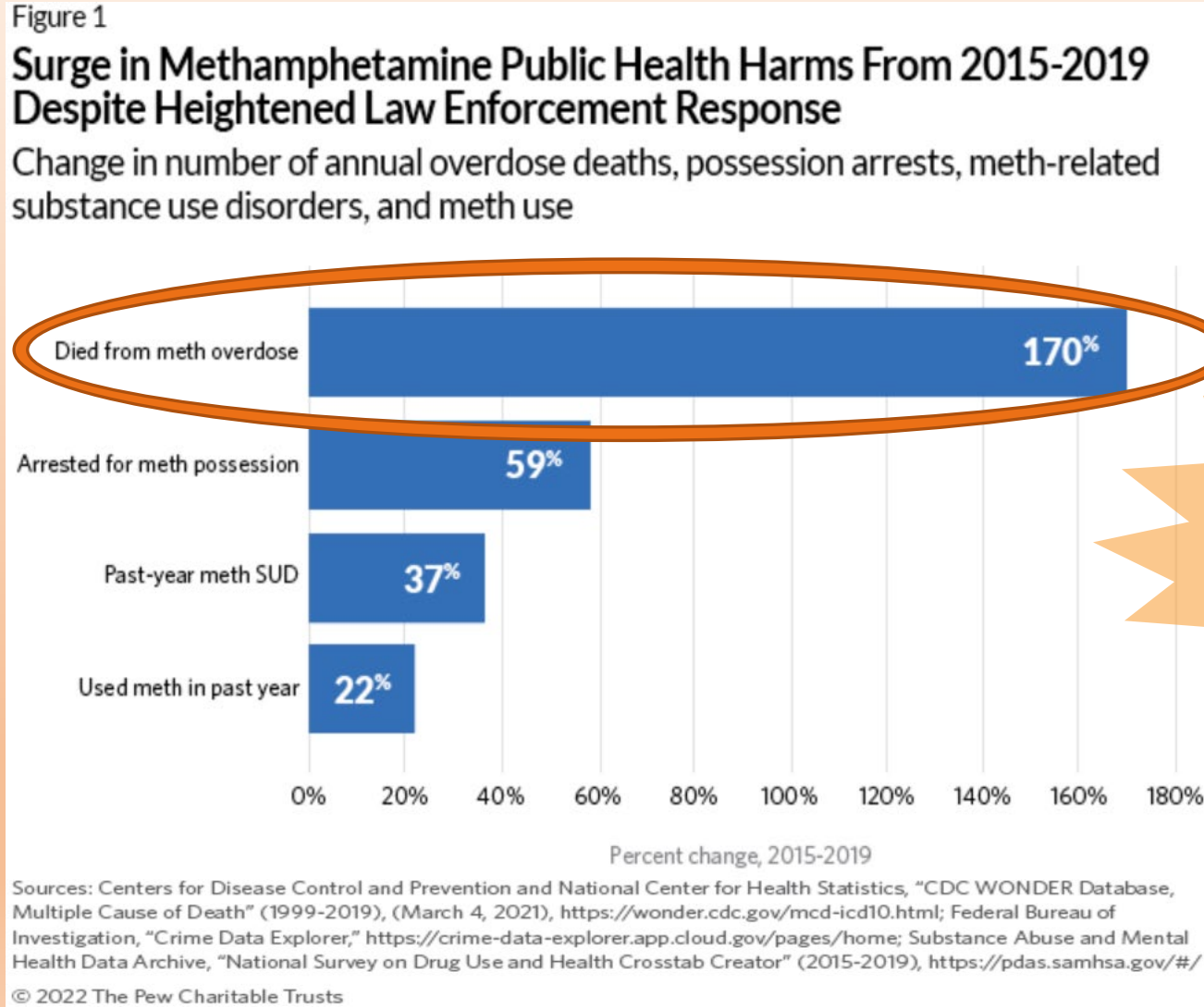
The Reach of Methamphetamine

Number of meth users in rehab per 100,000 state residents in 2003, the last year for which data is available for all 50 states.

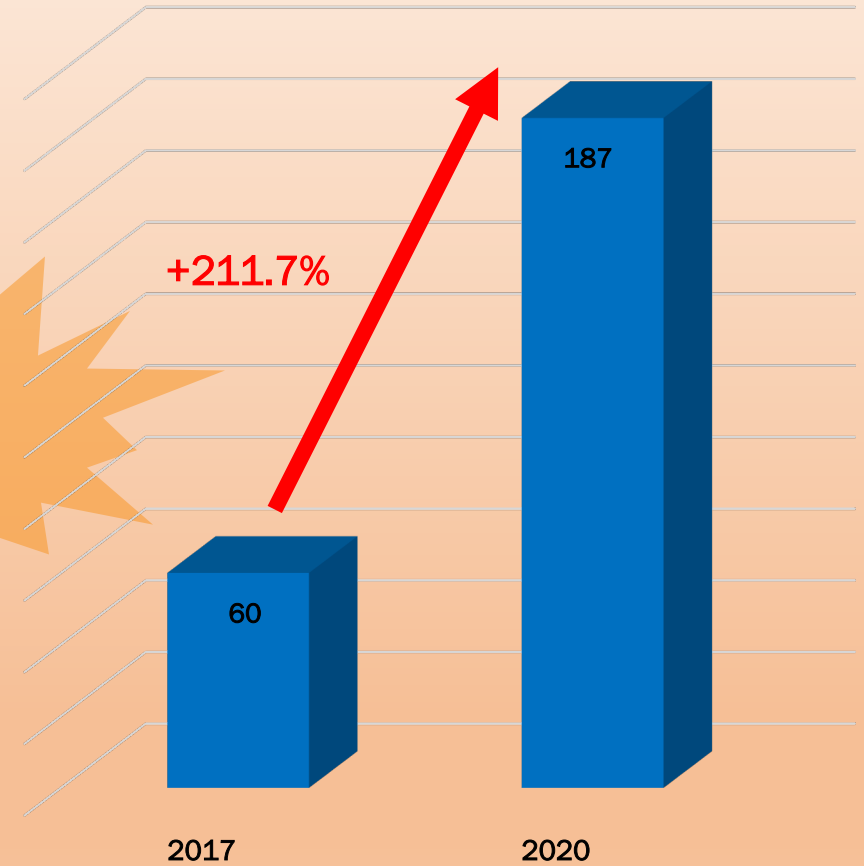


National Methamphetamine-Related Deaths (% Increase 2015 -2019)

New Jersey Methamphetamine-Related Deaths (% Increase 2017 -2020)



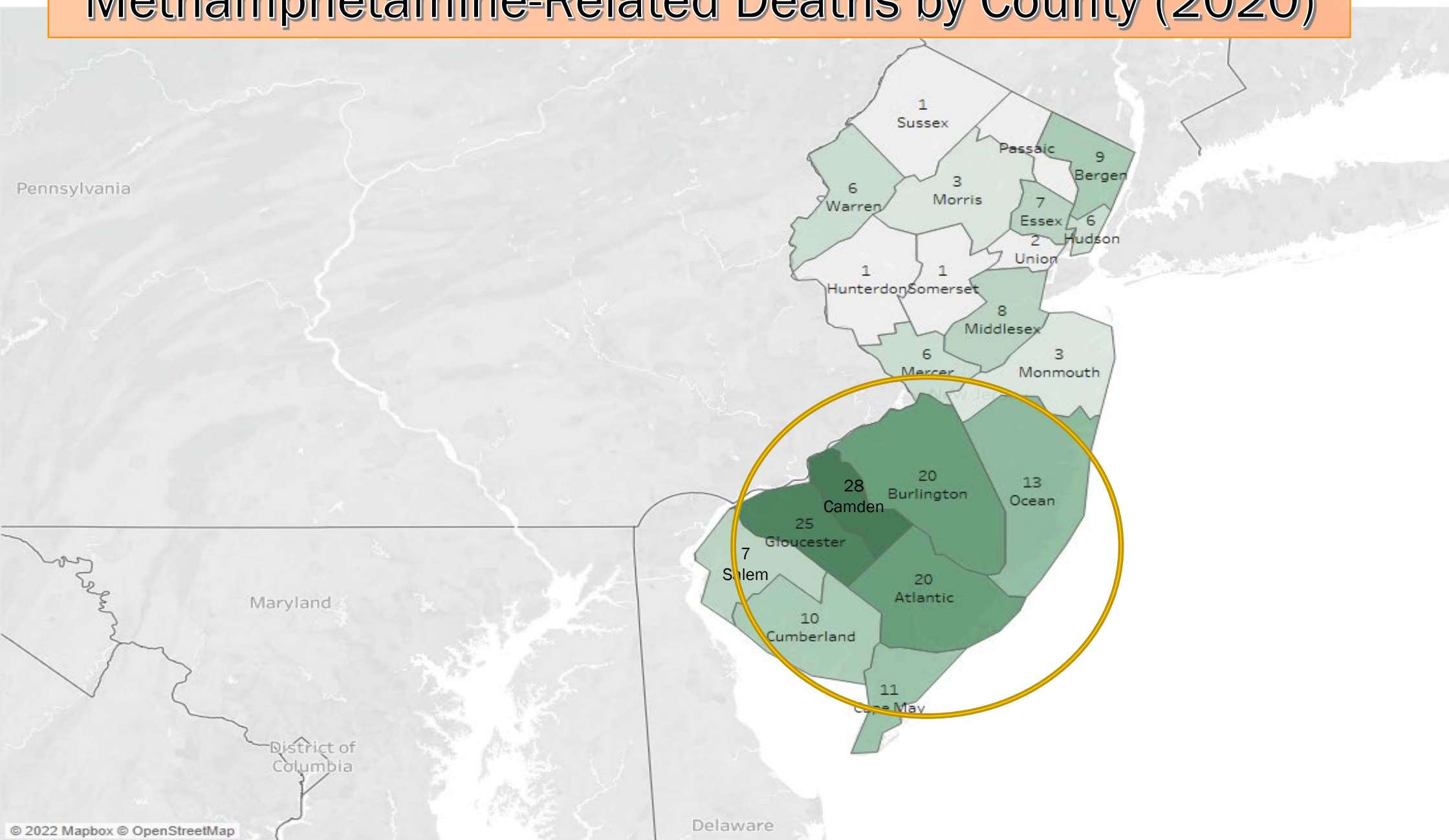
VS.



Methamphetamine-Related Deaths by County (2020)

New Jersey Office of the
Chief State Medical Examiner

Methamphetamine
1 28

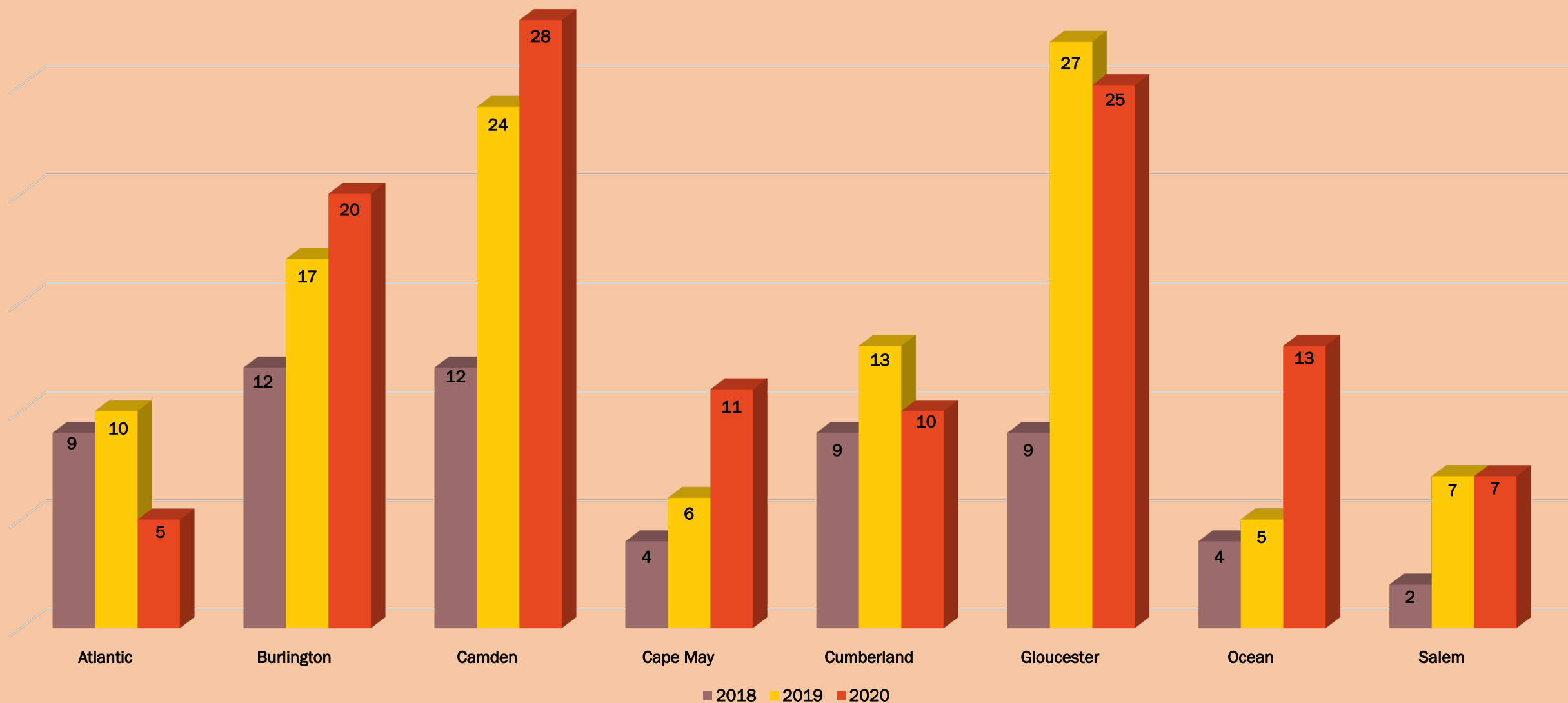


© 2022 Mapbox © OpenStreetMap

Map based on Longitude (generated) and Latitude (generated). Color shows sum of Methamphetamine. The marks are labeled by sum of Methamphetamine and County. Details are shown for County.

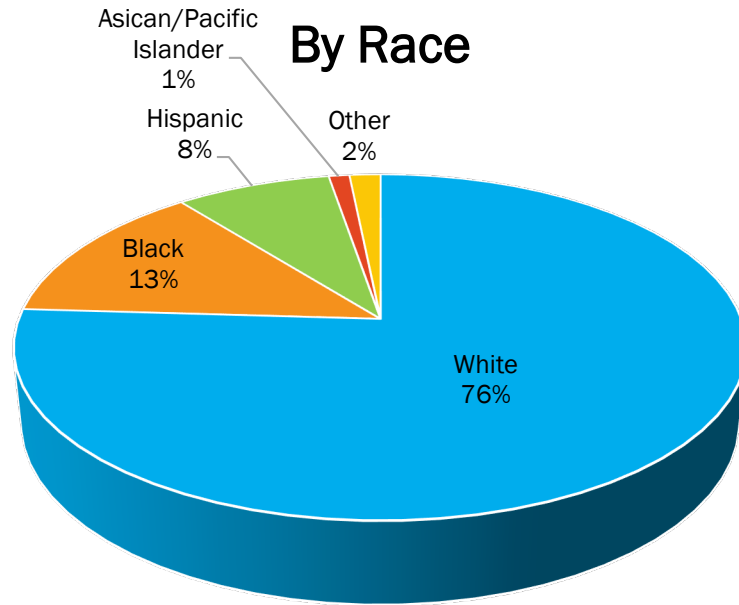
Southern NJ Counties

Methamphetamine-Related Deaths (2018-2020)

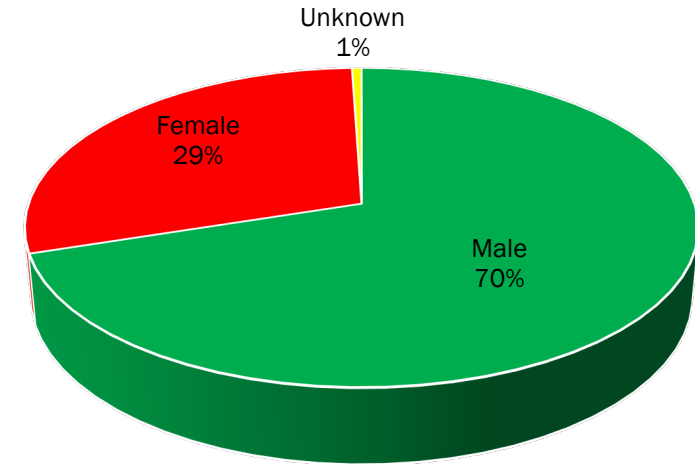


Methamphetamine-Related Deaths (2020)

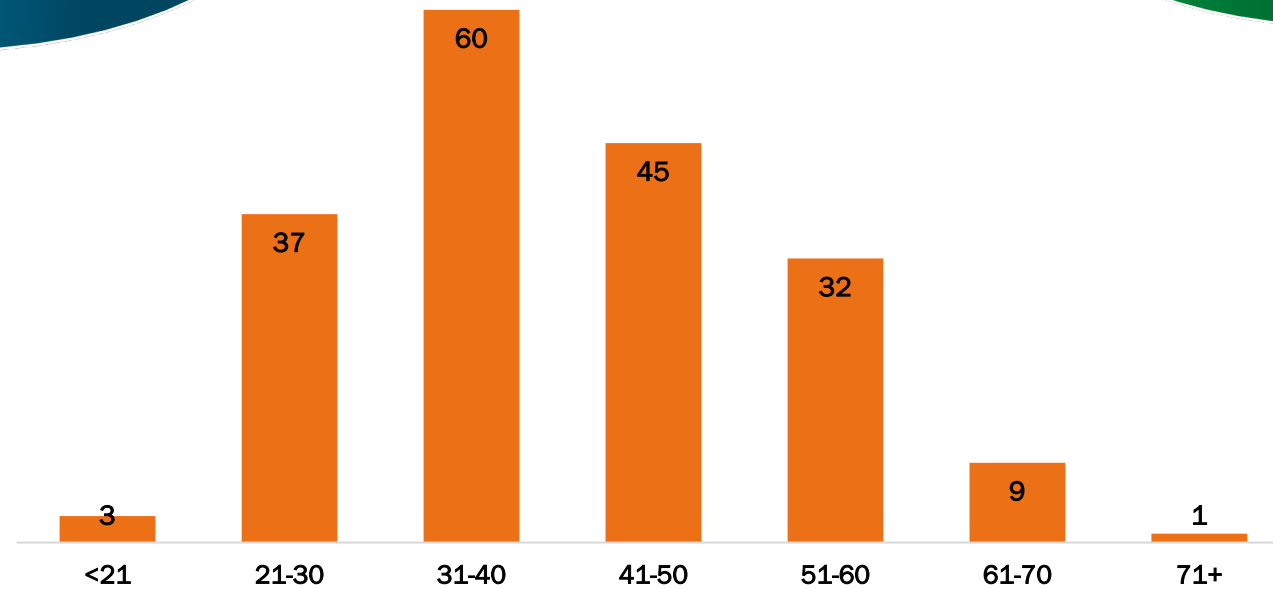
By Race



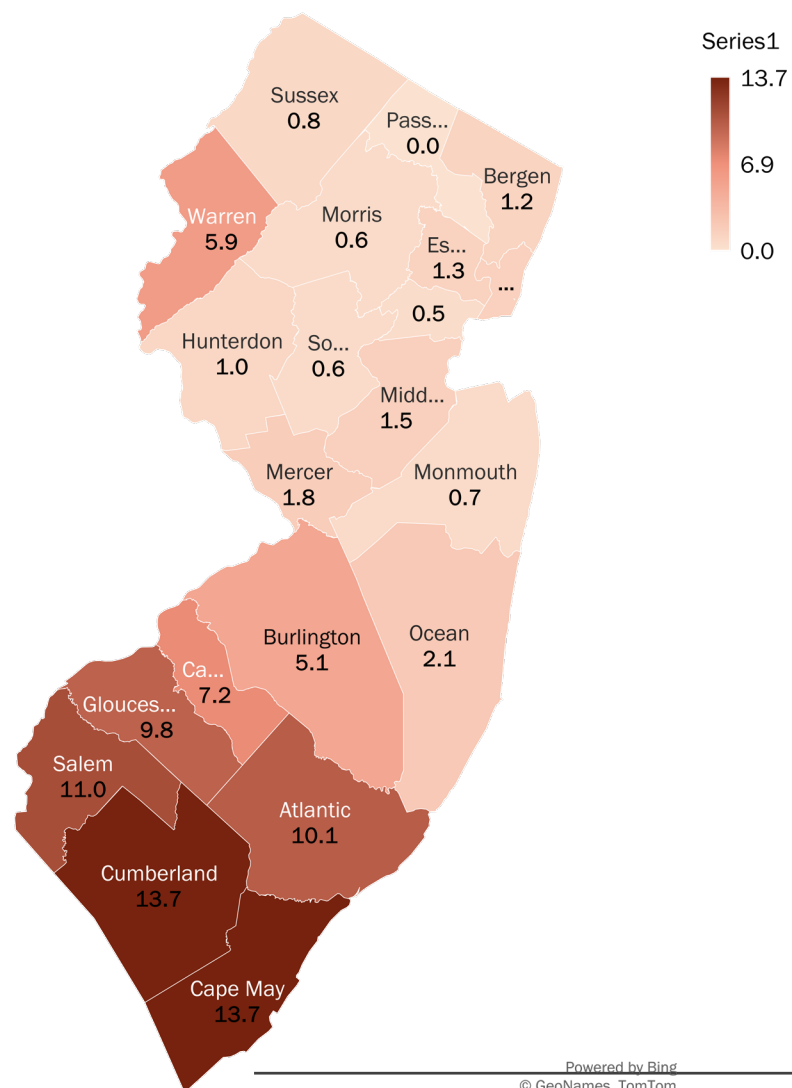
By Gender



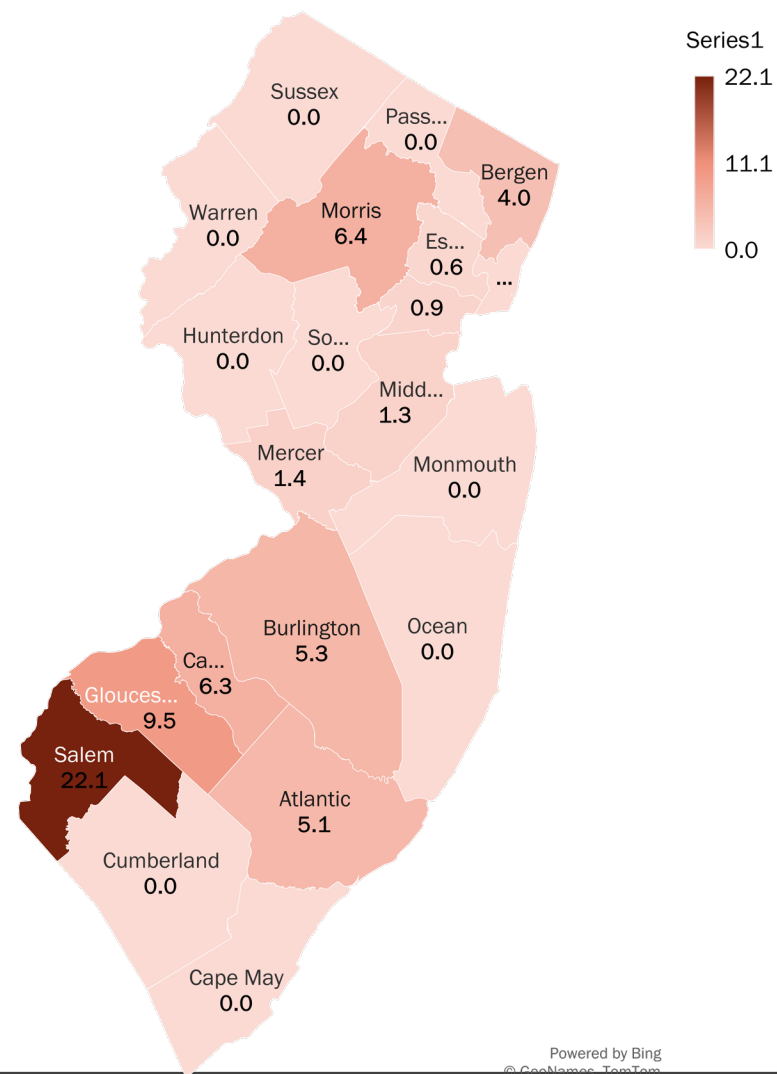
By Age



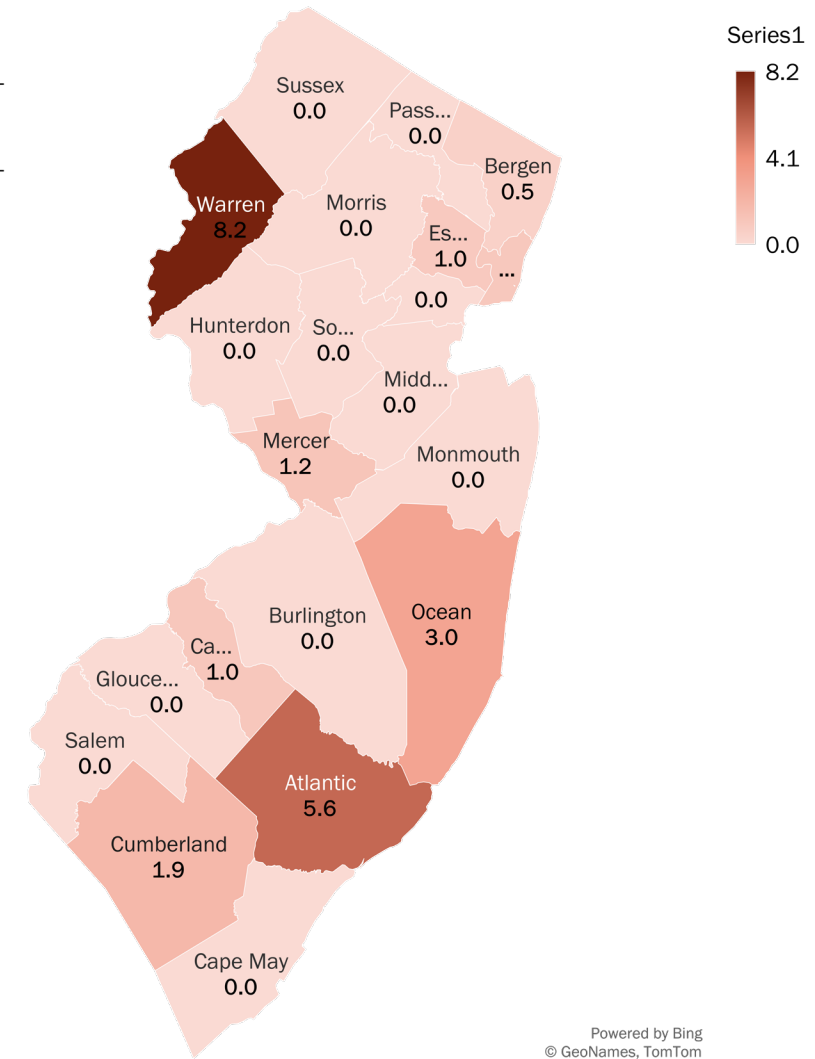
White Fatalities



Black Fatalities



Hispanic Fatalities



Methamphetamine-Related Deaths Per Capita by Race and County (2020)

Top Substances Involved in Methamphetamine-Related Deaths (2020)

Methamphetamine (ALONE)



Benzodiazepine



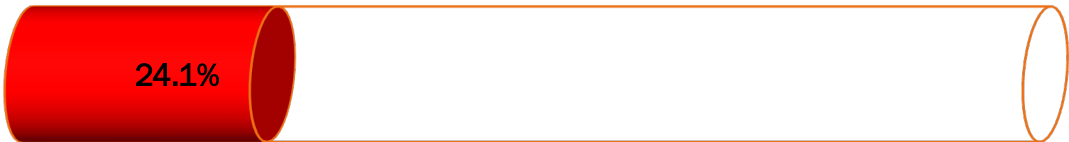
Heroin



Fentanyl



Cocaine



What are Motivations for Co-use of Methamphetamine and Opioids?

- To produce a greater than synergistic effect versus when either drug is taken alone.
- To reduce the side effects of one (reducing the agitation from methamphetamine or the sedation from the opioid).
- Because “the combination produces unique subjective effects desired by the user.
- Availability and financial.
- Misconceptions.
- Unknowingly using tainted drugs

Key Takebacks

1. Like the nation, New Jersey has experienced an increase to the Methamphetamine-Related deaths. (Rate increased 3x's)
2. Death from Methamphetamine is more often due to a polysubstance use (mostly seen with Fentanyl).
3. Methamphetamine usage poses novel challenges for prevention, treatment and harm reduction
4. It is a regional predicament in New Jersey, affecting the Southern areas of the state.





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XYLAZINE ET AL

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Associate Professor of Emergency Medicine
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Cooper University Health Care
Cooper Medical School of Rowan University
Camden, NJ



[Administration](#)

[Priorities](#)

[T](#)

APRIL 12, 2023

Biden-Harris Administration Designates Fentanyl Combined with Xylazine as an Emerging Threat to the United States



› [ONDCP](#)

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› [PRESS RELEASES](#)

XYLAZINE



Created by Bayer in 1962

- Antihypertensive
- Not approved for human use – *trials stopped due to hypotension and sedation*

Large animal sedative–analgesic

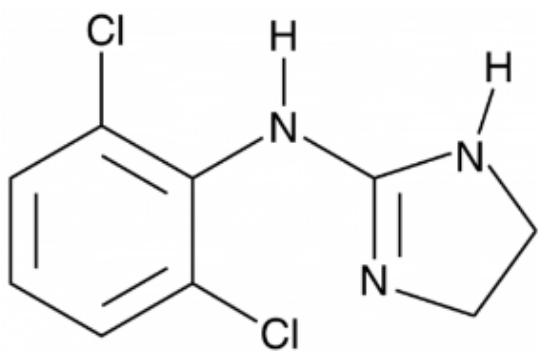
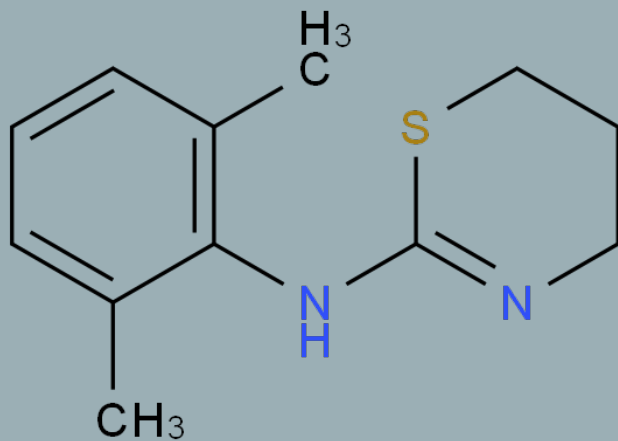
- *Anestica de caballo*
- “Tranq”

Comes in 20,100,300 mg/ml soln

Often used with ketamine or barbiturates

Photo via Dechra

XYLAZINE



Clonidine

Alpha adrenergic receptor agonist

Mixed mechanism of action*

- Central alpha-2 agonist
- ↓ NE release
- ↓ ACh release
- Agonizes multiple receptors

Hypertension followed by hypotension

Respiratory depression

- Potentially lethal dose 40–2400 mg in humans

*

Xylazine Prevalence

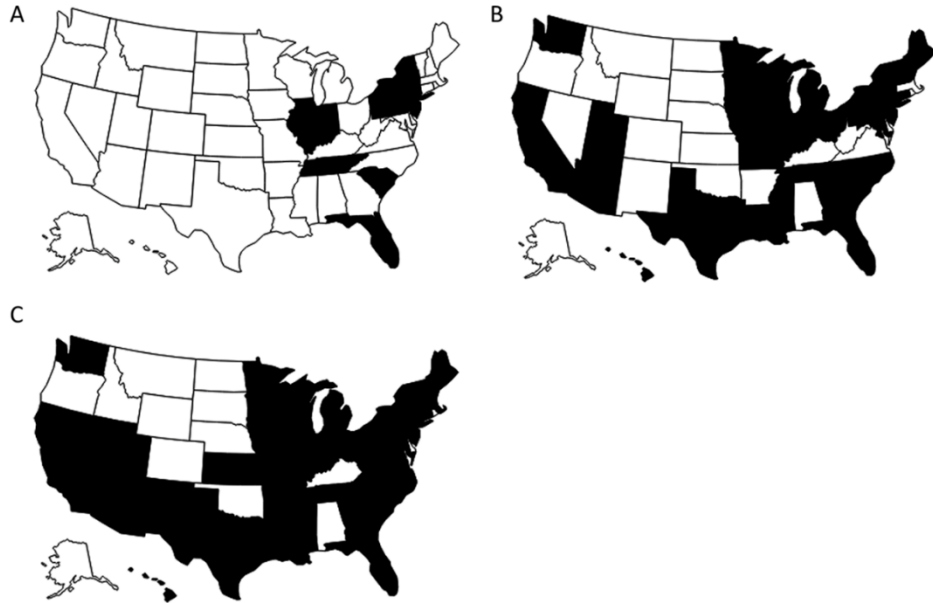
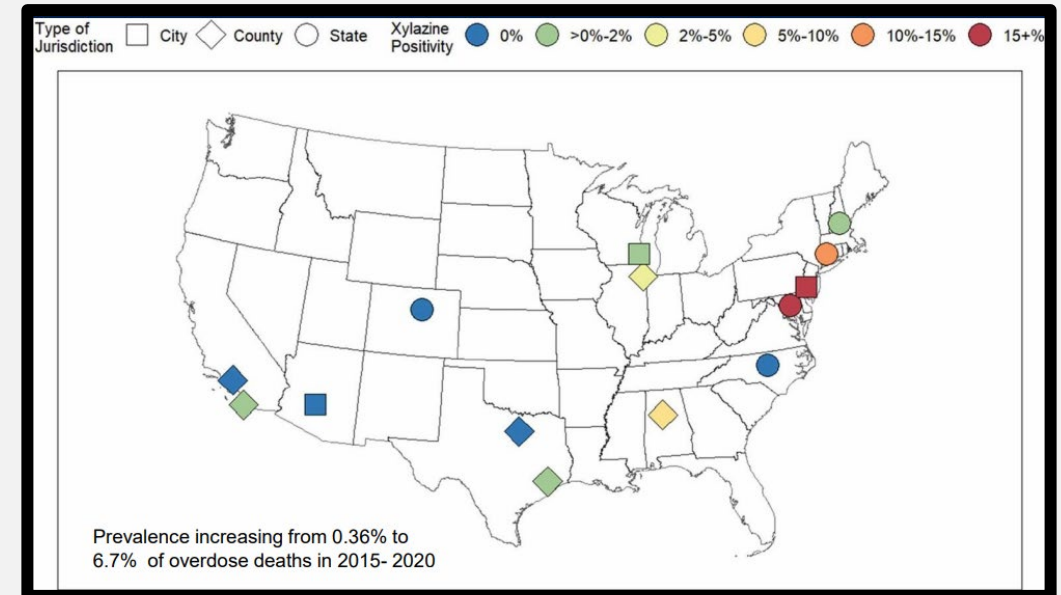


Figure 1. States with at least one positive xylazine detection in A) January 2019, B) January 2020 and C) June 2021. Note: in 2019 no testing had been performed in AL, DE, MD, MA, MT, ND, OK, RI or SD. By the end of the study period at least one case from every state, with the exception of SD, had been tested.



Drug Alcohol Depend. 2022 April 01; 233: 109380. doi:10.1016/j.drugalcdep.2022.109380.

Xylazine spreads across the US: A growing component of the increasingly synthetic and polysubstance overdose crisis

Joseph Friedman^{a,b,*}, Fernando Montero^c, Phillippe Bourgois^a, Rafik Wahbi^d, Daniel Dye^e, David Goodman-Meza^f, Chelsea Shover^g

XYLAZINE GROWTH BY REGION

(U) Figure 1. DEA Forensic Laboratory Identifications of Xylazine by Region

Region	2020	2021	Percent Increase
Northeast	346	556	61%
South	198	580	193%
Midwest	110	118	7%
West	77	163	112%

Source: DEA

(U) Figure 2. Number of Xylazine-Positive Overdose Deaths by Region

Region	2020	2021	Percent Increase
Northeast	631	1,281	103%
South	116	1,423	1,127%
Midwest	57	351	516%
West	4	34	750%

Source: DEA



The Growing Threat of Xylazine and its Mixture with Illicit Drugs

DEA Joint Intelligence Report
OCTOBER 2022



YEAR	XYLAZINE-RELATED				ALL SUSPECTED HEROIN	
	SUBMISSIONS		GLASSINE BAGS		SUBMISSIONS	GLASSINE BAGS
2019	368	3%	9,038	1%	13,010	680,807
2020	855	11%	30,236	6%	7,814	500,715
2021	3,052	30%	239,998	29%	10,341	821,171
2022	2,610	35%	138,797	29%	7,365	475,753
2023 (TO 3/31)	848	45%	59,000	42%	1,898	141,225

Office of Drug Monitoring & Analysis
Quarterly Report



January 1, 2023 ~ March 31, 2023

XYLAZINE-RELATED SUBMISSIONS												
COUNTY	2019		2020		2021		2022		2023 (TO 3/31)		TOTAL	
ATLANTIC	10	3%	94	11%	400	13%	262	10%	70	8%	836	11%
BERGEN	15	4%	28	3%	73	2%	83	3%	26	3%	225	3%
BURLINGTON	73	20%	101	12%	325	11%	250	10%	30	4%	779	10%
CAMDEN	17	5%	90	11%	639	21%	431	17%	107	13%	1,284	17%
CAPE MAY	20	5%	89	10%	128	4%	113	4%	24	3%	374	5%
CUMBERLAND	4	1%	10	1%	28	1%	39	1%	30	4%	111	1%
ESSEX	49	13%	73	9%	202	7%	130	5%	42	5%	496	6%
GLOUCESTER	6	2%	30	4%	141	5%	69	3%	20	2%	266	3%
HUDSON	2	1%	2	0.2%	8	0.3%	42	2%	26	3%	80	1%
HUNTERDON	0	0%	11	1%	17	1%	28	1%	21	2%	77	1%
MERCER	6	2%	78	9%	386	13%	373	14%	193	23%	1,036	13%
MIDDLESEX	48	13%	39	5%	102	3%	134	5%	33	4%	356	5%
MONMOUTH	66	18%	84	10%	195	6%	200	8%	71	8%	616	8%
MORRIS	22	6%	18	2%	60	2%	41	2%	19	2%	160	2%
OCEAN	0	0%	3	0.4%	12	0.4%	11	0.4%	6	1%	32	0.4%
PASSAIC	25	7%	65	8%	242	8%	325	12%	95	11%	752	10%
SALEM	0	0%	7	1%	21	1%	31	1%	8	1%	67	1%
SOMERSET	0	0%	7	1%	24	1%	13	0.5%	6	1%	50	1%
SUSSEX	2	1%	14	2%	13	0.4%	16	1%	6	1%	51	1%
UNION	0	0%	4	0.5%	5	0.2%	1	0.04%	4	0.5%	14	0.2%
WARREN	3	1%	8	1%	31	1%	18	1%	11	1%	71	1%
TOTAL	368		855		3,052		2,610		848		7,733	
	5%		11%		39%		34%		11%			

XYLAZINE-RELATED GLASSINE BAGS														
COUNTY	2019		2020		2021		2022		2023 (TO 3/31)		TOTAL			
ATLANTIC	190	2%	7,656	25%	31,133	13%	15,444	11%	17,548	30%	71,971	15%		
BERGEN	116	1%	347	1%	16,809	7%	3,676	3%	599	1%	21,547	5%		
BURLINGTON	1046	12%	2,003	7%	5,647	2%	6,088	4%	543	1%	15,327	3%		
CAMDEN	111	1%	2,537	8%	27,830	12%	9,967	7%	2,027	3%	42,472	9%		
CAPE MAY	521	6%	1,094	4%	7,554	3%	9,141	7%	5,588	9%	23,898	5%		
CUMBERLAND	30	0.3%	84	0.3%	417	0.2%	450	0.3%	331	1%	1,312	0.3%		
ESSEX	989	11%	2,416	8%	20,809	9%	15,503	11%	2,136	4%	41,853	9%		
GLOUCESTER	20	0.2%	386	1%	2,252	1%	418	0.3%	264	0.4%	3,340	1%		
HUDSON	3	0.03%	3	0.01%	78	0.03%	987	1%	1,331	2%	2,402	0.5%		
HUNTERDON	0	0%	130	0.4%	234	0.1%	318	0.2%	879	1%	1,561	0.3%		
MERCER	186	2%	3,722	12%	40,223	17%	30,575	22%	10,139	17%	84,845	18%		
MIDDLESEX	1394	15%	2,733	9%	3,627	2%	4,983	4%	744	1%	13,481	3%		
MONMOUTH	3071	34%	2,031	7%	7,782	3%	4,622	3%	1,665	3%	19,171	4%		
MORRIS	394	4%	421	1%	2,618	1%	1,118	1%	450	1%	5,001	1%		
OCEAN	0	0%	92	0.3%	214	0.1%	372	0.3%	333	1%	1,011	0.2%		
PASSAIC	897	10%	3,530	12%	58,258	24%	25,361	18%	13,128	22%	101,174	21%		
SALEM	0	0%	24	0.1%	130	0.05%	451	0.3%	182	0.3%	787	0.2%		
SOMERSET	0	0%	139	0.5%	1,443	1%	180	0.1%	109	0.2%	1,871	0.4%		
SUSSEX	29	0.3%	269	1%	812	0.3%	1,335	1%	230	0.4%	2,675	1%		
UNION	0	0%	478	2%	11,163	5%	68	0.05%	242	0.4%	11,951	3%		
WARREN	41	0.5%	141	0.5%	965	0.4%	7,740	6%	532	1%	9,419	2%		
TOTAL	9,038		30,236		239,998		138,797		59,000		477,069			
	2%		6%		50%		29%		12%					

Health Department Releases Data on 2021 Overdose Deaths in Philadelphia

For immediate release: October 26, 2022 | Published by: [Board of Health](#), [Department of Public Health](#) | Contact: James Garrow phpublichealth@phila.gov

2021 Xylazine-Related Overdose Deaths in Philadelphia

2006 2019 2021



Data Source: City of Philadelphia Health Department

Cooper
University Health Care

Xylazine/Fentanyl overdose

- ◆ Multicenter prospective cohort of patients following an opioid overdose from 9 EDs across the US
 - ◆ Included 321 patients testing positive for an illicit opioid or xylazine
 - ◆ 83% of patients received naloxone (median initial dose 2 mg)
 - ◆ Xylazine-negative patients were more likely to develop a coma within 4 hours of ED arrival and suffer a cardiac arrest
 - ◆ Most patients were discharged from the ED (59 [65.5%] xylazine-positive, vs. 147 [63.6%] xylazine-negative patients)

Love JS: et al. Opioid overdoses involving xylazine in emergency department patients: a multicenter study. Clin Toxicol (Phila). 2023 Mar;61:173-180.

XYLAZINE WITHDRAWAL???

Clonidine withdrawal*

Hypertensive
emergencies???

Compassionate care

*Geyskes GG, Boer P, Dorhout Mees EJ. Clonidine withdrawal.
Mechanism and frequency of rebound hypertension.
Br J Clin Pharmacol. 1979 Jan;7(1):55-62.
doi: 10.1111/j.1365-2125.1979.tb00897.x. PMID: 760743; PMCID: PMC1429594.

Ehrman-Dupre, R., Kaigh, C., Salzman, M., Haroz, R., Peterson, L. K., & Schmidt, R. (2010). Management of xylazine withdrawal in a hospitalized patient: A case report. *Journal of Addiction Medicine*, 16(5), 595-598.



XYLAZINE WITHDRAWAL MANAGEMENT

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Hydromorphone	Patient-controlled anesthesia (PCA) pump; settings: no basal rate, bolus 1 mg q 10 minutes	PCA pump; settings: basal rate 1 mg/hour, bolus 1 mg q 12 minutes	PCA pump; settings: basal rate 1.5 mg/hour, bolus 1 mg q 12 minutes	PCA pump; settings: basal rate 1.5 mg/hour, bolus 1 mg q 12 minutes	PCA pump; settings: basal rate 1.5 mg/hour, bolus 1.2 mg q 12 minutes	PCA pump; settings: basal rate 1.5 mg/hour, bolus 1.2 mg q 12 minutes
Phenobarbital	Load (per institution's intensive care unit alcohol withdrawal protocol)	Taper (per institution's intensive care unit alcohol withdrawal protocol)	Taper (per institution's intensive care unit alcohol withdrawal protocol)	Taper (per institution's intensive care unit alcohol withdrawal protocol)	<i>Discontinued (taper completed)</i>	
Dexmedetomidine	Infusion	Infusion	Infusion	Infusion	<i>Discontinued</i>	
Tizanidine	4 mg q 6 hours PO	<i>Discontinued</i>				
Clonidine		0.3 mg q 8 hours PO	0.3 mg q 8 hours PO	0.3 mg q 8 hours PO	0.3 mg q 8 hours PO	0.3 mg q 8 hours PO
Buprenorphine				300 mcg once buccal	300 mcg BID buccal	450 mcg BID buccal
Gabapentin				300 mg q 8 hours PO	300 mg q 8 hours PO	300 mg q 8 hours PO
Ketamine				Infusion during dressing changes	Infusion during dressing changes	Infusion during dressing changes

Ehrman-Dupre, R., Kaigh, C., Salzman, M., Haroz, R., Peterson, L. K., & Schmidt, R. (2010). Management of xylazine withdrawal in a hospitalized patient: A case report. *Journal of Addiction Medicine*, 16(5), 595-598.

XYLAZINE WITHDRAWAL MANAGEMENT???

[illegible]

XYLAZINE WITHDRAWAL
MANAGEMENT???

[illegible]

XYLAZINE ASSOCIATED WOUNDS

Early Stage



Late Stage



44 year-old male



Left upper extremity



Left upper extremity

31 year old Female



Photos from Cooper University Hospital

41 year old male

Photos from Cooper University Hospital



Right forearm



Left forearm



Photo from Cooper University Hospital

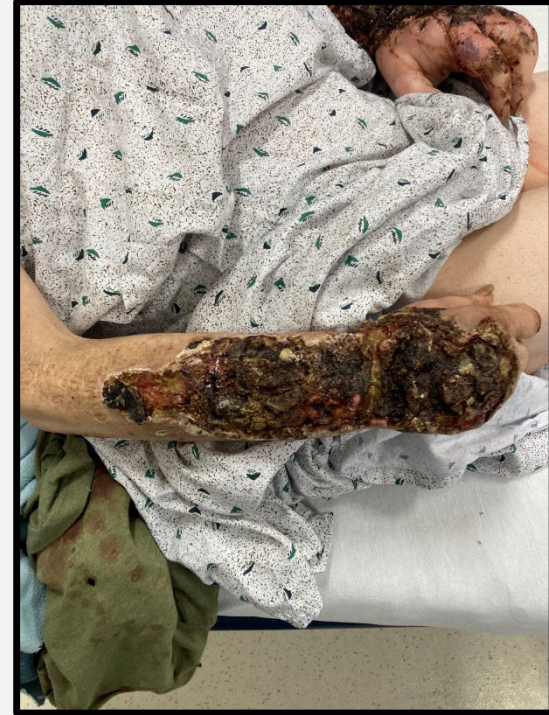


Photo courtesy of Michael Coletta, MD

XYLAZINE WOUND PATHOLOGY

- IVDA has been associated with wounds
- Potential Causes:
 - Skin picking behavior leading to excoriation and ulceration
 - Increased frequency of injection
 - Infection
 - Compression
 - Poor wound healing (?malnutrition)
 - Cytotoxic effect of drug or contaminant
 - Obliterative vasculitis from repeated injection “shooters patch”

Wound Treatments

Cessation of injection

Clean with soap/water, chlorhexidine, Dakin's Half Strength Solution, or 1% acetic acid

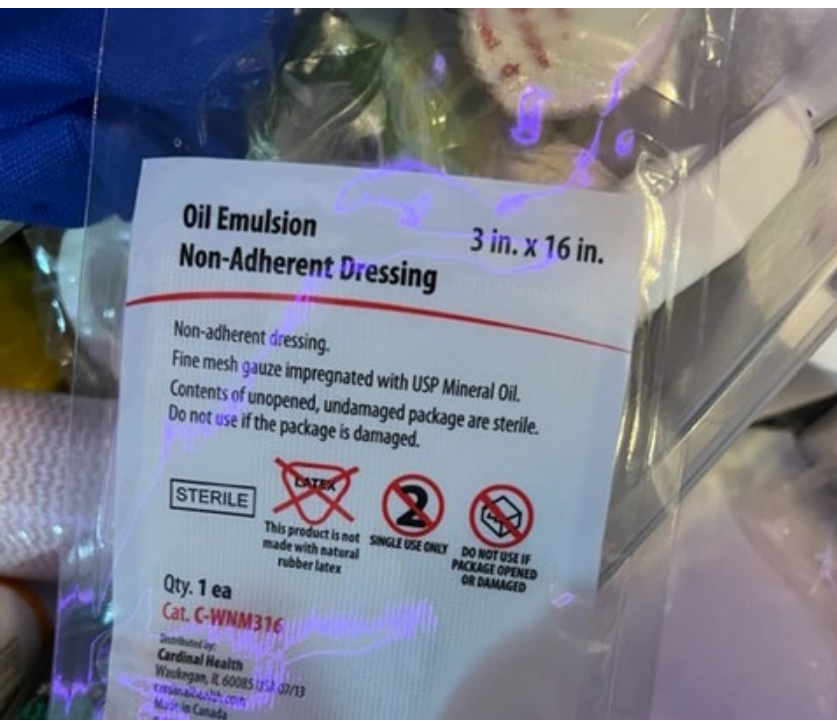
Debridement (enzymatic > surgical)

Antimicrobial coverage (Silver sulfadiazine cream, bacitracin ointment)

Non-adherent (petroleum gauze or other additive to promote moist wound environment) and absorptive dressing

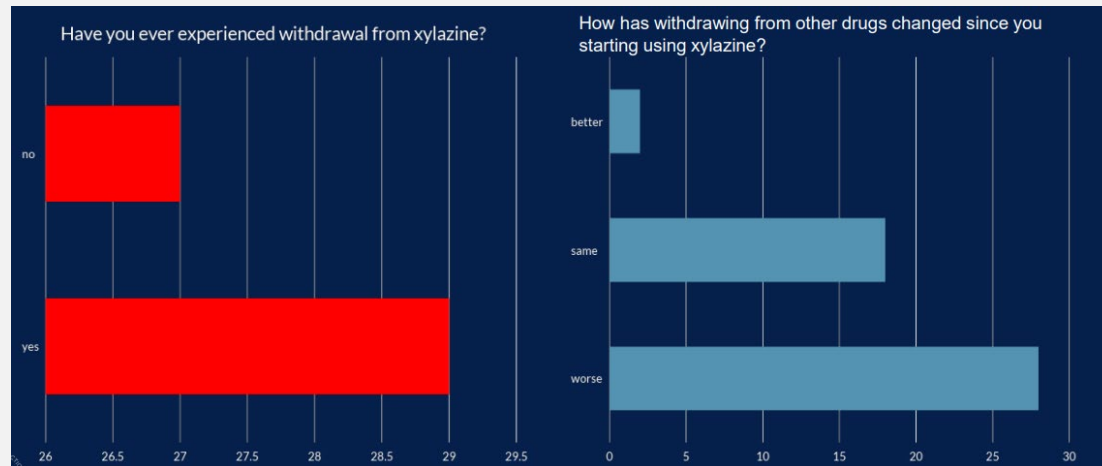
Biodegradable Temporizing Matrix (BTM), skin grafting, epithelialization/complete closure





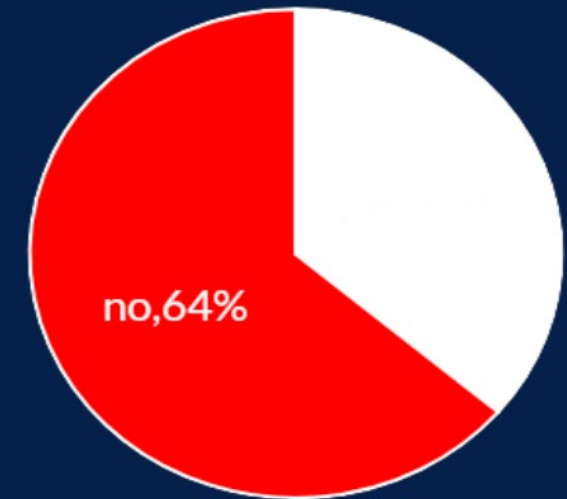
TOXICOSURVEILLANCE OF SOCIAL MEDIA: REDDIT

- Who is describing Xylazine Use?
- How does xylazine impact withdrawal symptoms?
- What complications are people reporting?



Spadaro etal Amersa 2022

Do you seek out xylazine intentionally?



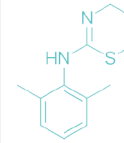
CONCLUSIONS

- Xylazine prevalence has significantly increased across the country
- Appears to be linked to overdose deaths although some of the data is conflicting
- Xylazine dependence is difficult to treat
 - Gabapentin
 - Clonidine (high dose)
 - Dexmedetomidine
- Xylazine associated wounds are difficult to treat
 - May need hospital referral
 - Treat like burns
 - Increased caloric requirement

RESOURCES

- DEA: [The Growing Threat of Xylazine and Its Mixture with Illicit Drugs \(Intelligent Report\)](#)
- NIDA: [Research Topics—Xylazine](#)
- NHRC: [Xylazine FAQ, Education, Webinars](#)
- NEXT Distro: [Xylazine Quick Guide for People Who Use Drugs](#)
- Upenn: [CAMP-Xylazine-Best-Practices-I.pdf](#)

Xylazine



What is Xylazine?

Xylazine is a veterinary anesthetic that's often used as a cut in street drugs. It's sometimes called tranq, tranq dope or sleep cut and people usually use xylazine unknowingly when their drugs are cut with it.

Uses

For humans there isn't a prescribed use because it's intended for use in animals.

Effects

Sedation, analgesia (pain killing like ibuprofen or advil but not opioids) and muscle relaxation. Strong sedative effects and excessive sleepiness without euphoria have been anecdotally reported to happen anywhere from 5 to 200mg.

Side Effects

Xylazine isn't intended for human use and long term use can cause skin lesions or ulcers. In high doses, respiratory depression, passing out or falling unconscious while still standing is common. Deaths are rare but have occurred in humans using anywhere from 40 to 2400mg of xylazine.

Dose

There isn't an established human dose for xylazine use. For harm reduction purposes, use as little as possible if you think your drug contains xylazine. It's recommended to start as low as possible and go slow if using xylazine.

Routes of Administration

Not much is known about the human use of xylazine but there have been reports of people eating, snorting, IVing, IMing, and using xylazine subcutaneously (injection in the skin or skin-popping).

Withdrawal

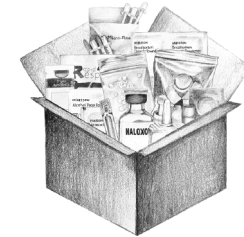
Withdrawal symptoms have been reported to be mild but because of the lack of human information about xylazine your results may vary.

Withdrawal Management

Research suggests that if withdrawal symptoms are present, low dose clonidine can be used to manage withdrawal symptoms.

Overdose Prevention

Treat xylazine like you would any other drug that can cause respiratory depression such as opioids, benzos or alcohol. If combining with other drugs, keep the doses low especially if they are other depressant drugs. There isn't an overdose reversal drug for xylazine so it's recommended to not to use alone and practice harm reduction if you decide to use xylazine.



For more drug-specific information & resources, visit:
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www.nextdistro.org
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