



PROGRESS REPORT, 2023-2024

TABLE OF CONTENTS

INTRODUCTION	3
ACCOMPLISHMENTS	4
MILESTONES	6
EXPANSION	7
SAMPLE COLLECTION	8-9
BREAKOUT: PAG DRUG DISCOVERIES	10
CLINICIAN CONSULTING	11
<hr/>	
<u>DATA</u>	12
A NOTE ON NOMENCLATURE	12
SUMMARY OF FINDINGS	14
INDIVIDUAL DRUG TRENDS	16
METHAMPHETAMINE	17
COCAINE	18
CRACK COCAINE	18
BENZODIAZEPINES	19
PARTY DRUGS	20
OPIOIDS	21
NEW ADULTERANTS	24
CONCLUSION	29

Introduction

Over the past decade, the illicit drug supply in the United States has become increasingly chaotic as traffickers turned to compounds made in the lab to circumvent legal restrictions on traditional controlled substances and pharmaceuticals.

Illicitly manufactured synthetic drugs, often modified by a single molecule to skirt legal restrictions, have turned drug users into guinea pigs, as substances never tested on humans continue to saturate the market. More recently, these Novel Psychoactive Substances (NPS) are being blended with a startling array of both drug and non-drug cutting agents. These adulterants produce a range of side effects that have stymied the medical community; forced a complete overhaul of overdose response protocols; and left people who use drugs (PWUD) in a near constant state of anxiety.

PA GROUNDHOGS (PAG), a community based drug-checking program serving the commonwealth of Pennsylvania and bordering states, stepped into this landscape in November 2023, shortly after Governor Josh Shapiro signed a law legalizing all drug checking technologies for the purpose of harm reduction, and providing for third-party access to these technologies.



Leveraging our existing relationship with the non-profit **Center for Forensic Science, Research & Education**—the nation’s leading lab for the discovery of NPS—we began building the foundation for a unique organization that would offer individuals and community organizations across the state FREE access to real-time data on their evolving local drug supply.

PAG’s motto: *A Safer Supply Through Science*, reflects our commitment to using evidence-based approaches to enhance public health and safety. By combining cutting-edge technology, expert analysis and community engagement, PA GROUNDHOGS seeks to uncover new trends, identify risks, and foster informed responses to the dynamic challenges posed by the illicit drug supply.

This inaugural report highlights our accomplishments during our first year and presents key findings drawn from our data.

Accomplishments

In its first year, PA GROUNDHOGS has set a new standard for real-time drug supply analysis in a lab-based setting. Our comprehensive program provides both qualitative and quantitative data to community stakeholders—marking a new milestone for a grassroots drug-checking organization. The insights gained through our work underscore the importance of continued investment in harm reduction initiatives and evidence-based efforts to address the overdose crisis.

GROWTH EXCEEDS EXPECTATIONS

In the months prior to its funding, in September 2023, PA GROUNDHOGS began working aggressively with the **Pennsylvania Harm Reduction Network (PAHRN)** to establish an anonymous network of volunteer partners and partner organizations across the state to distribute our free test kits, collect exhibits and deliver samples to the CFSRE for analysis. As expected, people who use drugs (PWUD) and harm reduction groups across Pennsylvania have led this effort; but we were surprised by the range of disciplinary interest in drug checking as an emerging harm reduction modality.

Early buy-in from the Shapiro Administration—in particular The Pennsylvania Department of Drug & Alcohol Programs (DDAP)—and PAG’s presence at numerous conferences and festivals over the past year facilitated engagement from unexpected stakeholder groups. PAG’s more than three-dozen partner organizations include county and municipal agencies; clinicians and treatment providers; hospitals and first responders; and independently owned pharmacies that stock our free drug-checking kits for their patrons alongside naloxone.

Remarking on this growth, Christopher Moraff, a pioneer of drug checking in Philadelphia and founder of PA GROUNDHOGS, said: “The two greatest assets for detecting changes in the drug supply and identifying new substances and adulterants are the trust of people who use and sell drugs, and a cutting-edge forensics lab willing to think outside the box to identify changes in the supply in real time. Over the past 12 months PAG has successfully leveraged these assets to create a truly unique harm reduction vehicle capable of identifying problems before they become crises and unraveling crises before they become disasters.

“We owe a debt of gratitude to the lawmakers who made this possible, our funders who recognized PAG’s untested potential, our fiscal sponsor, our lab partners at the CFSRE for undertaking this enormous task with us, and the growing number of community organizations adopting drug checking under the PA GROUNDHOGS umbrella,”



ASK US ABOUT FREE DRUG CHECKING SERVICES BY PAGROUNDHOGS

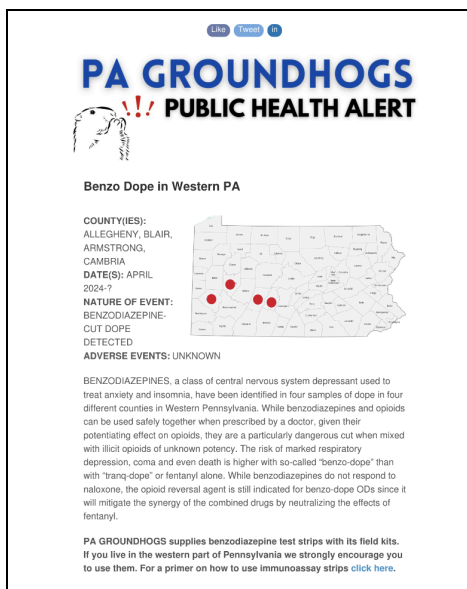


Carter Graves (right), head of PAG's Allegheny County office and Grimm Criley, its Rural Engagement Liaison at DDAP's 2024 Emerging Drugs Symposium in Harrisburg.

Milestones

During its inaugural year, PA GROUNDHOGS focused its efforts on coalition building, infrastructure development, and establishing resources and protocols for our expanding network of grassroots partner organizations:

- With help from MRM Insights, developed and deployed a sophisticated and secure relational database that is integrated with powerful reporting tools including geo-mapping and public reporting capabilities through [Tableau](#).
- Partnered with Penn State University's Consortium on Drugs & Addiction to advance our common goal of establishing an analytical framework capable of identifying drug adulteration and overdose spikes in real time and, through predictive modeling, anticipate future outbreaks before they occur;
- Established relationships with individuals & organizations in nearly half of Pennsylvania's 67 counties to share educational materials & distribute drug checking kits;



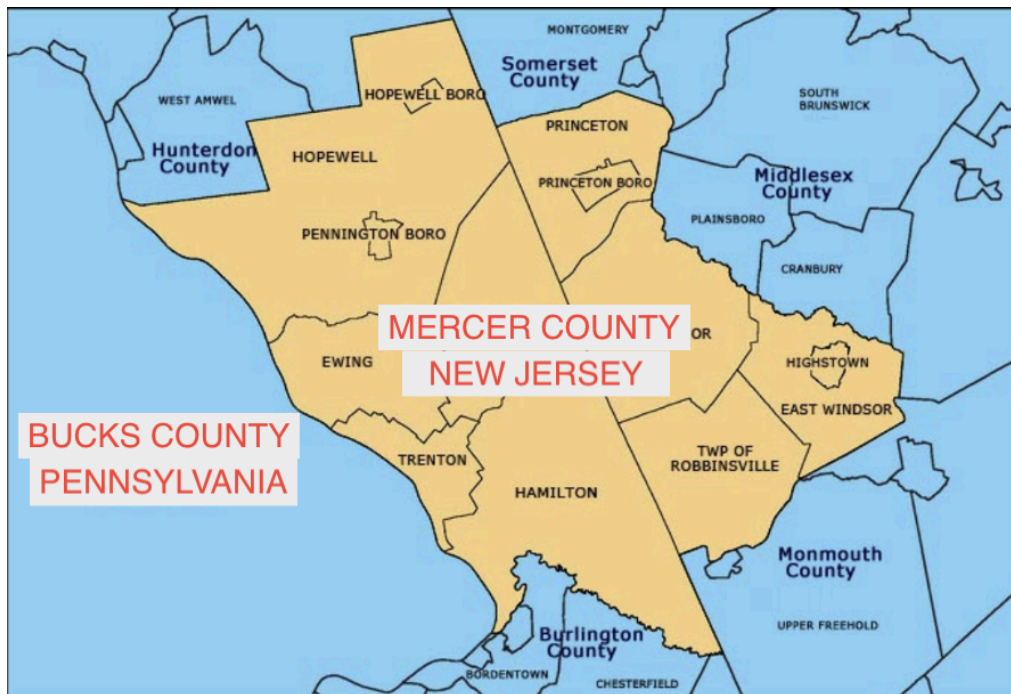
- Collaborated with the NAACP in central Pennsylvania to launch our [Safer Smoking Campaign](#)—an educational initiative aimed at stimulant users in predominantly Black communities to address the risks of second-hand fentanyl exposure;
- Released close to a dozen public health alerts through our email-based early warning program (left);
- Launched a PAG office in Allegheny County led by veteran drug-checker **Carter Graves** (they/them), co-founder of KMFK Safety Services, based in Pittsburgh; Appointed **Grimm Criley** (he/him) as Rural Engagement Liaison to target stakeholders in Pennsylvania's rural communities; Welcomed **Jennifer Shinefeld** (she/her) to PAG's Philadelphia team,

focusing on operations. Jen spent four years at the helm of the Philadelphia Department of Public Health's drug checking program before her departure this year.

- Distributed 4,000 test strips each for fentanyl, xylazine and benzodiazepines across the state.
- PAG was contracted by the PA Department of Health to design and conduct a CDC-funded research project on how opioid consumers are navigating the ongoing supply disruption.

EXPANSION

In 2024, PAG began receiving inquiries about its program from individuals and organizations in states outside Pennsylvania—including Missouri, Kentucky, Michigan, California, New Jersey and New York. The group has been weighing these requests on an individual basis. After careful consideration, PAG partnered with **The Kind Collective (TKC)**, a provider of mobile harm reduction services, to begin a formal expansion into New Jersey. PAG is now firmly established in Mercer County (Trenton) through its collaboration with TKC, and was the first organization to confirm the presence of the adulterants Medetomidine and BTMPS in retail fentanyl samples in New Jersey. The partnership has identified stakeholders in high risk communities across the Garden State—including Passaic County and the City of Paterson, and Burlington County. PAG is exploring talks with potential funding partners and the New Jersey Department of Health.

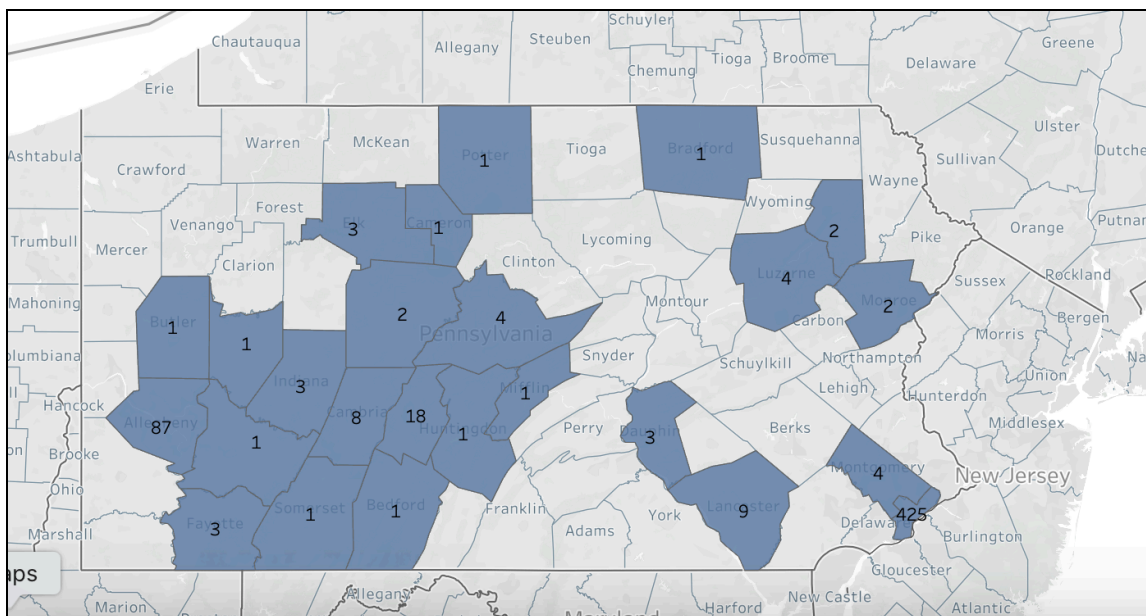


IN SEPTEMBER 2024, PA GROUNDHOGS PARTNERED WITH THE KIND COLLECTIVE TO BEGIN DRUG CHECKING IN NEW JERSEY

With the appropriate resources, PA GROUNDHOGS has not ruled out further expansion into states lacking an established drug-checking infrastructure and welcomes inquiries about partnerships or consulting services outside of Pennsylvania.

Sample Collection

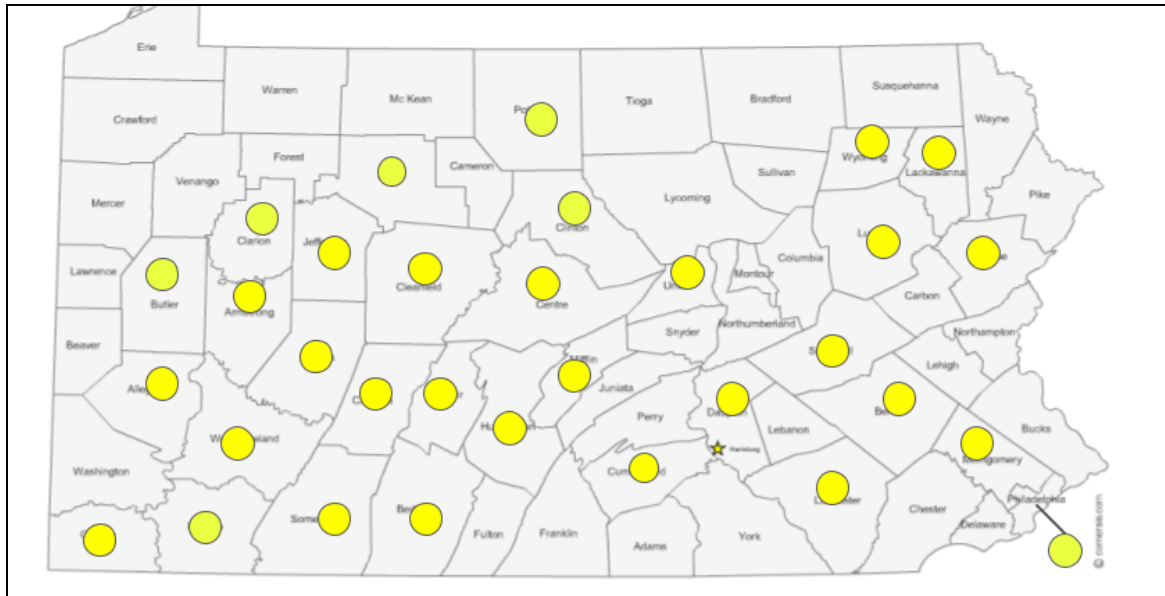
As of this report, PAG has analyzed 645 drug samples through our partnership with The Center for Forensic Science Research & Education. From 2023 through 2024 the majority of these samples came from **Philadelphia (448)**. **Allegheny County** was the nearest second (**91**), followed by **Blair County (18)**, **Lancaster County (10)** and **Cambria County (9)**. Eighteen (**18**) samples have been submitted to date from **New Jersey** (Trenton & Camden). PAG received fewer than five samples each from another 20 PA counties, identified on the below map. Fewer than five samples were also analyzed from North Carolina, New York, West Virginia and Detroit.



PA COUNTIES WHERE FEWER THAN FIVE SAMPLES HAVE BEEN SUBMITTED ARE SUPPRESSED FROM DISPLAY BUT ARE INCLUDED IN AGGREGATED STATEWIDE DATA

PA GROUNDHOGS has shipped kits to nearly half of Pennsylvania's 67 counties and receives multiple requests weekly for 25- and 50-kit starter packages from organizations interested in participating in our street-to-lab drug-checking service. Each kit contains test strips for fentanyl, benzodiazepines and Xylazine, as well as materials required to submit up to a 10mg sample (about the size of a pinhead) to the CFSRE, a DEA-certified lab in Horsham, PA, for free analysis using sophisticated mass spectrometry. Every sample is given a unique ID that contains no identifiable information. Results are posted by the CFSRE on the PA GROUNDHOGS website within two weeks.

As of this report, PAG has distributed roughly 1,500 drug-checking kits across Pennsylvania; Each is good for free mass spectrometry analysis of two samples at the CFSRE.



COUNTIES WHERE INDIVIDUALS OR ORGANIZATIONS HAVE REQUESTED TEST KITS

CHALLENGES

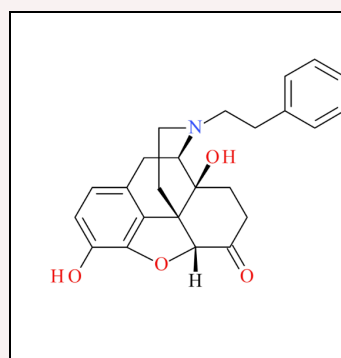
1. Rural counties in Pennsylvania are currently underrepresented in the PAG dataset. Many rural counties lack a strong harm reduction foundation, rely solely on volunteers or are one-person operations and do not have the resources to expand services to drug checking. Others are misinformed about the legality of kit distribution or are otherwise risk averse. The unfortunate decision this year by the Philadelphia Department of Public Health to discontinue its drug-checking efforts has left many Philly-area groups transitioning their drug checking efforts to PAG and we expect the rural/urban imbalance will continue to be a challenge to overcome. With the addition of Grimm Criley as PAG's Rural Engagement Liaison we hope to address this divide in 2025.
2. PAG is paying close attention to a bill currently in the Pennsylvania legislature that would legalize syringe service programs across the state. Currently, third-party distribution of clean syringes for harm reduction is illegal throughout much of the state, and many harm reduction organizations are mobile and underground. This makes identifying stakeholder in some counties difficult. With the exception of test strip distribution, point-of-use drug checking is virtually non-existent in Pennsylvania. Passage of an SSP bill would help legitimize harm reduction across Pennsylvania, while failure to pass a bill could signal to organizations that they are undervalued or worse, at risk of being targeted.

BREAKOUT

PAG DRUG DISCOVERIES

Together with our lab partners at The Center for Forensic Science, Research & Education (CFSRE), PA GROUNDHOGS published monographs on two novel psychoactive substances first identified in Pennsylvania's drug supply:

1. [N-Phenyl Noroxymorphone](#)—a boutique opioid structurally similar to the brand name painkiller Opana. This sample was submitted in Philadelphia as an “Opana Analog” that reportedly sold for \$500 a gram in Oct. 2023 & was not seen again. Given its cost it's not likely to supplant other cheaper opioid analogs, such as nitazenes in the supply.



2. [Rilmazafone](#)—a benzodiazepine-type drug that has recently emerged in the recreational drug supply. As a

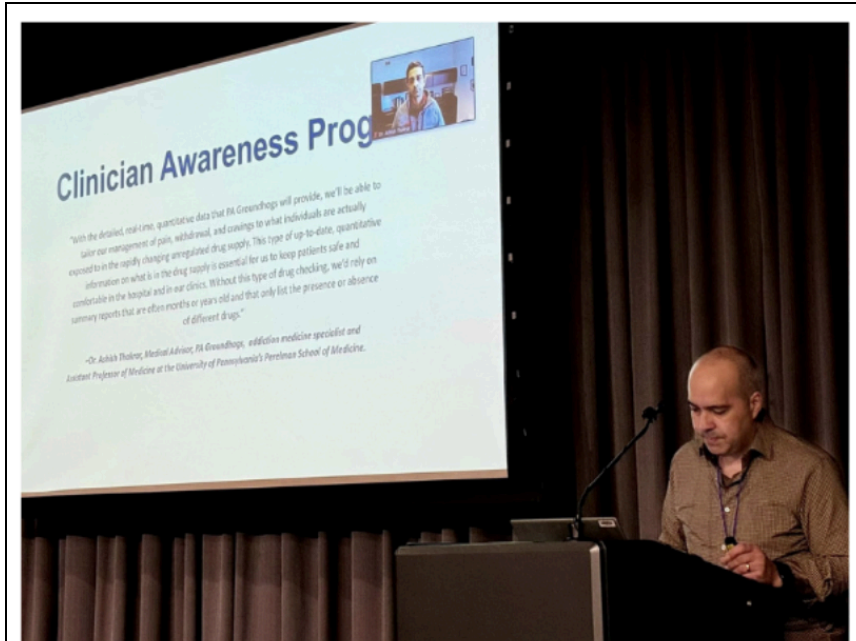


prodrug, rilmazafone is converted in the body to the benzodiazepine rilmazolam, which is the analyte expected to appear in toxicology specimens; however, standard reference material for rilmazolam is not currently available. This substance appears two times in PAG data, both in samples obtained in

Philadelphia.. One sample was submitted as a counterfeit Xanax/Alprazolam 2mg “bar” (pictured). The other exhibit came to PAG with a selection of samples labeled “unknown” that were sent from a vendor in China.

3. [Ortho Methylfentanyl](#)—An analog of fentanyl that first emerged in Canada in early 2023. oMF was first identified by the CFSRE in blood specimens from British Columbia. It first appeared in drug sample material in Pennsylvania in November 2024 in trace amounts in three dope samples collected by PAG in Philadelphia.

Clinician Consulting



PAGROUNDHOGS Founder Christopher Moraff & Medical Advisor Dr. Ashish Thakrar presented on the clinical applications of PAG's quantitative mass spectrometry at the Allegheny Health Network's Conference, Bridging the Harm Reduction Gap on December 6.

While still in its early stages, PA GROUNDHOGS has been receiving more inquiries about its Clinician Awareness Program along with requests for localized data access from hospitals and treatment providers, emergency departments and researchers working to unravel the unexpected disruption in the street opioid supply in 2024. While these relationships are confidential, PAG's lab-based analysis and two-week turnaround time for results have been instrumental in shining a light on the extent of medetomidine

adulteration and its health implications, as well as the steep decline in the presence of xylazine in Philadelphia. One emergency doctor at a major urban hospital told PAG that they no longer encounter new tranq wounds (caused by xylazine), but are now grappling with rapid onset tolerance and severe withdrawal believed to be associated with medetomidine. PAG has engaged in information sharing with public health departments, acute care facilities, overdose response teams and researchers on the evolving supply of local street dope. In 2025 we expect this aspect of our work to take on a larger portion of our service offerings.

Data

A Note on Nomenclature

In developing its database, PA GROUNDHOGS has attempted to use chemically accurate descriptions of the samples we receive. We categorize each sample in our database as what it was 'SOLD AS'--which is indicated by the submitter on a short form accompanying each sample--and the 'PRIMARY DRUG' it contained, which is revealed during analysis. In some cases reconciling nomenclature was easy: METHAMPHETAMINE samples were invariably submitted as being sold as methamphetamine/meth and contain it as the primary drug. To account for differences in drug processing and consumer demographics we chose to break cocaine samples into two SOLD AS categories: CRACK (smokable freebase) and COCAINE (powder cocaine/cocaine HCL). In these cases, the PRIMARY DRUG in both will be reflected as cocaine.

All pills that have the physical characteristic of a 2mg alprazolam "bar" are logged as being sold as ALPRAZOLAM/XANAX or XANAX, despite the high proportion of known counterfeits.

In some cases we encountered regional variations in slang terms used to describe drugs. In western PA, for instance, MDMA is called "Roll" while in the Philadelphia-metro area the term "Ecstasy" is still commonly used. Sellers market both pill and crystalline variations of the drug. PAG opted to identify these submissions as being SOLD AS MDMA regardless of how it was submitted to us. A separate field is allocated for a sample's physical DESCRIPTION.

Given the wide variation in the composition of fentanyl/heroin/synthetic heroin/powdered illicit opioids sold in glassine stamp bags in the northeastern US, we received samples labeled in a variety of ways, including "fentanyl," "heroin," "fent/tranq, tranq-dope," "tranq," "dope" and "unknown." Upon analysis many wound up containing similar compounds. In almost all cases the primary drug in these samples was fentanyl. In light of the enduring use of the term "dope" as a catchall term to market street opioids since at least the 1980s, we opted to use the term throughout this report. We acknowledge the term is not ideal from a scientific standpoint and for this reason have abstained from using it on our publicly accessible data dashboard accessible [here](#) and [here](#).

Sample Composition

Our qualitative analysis includes a simple proportional ratio showing the amount of each adulterant in relation to the active substances. The primary drug is always represented as (1P). Here are three examples of what this qualitative data looks like this in our database:

- **A heavily adulterated dope sample collected on 12/16/2024 in Philadelphia*:**
FENTANYL (1P), PROCAINE (10.5P), LIDOCAINE (4.2P), MEDETOMIDINE (1P), BTMPS (TINUVIN 770) (0.4P), ACETAMINOPHEN (0.1P), 4-ANPP (0.1P), TETRACAINE (0.1P), ETHYL-4-ANPP (TRACE), BENZOCAINE (TRACE)

**In this sample. Medetomidine is present in roughly a 1:1 ratio to fentanyl. The sample has an abundance of Procaine (a more than 10:1 ratio to the fentanyl in the sample). Notice the absence of xylazine.*

- **An unadulterated sample of methamphetamine collected on 2/23/23 in Altoona, PA:**
METHAMPHETAMINE (1P)
- **A dope sample collected in Philadelphia in 3/23 with a very high concentration of xylazine:**
FENTANYL (1P), PARA-FLUOROFENTANYL (0.3P), XYLAZINE (111.6P)

The CFRSE is the nation's leading lab in identifying new psychoactive substances and adulterants. This type of proportional representation enables us to see what new drugs and adulterants are being favored by drug suppliers and in what concentrations. This information also provides crucial insight to our partners in the clinical community for responding to adverse events in real time.

Sample Purity

PAG also reports the amount (or "purity") of psychoactive substances contained in certain samples. Chemists at the CFSRE conduct quantitative analysis using GC-MS to determine the amount of an individual substance within a small sub-sampling of drug material (usually 3-5mg) which is then transformed into the percent of the drug (in its base form) contained within the sample.

This calculation is known as mass fraction and it has certain limitations:

1. *We currently run quantitative analysis on nine substances: fentanyl, para-fluorofentanyl, heroin, cocaine, methamphetamine and xylazine, 4-ANPP (a fentanyl precursor and byproduct of production) and two adulterants: lidocaine and caffeine. Efforts are underway to add bromazolam and other substances to the list.*

2. *Our quantitative summaries are calculated using a small sub-sample of the entire drug material. Since people who use opioids measure their dosage in “bags,” and bag weights vary even when they come from the same source, it’s difficult to determine how many total milligrams of fentanyl are contained in the average bag of dope.*
3. *Based on our current testing protocol, there’s no way to ascertain if a sample contains hotspots due to inadequate milling.*

Despite these limitations, our quantitative analysis is critical for revealing the trendlines in longitudinal data on drug purity that PA GROUNDHOGS is unique in providing.

Expert Analysis

Additionally, our analysts rely on human intelligence, published reports & research, and decades of combined expertise—including lived experience—to add context to our data when possible.

SUMMARY OF FINDINGS

PAG has been in operation for just over a year and has tested nearly 700 samples; while that is an impressive number, Pennsylvania is a big state and more than half of our samples were submitted from two counties: Philadelphia and Allegheny. Another four counties account for 55 samples, while 20 counties are represented by fewer than five samples. While all data is aggregated in our state-level reporting, we are cautious about making any definitive statements until we’ve built a larger and more representative dataset.

After a year of collecting data, talking to colleagues, stakeholders, drug consumers and suppliers, however, several patterns do emerge:

1. **By and large drug consumers get what they pay for.** With some notable exceptions (i.e. illicit opioids) the samples we analyzed contained the drugs they were marketed as being. In some cases this led to us disproving certain enduring street myths. For example, retail cocaine in Kensington, Philadelphia, is not “bath salts” as consumers have conjectured for years. It’s cocaine and cut (primarily lidocaine.)
2. **Fentanyl is not “in everything.”** Contrary to many law enforcement and media reports to the contrary, almost no substances other than dope tested positive for fentanyl in our dataset. Not one cocaine sample contained anything more than trace amounts of fentanyl too small to quantify. This is likely the result of cross contamination and unlikely to produce an effect. Even fake 2mg alprazolam (Xanax) bars, which are easily the most frequently counterfeited drug in our dataset, contained a benzodiazepine analog of similar potency and structure. Not a single counterfeit Xanax bar contained fentanyl. Only one methamphetamine sample, from Altoona, in Blair County, contained a

concerning level of fentanyl. That sample was 91% pure meth contaminated with 1.4% pure fentanyl.

3. **In the vast majority of cases methamphetamine is trafficked to Pennsylvania from Mexico and sold at retail level unadulterated.** Smaller quantities of the drug originate in Canada and are trafficked to western Pennsylvania through New York State. Meth is notoriously difficult to cut. While some distributors cut crystal meth by reducing it to a solution and recrystallizing it with methylsulfonylmethane (MSM), a relatively harmless dietary supplement, differences in purity are likely the result of variations in production methods. Domestically produced meth is rare, but sources report it is still produced in small quantities by cooks in rural counties.
4. **The street dope supply has changed radically over the past year** as fentanyl packets that once contained 1-3 adulterants are now regularly composed of 6-9 different chemicals.
5. **Nitazenes are in Pennsylvania.** Nitazenes, a class of potent non-fentanyl opioid, arrived in Philadelphia in 2023 in whole drug samples, then in small quantities cut with fentanyl as a component in retail dope samples. Nitazene analogs confirmed by PAG included N-PYRROLIDINO ETONITAZENE, N-PYRROLIDINO PROTONITAZENE, METONITAZENE, ISOTONITAZENE, and PROTONITAZENE
6. **Fentanyl purity has declined year-over-year**, and this has likely been a factor in the double-digit decrease in fatal overdoses in Pennsylvania. But samples containing the slightly less potent analog para fluorofentanyl have increased in recent months. More recently Ortho Methylfentanyl has appeared in the dope supply in trace amounts.
7. **Dope millers have turned to local anesthetics from China** as bulking agents due to rising prices and less availability of fentanyl.
8. **Medetomidine is becoming the tranquilizer of choice for dope millers**, slowly replacing xylazine, which is more difficult and expensive to obtain since statewide scheduling.
9. **There is no transparency in the black market for illicit drugs. Sellers frequently do not know what compounds their products contain. It's not advisable to rely on drug sellers for factual information on drug composition and purity. Consumers of illicit drugs should regularly test their drugs by using test strips and through a program like PA GROUNDHOGS as supply volatility is likely to remain high throughout 2025**

INDIVIDUAL DRUG TRENDS

ONE STATE, MULTIPLE DRUG ECONOMIES

As one of the longest states in the nation, Pennsylvania shares borders with six states as well as Lake Erie and the Canadian province of Ontario to the northwest. The state's drug supply is varied and illicit substances are trafficked along at least five primary trafficking corridors and multiple secondary and tertiary routes. The following section lists some of the aggregate findings, by primary drug, that were revealed by our partner chemists at the CFSRE through 2023 and 2024.

METHAMPHETAMINE



- Least adulterated and highest purity drug in PAG sample set;
- The average purity of methamphetamine at state level is approximately 77%, with some samples reaching above 90%.
- Wholesale meth costs are currently the lowest among quantifiable drugs tested by PAG. Sources report a pound of meth can be obtained for \$2,000 or less. An ounce of meth can retail for as low as \$200. A quarter ounce can be obtained for \$75-90.

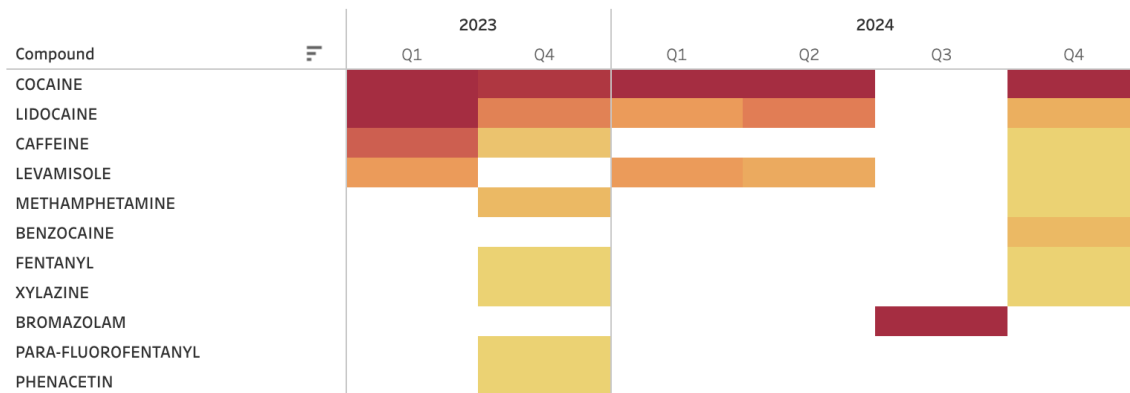
METH PURITY ACROSS COUNTIES (ALL SAMPLES)

COUNTY	AVERAGE METH PURITY
JEFFERSON	86%
CAMERON	86%
BLAIR	86%
CENTRE	84%
ELK	82%
CAMBRIA	82%
MONTGOMERY	82%
FAYETTE	82%
PHILADELPHIA	77%
ALLEGHENY	73%

COCAINE

- Average purity of cocaine (powder/soft) in PAG's samples is approximately 48%; Median purity is 42%
- Common adulterants include lidocaine, caffeine and levamisole

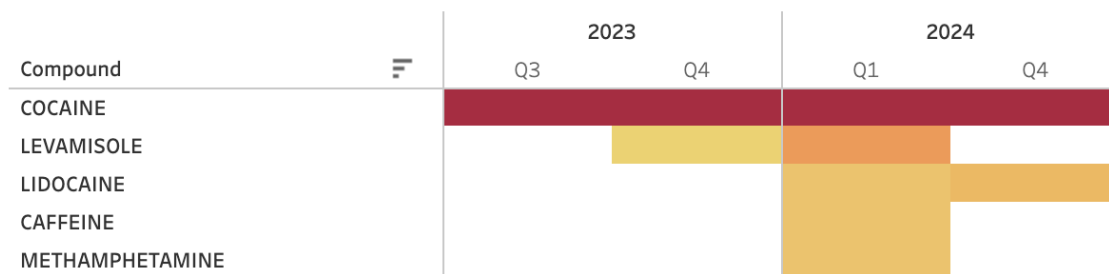
ADULTERANTS FOUND IN PA STREET DRUGS SOLD AS COCAINE



CRACK COCAINE

- The average purity of cocaine in samples sold as "crack," "crack cocaine," or "hard" is approximately 73% due largely to the chemical process associated with turning cocaine HCL into freebase. This has the effect of removing some impurities.

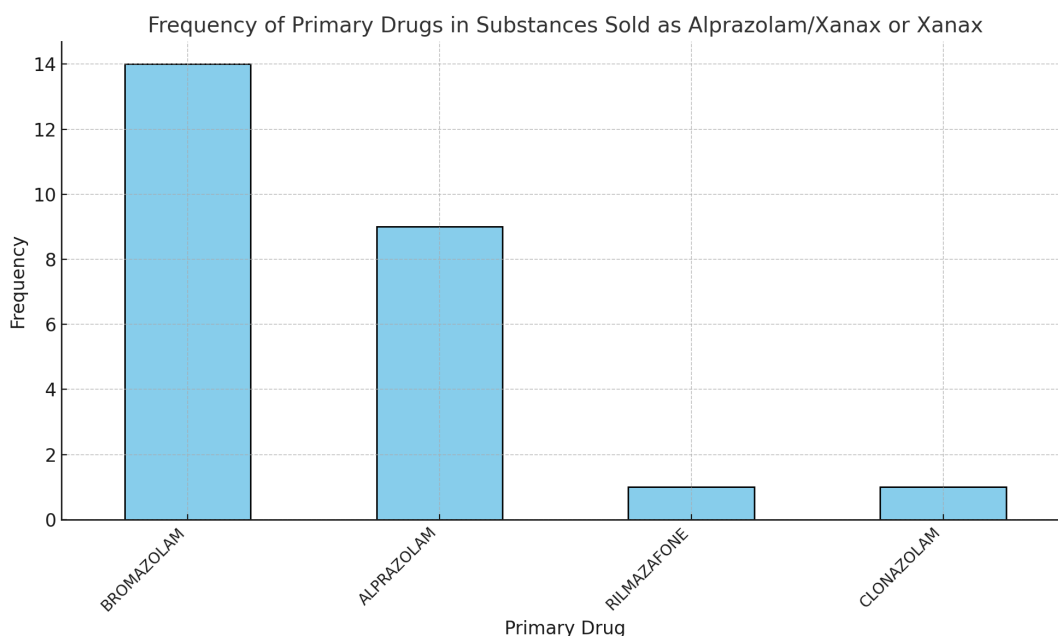
ADULTERANTS FOUND IN PA STREET DRUGS SOLD AS CRACK



BENZODIAZEPINES

Our data showed significant misrepresentation in substances sold as Alprazolam/Xanax:

- A majority of the samples labeled as “Alprazolam/Xanax” contain **Bromazolam**, a designer benzodiazepine. The proliferation of counterfeit alprazolam is a result of stricter regulations over benzodiazepine prescribing and suggests a pattern of substitution with cheaper, less-regulated alternatives.
- Consumers are largely aware of these counterfeits, which retail for \$5-7 a pill on average, cheaper than genuine alprazolam
- Genuine Alprazolam is found but not as consistently as misrepresented alternatives.
- Trace adulterants like ketamine, cocaine, and lidocaine are likely the result of contamination during manufacturing.



Since July 2023 when the Drug Enforcement Administration scheduled five popular benzodiazepine analogs (etizolam, flualprazolam, clonazepam, flubromazolam, and diclazepam), bromazolam has emerged as the dominant benzodiazepine analog in use by pill pressers. Bromazolam was synthesized in 1976 but never brought to market. It is structurally similar to alprazolam and roughly the same potency, but is reportedly more sedating. Benzo-dope (fentanyl cut with a benzodiazepine) is rare in Pennsylvania. Bromazolam was found in four dope samples in western PA, however the drug is not water soluble. Those who smoke or snort their dope may be at risk of benzo-dope contamination. **PAG includes benzodiazepine strips in its test kits, which will pick up the presence of bromazolam.**

PARTY DRUGS

PA GROUNDHOGS received a small number of samples of LSD, MDMA and ketamine from Philadelphia and Pittsburgh over the past year. By and large these samples were unadulterated, with the exception of MDMA, which has been found to contain MDA on several occasions as well as methamphetamine (the latter confined to pill forms of the drug.)



STREET DRUG

MDMA

Updated:

1/9/2025

ADULTERANTS FOUND IN PA STREET DRUGS SOLD AS MDMA

Compound	2023		2024	
	Q4	Q1	Q3	Q4
MDMA	Orange	Orange	Dark Red	Dark Red
MDA	Dark Red			
CAFFEINE	Orange	Orange		
COCAINE	Orange			
METHAMPHETAMINE		Orange		
DIMETHYLTRYPTAMINE (DMT)				Yellow
KETAMINE				
N-ETHYLPENTYLONE		Orange		

Stakeholders in western PA have raised concerns about sudden price increases in the “party drug” scene. Since October of 2024, the cost of ketamine and cocaine has doubled at distribution levels. In October 2024, an ounce of ketamine could be purchased for \$800. As of January of 2025 the same ounce is now selling for \$1,600.

PAG sources recalled similar price hikes just before the MDMA and club drug shortage of 2011. This shortage not only made drugs themselves expensive but also led to a flood of substitute research chemicals. Sources speculate the increase could be a function of suppliers holding on to products in anticipation of a crackdown under the incoming Trump Administration. From a harm reduction perspective this is problematic because it could lead to additional cuts in supply and new substances entering the market. PAG will continue to monitor the situation and update when new information becomes available.

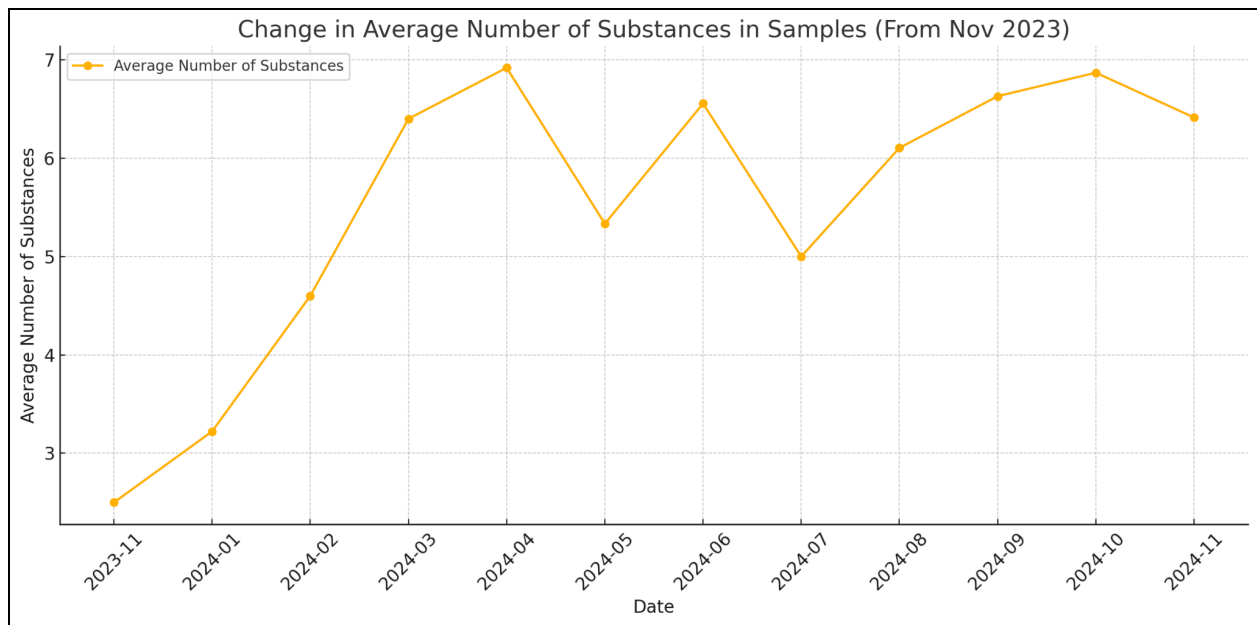
ILLICIT OPIOIDS

Since 2023, street opioids have become by far the most adulterated class of drug for sale. Since



at least 2017 local suppliers in the Philadelphia area have been experimenting with ways to stretch fentanyl supplies to meet increasing demand, and address the short “legs” (time between dosage and withdrawal) associated with fentanyl. To date, local dope sets in Philadelphia have experimented with synthetic cannabinoids (2018), animal tranquilizers and other psychoactive and non-psychoactive cuts to add additional sedative effects to their drugs and provide a pharmacological effect similar to the opioid “nod.” Over the past 12 months Pennsylvania has

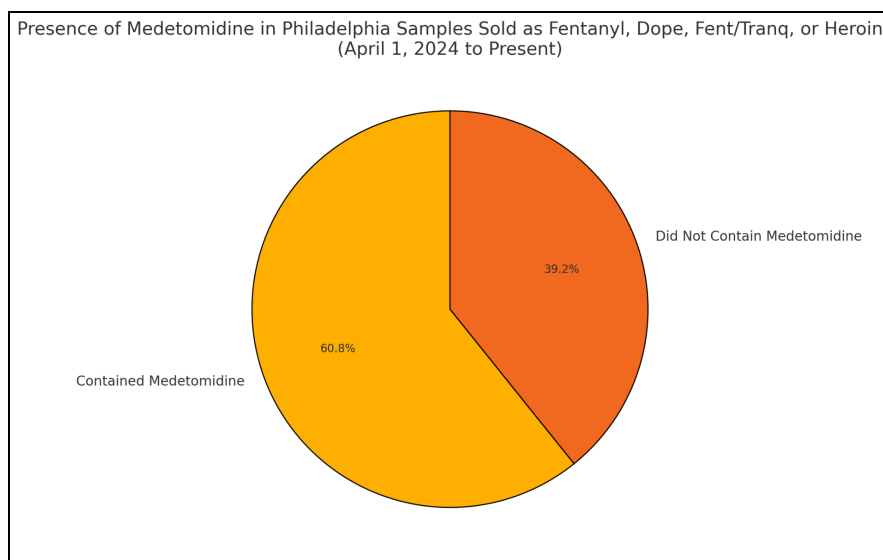
experienced a new disruption in its illicit opioid supply distinguished by the gradual decline in fentanyl purity, the inclusion of increasingly powerful tranquilizers (medetomidine) as cutting agents, and the introduction of new drug and non-drug adulterants not previously found in the retail drug supply.

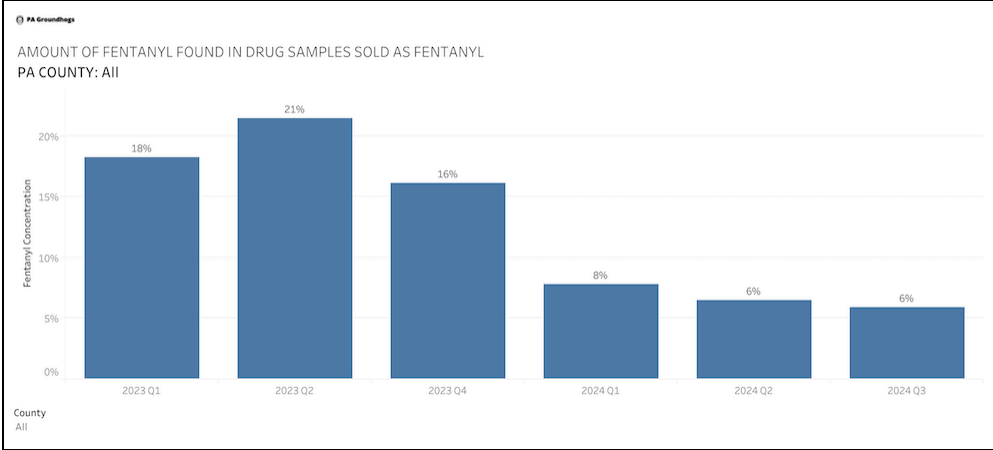


NUMBER OF SUBSTANCES IN A BAG OF DOPE 2023-2024

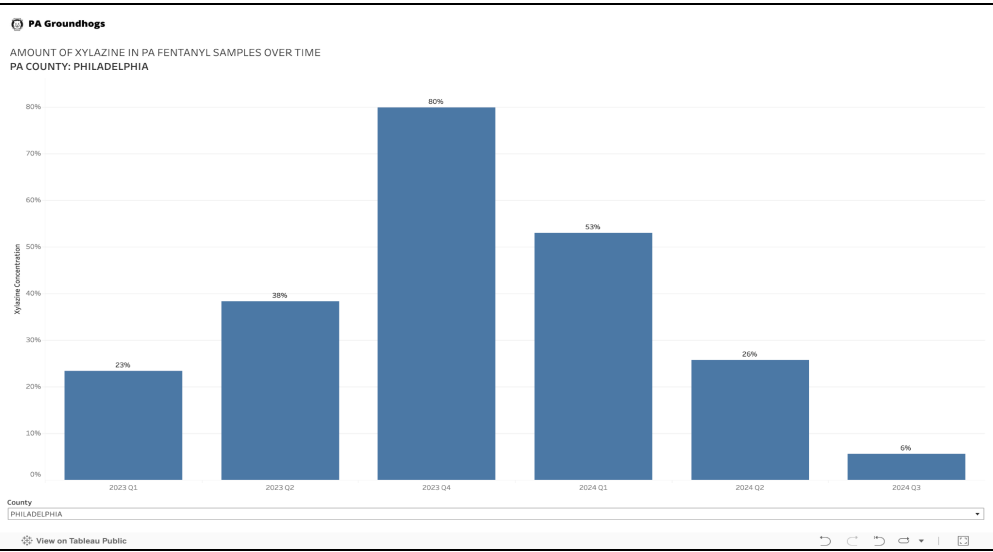
Supply dynamics, including adulteration, are influenced by a variety of factors, including proximity to the source of a drug, price fluctuations, profit motive, geo-political factors, interdiction efforts and changes in demand. In highly concentrated urban centers retail distribution may be one or two steps away from the wholesale source. Two uncut fentanyl samples from Mexico obtained in Philadelphia in 2023 revealed an unadulterated blend of fentanyl and acetyl fentanyl, with fentanyl purity levels of 41% and 59%, respectively. A sample of retail-level dope provided by the same source, meanwhile, was 24% fentanyl and 37% xylazine, indicating a locally cut product. The source described cutting their dope using an ounce of fentanyl, three-quarters of an ounce of xylazine and a quarter of an ounce of mannitol, a bulking agent. Once packaged for sale, “dope” is exported in “racks” or “sleeves” of pre printed stamp bags to neighboring counties where it can be sold at a premium or repackaged.

In Philadelphia, wholesale fentanyl is acquired through brokers working directly with factions of the Sinaloa Cartel in Mexico. **Current anomalies in the drug supply are likely influenced by strict production limits placed on fentanyl by cartel leaders in the summer of 2023, and more recently a violent civil war being waged between factions of the cartel, which has further impacted price and availability.** A similar phenomenon occurred when Pennsylvania scheduled xylazine in June, 2023. Within a week prices for the drug doubled, and vendors in China began withholding shipments. Shortly before xylazine scheduling, medetomidine began showing up in the street opioid supply in Pittsburgh and Philadelphia.

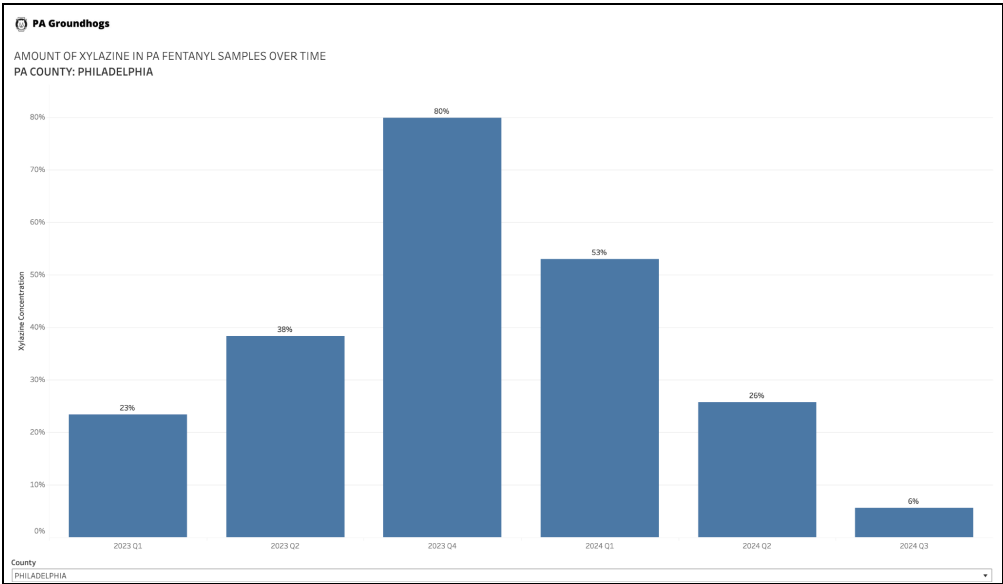




**Fentanyl Purity
Statewide Q1/23
to Q3/24**



**Fentanyl Purity in
Philadelphia
Q1/23 to Q3/24**

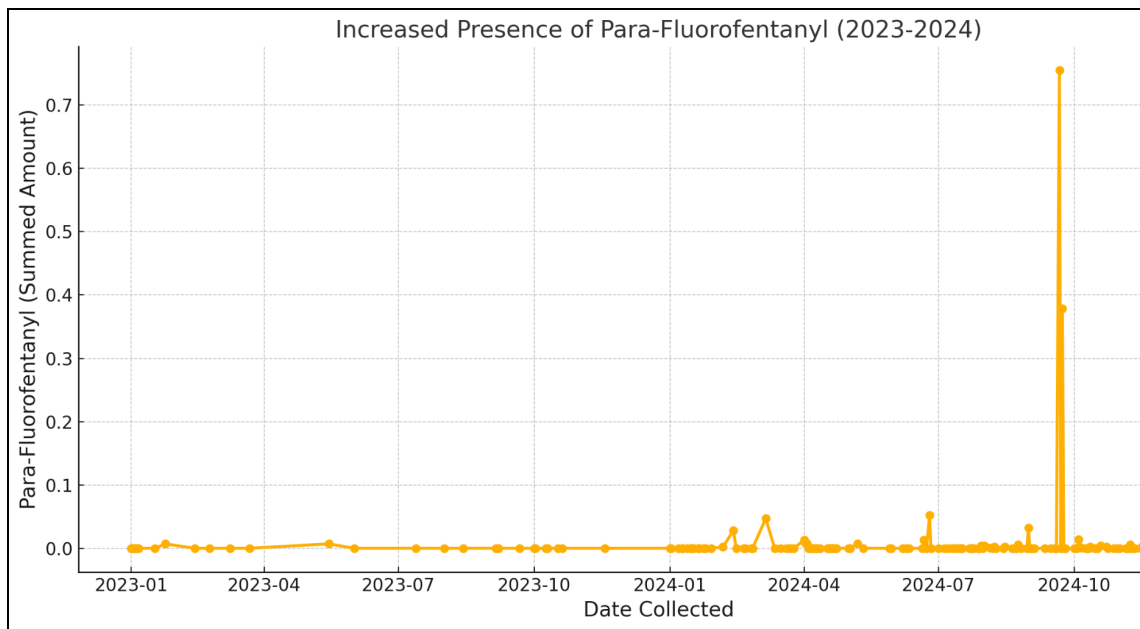


**Amount of
Xylazine in
Philadelphia
Fentanyl Samples
Q1/23 to Q3/24**

NEW ADULTERANTS & THEIR SIDE EFFECTS

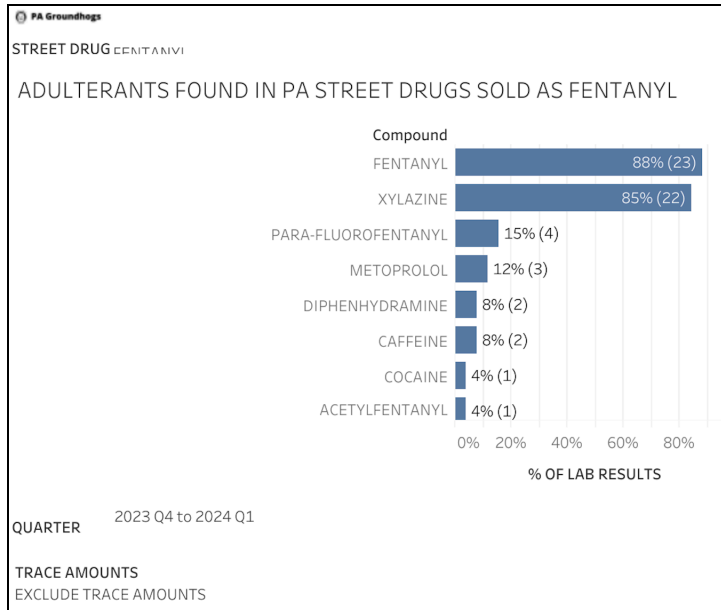
PARA-FLUOROFENTANYL

Para-fluorofentanyl is a fentanyl analog that can be synthesized relatively easily in clandestine laboratories. Its production may be appealing to traffickers due to its lower cost and similar effects to fentanyl, making it an economically viable alternative or additive. In laboratory studies, pFF is approximately three times less potent compared to fentanyl, however, concentrations in drug deaths suggest that deaths can occur with concentrations similar to those involving fentanyl. pFF is believed to be added to fentanyl to increase total drug volume for distribution, to dilute the drug being cut, and to enhance the pharmacological effect. Its increase in prevalence may also be a result of a transition by illicit manufacturers to more readily available precursors.

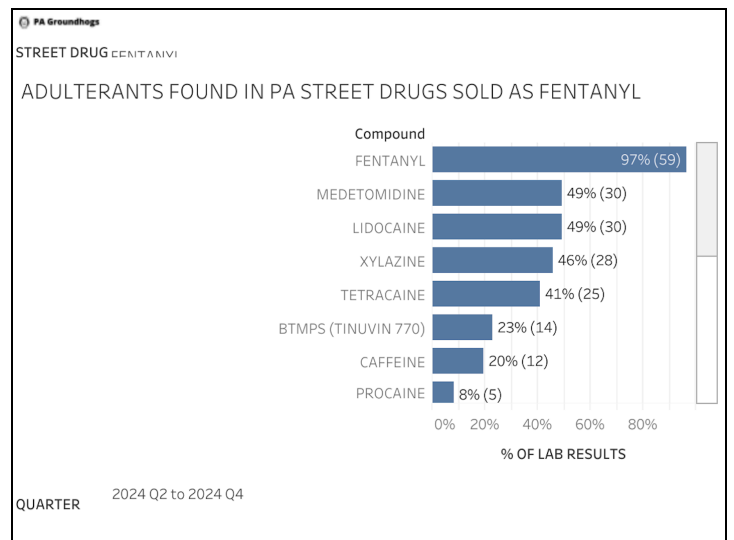


MEDETOMIDINE:

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 sample from Philadelphia containing the drug. Since then 156 exhibits have tested positive for the potent tranquilizer, or 61% of the total dope samples tested.



Q3/23 to Q1/24



Q2/24 TO Q4/24

The rapid influx of medetomidine has knocked xylazine from the most prevalent adulterant found with fentanyl, present in 85% of Pennsylvania’s dope samples at the end of 2023, down to third place, present in fewer than half of dope samples at the end of 2024 .

Medetomidine, a sedative and analgesic used in veterinary medicine, is easily obtained from China and is replacing the more scrutinized drug, xylazine, as the most common adulterant in retail dope samples. It is not approved for human use, and its inclusion in illicit drug formulations is particularly concerning because of its potent pharmacological effects:

- Medetomidine acts as an **alpha-2 adrenergic receptor agonist**, causing sedation, bradycardia (slowed heart rate), and hypotension.



- Medetomidine can cause severe **bradycardia** and **hypotension**, which may lead to cardiovascular collapse, especially when combined with fentanyl's depressant effects.

- 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 coma. It may also contribute to memory impairment, dizziness, and impaired coordination, increasing the risk of injury.
- According to emergency room doctors and people who use drugs, medetomidine has a rapid onset and especially severe withdrawal syndrome.



LOCAL ANESTHETICS

The use of procaine, tetracaine, benzocaine, and lidocaine (**so called 'caine' drugs**) as adulterants increased significantly over the past year. The use of these topical or local anesthetics, which can be obtained from China for as little as \$10 a kilogram, poses significant risks, including neurotoxicity, cardiovascular depression, and in severe cases, life-threatening conditions like seizures and methemoglobinemia. Proper awareness and prompt medical intervention are critical in cases of suspected exposure.



1. 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

2. Tetracaine:

Known for systemic toxicity, it can cause neurotoxicity, including convulsions and nervous system abnormalities termed Local Anesthetic Systemic Toxicity (LAST) even at low doses. Highly lipid-soluble and potent, tetracaine has a lower therapeutic index, increasing the risk of central nervous system and cardiovascular toxicities.

3. Benzocaine:

Methemoglobinemia is a well-documented risk, leading to reduced oxygen-carrying capacity of blood, presenting as cyanosis and hypoxia. Symptoms may escalate to life-threatening levels with significant exposure

4. Procaine:

Less toxic than lidocaine, but ingestion can cause nausea, vomiting, dizziness, and cardiovascular depression at high doses. If injected intravenously (instead of intramuscularly), 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.

TINUVIN 770 (BTMPS)

Tinuvin 770, bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate (BTMPS), is a UV light stabilizer commonly found in plastics. It has been studied for its toxic effects, particularly when used in contexts like medical equipment or food packaging. Its use as an adulterant with fentanyl, while not well-documented directly, raises significant health concerns due to its toxic profile. **BTMPS first appeared in PAG's database in June 2024, as an adulterant in a dope sample sent to us from Pittsburgh.** By July PAG samples in Philadelphia were testing positive for the substance, which acts as a calcium channel blocker, lowering blood pressure in humans. **Since its first appearance BTMPS has been present in 74 samples with increasing frequency.** It varies in concentration, and in one case was determined to be the primary drug in a sample of Philadelphia dope. Below are the key findings on its potential risks:

Cardiotoxicity:

Tinuvin 770 has been shown to cause myocardial damage, including focal myocytolysis and hypercontraction necrosis, due to intracellular calcium accumulation and catecholamine release.

Acute hemodynamic effects observed in animal models include significant declines in blood pressure and cardiac contractility, leading to irreversible circulatory failure at higher doses.

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

The toxic effects of Tinuvin 770 could synergize with fentanyl's potent opioid effects, exacerbating cardiovascular and respiratory depression. Its impact on calcium channels and receptor systems may heighten the risk of sudden cardiac events, especially in individuals already vulnerable due to opioid toxicity. Lack of awareness and detection methods for such adulterants further complicates harm reduction and treatment efforts.

CONCLUSION

The increasing number of adulterants found in the current drug supply has elevated drug checking and surveillance to arguably the most critical component of a comprehensive harm reduction strategy outside naloxone distribution. The most recent data from the CDC shows overdose fatalities are on the decline. This is something to celebrate. But a new collection of drug-related harms has emerged over the past year forcing an overhaul of long established protocols for overdose response and drug treatment. PA GROUNDHOGS has revealed critical insights into Pennsylvania's drug landscape. The introduction of novel substances and shifting use patterns highlight the need for adaptive strategies in harm reduction and policy-making. In 2025, we anticipate:

1. Increased focus on the clinical implications of rapid changes to the opioid supply, including new complexities of withdrawal management;
2. The gradual disappearance of xylazine from the dope supply as medetomidine proliferates across the region;
3. Continued uncertainty in the fentanyl supply: The Trump administration's [designation](#) of Mexican drug trafficking organizations as foreign terrorist organizations and cartel infighting in Sinaloa may facilitate increasing experimentation with non-fentanyl opioids including nitazenes from China.
4. Potential for fentanyl availability/price stabilization as chemists displaced from Sinaloa find employment closer to US/Mexico border
5. Potential disruption in the benzodiazepine market due to the United Nations designation of bromazolam a schedule IV controlled substance on [December 3, 2024](#)

PA GROUNDHOGS (PAG), Pennsylvania's street-to-lab drug-checking organization, is dedicated to harm reduction, overdose prevention, and real-time drug supply monitoring. By providing free lab-based drug analysis and early warning alerts, PA GROUNDHOGS empowers individuals, harm reduction organizations, clinicians and public health officials to respond effectively to changes in the regional drug supply. In 2024 PAG received funding from Vital Strategies, The Tuttleman Foundation & The Scattergood Foundation. Learn more at PAGROUNDHOGS.ORG