Drug Checking in Pennsylvania

2025 ACDC Drug Checking Summit

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DISCLOSURES

- I have no conflicts of interest to disclose.
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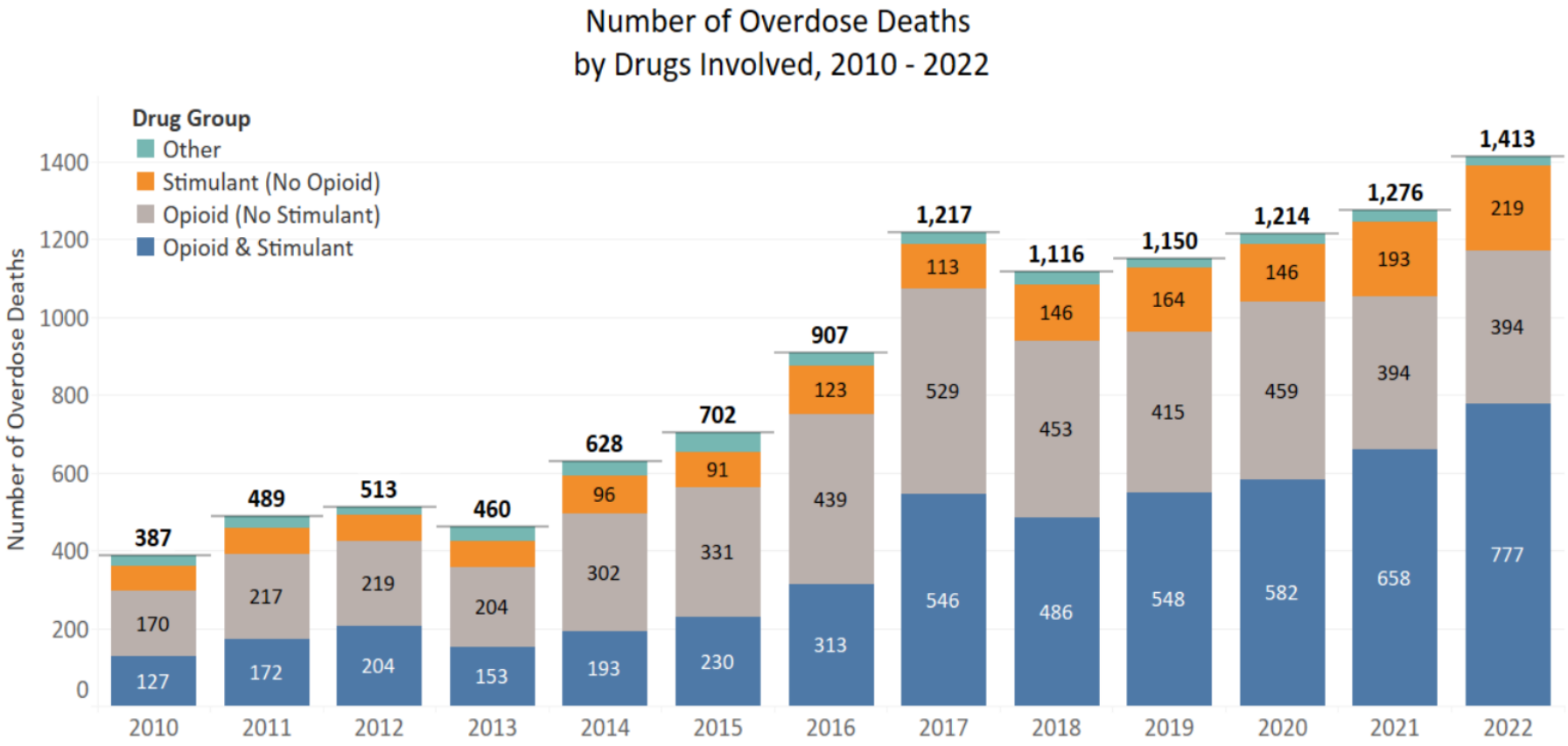
  - The opinions, findings, conclusions and/or recommendations expressed in this presentation are those of the author(s) and do not necessarily represent the official position or policies of NIJ, NIH, CDC, or FDA.

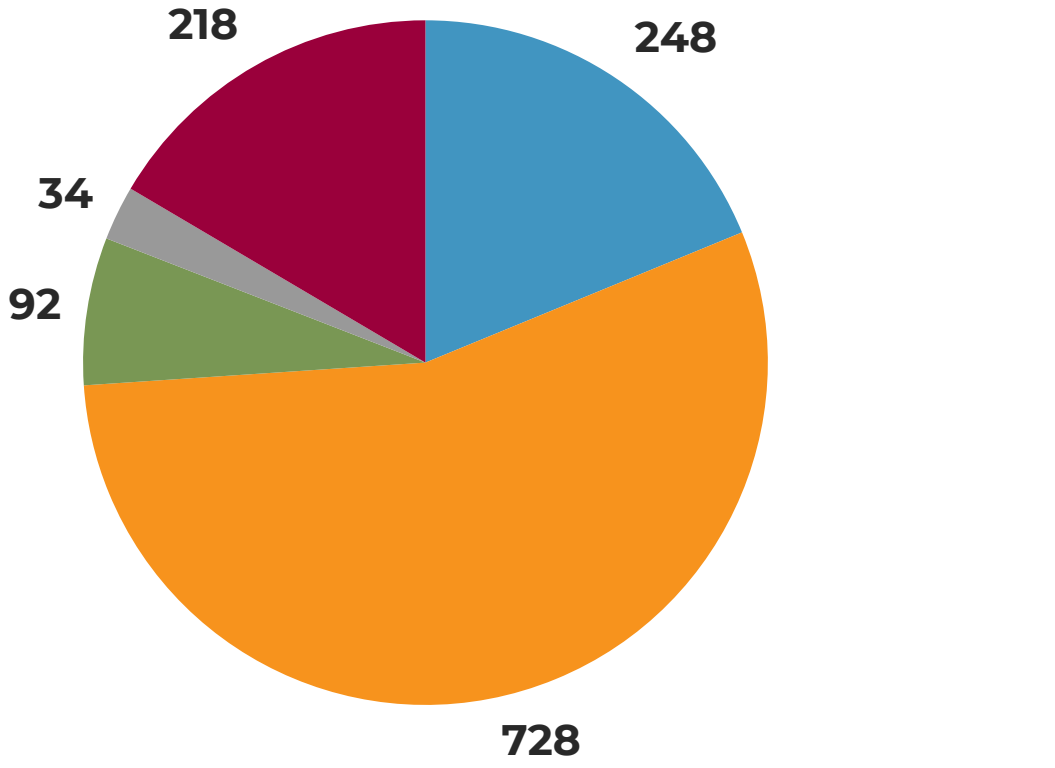
RECREATIONAL DRUGS IN PHILADELPHIA



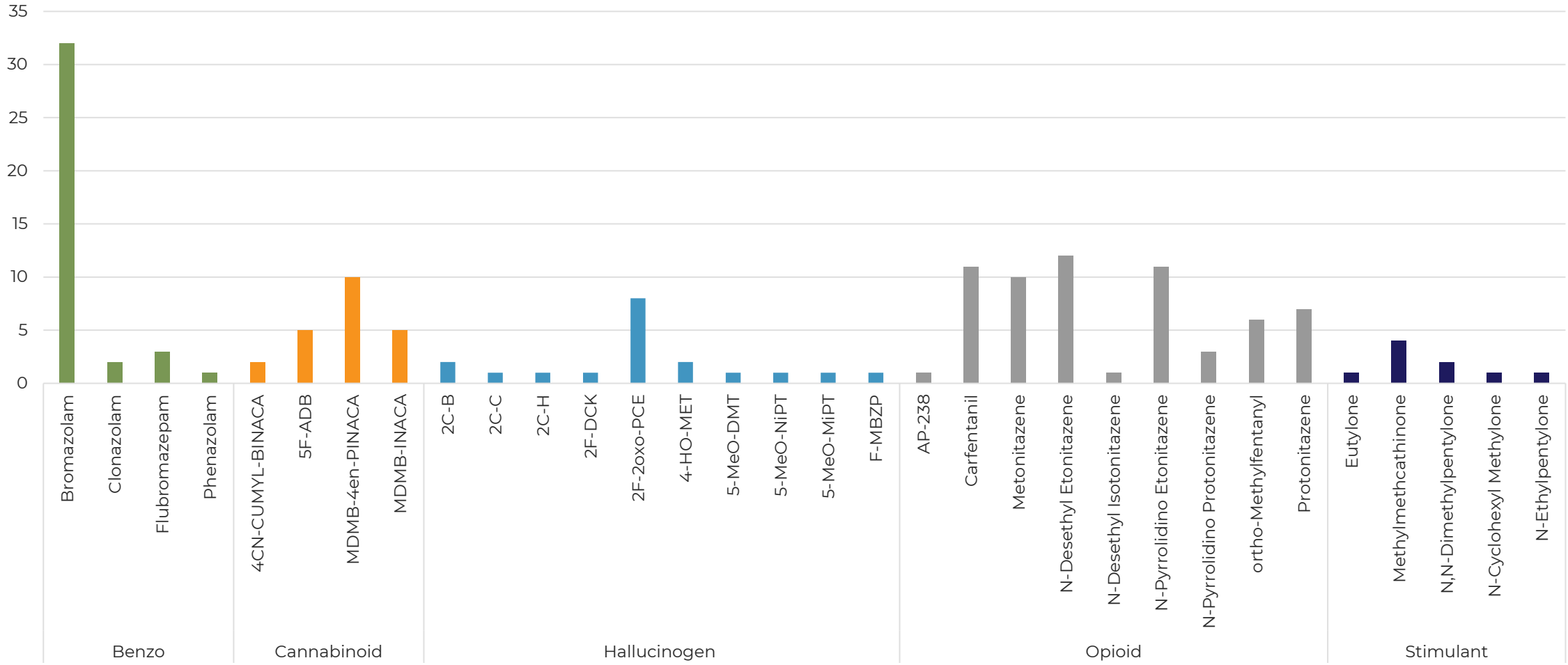
https://www.dailymail.co.uk/news/article-9372555/Philadelphias-Skid-Row-Video-shows-citys-homeless-crisis-dozens-camped-trash-bin-fire.html
https://www.phila.gov/media/20231002090544/CHARTv8e3.pdf

CFSRE DRUG CHECKING

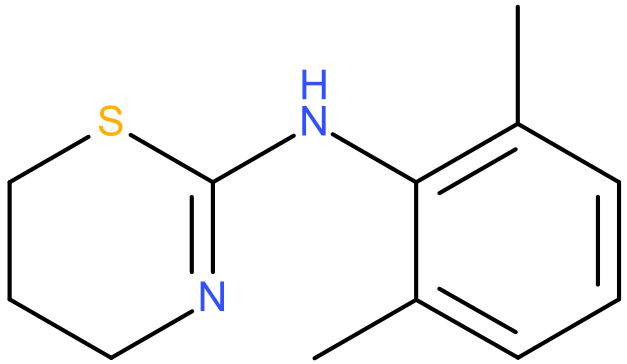
- 2023⟶2024
- 1,320 Samples
- Collected from community harm-reduction partners+PDPH



NPS IN PENNSYLVANIA (2024)



XYLAZINE, “TRANQ”



October 2020

Xylazine: A Toxic Adulterant Found in Illicit Street Drugs.

PUBLIC HEALTH ALERT

Substance abuse treatment providers, clinicians, outreach workers, public health clinics, etc. need to be aware of the following information. Xylazine is commonly used as an adulterant in heroin. Xylazine is also frequently found in a combination with heroin and cocaine called a “speedball”. Adulteration of illicit drugs with xylazine has become a serious health concern for public health officials and drug users. The drug has been implicated as a cause, or contributing cause, of death in several cases both alone and in combination with other drugs. The most common side effects in humans associated with xylazine poisoning include bradycardia, respiratory and CNS depression, hypotension, and other changes in cardiac output. **CONCOMITANT use of xylazine with heroin, cocaine and/or both can result in synergistic effects that may increase the risk of an overdose and/or of death.**

LOCAL NEWS

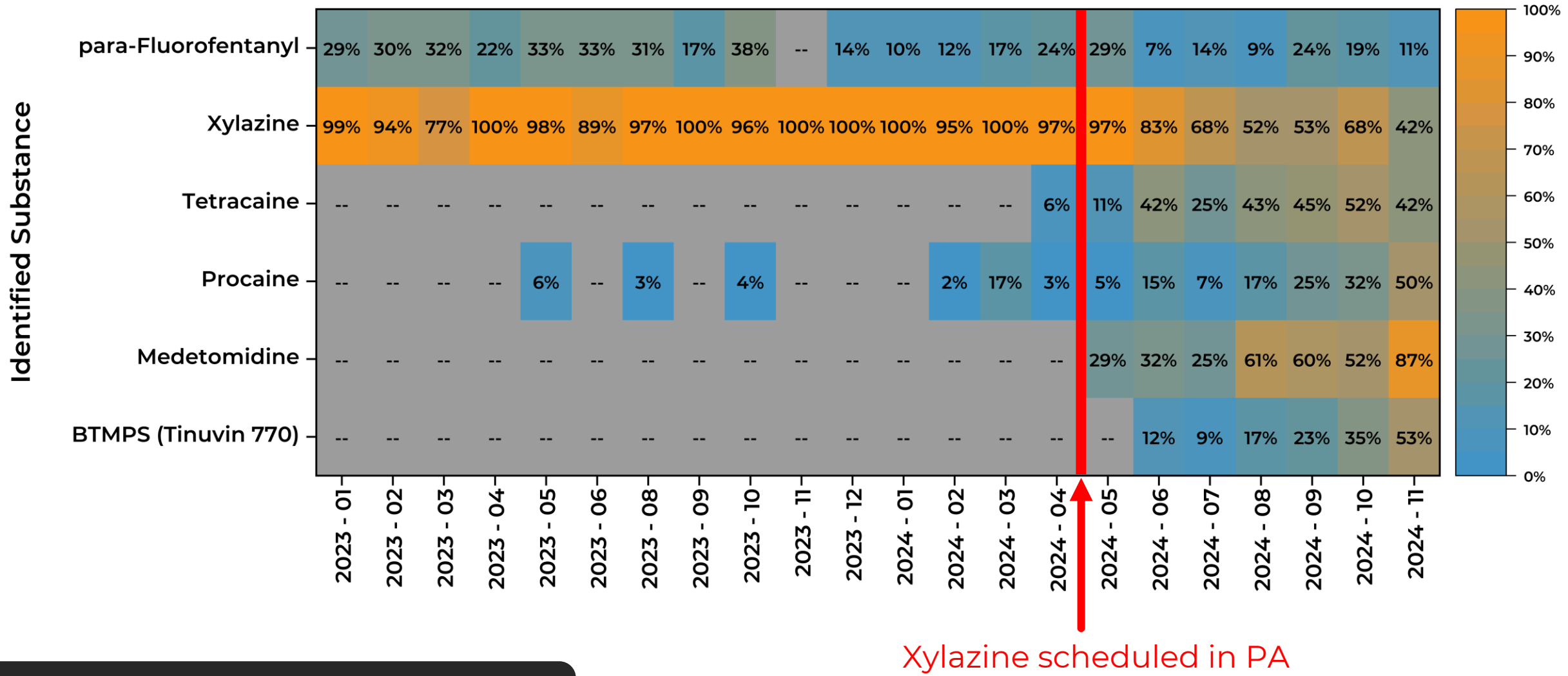
Pennsylvania to make the animal sedative xylazine a controlled substance

CBS NEWS PHILADELPHIA

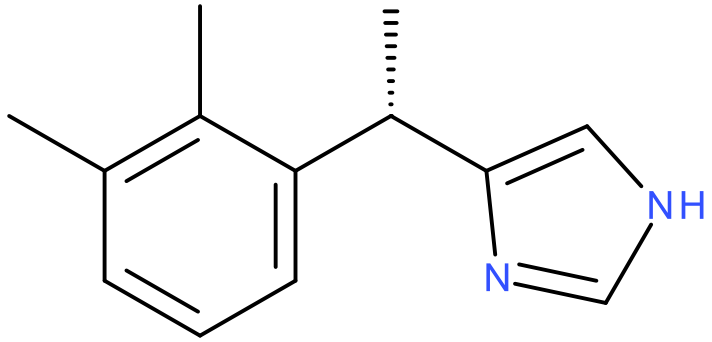
By CBS News Philadelphia Staff, The Associated Press
Updated on: May 9, 2024 / 10:10 PM EDT / CBS/AP

https://harmreductionjournal.biomedcentral.com/articles/10.1186/s12954-023-00879-7
https://penntoday.upenn.edu/news/penn-ldi-new-us-plan-target-xylazine-laced-fentanyl

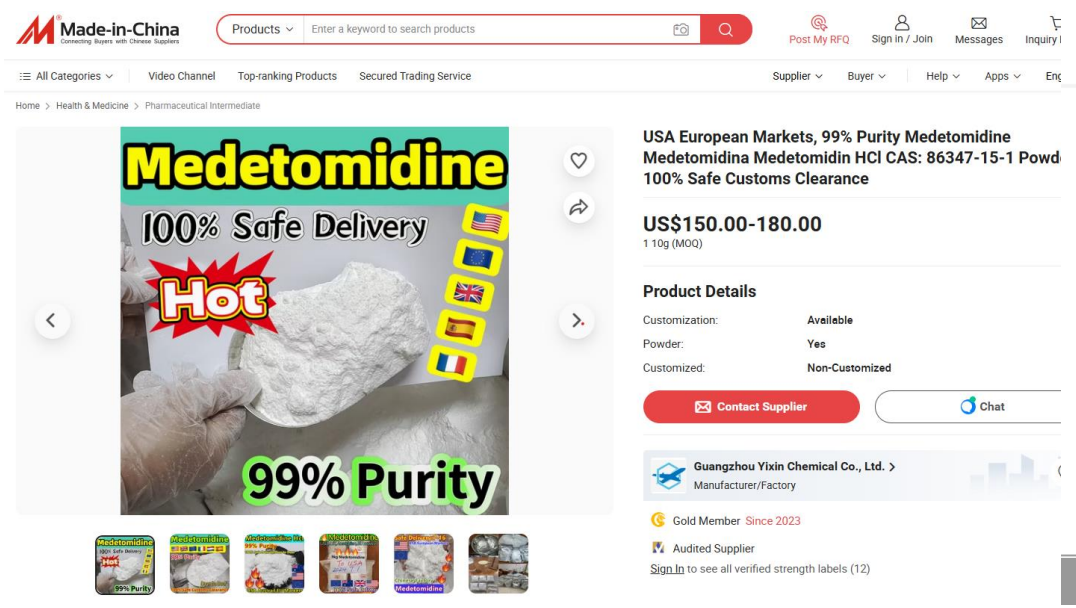
Positivity of Selected Adulterants in Fentanyl Samples in Philadelphia Area

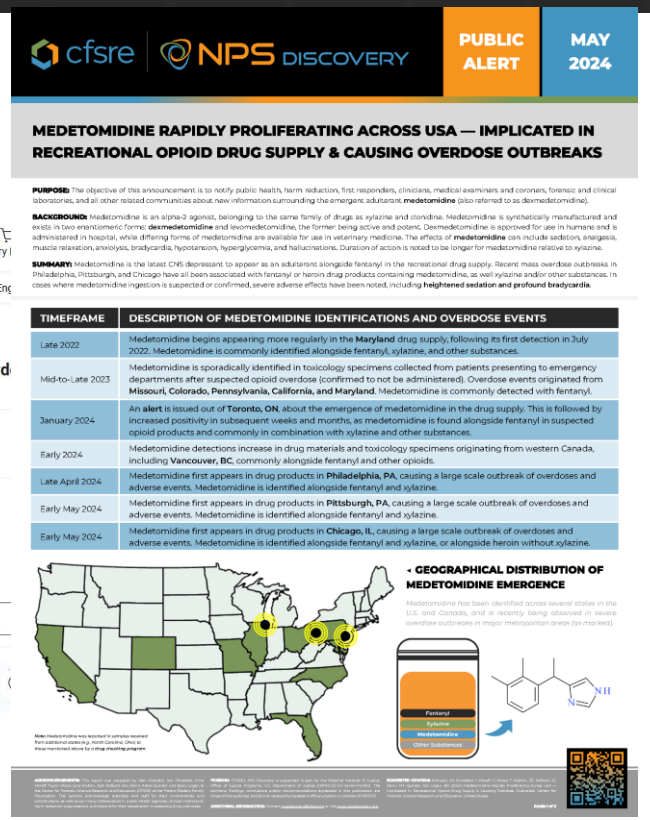


MEDETOMIDINE (DOMITOR®), “DEX”



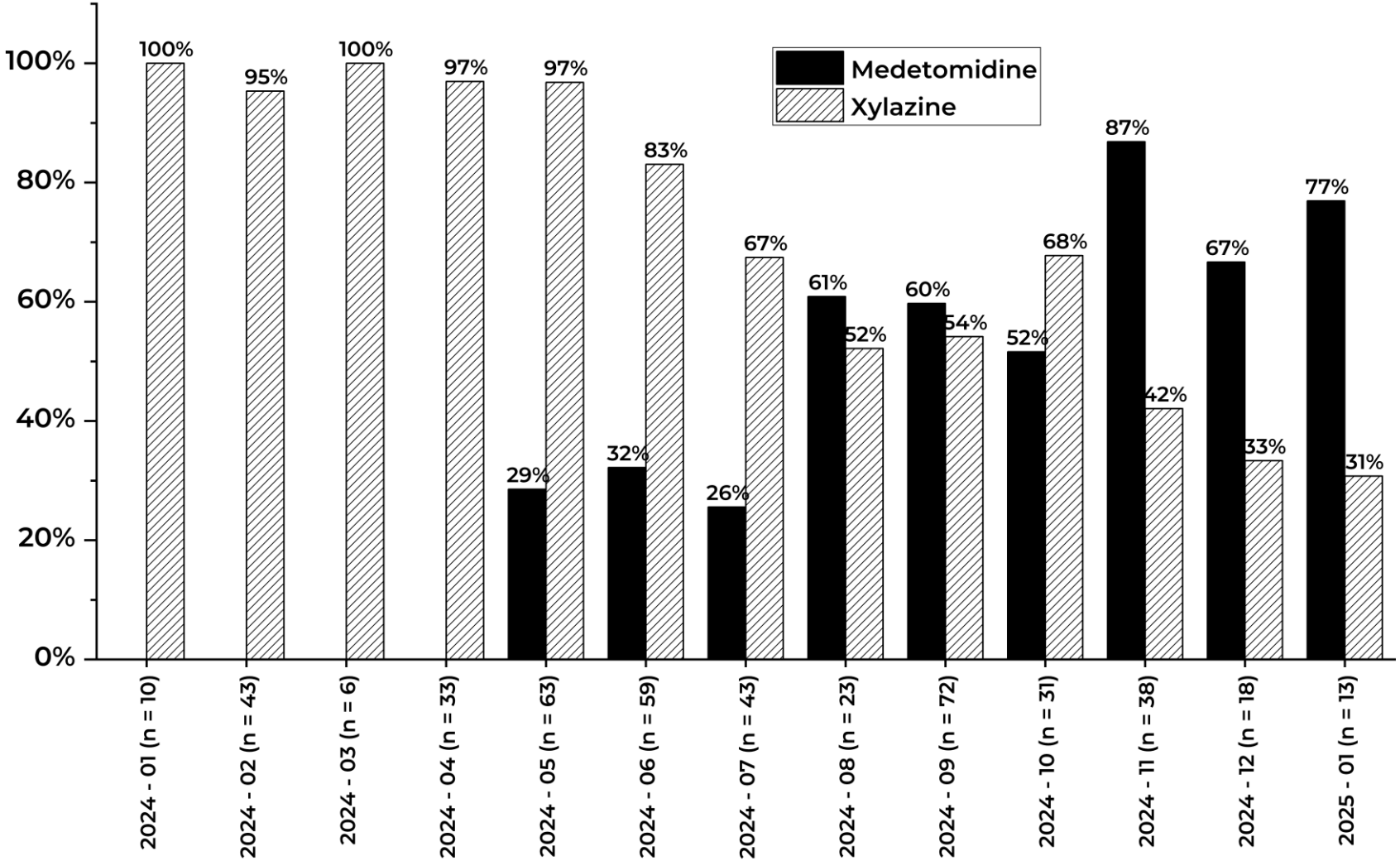
- ~200x more potent than xylazine
- First detected in fentanyl samples from Maryland in 2022
- Dexmedetomidine used in sedation/intubation



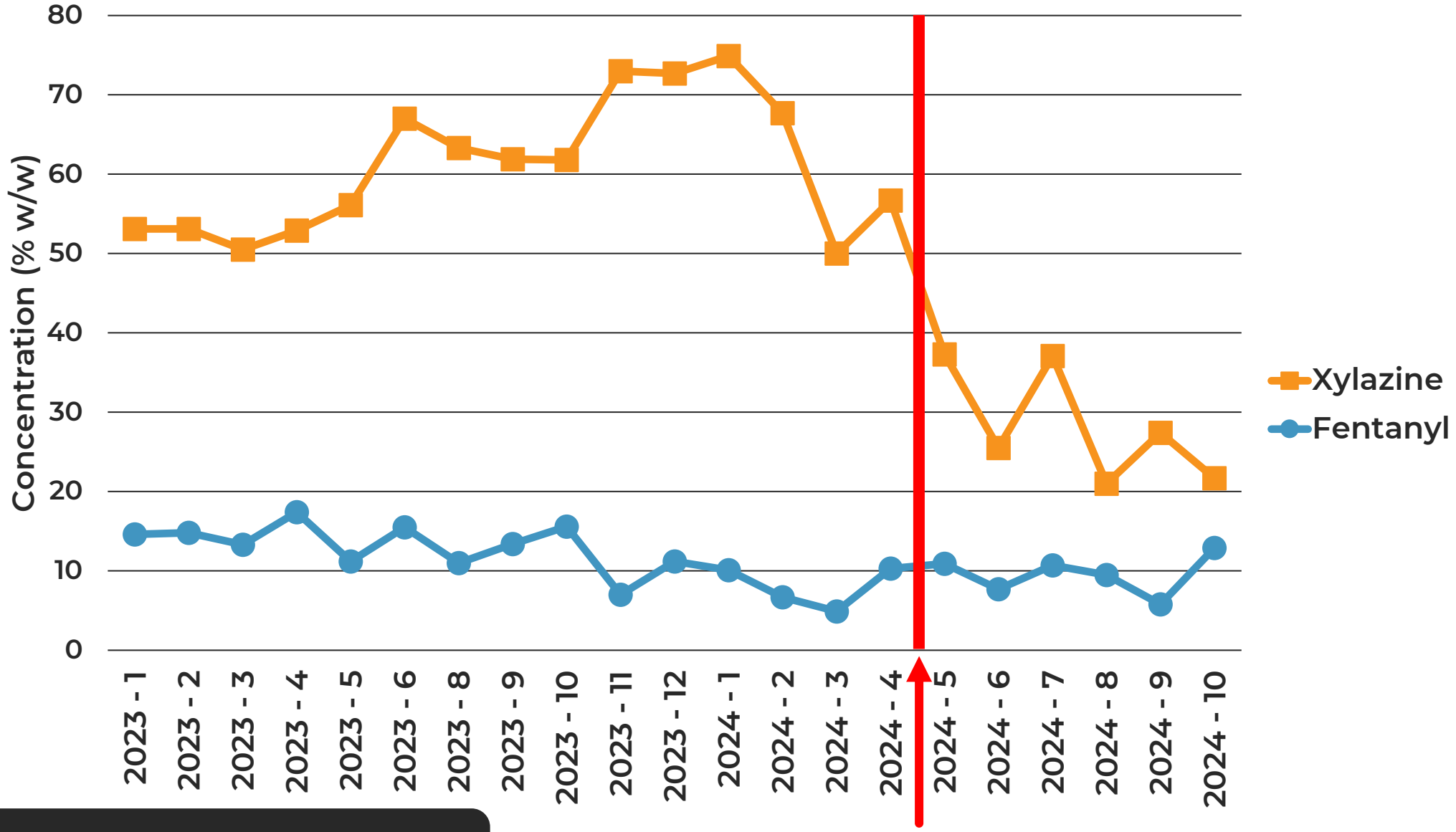


https://nexgenvetrx.com/medetomidine-hcl-40-mg-ml-injectable-solution-10ml/

Percentage of Fentanyl Samples Testing Positive for Xylazine and/or Medetomidine in the Philadelphia, PA Area

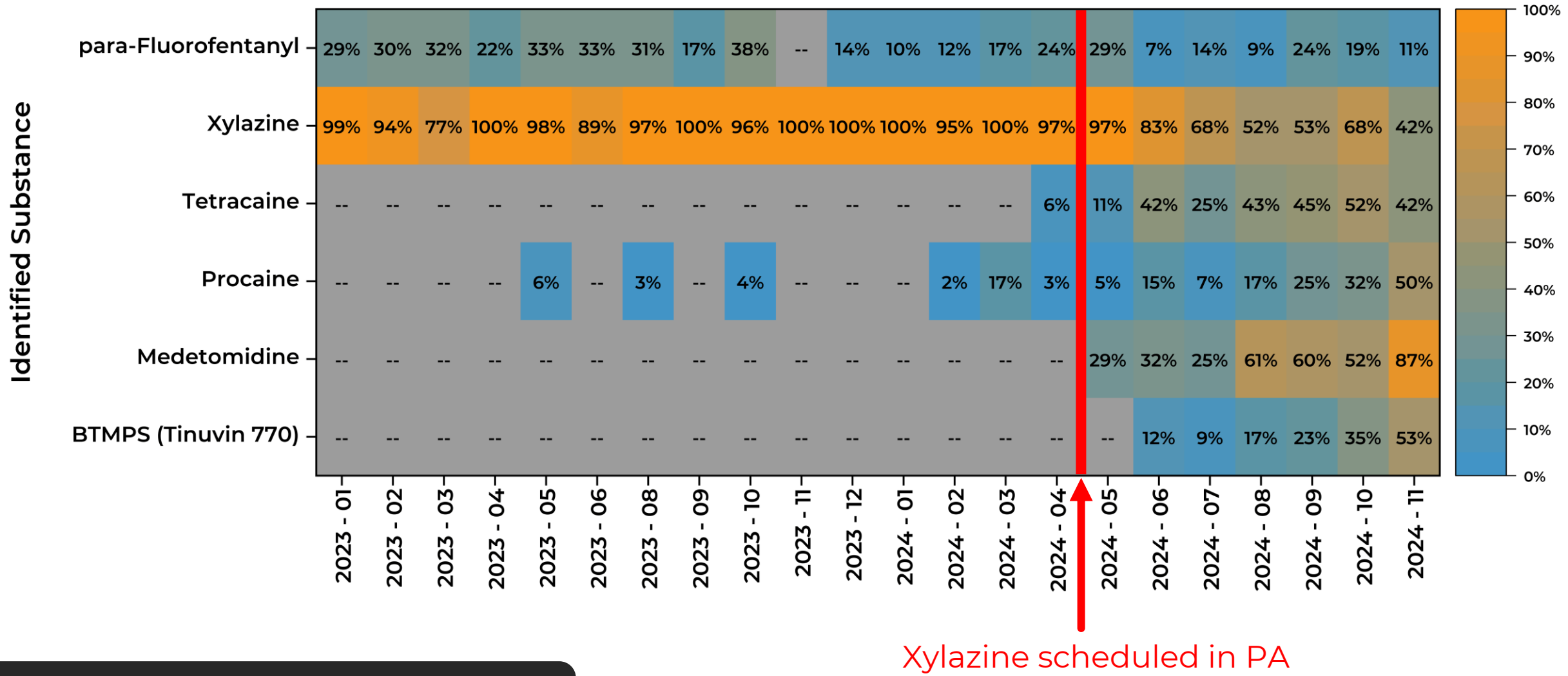


Fentanyl and Xylazine Concentration

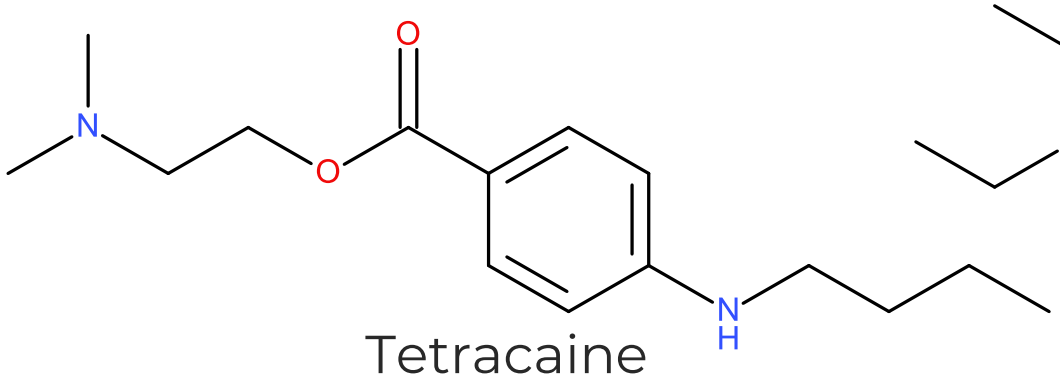


Xylazine scheduled in PA

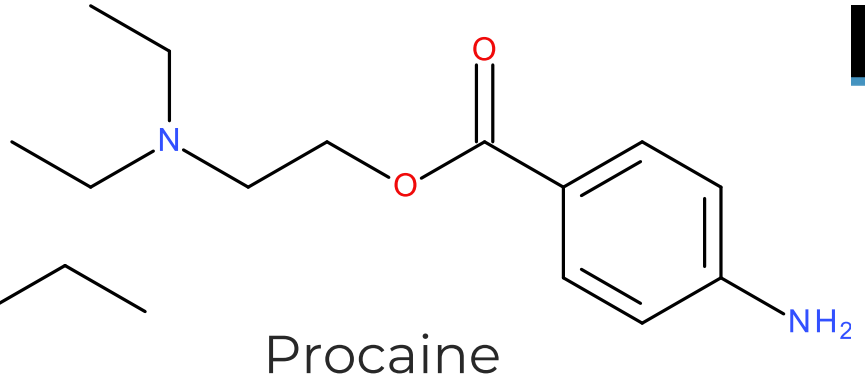
Positivity of Selected Adulterants in Fentanyl Samples in Philadelphia Area



TETRACAINE AND PROCAINE

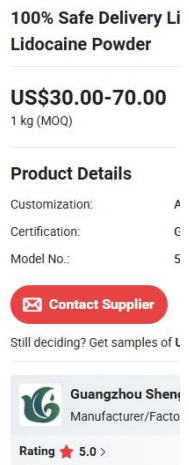


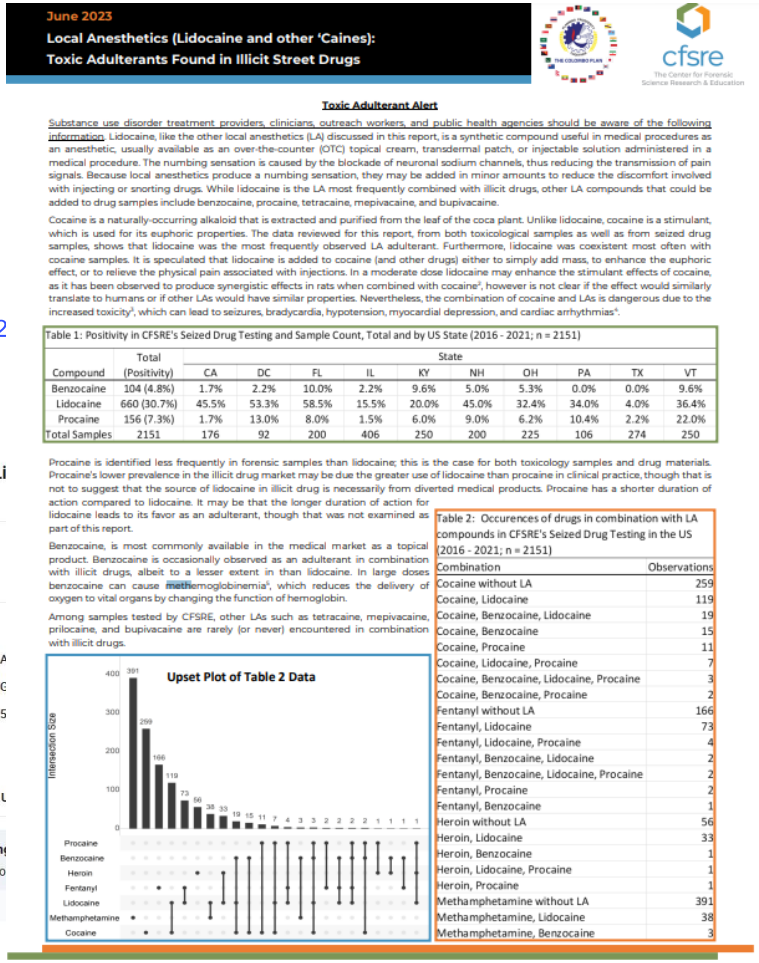
Tetracaine



Procaine

- Local anesthetics
- May reduce pain when injecting or snorting
- May cause methemoglobinemia in large doses





June 2023

Local Anesthetics (Lidocaine and other 'Caines): Toxic Adulterants Found in Illicit Street Drugs

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Toxic Adulterant Alert

Substance use disorder treatment providers, clinicians, outreach workers, and public health agencies should be aware of the following information. Lidocaine, like the other local anesthetics (LA) discussed in this report, is a synthetic compound useful in medical procedures as an anesthetic, usually available as an over-the-counter (OTC) topical cream, transdermal patch, or injectable solution administered in a medical procedure. The numbing sensation is caused by the blockade of neuronal sodium channels, thus reducing the transmission of pain signals. Because local anesthetics produce a numbing sensation, they may be added in minor amounts to reduce the discomfort involved with injecting or snorting drugs. While lidocaine is the LA most frequently combined with illicit drugs, other LA compounds that could be added to drug samples include benzocaine, procaine, tetracaine, mepivacaine, and bupivacaine.

Cocaine is a naturally-occurring alkaloid that is extracted and purified from the leaf of the coca plant. Unlike lidocaine, cocaine is a stimulant, which is used for its euphoric properties. The data reviewed for this report, from both toxicological samples as well as from seized drug samples, shows that lidocaine was the most frequently observed LA adulterant. Furthermore, lidocaine was coexistent most often with cocaine samples. It is speculated that lidocaine is added to cocaine (and other drugs) either to simply add mass, to enhance the euphoric effect, or to relieve the physical pain associated with injections. In a moderate dose lidocaine may enhance the stimulant effects of cocaine, as it has been observed to produce synergistic effects in rats when combined with cocaine[2], however is not clear if the effect would similarly translate to humans or if other LAs would have similar properties. Nevertheless, the combination of cocaine and LAs is dangerous due to the increased toxicity[3], which can lead to seizures, bradycardia, hypotension, myocardial depression, and cardiac arrhythmias[4].

Table 1: Positivity in CFSRE's Seized Drug Testing and Sample Count, Total and by US State (2016 - 2021; n = 2151)

	Total	State									
Compound	(Positivity)	CA	DC	FL	IL	KY	NH	OH	PA	TX	VT
Benzocaine	104 (4.8%)	1.7%	2.2%	10.0%	2.2%	9.6%	5.0%	5.3%	0.0%	0.0%	9.6%
Lidocaine	660 (30.7%)	45.5%	53.3%	58.5%	15.5%	20.0%	45.0%	32.4%	34.0%	4.0%	36.4%
Procaine	156 (7.3%)	1.7%	13.0%	8.0%	1.5%	6.0%	9.0%	6.2%	10.4%	2.2%	22.0%
Total Samples	2151	176	92	200	406	250	200	225	106	274	250

Procaine is identified less frequently in forensic samples than lidocaine; this is the case for both toxicology samples and drug materials. Procaine's lower prevalence in the illicit drug market may be due the greater use of lidocaine than procaine in clinical practice, though that is not to suggest that the source of lidocaine in illicit drug is necessarily from diverted medical products. Procaine has a shorter duration of action compared to lidocaine. It may be that the longer duration of action for lidocaine leads to its favor as an adulterant, though that was not examined as part of this report.

Benzocaine, is most commonly available in the medical market as a topical product. Benzocaine is occasionally observed as an adulterant in combination with illicit drugs, albeit to a lesser extent in than lidocaine. In large doses benzocaine can cause methemoglobinemia[5], which reduces the delivery of oxygen to vital organs by changing the function of hemoglobin.

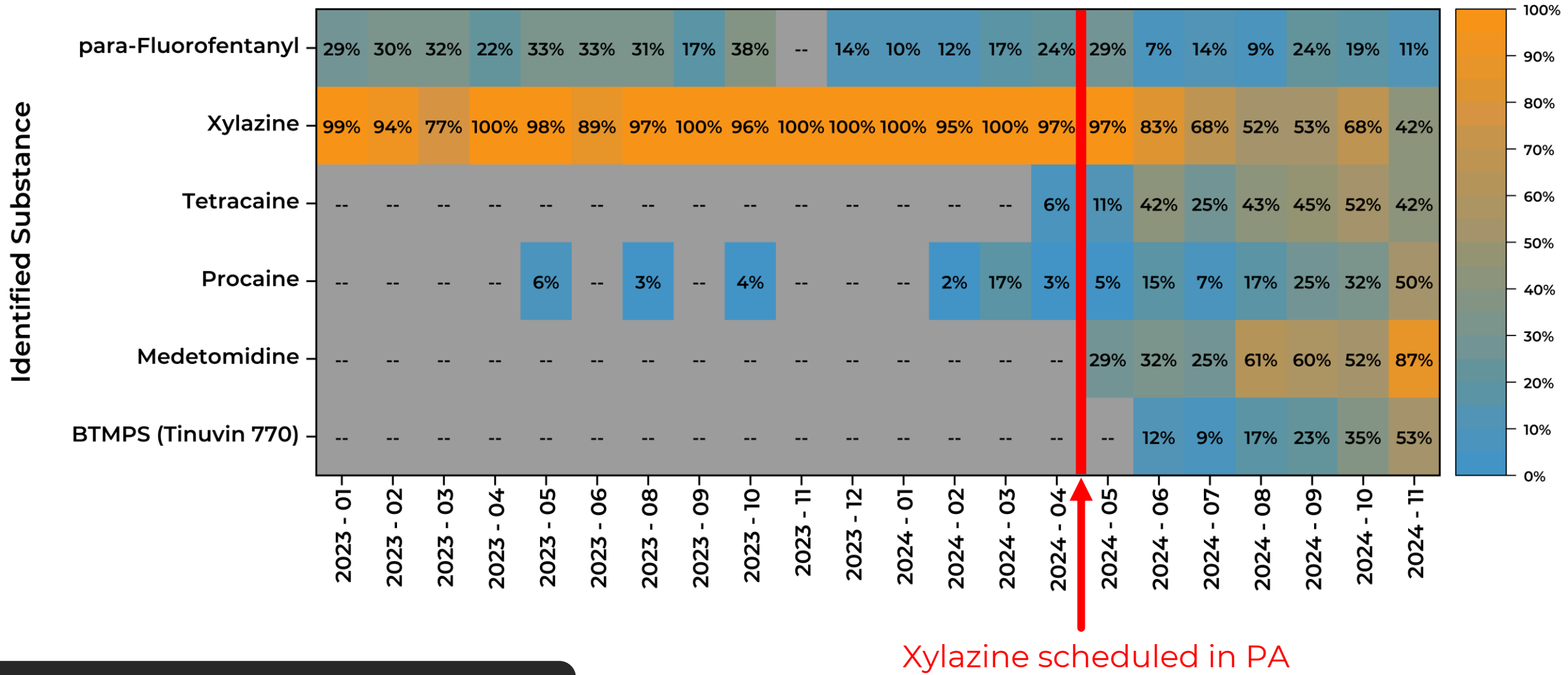
Among samples tested by CFSRE, other LAs such as tetracaine, mepivacaine, prilocaine, and bupivacaine are rarely (or never) encountered in combination with illicit drugs.

Upset Plot of Table 2 Data

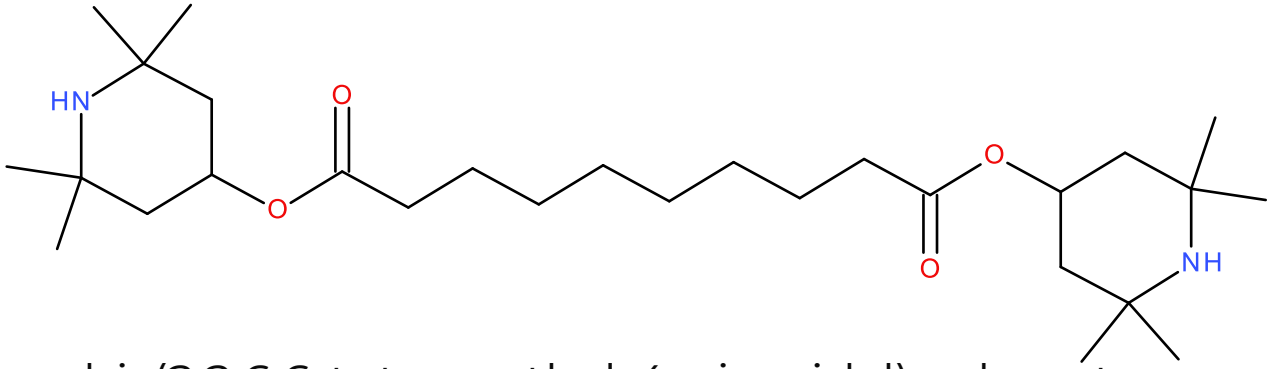
Table 2: Occurences of drugs in combination with LA compounds in CFSRE's Seized Drug Testing in the US (2016 - 2021; n = 2151)

Combination	Observations
Cocaine without LA	259
Cocaine, Lidocaine	119
Cocaine, Benzocaine, Lidocaine	19
Cocaine, Benzocaine	15
Cocaine, Procaine	11
Cocaine, Lidocaine, Procaine	7
Cocaine, Benzocaine, Lidocaine, Procaine	3
Cocaine, Benzocaine, Procaine	2
Fentanyl without LA	166
Fentanyl, Lidocaine	73
Fentanyl, Lidocaine, Procaine	4
Fentanyl, Benzocaine, Lidocaine	2
Fentanyl, Benzocaine, Lidocaine, Procaine	2
Fentanyl, Procaine	2
Fentanyl, Benzocaine	1
Heroin without LA	56
Heroin, Lidocaine	33
Heroin, Benzocaine	1
Heroin, Lidocaine, Procaine	1
Heroin, Procaine	1
Methamphetamine without LA	391
Methamphetamine, Lidocaine	38
Methamphetamine, Benzocaine	3

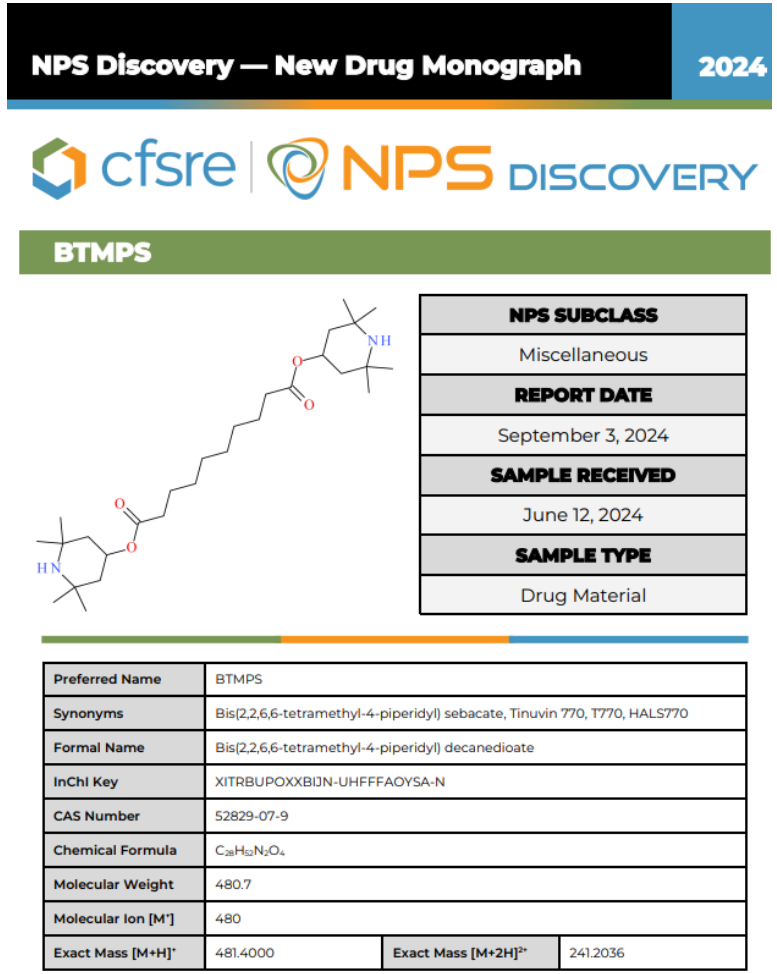
Positivity of Selected Adulterants in Fentanyl Samples in Philadelphia Area



BTMPS (TINUVIN 770)



- bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate
- Used commercially as a light-stabilizing additive for plastics
  - Manufacturer studies suggest very low overdose risk (1975-76)
  - Oral LD50 of 3.7 g/kg
- An active L-type Ca(2+)-channel blocker
- Non-competitive antagonist at nicotinic ACH receptors
- Demonstrated cardiotoxicity in rats



NPS Discovery — New Drug Monograph 2024

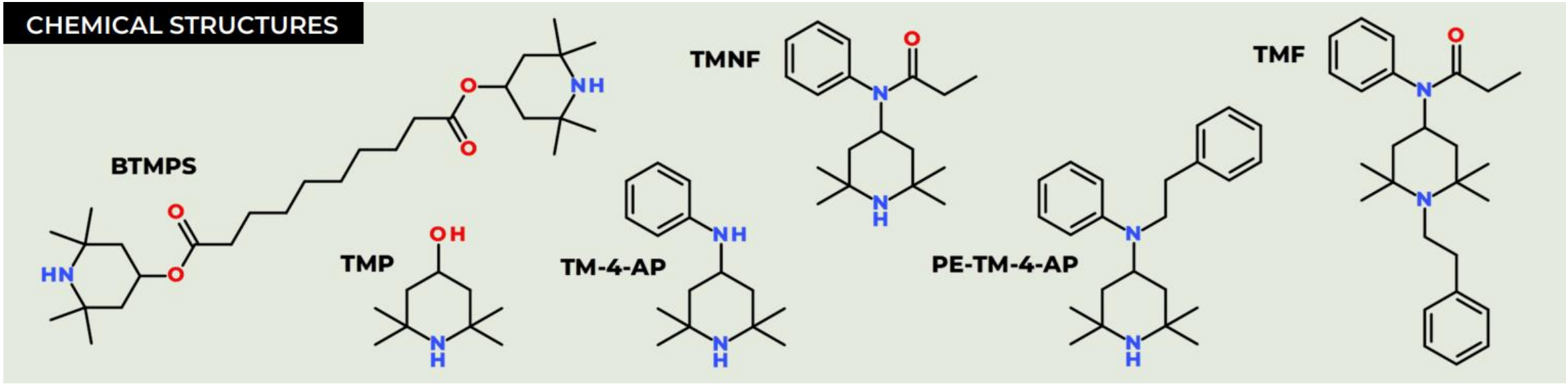
cfsre | NPS DISCOVERY

BTMPS

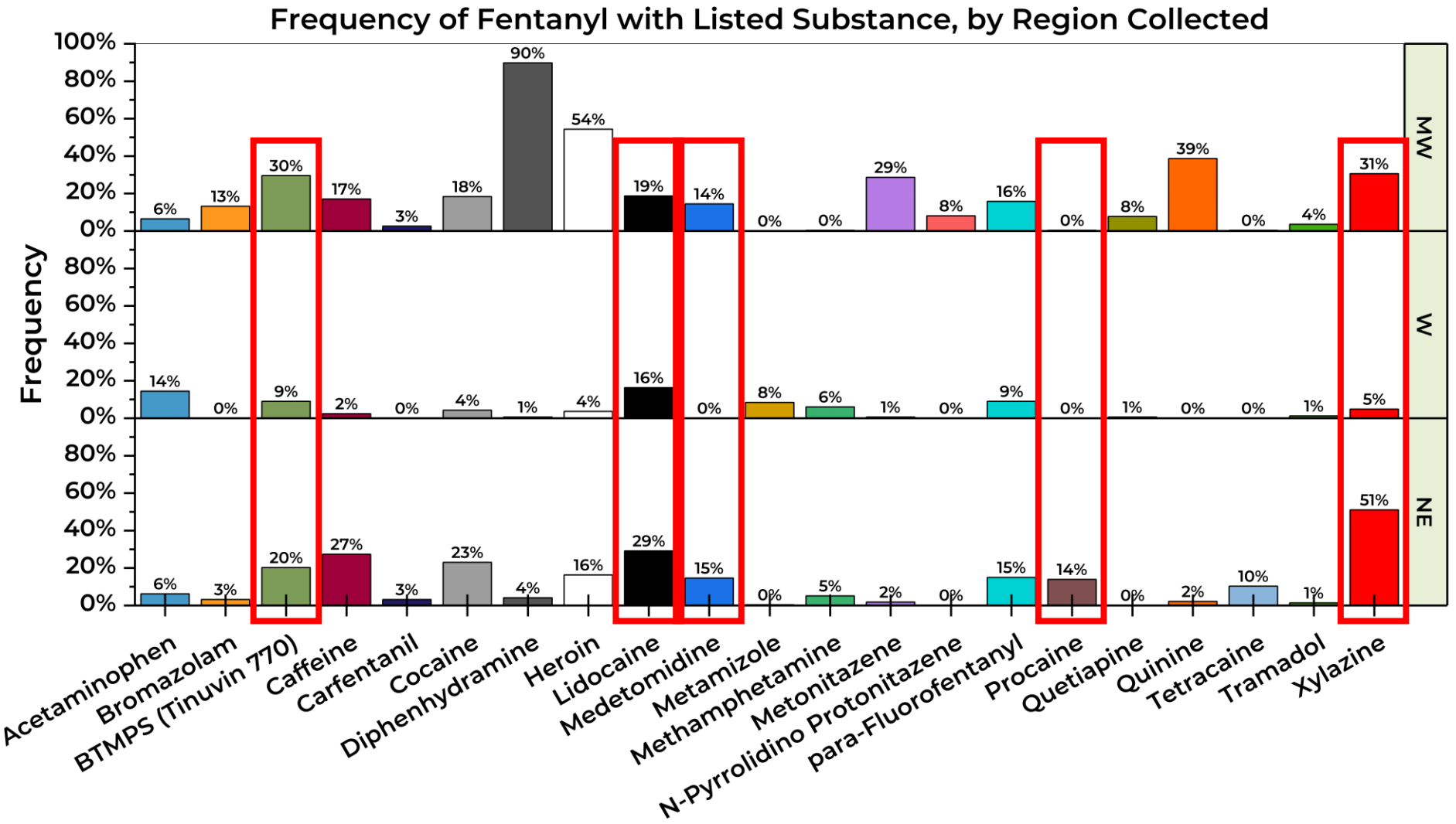
NPS SUBCLASS
Miscellaneous
REPORT DATE
September 3, 2024
SAMPLE RECEIVED
June 12, 2024
SAMPLE TYPE
Drug Material

Preferred Name	BTMPS		
Synonyms	Bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate, Tinuvin 770, T770, HALS770		
Formal Name	Bis(2,2,6,6-tetramethyl-4-piperidyl) decanedioate		
InChI Key	XITRBUPOXXBIJN-UHFFFAOYSA-N		
CAS Number	52829-07-9		
Chemical Formula	$C_{28}H_{52}N_2O_4$		
Molecular Weight	480.7		
Molecular Ion [M$^+$]	480		
Exact Mass [M+H]$^+$	481.4000	Exact Mass [M+2H]$^{2+}$	241.2036

BTMPS (TINUVIN 770)



- BTMPS used to produce fentanyl precursors/intermediates
- Synthesis based around tetramethyl-4-piperindinol (TMP)
- Potency of tetramethylfentanyl (TMF) is unknown


Frequency of Fentanyl with Listed Substance, by Region Collected
Frequency
100%
80%
60%
40%
20%
0%
MW
W
NE
6% 13% 30% 17% 3% 18% 90% 54% 19% 14% 0% 0% 29% 8% 16% 0% 8% 39% 0% 4% 31%
14% 0% 9% 2% 0% 4% 1% 4% 16% 0% 8% 6% 1% 0% 9% 0% 1% 0% 0% 1% 5%
6% 3% 20% 27% 3% 23% 4% 16% 29% 15% 0% 5% 2% 0% 15% 14% 0% 2% 10% 1% 51%
Acetaminophen
Bromazolam
BTMPS (Tinuvin 770)
Caffeine
Carfentanil
Cocaine
Diphenhydramine
Heroin
Lidocaine
Medetomidine
Metamizole
Methamphetamine
Metonitazene
N-Pyrrolidino Protonitazene
para-Fluorofentanyl
Procaine
Quetiapine
Quinine
Tetracaine
Tramadol
Xylazine

WHAT'S HAPPENING?

- People using fentanyl remaining sedated even after administering Narcan[1]
- More severe presentations of withdrawal owing to Medetomidine's potency[1,2]
- 90% of opioid OD presentations in Philadelphia EDs resulting in ICU admission
  - 23% of those are intubated
- Unclear whether medetomidine causes wounds like those associated with xylazine use[1,3]
- Negative reactions to BTMPS (foul smell/taste)[4]
  - Increased concern among PWUD over adulteration in fentanyl supply

(1) https://www.statnews.com/2025/05/01/medetomidine-replacing-xylazine-in-fentanyl-increases-overdose-danger-withdrawal-risks/
(2) https://hip.phila.gov/document/4874/PDPH-HAN-00444A-12-10-2024.pdf/
(3) https://hip.phila.gov/document/4421/PDPH-HAN-0441A-05-13-24.pdf/
(4) https://www.latimes.com/california/story/2024-09-16/an-industrial-chemical-is-being-mixed-with-fentanyl

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- NPS Discovery Team
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  - Nicholas Khorozov
  - John Beer

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THANK YOU!

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