

FEBRUARY 2025

## ABOUT THIS REPORT

PA GROUNDHOGS is a provider of drug checking solutions and services, including lab-based mass spectrometry testing for individuals and organizations. It operates in partnership with the Center for Forensic Science, Research & Education (CFSRE) to provide both qualitative and quantitative analysis of the illicit drug supply. This report covers data observed from April 1 through the end of the calendar year, 2024. Over that period, our data has revealed a major disruption in the street opioid supply, characterized by a decrease in fentanyl purity and an increase in the average number of unique cutting agents. These new adulterants are causing a range of new adverse reactions associated with dope/fentanyl usage and withdrawal in markets that we monitor, including Trenton, NJ, Pittsburgh, PA and Philadelphia.

We provide this document to educate consumers of illicit drugs, harm reduction organizations, public health agencies, and clinicians on:

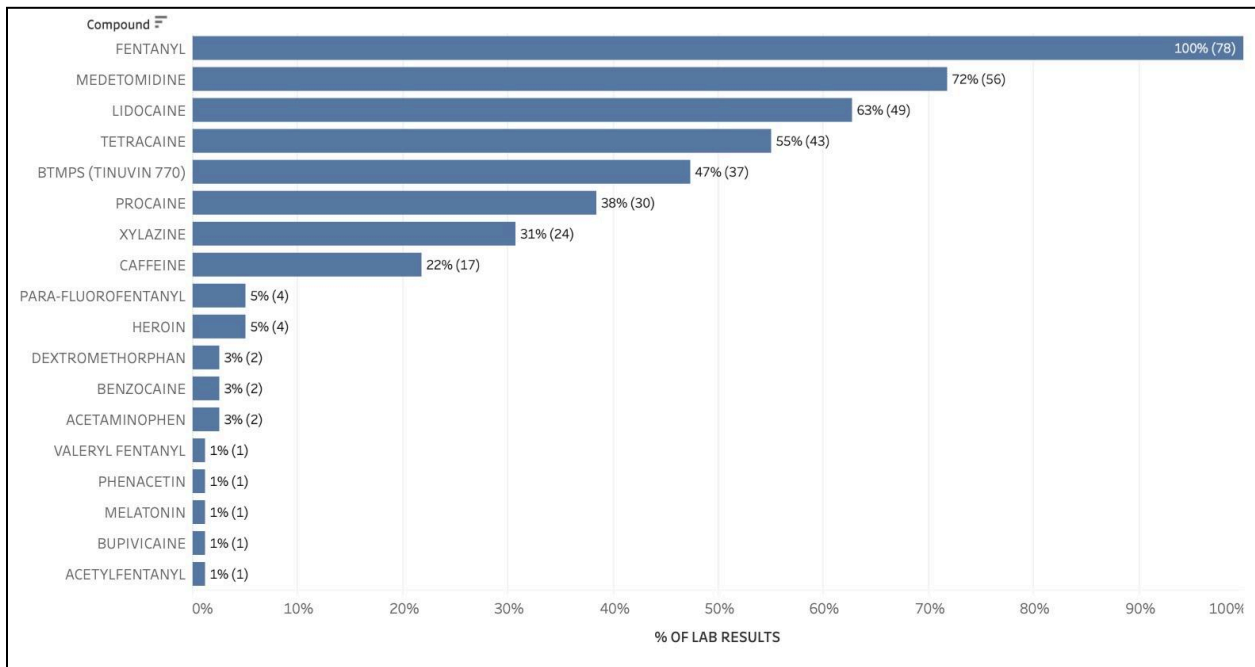
- what new substances are being found in the street level drug supply and in what proportions;
- the strange new side effects these substances are causing;
- when possible, evidence-based practices for mitigating harmful effects of drug adulterants.

While, in most cases, these adulterants do not respond to naloxone, as always we encourage our stakeholders to carry the overdose reversal drug at all times, if possible as an intramuscular injection, so that doses may be appropriately titrated. For more information on compassionate overdose reversal responses in the age of tranquilizers, refer to this document: [Health Management Associates report, 2023](#)

**\*NOTE: This is a living document: We urge our stakeholders, including people who use drugs, clinicians, first responders and outreach workers across the region to share your experiences with us by emailing [tips@pagroundhogs.org](mailto:tips@pagroundhogs.org) using the subject heading “adulterants.” Please describe any unusual adverse reactions or withdrawal symptoms so that we may incorporate your experiences into our database and improve our reporting. If you are an organization interested in distributing our drug checking kits please visit [pagroundhogs.org/test-kits](https://pagroundhogs.org/test-kits)**

## XYLAZINE

The presence of the veterinary sedative xylazine in the dope supply in Pennsylvania has declined significantly since its classification as a Schedule III controlled substance. However it continues to be a problem for people who use drugs, and has been identified as the cause of severe necrotic wounds on the extremities leading to infection and in some cases amputations. PAG's founder Christopher Moraff, first revealed the presence of xylazine in the illicit fentanyl supply while reporting from Philadelphia's Kensington neighborhood in [2018](#). He published a follow-up story in [2019](#) and was one of the first to connect the adulterant to new necrotic wounds that were just beginning to appear on injection drug users. It wasn't until 2022 that xylazine adulteration was identified as a public health threat by the FDA. By the end of 2022, xylazine was present in 98% of all retail fentanyl samples in Philadelphia. In 2023, with xylazine peppering headlines of every major media outlet and lawmakers calling for new restrictions on the sedative, fentanyl retailers pivoted to a different veterinary sedative, medetomidine, as a new cutting agent. Since Pennsylvania Governor Josh Shapiro announced his intention to schedule xylazine, in April 2023, there has been a precipitous decline in the amount of xylazine in the drug supply. In the fourth quarter of 2024, xylazine was present in just 31% of fentanyl samples analyzed by PAG.



**Adulterants commonly found alongside fentanyl, Trenton/Phila/Pittsburgh, Q4/2024**

Where xylazine is present it's appearing in much smaller concentrations than a year ago; by the end of 2024, fentanyl smokers will have noticed an absence of the distinct smell of xylazine smoke/vapor. According to anecdotal reports this is having an impact on tranq wounds. One emergency room physician told PAG that new xylazine wounds are rare. Individuals with existing wounds should continue to seek treatment and follow self-care instructions.

## MEDETOMIDINE

**Medetomidine** is a sedative and analgesic used in veterinary medicine. It is easily obtained from overseas labs and is replacing the more scrutinized drug, xylazine, as the most common adulterant in retail dope samples. Unlike xylazine, there is a human formulation of medetomidine (dexmedetomidine) that is used for sedating patients who are intubated or undergoing surgical procedures in conjunction with other drugs; however medetomidine is not approved for human use, and its inclusion in illicit drug formulations is particularly concerning because of its potent pharmacological effects.



PA GROUNDHOGS's first encounter with medetomidine was in **two different samples purchased in Pittsburgh on April 8, 2024**. By April 12 we received our first dope sample from Philadelphia containing the drug. Since then 169 fentanyl exhibits have tested positive for the potent tranquilizer, or 61% of the total dope samples tested since its first appearance.

The rapid influx of medetomidine has knocked xylazine from the most prevalent adulterant found with fentanyl, present in 85% of dope samples at the end of 2023, down to sixth place, present in fewer than a third of dope samples at the end of 2024, according to our data.

- Medetomidine acts as an **alpha-2 adrenergic receptor agonist**, causing sedation, bradycardia (slowed heart rate), and hypotension.
- In some cases, reflex hypertension may occur initially, followed by a dangerous drop in blood pressure. Medetomidine has a long duration of action, which may complicate emergency medical interventions like naloxone administration for opioid overdose. Unlike naloxone, which reverses opioid effects, there is no widely available antagonist for medetomidine in humans.
- Medetomidine can cause severe **central nervous system depression**, leading to unresponsiveness, confusion, or comatose-like state. This typically abates within six hours of use. It may also contribute to memory impairment, dizziness, and impaired coordination, increasing the risk of injury. ([PAGROUNDHOGS/Philadelphia Department of Public Health, 2024](#))

According to emergency room doctors and people who use drugs, medetomidine has rapid onset tolerance and particularly severe withdrawal syndrome. User experience varies from person to person, as with any drug. Consumers of illicit fentanyl in Philadelphia describe periods of extreme sedation followed by acute withdrawal symptoms upon waking. In some cases hallucinations are reported. Length of continuous use may be a factor in withdrawal. Dexmedetomidine, which is approved for human use, is recommended only for short-term use. In [one case study](#), a two-year old receiving dexmedetomidine for 11 days postoperative was described as experiencing “episodes of blank staring, agitation, and decreased verbal communication,” as well as asymmetrical dilation of the eyes that lasted five days after discontinuation of the drug. Additional experiences include excessive urination, and dizziness (which we attribute to the changes in blood pressure that individuals are experiencing).

Two companies are currently marketing medetomidine test strips, with cutoffs of 1000 ng/ml. PAG has not independently tested the strips for efficacy and can therefore not endorse them

## LOCAL ANESTHETICS

Local anesthetics have historically been a common adulterant in the street level stimulant supply. Over the past year, we have seen the use of local anesthetics, namely: procaine, tetracaine, benzocaine, and lidocaine, as adulterants in the street level dope/fentanyl supply as adulterants increased significantly. The use of these topical or local anesthetics poses significant risks, including neurotoxicity, cardiovascular depression, and in severe cases, life-threatening conditions like seizures and methemoglobinemia ([Anesthesia & Analgesia, 2009](#)). Proper awareness and prompt medical intervention are critical in cases of suspected exposure.



Below outlines and highlights the peer-reviewed research studying common side effects of these substances:

### **Lidocaine:**

Central nervous system toxicity can include seizures, euphoria, agitation, and sedation at higher doses. Symptoms are dose-dependent and include drowsiness or excitation at low levels, progressing to seizures and unconsciousness at higher concentrations. There is no specific treatment for lidocaine toxicity. Management is symptomatic to prevent hypoxia, acidosis, and hyperkalemia, which may increase the risk of cardiac toxicity. Benzodiazepines and barbiturates can be prescribed to control local anesthetic-induced seizure. ([Medicina, 2021](#)); [Lidocaine Toxicity, 2022](#); [Cephalalgia, 2009](#)

### **Tetracaine:**

**PA GROUNDHOGS first encountered tetracaine in October 2023, in a collection of a dozen samples labeled by their submitter as “unknown.” The samples originated from an overseas vendor and included one exhibit of pure tetracaine and a second that contained pregabalin (brand name: Lyrica) and tetracaine.** Its first appearance in a retail dope exhibit was not until April 2024, in a sample submitted from Johnstown in Cambria County that also contained fentanyl and heroin. Since then it has appeared in 129 samples, always together with fentanyl. Known for systemic toxicity, tetracaine can cause neurotoxicity, including convulsions and nervous system abnormalities termed *Local Anesthetic Systemic Toxicity (LAST)* even at low doses. ([Colombian Journal of Anesthesiology, 2011](#))

### **Benzocaine:**

Using benzocaine can sometimes cause a condition called methemoglobinemia, where the blood can't carry oxygen as well as it should. This can make the skin or lips look blue and cause breathing problems. Symptoms may escalate to life-threatening levels with significant exposure. ([Texas Heart Institute Journal, 2003](#))

### **Procaine:**

Procaine (novocaine) is one of the most commonly used local anesthetics and is routinely used in dental surgery. It is less toxic than lidocaine, but ingestion can cause nausea, vomiting, dizziness, and cardiovascular depression at high doses. If injected intravenously, procaine can rapidly reach the CNS, causing neurotoxic effects, including:

- **Auditory Hallucinations:** Perception of non-existent sounds.
- **Visual Hallucinations:** Seeing objects, shapes, or colors that aren't present.
- **Agitation and Confusion:** A sudden onset of disorientation or irrational behavior. ([The International Journal of Psychiatry in Medicine, 1987](#))

## TINUVIN 770 (BTMPS)



Tinuvin 770, or Bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate (BTMPS), is an industrial chemical widely used as a UV light stabilizer in the manufacture of plastics. It has been studied for its toxic effects, particularly when used in contexts like medical equipment or food packaging, but only recently emerged as an adulterant found in retail fentanyl samples. Communications regarding a strange new opioid adulterant (later confirmed as BTMPS) first began in June 2024 as the substance emerged simultaneously in Portland OR, Philadelphia PA, and locations across the country. **PAGROUNDHOGS first identified BTMPS in a retail dope sample collected on June 7, 2024 in Pittsburgh. It subsequently appeared in a sample collected on June 21 in Philadelphia, and by July 25 was present in a sample obtained in Trenton, NJ.** Concentrations of the chemical in relation to fentanyl vary greatly, from trace amounts to proportions in the double digits. In one case BTMPS was the primary chemical in a sample of dope.

The inclusion of an industrial chemical not intended for human use in the fentanyl supply raises significant health concerns due to its toxic profile and unknown long-term effects.

Below are the key findings on the potential risks of BTMPS use from the published literature:

### **Cardiotoxicity:**

Tinuvin 770 can cause serious heart damage by making heart cells break down and die due to a buildup of calcium and stress hormones. In animal studies, it also led to a sudden drop in blood pressure and weakened the heart's ability to pump blood. At high doses, this caused the heart and circulation to fail completely, leading to death.

### **Neurotoxicity:**

Tinuvin 770 acts as a non-competitive antagonist of nicotinic acetylcholine receptors, potentially impairing nervous system function. This mechanism is concerning when combined with potent opioids like fentanyl, as it may exacerbate central nervous system depression

Unknown factors, including the potential harm of repeated exposure to BTMPS, as well as a lack of awareness and detection further complicates harm reduction and treatment efforts.

## **CONCLUSION**

In conclusion, we have observed that these new adulterants are confined to the illicit opioid supply and their entrance coincided with the increased scrutiny placed on xylazine by state and federal agencies. We also heard from sources in the second half of 2023 who described increasing difficulty obtaining xylazine from overseas suppliers (based on misperceptions about its legal status) accompanied by increasing prices domestically for the drug. Too little is known to determine whether the introduction of new cutting agents was a direct response to the difficulty in obtaining xylazine from overseas vendors; however, we have evidence that overseas manufacturers of some new adulterants (tetracaine, for instance) began sending free samples to buyers in the U.S. in 2023. The current disruption in the US dope supply is most certainly a supply side event, and universally unwelcome by consumers of illicit opioids. The problem has been amplified by stresses on fentanyl production imposed by Los Chapitos faction of the Sinaloa Cartel and made worse by a Cartel war being waged by factions loyal to the sons of El Chapo and sicarios loyal to his former business partner Ismael "El Mayo" Zambada. How these drugs interact with one another remains unknown, but their presence has complicated overdose response for first responders, withdrawal management and wound care management. PA GROUNDHOGS is currently awaiting funding from the PA Department of Health to study how users of illicit opioids are navigating these changes. We will continue to monitor the street-level drug supply, with the hopes of being able to aid in the safety and care of persons who use drugs.

**Please feel free to download this report for dissemination \* PA GROUNDHOGS - A Safer Supply Through Science**