



averhealth



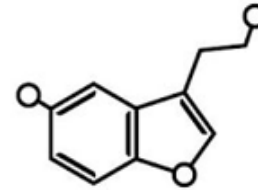
- Testing Technology
- Specimen Options
- Results Interpretation
- The Deception of Dilution
- Adulterants



Effective substance use monitoring requires **random, scientifically valid, forensically defensible, and timely objective** information, a combination that enables therapeutic intervention and helps Patients to develop coping and refusal skills to new use.



Forensically Defensible
Test results meet Daubert and Frye scientific rules of evidence and supported by case law.



Scientifically Valid
Use proven technology accepted by the scientific community and evaluated by peer-reviewed journals.



Sustained Sobriety
Providing accurate test results that facilitates timely treatment intervention and support recovery.



Timely Objective
Positive or negative results within 48 hours of sample collection enabling timely intervention.



Random
Equal probability to test each day, including weekends and holidays. Not related to treatment, supervision, or court schedules. Notification period is best when limited to 2 to 12 hours.



- Since 1995, Averhealth has helped to reclaim lives, unite families, and strengthen communities by helping people to overcome substance use.
- We do this by integrating technology, people, and science to create and provide the smartest, most innovative solutions for substance use monitoring.
- Today, Averhealth cares for over 550,000 clients nationwide serving more than 2,700 treatment courts and social service programs



Technology: Aversys

- Daily client notification and engagement. Clients check in daily via web, phone or text
- Random selection
- Aversys allows instant access to client information like testing compliance and analytics to help staffing sessions run smoothly



People: Facing Forward

- Work side-by-side with local care team
- Training, Support and Testimony
- Observed Collection Specialization
Averhealth staff collect more than one million same gender observed collections annually
- Prosocial client environment



Science: Super Laboratory

- Nationally Certified with CLIA, CAP-FDT, and DEA Certifications
- Broad Testing Menu. Averhealth tests for more than 1,500 substances including substances designed to avoid detection
- Next Business Day Results



- Averhealth is accredited by CLIA, the College of American Pathologists (CAP-FDT), and the State of New York
- We are subject to comprehensive reviews and certifications by CLIA and the College of American Pathologists (“CAP”) for the CAP Forensic Drug Testing (“CAP-FDT”) certification
- Averhealth is one of only 30 U.S. labs that have achieved CAP-FDT certification



Clinical
Laboratory
Improvements
Amendments



Testing Technology



A selection of the optimal testing technology for a given situation must consider:

- **Sensitivity:**
 - Can the test correctly detect the presence of a drug in the specimen?
 - Greater sensitivity increases window of detection and can detect a lower dose.
 - How accurate is your positivity rate?
- **Specificity:**
 - Does the test mistake other substances for the targeted drug (cross reactivity)?
 - How accurate is your negative rate?
- **Substance:** alcohol (Ethanol or EtG), THC, synthetic THC, opiates, cocaine, etc.
- **Specimen Type:** urine, oral fluid, hair, breath, blood, sweat, finger nails, etc.
- **Time:** NADCP Best Practices and Standards maintain that test results should be available within 48 hours of samples collection.
- **Cost:** ranges from about \$1 to over \$2,000





- Used with just urine or oral fluid
- Qualitative only (positive or negative)



- Threshold 50 to 1000 ng/ml
- Detects classes of drugs, a 'wide net approach'





Pros

- Results in minutes
- Low Cost
- Just about anyone can administer

Cons

- Variable and Subjective results
 - Variably reactive with drugs within a class
 - Vulnerable to cross reactivity with unrelated substances
- Incapable of distinguishing among specific drugs within a class
- Cannot differentiate new use from residual elimination
- Limited case law
- No proficiency testing
- Fixed test panel
- Yuck factor – urine dip anyone?



- Detects classes of drugs, a 'wide net approach'
- Used with most specimen types
- Usually qualitative (positive or negative)
- Threshold: 2 to 1000 ng/ml





Pros

- Can establish a custom panel for each client
- Ability to rotate the tests on the panel to cover more drugs
- Established case law
- Distinguish between new and residual elimination

Cons

- Results based on reaction to an antibody
- Drug present below the threshold will be deemed negative
- Cross-reactivity noise (i.e., false positives or unconfirmed positives)
- Many drugs lack antibodies, so no screen is possible



			% of Cutoff			
	0	500	75%	100%	125%	
AMP (ng/ml)	0	500	750	1000	1250	1500
(+/-)	0/135	0/135	34/101	75/60	110/25	135/0
BAR (ng/ml)	0	150	225	300	375	450
(+/-)	0/135	0/135	34/101	74/61	102/33	135/0
BUP (ng/ml)	0	5	7.5	10	12.5	15
(+/-)	0/135	0/135	33/102	73/61	101/34	135/0
BZO (ng/ml)	0	150	225	300	375	450
(+/-)	0/135	0/135	29/106	75/60	107/28	135/0
COC 150 (ng/ml)	0	75	112.5	150	187.5	225
(+/-)	0/135	0/135	33/102	75/60	105/30	135/0
COC300 (ng/ml)	0	150	225	300	375	450
(+/-)	0/135	0/135	30/105	65/70	96/36	135/0
MDMA (ng/ml)	0	250	375	500	625	750
(+/-)	0/135	0/135	35/100	75/60	95/40	135/0
MET500 (ng/ml)	0	250	375	500	625	750
(+/-)	0/135	0/135	32/103	77/58	99/36	135/0
MET1000 (ng/ml)	0	300	750	1000	1250	1500
(+/-)	0/135	0/135	31/104	77/58	98/37	135/0
MTD (ng/ml)	0	150	225	300	375	450
(+/-)	0/135	0/135	31/104	69/66	95/40	135/0
OPI300 (ng/ml)	0	150	225	300	375	450
(+/-)	0/135	0/135	33/102	70/65	95/40	135/0
OPI2000 (ng/ml)	0	1000	1500	2000	2500	3000
(+/-)	0/135	0/135	37/98	76/59	104/31	135/0
OXY (ng/ml)	0	50	75	100	125	150
(+/-)	0/135	0/135	50/85	86/49	111/24	135/0
PCP (ng/ml)	0	12.5	18.75	25	31.25	37.5
(+/-)	0/135	0/135	26/109	62/73	99/36	135/0
PPX (ng/ml)	0	150	225	300	375	450
(+/-)	0/135	0/135	34/101	77/58	103/32	135/0
TCA (ng/ml)	0	500	750	1000	1250	1500
(+/-)	0/135	0/135	24/111	60/75	99/36	135/0
THC (ng/ml)	0	25	37.5	50	62.5	75
(+/-)	0/135	0/135	27/108	58/77	91/44	135/0

- For common drugs of abuse, instant tests are wrong on about 1 of 4 samples when the substance is within the +/-25% of the Cutoff Level
- Data based on synthetic samples precisely spiked with a known concentration of substance
- The introduction of cross reactivity noise leads to a higher error rate



Feature	Laboratory	Instant
Urine	✓	✓
Established Case Law	✓	
Definitive Test Results	✓	
New vs. Residual Analysis	✓	
Expansive Test Menu	✓	
Test Panel Flexibility	✓	
Oral Fluid	✓	✓
Hair	✓	
Blood	✓	
Proficiency Testing	✓	
Regulated	✓	



- Detects individual drugs, a ‘targeted approach’
- GC/MS (better) or LC/MS/MS (best)
- Result based on molecular fingerprint of substance
- Quantitative results
- Threshold: <math><1</math> to 100 ng/mL





Pros

- Sensitive: detects very small amounts of drug in a sample (<1-10 ng/mL).
- Specific: distinguishes individual drugs and related metabolites.
- State-of-the-art, viewed as “gold standard” for forensic laboratories.
- Objective, quantitative result.
- Can detect virtually any drug (not limited to an antibody) because test results are compared to databases: NIST, reference books, in-house libraries

Cons

- Time: takes longer. Must complete sample preparation before beginning analysis.
- Costs: cost more. Sample prep, consumables, and equipment all cost more than an immunoassay screen.



The required standard is determined by the use of the test result and potential sanction, fine, or punishment.

Laboratory Screen

- Increased treatment, essay, juror box, or some other graduated sanction.
- A Patient that self-admits is on the right track to recovery, no confirmation is necessary.
- If a Patient adamantly denies use, then order a confirmation.

Confirmation (LC-MS/MS or GC/MS)

- Jail, prison, loss of driving privileges, or any other loss of liberty.
- Adjudication requires a high degree of certainty and precision.
- Why not use chromatography for every test? (Time & Costs)



Specimen Options



What difference does a biological specimen make to drug test results?



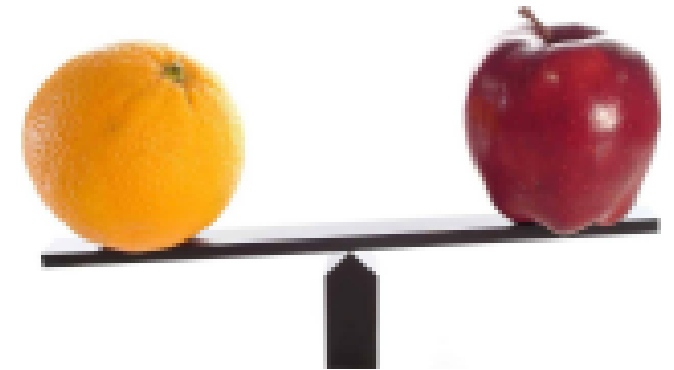


- **Dose** amount substance consumed.
- **Absorption** into the blood stream.
- **Distribution** to organs and tissues.
- **Metabolism** to inactive compounds.
- **Elimination** from the body via urination, sweat, oral fluid, hair, nails.



- **Blood & Breath:** Indicate what is currently in the system & may be affecting function
- **Oral Fluid:** Similar to blood, but capable of detecting fewer drugs
- **Urine:** Indicates prior use
- **Hair:** Historical use

**Oral fluid and blood may test negative,
while urine and hair test positive.**



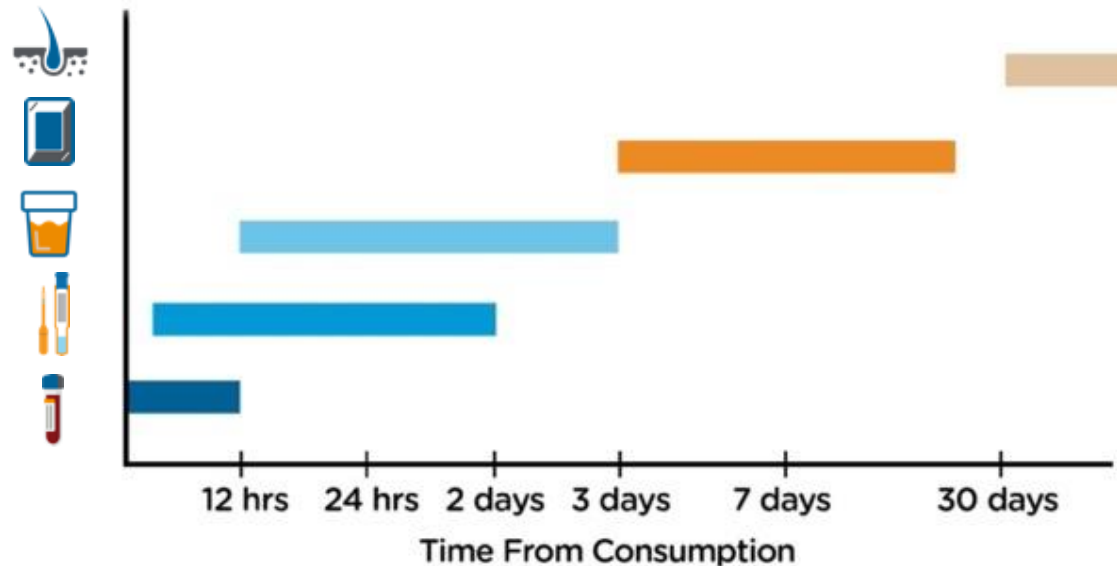
Comparing specimen types is like comparing apples to oranges, it doesn't work



Detection time varies for each specimen time - elimination time matters.

- Blood & Breath: 8 to 12 hours
 - Oral fluid: 5 to 48 hours
 - Urine: 0.5 to 5 days
 - Sweat: 5 to 10 days
 - Hair: 2 weeks to months
- Drug use is detectable within minutes of consumption
- Require multiple doses / uses to produce a positive result

Specimen Types Detection Windows





Distribution

- Seconds to Minutes: Smoked drugs appear in blood
- Minutes to Two Hours: Orally ingested drugs in blood and drugs move from blood to oral fluid and (alcohol, inhalants) breath
- About One hour: Drugs appear in urine
- One to Seven Days: Drugs appear in hair

Elimination

- One to Two Days: Drugs most likely cleared from blood or oral fluid
- After Three Days: Most drugs cleared from urine
- After One Week to Several Months: Drugs only found in hair



Specimen	Breadth of Detectable Drugs	Detection Window	Collection Process	Primary Use
Blood	Broad	8 to 12 hours	Invasive	DWI, Post Mortem
Breath	Narrow	8 to 12 hours	Non-Invasive	DWI
Oral Fluid	Moderate	5 to 48 hours	Non-Invasive	Abstinence Monitoring
Urine	Broad	2 to 3 days	Moderately Invasive	Abstinence Monitoring
Sweat	Narrow	5 to 10 days	Non-Invasive	Special Situations, Rural
Hair	Moderate	2 weeks to 3 months	Non-Invasive to Invasive	Child Custody, Rural



Best Use

- Indicates possible or probable impairment.
- What the central nervous system is currently exposed to.
- Commonly used for DUI & Post-Mortem.

Benefits

- Difficult (impossible) to adulterate/substitute.
- Accurate for certain substances within a specified detection window.

Drawbacks

- Short window of detection.
- Limited volume.
- Invasive. Phlebotomist must conduct the collection.
- Noisy specimen (protein, blood cells, lipids).
- Low concentration of drug levels, requires sensitive test.
- Cost.



Best Use

- Currently intoxicated?
- Used independently, does not work well for abstinence monitoring.

Benefits

- Difficult (impossible) to adulterate.
- Immediate results.
- Readily available in virtually unlimited quantities.

Drawbacks

- Limited to ONLY ALCOHOL.
- Short detection window of about 8 to 12 hours.
- Must use a certified collection device that is appropriately calibrated.
- Technician must be trained on proper collection protocols – this is not a bar game.



- **Best Use**
 - Indicates prior exposure.
 - Does not perfectly correlate with impairment but implies current impairment.
- **Benefits**
 - Less invasive.
 - Does not require gender specific technician to conduct collection.
 - No need to ask recent or residual – Positive = Positive
 - Difficult or impossible to adulterate.
- **Drawbacks**
 - Shorter detection window of 5 to 48 hours.
 - Low detection levels.
 - Higher percentage of Quantity not Sufficient for Confirmation testing due to minimal sample volume.
 - Cost, but technology is improving.



Best Use

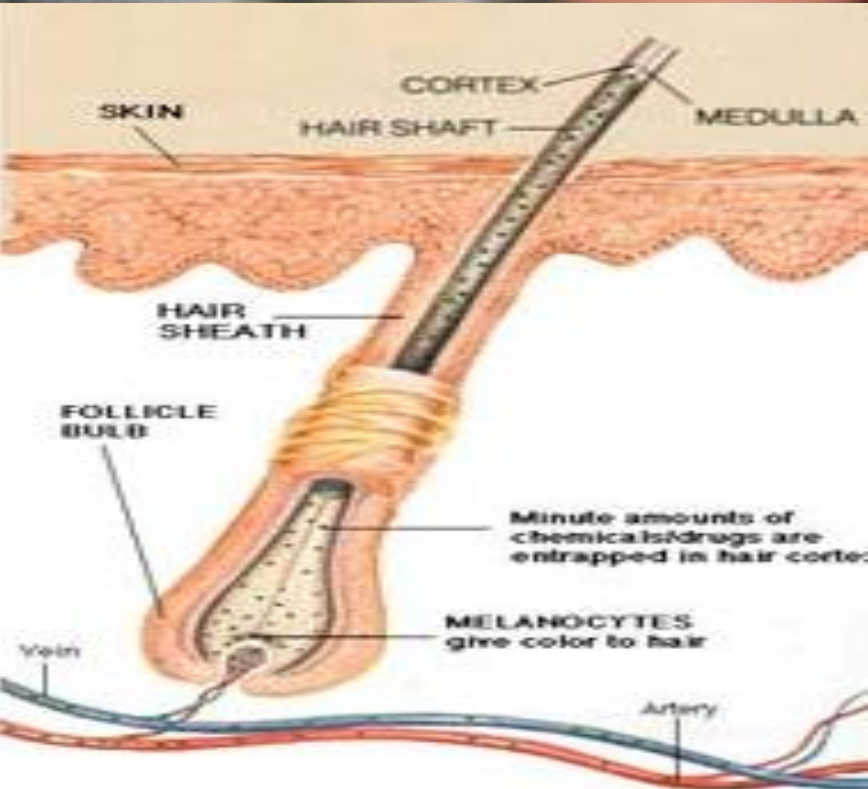
Ideal for abstinence monitoring – frequent, random drug testing

Benefits

- Broadest spectrum of drug tests.
- Lower cost relative to other specimens.
- Small sample volume (30 ml) supports multiple tests.
- Contains high concentration of drugs.
- Detects both recent and past usage.

Drawbacks

- Must follow collection procedures.
- Must conduct validity (dilution) testing.
- Must guard against attempted substitution and adulteration



Best Use

Monitor extended periods of time (employment testing, not abstinence monitoring) or establish a baseline a previous history. Low volume testing.

Benefits

- Long detection window, ranging from ~2 weeks up to ~3 months
- Difficult to adulterate
- Not intrusive, if properly collected

Drawbacks

- Requires an accumulation of use (e.g. 2-5 joints over 3-5 days) delaying relapse identification.
- Lack of head hair...that's ok, any body hair will suffice (extends detection window).
- Hair color, texture and treatments can affect results
- Environmental and occupational exposure



Best Use

Short-term to intermediate monitoring

Benefits

- Non-invasive
- Extended wear (7 to 14 days)

Drawbacks

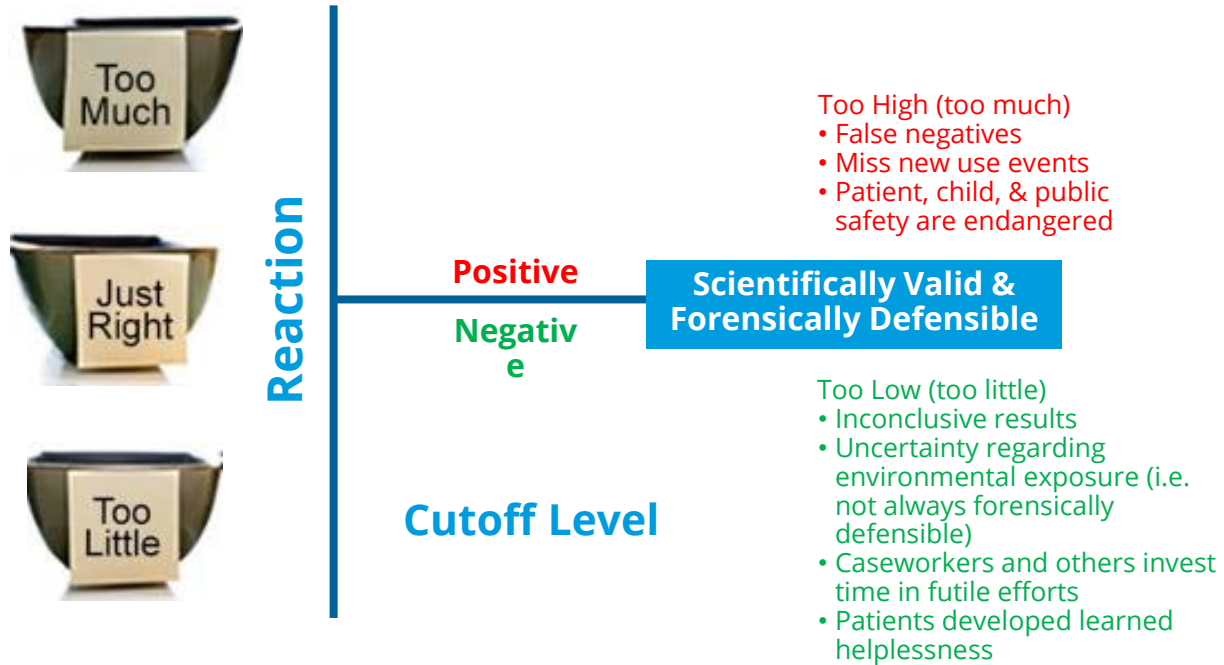
- Environmental and occupational exposure
- Requires accumulation of drug use for detection
- Extended lead time to identify relapse
- Removal caused by life activities or attempts to circumvent test
- Cost



Results Interpretation



Cutoff levels help to ensure that drug testing is *scientifically valid* and *forensically defensible*.




From a legal perspective, a specimen that produces a reaction just below the cutoff level is as equally negative as a specimen that produces a reaction far below the cutoff level.

- Cutoff levels serve as a safeguard designed to ensure the reliability of testing results.
- Drug tests can be unreliable at detecting the presence (or absence) of drugs at concentrations below the cutoff levels (thresholds).



The Patient is abstaining from drug use or:

- Patient did not use enough to be detected
- Patient is not using frequently enough to be detected
- Detection window has closed
- Drug test is not sensitive enough (i.e., cutoff level is too high)
- Specimen is dilute or tampered
- Patient is using a drug that is not on the test panel



Feasible in the short-term, but prevented by frequent, random testing over time



The Patient used the drug that tested positive

- Most positive results do not measure how much? How intoxicated? How high?
- Positive results generally tell us that the Patient ingested a banned substance or a substance that cross-reacts with a banned substance.
 - Substances that cross-react with banned substances are generally treated as banned substances, unless the Patient obtains approval for such substances.
 - Occasionally, Patients will vehemently deny drug use. Due process mandates that these Patients should have the option of requesting a confirmation test.



Imagine a bowl of M&Ms and Skittles.

- Green M&Ms are strictly prohibited, while green Skittles are permitted.
- Immunoassay screens detects all green candy; both M&Ms and Skittles.
- Immunoassay screens will deem a client that consumes green Skittles as positive for green.
- This is **cross reactivity**, a known limitation of the immunoassay screen methodology.
- Conversely, confirmation testing distinguishes between green M&Ms and green Skittles.



Why bother to screen specimens and not just confirm every sample?

- Time and cost.
- Confirmations are rarely required when high standards are followed and patients abstain from banned substances.
- When a client adamantly denies substance use, request a confirmation prior to punitive intervention.
- Intervention should not be delayed if there is a concern for client or public safety.
- Averahealth recommends a confirmation test when the client denies use and is faced with a loss of liberty.



Denial and manipulation are unfortunately tenants of addiction.

- Fortunately, we do not have to determine the legitimacy of every inventive story.
- Patients who test positive may request a confirmation test.
- A positive drug test, no matter the cause, is in violation of the Patient contract
 - Medication Guide informs Patients of acceptable medications for common symptoms (Acceptable Medications = no patterns of abuse or cross reactivity issues).
 - Everyday substances that can cross-react with the screen (e.g., poppy seeds) so if clients adamantly deny use after a positive result, you can consult with one of our expert toxicologists.



Detection Window

- EtG aids in detecting ingestion for up to two days after light or moderate drinking and up to four days in heavy drinkers.

Screen Cutoff

- 500 mg/mL
 - Research demonstrates that an EtG positive in excess of 500 ng/mL is not associated with everyday products.
- What does it mean if a Patient tests positive for EtG?
 - **Ethyl Gluconuride, EtG**, is a metabolite of alcohol (ethanol) that is used as a marker for consumption of alcoholic beverages.
 - **Ethyl Sulfate, EtS**, is a second metabolite of alcohol (ethanol) that is used in conjunction with EtG as a marker for consumption of alcoholic beverages.



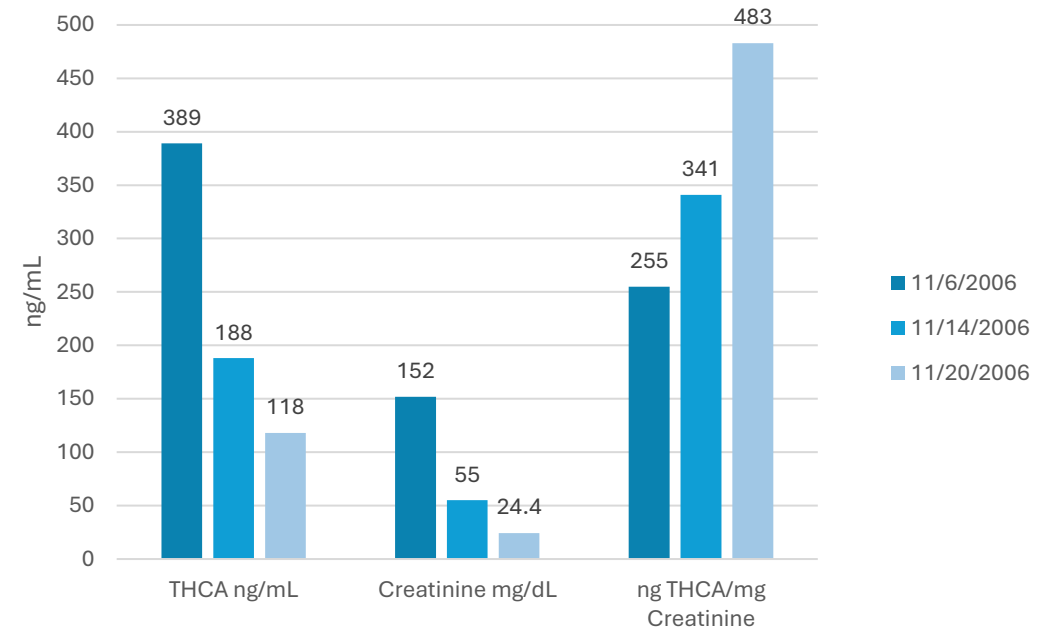
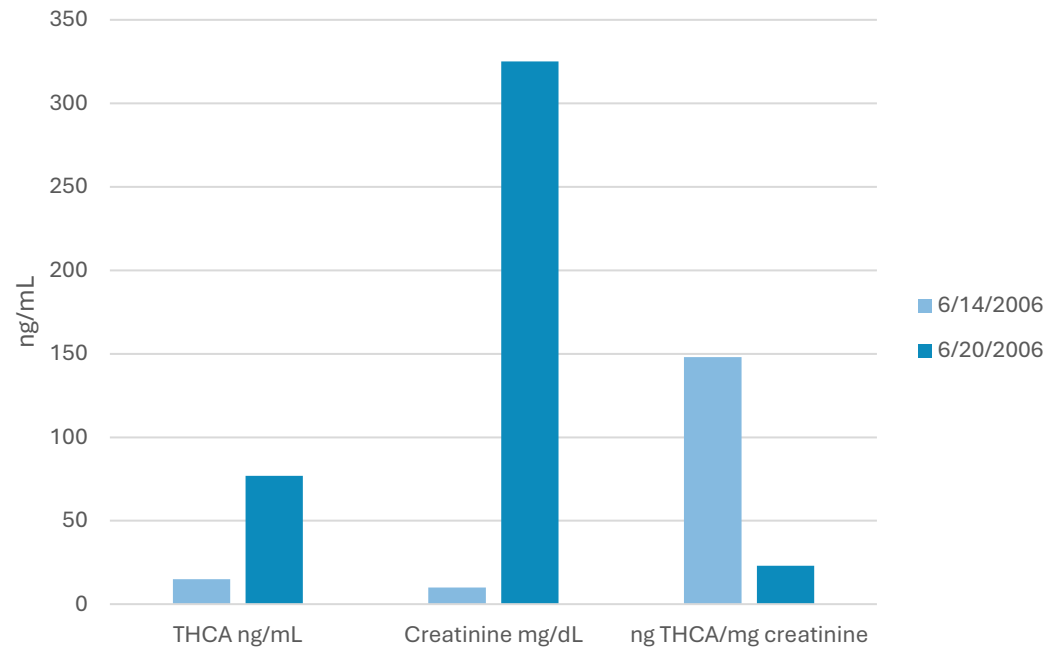
- Popular assumption is that the THC detection window is 30 days or more.
- Assumption is supported by various non-scientific media that indicate the body retains THC for a couple months to 17 years after use.
- Conventional wisdom quandary:
 - Delays intervention (therapeutic or child protection)
 - Delays timely judicial sanction
 - Encourages Patients to deny use

THC detection window is closer to 7 to 25 days & is only an issue when a Patient initially submits to testing.

Cutoff		
<u>Detection Time</u>	<u>20 ng/ml</u>	<u>50 ng/ml</u>
Occasional Use	Up to 7 days	Up to 3 days
Chronic Use	Up to 25 days	Up to 14 days



- Only an issue when a Patient first submits to testing
- Only an issue for THC
- If simplified approach does not answer the question, call your lab for qualified toxicological support. More in-depth analysis using recent tests results can be done to distinguish between new use and residual elimination.





The Deception of Dilution

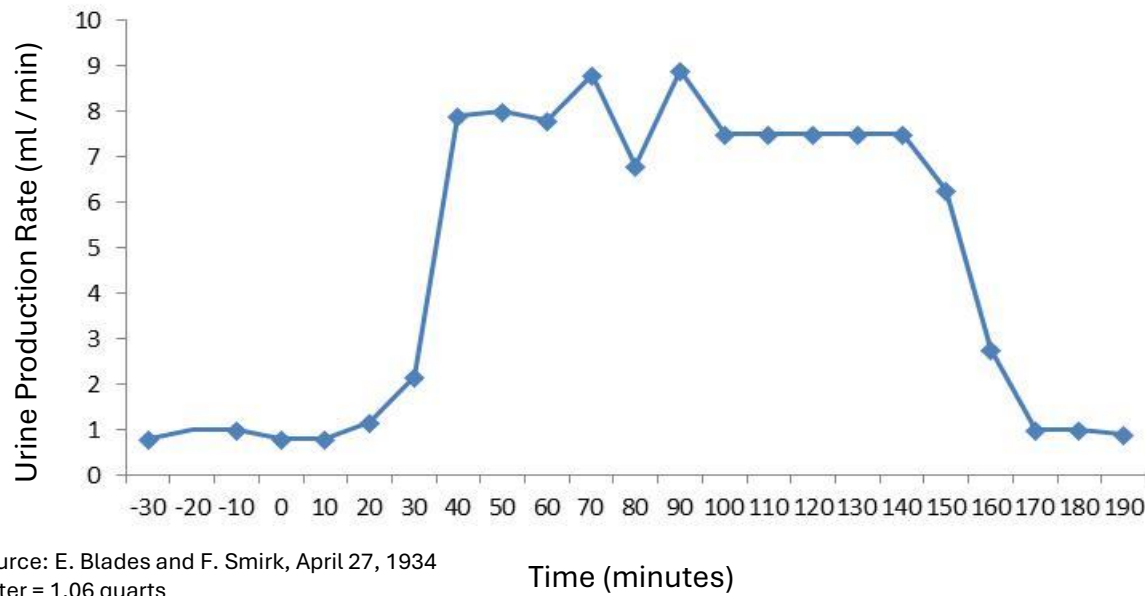


- Urine specimen dilution is **the** most common ploy used to avoid the detection of drug (drug and alcohol) use.
- Consuming excess fluid over a short period of time lowers the concentration of detectable drugs in urine, reduces creatinine levels.
- The combination of a directly observed collection with creatinine testing reduces the Patient's ability to dilute a urine sample.
 - Observation ensures the Patient does not dilute the sample post urination (i.e. adding water to the specimen post collection).
 - Creatinine test detects if the Patient is diluting prior to submitting a urine sample.

We cannot intervene to change a Patient's behavior if we do not know that the Patient has relapsed.



- Water loading / flushing is the rapid consumption of a copious volume of fluid.
 - Rapid consumption = 90 minutes
 - Copious volume = 2-4 quarts (about 2-4 liters)
- Water loading increases the volume of water relative to the volume of detectable drugs, creatinine, and other solids for a period of 2-3 hours...resulting in possible negative drug tests and low creatinine levels.



Source: E. Blades and F. Smirk, April 27, 1934
1 liter = 1.06 quarts

Urine production is a function of time and volume. Rapidly consuming 1L of water will cause the urine production rate to sharply increase.

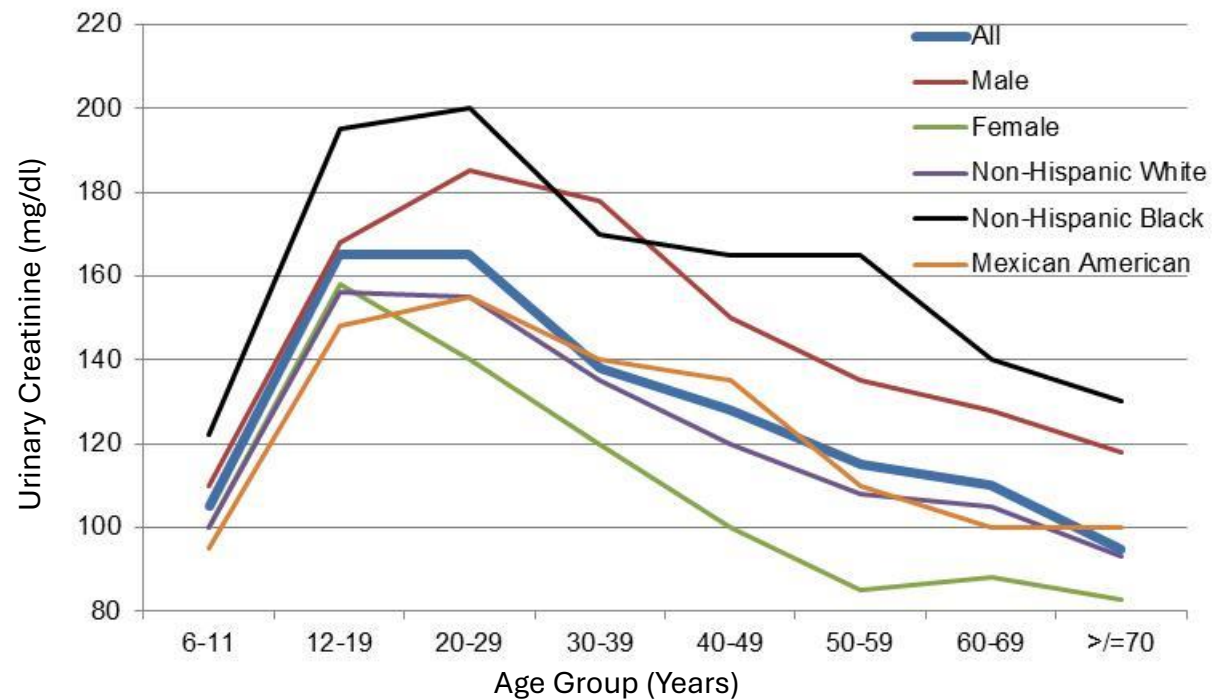


- Consume a large volume of fluid, which results in a drug detection level that is less than the cut-off level and produces a negative test.
- Water is the cheapest and most readily available fluid.
- Other products exist (Gold Seal, Clean'n Clear, Naturally Clean, Test Free, Ultra Klean, etc.), however product directions require the rapid consumption of a copious volume of fluid.
 - There is no evidence to support the ability of such products to eliminate drugs from urine.
 - Patients are instructed to drink a lot of water prior to testing and/or to abstain from drug use for 5 to 7 days prior to the test date.





- Creatinine is a by-product of muscle metabolism that is produced at a relatively constant rate throughout the day.
- Normal Creatinine is about 130 mg/dl –
“Urinary Creatinine Concentrations in the U.S. Population: Implications for Urinary Biologic Monitoring Measurements”, Dana Barr et al, September 23, 2004



*Less than 1%
of sample
population
had creatinine
level below 20
mg/dl*



- Muscle produces a relatively constant amount of creatinine throughout the day.
- Kidneys filter a constant volume of creatinine from blood per unit of time.
- The creatinine excretion rate (CER) for a normal, healthy person can be predicted with a 95% confidence at -2.5% to +1.0% -- *Dr. Joachim H., IX et al, October 22, 2010*

Therefore, urine creatinine levels for a normal, healthy person remain fairly stable:

- Throughout the day (Morning, Afternoon, Evening, Night)
- From Day-to-Day





- **Dilution**, also know as water loading, flushing, over hydrating, etc.
- **Certain Medical Conditions**
 - Rare muscle wasting diseases & some kidney ailments.
 - Patients that always produce a low creatinine level should seek medical treatment.
- **Low creatinine levels are not caused by:**
 - Diabetes (controlled)
 - Exercise
 - High blood pressure
 - Obesity
 - Diet
 - Pregnancy
 - Menstrual Cycle

Denial is common with substance abuse – Patients are expected to deny sample dilution in the same persuasive manner as a positive test result.



It is possible for a Patient's creatinine levels to decline to below 20 mg/dl under extreme conditionHowever, multiple creatinine levels below 20 mg/dl are rare and creatinine levels below 10 mg/dl almost always require a concerted dilution effort.

- **Common extreme condition excuses**

- “I work in the heat and consume a lot of liquids to remain hydrated”...this will cause creatinine levels to increase. The body “knows” to retain excess water for the replenishment of diminished tissue water concentrations and therefore the urine production rate does not increase.
- “I drink coffee, green tea, etc.” – only if the Patient consumes 2 to 4 quarts of such beverage within 90 minutes, equating to more than one Big Gulp every 30 minutes.
- “I take [drug abc] to manage [condition xyz]” – very few medications will cause a low creatinine level, please check with a healthcare provider if a Patient attributes a low creatinine level to a prescribed or over-the-counter medication.



- **NADCP's Policy:** Urine samples with a less than 20 mg/dl should be considered dilute
- **Common Laboratory Reporting:** Specimens with a creatinine level less than 20 mg/dl are reported as an abnormal specimen

The goal is to encourage positive behavior while preventing destructive behavior.



- A dilute sample does not accurately reflect the recent drug use history of the sample Patient.
- Negative test results from a dilute sample should never be interpreted as no drug use
 - If drugs are present, they are probably not detectable due to dilution.
- Positive test results from a dilute sample are valid
 - The Patient just did not consume enough fluid in a short period of time
 - OR**
 - The drug concentration is sufficient to remain above the established cut-off level.

Negative dilute test results **DO NOT** provide accurate data regarding a Patient's potential relapse and consequently comprise the treatment court team's ability to affect positive behavior modifications.



- Do not drink excessive amounts of fluids within two hours of providing a sample.
- Limit the amount of fluid you drink to 32 ounces prior to providing a sample.
 - 7-11 Big Gulps contain 32 ounces of fluid
 - McDonald's large drinks contain 32 ounces of fluid
 - Starbucks Venti size drinks contain 24 ounces of fluid
- Allow your urine to naturally accumulate. The average person naturally creates about one milliliter of urine per minute.
- Drinking excessive amounts of fluid can result in a diluted urine sample.





True or False

1. Creatinine is only excreted through urination.
2. Creatinine levels fluctuate throughout the day and from day-to-day.
3. Drinking a bottle of water (a few cups of coffee, green tea, sports drink, etc.) prior to dropping will cause an abnormally low creatinine level.
4. Exercising or working in the heat and drinking a lot of fluids to remain hydrated will cause an abnormally low creatinine level.
5. Drinking a lot of water (or any other fluid) in a short period of time can cause abnormally low creatinine levels.
6. Rare muscle wasting and kidney diseases can cause abnormally low creatinine levels.
7. Creatinine levels can fluctuate from normal to abnormally low for individuals with rare muscle wasting and kidney diseases.
8. A sample that tests positive, but is dilute, should be viewed as reliable.



True or False

1. Creatinine is only excreted through urination.

TRUE

2. Creatinine levels fluctuate throughout the day and from day-to-day.

FALSE

3. Drinking a bottle of water (a few cups of coffee, green tea, sports drink, etc.) prior to dropping will cause an abnormally low creatinine level.

FALSE

4. Exercising or working in the heat and drinking a lot of fluids to remain hydrated will cause an abnormally low creatinine level.

FALSE

5. Drinking a lot of water (or any other fluid) in a short period of time can cause abnormally low creatinine levels.

TRUE

6. Rare muscle wasting and kidney diseases can cause abnormally low creatinine levels.

TRUE

7. Creatinine levels can fluctuate from normal to abnormally low for individuals with rare muscle wasting and kidney diseases.

FALSE

8. A sample that tests positive, but is dilute, should be viewed as reliable.

TRUE



Emerging Drugs



What are the three most commonly used drugs in America in 2023/2024?



- **Alcohol**

- Past month - 48%
- Binge drinking past month – 21.7%

- **Tobacco**

- Past year - 21.2%
- More than 1 in 5 people smoke cigarettes in **West Virginia, Missouri, Wyoming, Louisiana and Arkansas.**

- **Marijuana**

- Past year - 13%
- #3 overall, but #1 most common illicit drug

National Forensic Laboratory Information System-Drug Top-Five Drug Submissions 2023* by IACP Region

Mountain Pacific Region

1. Methamphetamine
2. Fentanyl
3. Cocaine
4. Heroin
5. Alprazolam

North Atlantic Region

1. Cocaine
2. Fentanyl
3. Methamphetamine
4. Xylazine
5. Heroin

North Central Region

1. Methamphetamine
2. Cocaine
3. Fentanyl
4. Heroin
5. Xylazine

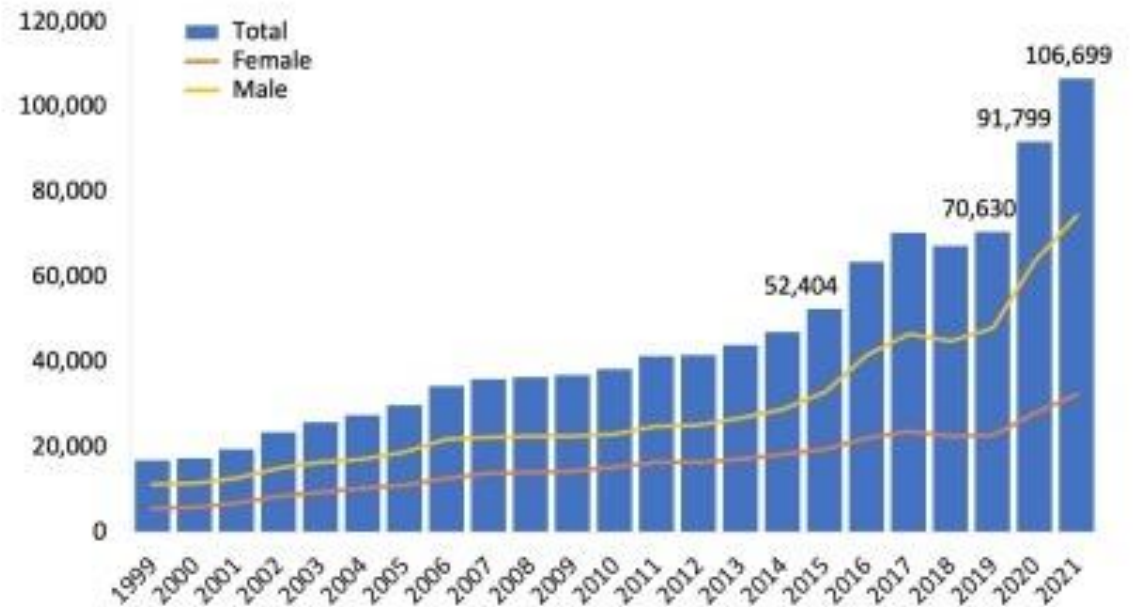
Southern Region

1. Methamphetamine
2. Cocaine
3. Fentanyl
4. Heroin
5. Alprazolam



- According to the DEA, “**107,375** people in the United States died of a drug overdose and drug poisonings in a 12-month period ending January 2022. A staggering **67%** of those deaths involved synthetic opioids like **fentanyl**”
- In 2023 the overdose death rate topped 112,000 in a 12-month period for the first time, according to the Centers for Disease Control and Prevention. White House officials say they have "flattened" the upward curve.

Figure 1. National Drug-Involved Overdose Deaths*, Number Among All Ages, by Gender, 1999-2021



*Includes deaths with underlying causes of unintentional drug poisoning (X40-X44), suicide drug poisoning (X60-X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10-Y14), as coded in the International Classification of Diseases, 10th Revision. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2021 on CDC WONDER Online Database, released 1/2023.



- Since 2018, The Center for Forensic Science Research and Education’s NPS Discovery program has reported **154** newly discovered NPS in the United States (Figure 1). **NPS opioids** remain the largest subclass (Figure 2).
- In 2023, NPS Discovery reported the discovery of **17** NPS for the first time.

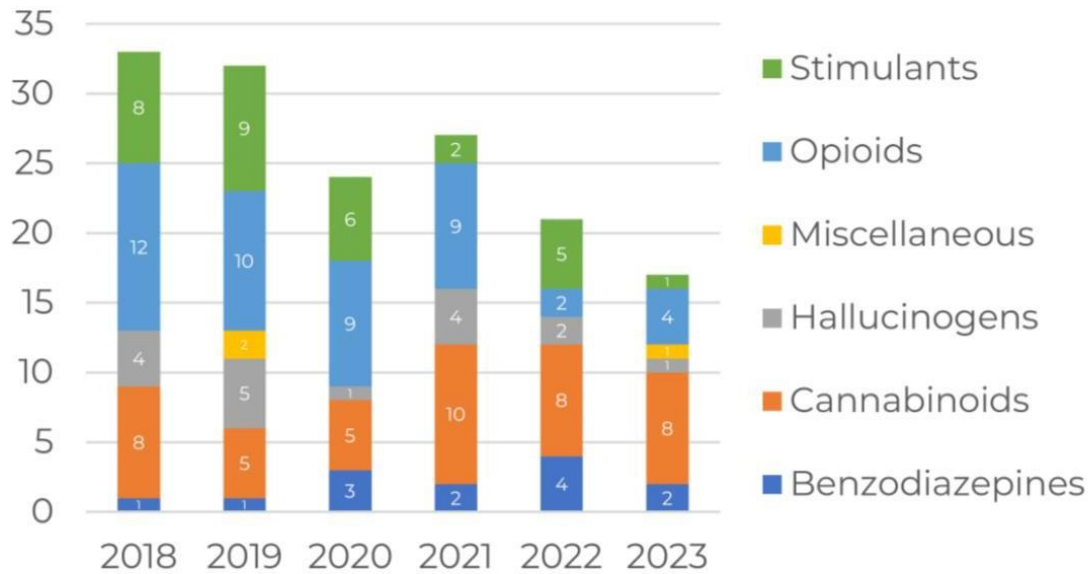


Figure 1: Newly discovered NPS reported for the first time since 2018.

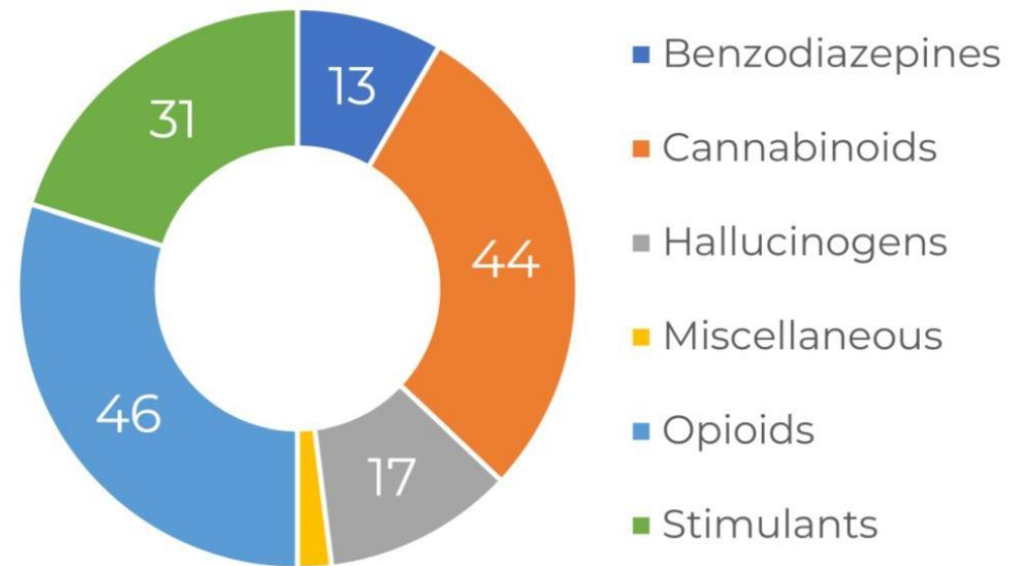


Figure 2: Breakdown by subclass of newly discovered NPS, 2018-2023.



- Since 2018, NPS NPS Discovery has identified **240** NPS in forensic samples (Figure 3).
- **NPS opioids, stimulants, and cannabinoids** represent the largest subclasses.
- In 2023, **79** total NPS were detected (Figure 4).

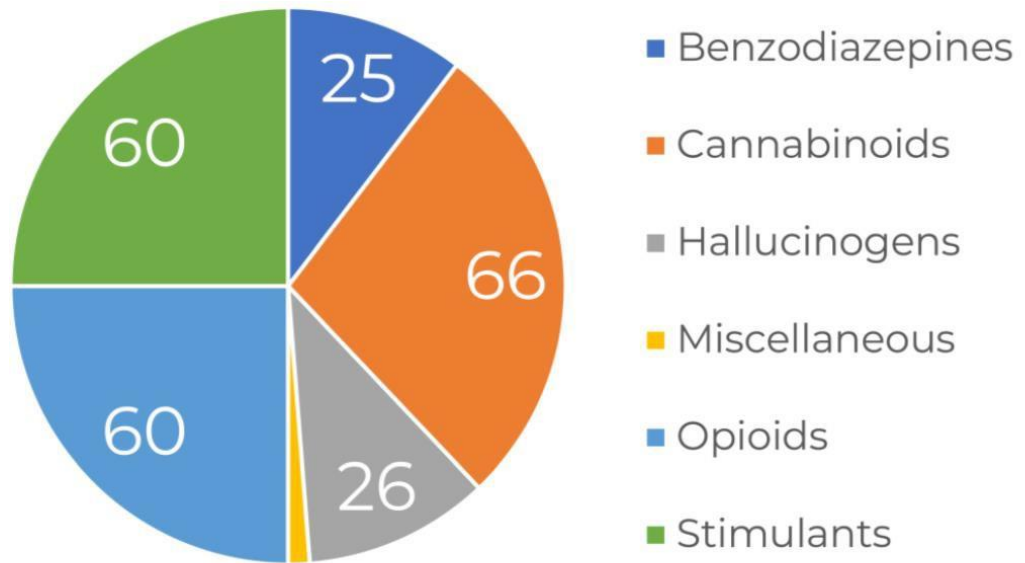


Figure 3: Breakdown by subclass of individual NPS detected, 2018-2023.

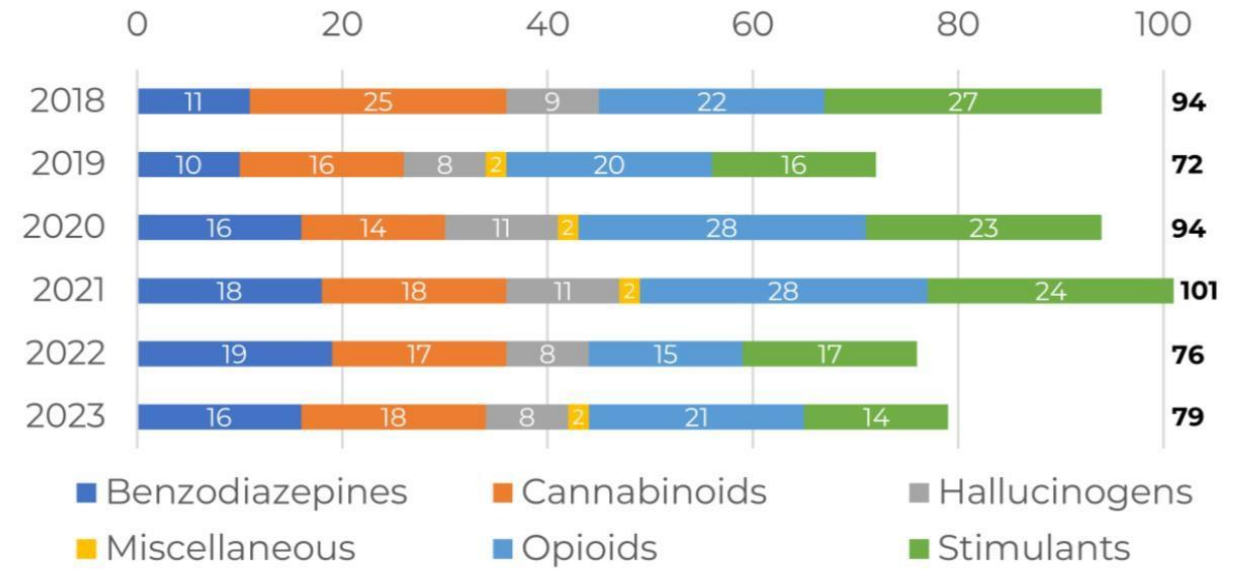
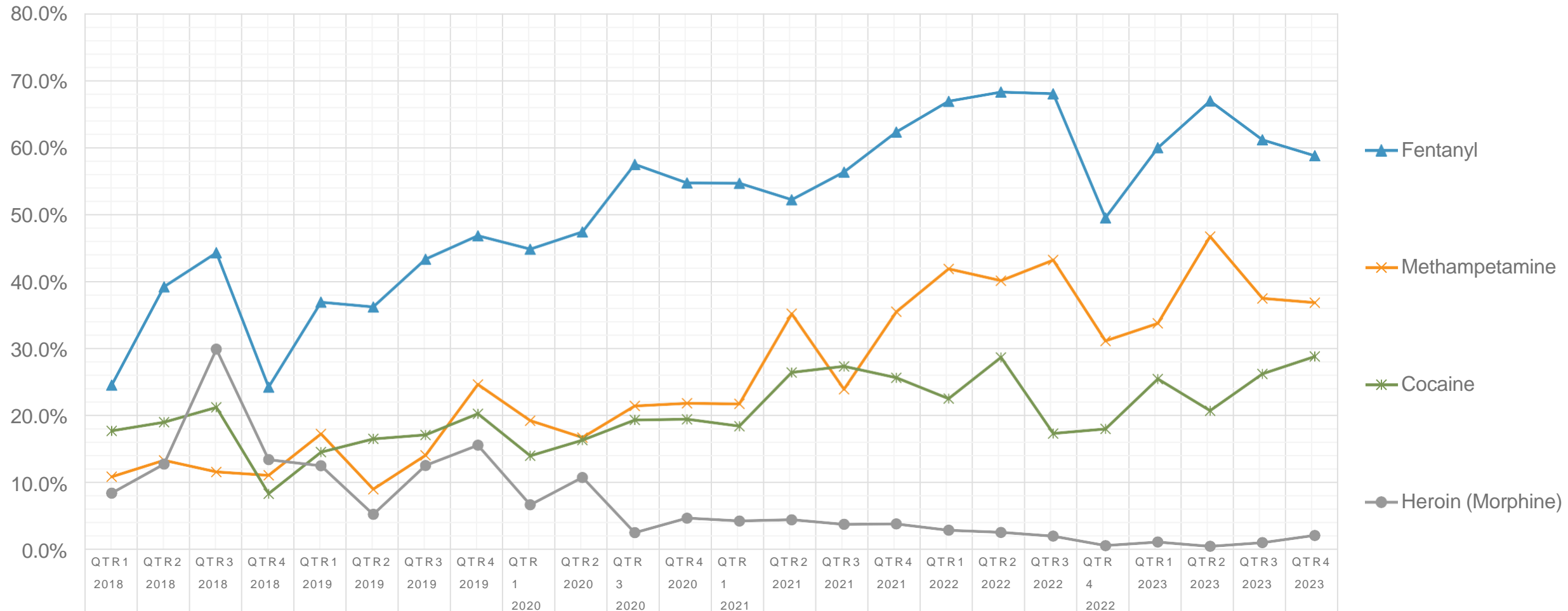


Figure 4: Individual NPS detected each year, cumulative since 2018.



NPS Discovery





- Data **indicates drug seizures** at the U.S.-Mexico border, by pounds seized, are trending down.
 - This good news, at closer look, can be misleading. Seizures of heavier, less-potent drugs like marijuana are down while illicit fentanyl, a drug **100 times more potent** than morphine, are up significantly: 480 percent higher at the southern border in fiscal year (FY) 2023 compared to FY 2020.
- U.S. Customs and Border Protection's (CBP) Border Patrol and Office of Field Operations (OFO) together **seized nearly 549,000 pounds** of illicit drug substances nationwide in FY 2023.
 - Most seizures concerned marijuana (150,000 pounds) and methamphetamine (140,000 pounds), but a notable and growing portion consisted of fentanyl (27,000 pounds). The total number of drug seizures by weight is below previous years: 16 percent below FY 2022, 40 percent below FY 2021, and 50 percent below FY 2020. Overall, this represents a downward trend. Yet, seizures of fentanyl in FY 2023, totaling 27,000 pounds, surpassed fentanyl seizures from the previous three years.
- AMO – Air and Marine Operation

Comparison: Drug Type and Drug Seizures at the Southern Border by Border Patrol and OFO, FYs 2022 and 2023		
Methamphetamine	2022	160,000 lbs.
	2023	121,000 lbs.
Marijuana	2022	85,700 lbs.
	2023	61,200 lbs.
Cocaine	2022	25,200 lbs.
	2023	27,600 lbs.
Fentanyl	2022	14,100 lbs.
	2023	26,700 lbs.
Heroin	2022	1,500 lbs.
	2023	1,200 lbs.
Other Drugs	2022	1,500 lbs.
	2023	2,800 lbs.

Nationwide Fentanyl Seizures by AMO, FY 2020-24	
FY 2023	1,453 lbs.
FY 2022	1,325 lbs.
FY 2021	786 lbs.
FY 2020	558 lbs.



Prince (2016)
Singer/Songwriter
Fentanyl



Tom Petty (2017)
Singer/Songwriter
Fentanyl and Oxycodone



Mac Miller (2018)
Rapper
Fentanyl, Cocaine, and Alcohol



Juice Wrld (2019)
Rapper
Oxycodone



Tony Hsieh (2020)
Zappos
Ketamine and Nitrous-Oxide



Dwayne Haskins (2022)
Quarterback
Hit by a Truck + Alcohol and Ketamine



Taylor Hawkins (2022)
Foo Fighters Drummer
Opiates, Benzos, TCA, and Alcohol



Matthew Perry (2023)
Actor
Ketamine



Testing Challenges



- All major drug classes now have synthetic versions
- Majority started in China
- Purchased over the internet
- Arrive by international mail and “express consignment operations environments” according to the DEA
- Usually see new drugs in Europe first–US about six months later
- Western governments complain to the Chinese government (sometimes at the UN), but clandestine chemists change formulas with ease, and the cycle begins again
- Mexico – faster and cheaper; higher quality and stronger; drug cartel sending fentanyl now that THC is legal in the US
- India is emerging as a source for finished fentanyl powder and fentanyl precursor chemicals



- Pills, powders, liquids seized by law enforcement
- Structure identified by crime lab analytical chemists: LC-MS/MS, GC/MS, FTIR
- Internet sources such as Erowid, Bluelight
- Emergency room admissions provide initial toxicology data
- After standards made – animal studies for pharmacokinetic data
- Very few controlled human studies generally done





Who is using? Waste-water analysis and public urinal studies

Q J Med 2013; **106**:147–152
doi:10.1093/qjmed/hes219 Advance Access Publication 22 November 2012

Analysis of anonymous pooled urine from portable urinals in central London confirms the significant use of novel psychoactive substances

J.R.H. ARCHER¹, P.L. DARGAN^{1,2}, S. HUDSON³ and D.M. WOOD^{1,2}





1. Authorities crack down on existing drug
2. Clandestine chemists tweak the structure – now considered legal!
3. New drugs found on the street by LE in pill, liquid, or powder form
4. ODs, OWIs, ER admissions
5. News stories, public attention
6. Vendors make reference standards
7. Labs develop tests
8. Research done, scientific data published
9. Legislature controls
10. Back to Step 2



Yeah, but Steps 6-7...how do we figure out what these things even are?



- Initially no reference standards to use for test development
- Metabolism unknown:
 - Compounds may be extensively metabolized. If the reference standard is of the parent drug and the drug is completely converted to metabolites, then you might miss it.
 - Which metabolites? Do some closely related drugs metabolize to the same thing? If we find a metabolite, how do we know which drug it came from?
- Doses usually not known – may be extremely low
- Half-life not usually known – how long can it be detected?
- What do screening panels detect, and at what efficiency?
- What transitions (instrument settings) do we use for LC/MS/MS?





Fentanyl



- Fentanyl is an “opioid” – that acts like an opiate in the body but chemically is not an opiate
 - Used since 1963 as an adjunct to surgery
 - 50 – 100x as potent as morphine
 - Half-life is 3 – 12 hr. – detectable in urine for around 3 days.
- **Oral doses:** 100 – 1600 mcg for breakthrough pain for cancer patients
- **Patches:** 25 – 100 mcg/hr. for 72 hrs., surgical breakthrough pain
- **Injections:** 2 mcg/ml for epidural infusion or 25–100 mcg for IV infusion
- **Nasal spray:** 100 – 400 mcg/spray, up to 800 mcg/day



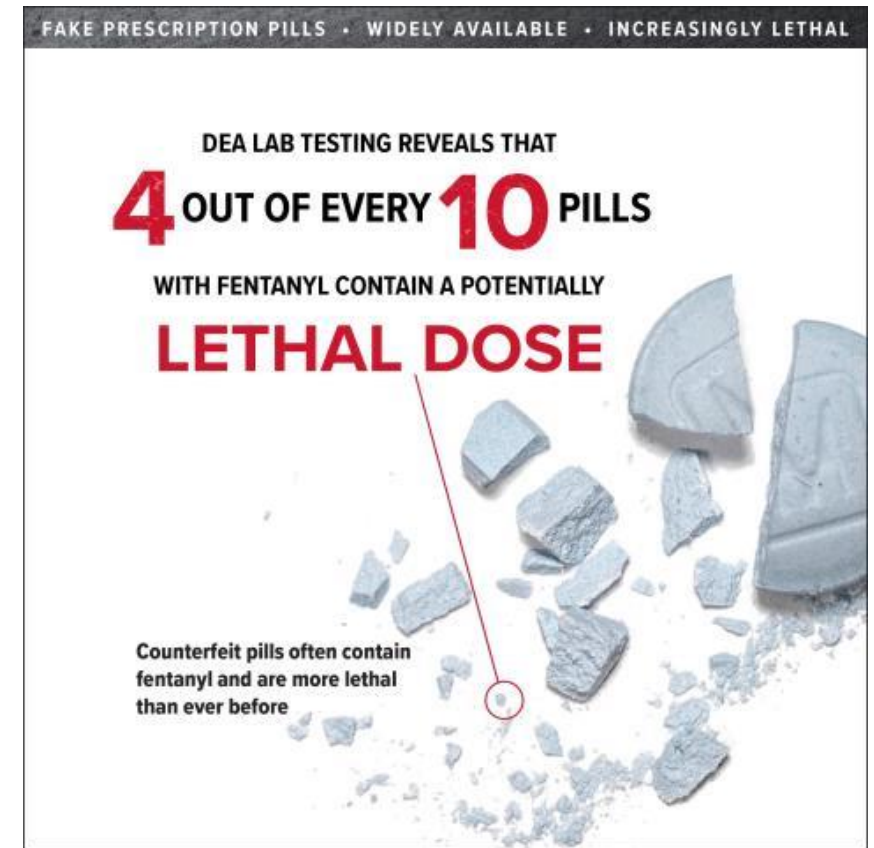


- Severe respiratory depression, muscle rigidity, seizures, hypotension, coma
- **Fatal Overdoses:**
 - Blood 3 – 28 ng/ml (average 8.3)
 - Urine 5 – 93 ng/ml (average 28)
- Beginning around 2005, we begin to see fentanyl-laced heroin. **Why?**
 - Cheaper to produce than heroin
 - Increases potency, gives more of a kick to heroin
 - Stretches supplies out
- Originally attributed to one lab in Mexico, but it caught on elsewhere





- **Fentanyl:** cheap, potent, and profitable, so dealers use it to make fake pills
- According to DEA, “criminal drug networks are mass-producing fake pills and falsely marketing them as legitimate prescription pills”
- Counterfeit pills are **fake medications with different ingredients than the actual medication**
 - They may contain no active ingredient, the wrong active ingredient, or have the right ingredient but in an incorrect quantity





Authentic Oxycodone
FRONT



Authentic Oxycodone
BACK



Counterfeit Oxycodone
FRONT



Counterfeit Oxycodone
BACK

Street Names: 30s; 40s; 512s; Beans; Blues; Buttons; Cotton; Greens; Hillbilly Heroin; Kickers; Killers; Muchachas; Mujeres; OC; Oxy; Oxy 80s; Roxy; Roxy Shorts; Whites



"Rainbow fentanyl—fentanyl pills and powder that come in a variety of bright colors, shapes, and sizes—is a deliberate effort by drug traffickers to drive addiction amongst kids and young adults," - DEA Administrator Anne Milgram

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CRIME

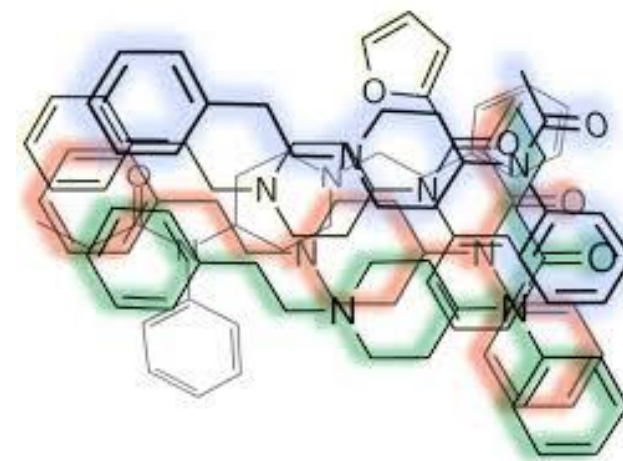
New 'rainbow' fentanyl pills seized in Phoenix drug bust

Brightly-colored fentanyl pills have also been discovered in 17 other states according to the DEA.





- Alphamethylfentanyl
- Acetylfentanyl
- Acrylfentanyl
- Alfentanil
- Benzocarfentanil
- Benzodioxole fentanyl
- Beta-hydroxyfentanyl
- Beta-methylfentanyl
- Butyrfentanyl
- Carfentanil
- Cyclopentanylfentanyl
- Cyclopropylfentanyl
- 4-fluorobutyrylfentanyl
- Furanylfentanyl
- Furanylethylfentanyl
- Methoxyacetylfentanyl
- Octafentanil
- Remifentanyl
- Sufentanil
- Tetrahydrofuranfentanyl
- Thienylfentanyl
- Thiofentanyl





- Trade name Wildnil. Used since 1975 for deer, elk, moose and other large animals
- All pharmacokinetic data are in goats or elands
- Half-life (**in goats**) is 3 – 20 hours
- 60 mg/kg dose gives peak serum 8 ng/ml (**in goats**)
- 169 mg/kg dose gives a peak plasma level of 13 ng/ml (**in elands**)
- Adverse effects: nausea, vomiting, dizziness, drowsiness, bradycardia, respiratory depression, muscle rigidity, coma and death (**in people**)



Elands are really big.



SARAH Carfentanil? That's impossible, it would have slept for days!

LUDLOW Something else too, to get it breathing again, maybe we used too much, I don't know. Oh, my God . . .

SARAH You administered an antagonist without knowing the proper dosage?! You put the animal in a narcoleptic state, that thing's a locomotive now! If we don't get it back here - -

Morphine. Carfentanil is mainly just used for sedating rhinos and elephants. A Tyrannosaur and an African Elephant have roughly the same mass, so the dosage used on a T-Rex would be the same as for an Elephant, which would be between 0.5-1.0 mg. Pumping 10 mg of Carfentanil into the T-Rex would be the same as injecting it with about 150,000 mg of Morphine, which is about 10 times the dosage needed to sedate an animal the size of a Tyrannosaur.

Jurassic Park 2: The Lost World



- Suspected in the Moscow theater crisis in October 2002
- 40 to 50 armed Chechen terrorists seized the theater, about 850 people held hostage
- Russian Federal Security Service forces pumped an unnamed chemical into the building's ventilation system, presumably to sedate occupants and allow a rescue operation
- Aerosol exposure – dose cannot be controlled
- Approximately 130 people died due to gas exposure
- One survivor had 0.1 ng/ml urinary norcarfentanil 5 days post-exposure
- Carfentanil and remifentanil found on clothing of another





Alpha MethylFentanyl

- Methylfentanyl, “China White,” was first seen in California in late 1979
- Similar side effects to other Fentanyls
- Possibly **10x** potency of fentanyl (400 – 6000x morphine)

AcetylFentanyl

- Increased use since 2013
- ~ **15x** potency of morphine
- 52 confirmed fatalities involving acetylfentanyl from 2013-2015 (DEA).



Pharmaceutical compounds were developed by Glaxo Smith Kline and Janssen Pharmaceuticals as surgical anesthesia agents:

Alfentanil (Alfenta), c. 1980

- Roughly similar to morphine in potency
- Faster-acting, shorter duration than fentanyl (half-life 1-2 hours)

Sufentanil (Sufenta), c. 1976

- 5 – 10 times as potent as fentanyl, 500 – 800 times as potent as morphine.
- Doses usually low (below 30 mg/kg), given by IV or epidural (patch form in Europe)

Remifentanil (Ultiva), c. 1996

- Very fast-acting – half life 6 – 16 minutes
- Available only in injectable form
- Thought to be used in the Moscow theater crisis





Butyrylfentanyl

- Seen since 2012
- Effects last 1 – 4 hours
- Somnolence, muscle rigidity, respiratory depression, seizures, and coma

Furanylfentanyl

- Seen since 2014
- Effects last 1 – 3 hours
- Toxicity same as Butyrylfentanyl





Emerging Concerns



Medetomidine Rapidly Proliferating Across USA — Implicated In Recreational Opioid Drug Supply & Causing Overdose Outbreaks

Medetomidine

- Alpha-2 agonist, in same family of drugs as xylazine and clonidine.
- Synthetically manufactured
- Effects include heightened sedation, analgesia, muscle relaxation, anxiolysis, profound bradycardia, hypotension, hyperglycemia, and hallucinations
- Duration of action is longer than xylazine

Recent mass overdose outbreaks in Philadelphia, Pittsburgh, and Chicago have all been associated with fentanyl or heroin containing medetomidine, as well xylazine and/or others.



5-MeO-DiPT

- "Foxy" or "Foxy Methoxy", is a synthetic psychedelic tryptamine drug, derivative of diisopropyltryptamine (DiPT)

Methallylescaline

- Synthetic analog of mescaline

Bromazolam

- Unscheduled benzodiazepine related to alprazolam

4-HO-MET

- Metocin, a synthetic tryptamine and psychedelic analog of psilocin

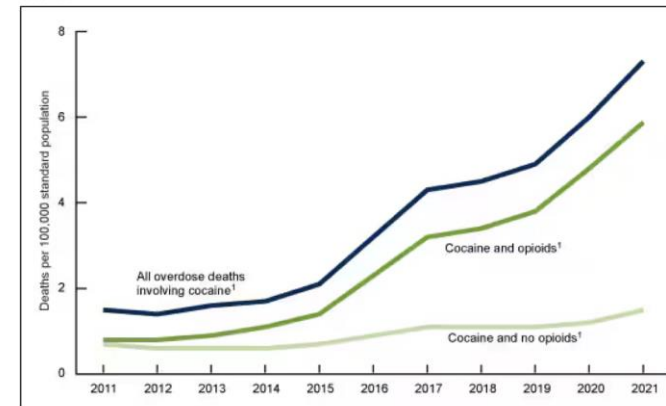
7-OH

- 7-hydroxymitragynine
- Not from Kratom, high potency, synthetically produced, unregulated opioid




- Also known as "moonrock," when smoked, is a popular term for the mixing of heroin or **morphine** with cocaine
- Typically, Cocaine and Heroin, but can include other substances such as: **fentanyl**, amphetamines, opiates, benzodiazepines, or barbiturates
- Cocaine acts as a **stimulant**, raising the pulse, but its effects wear off more quickly than those of heroin, which in turn slow the heart down
- Possible to experience a delayed "**overdose**" (technically, severe respiratory depression)

Figure 1. Age-adjusted rate of drug overdose deaths involving cocaine, by co-involvement of opioids: United States, 2011–2021



¹Increasing trend from 2011 through 2021 ($p < 0.05$).

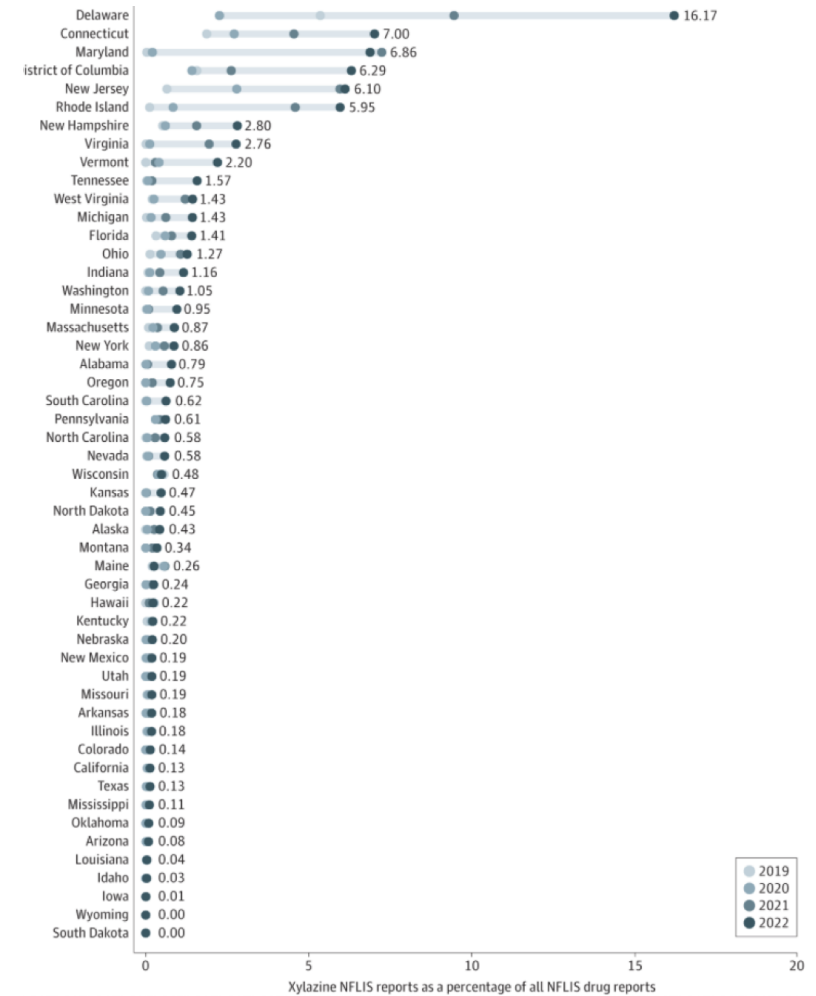
NOTES: Drug overdose deaths involving cocaine were identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14, with a multiple cause-of-death code T40.5. Deaths with co-involvement of opioids also had multiple cause-of-death codes T40.0–T40.4 or T40.6. Age-adjusted death rates were calculated using the direct method and the 2000 U.S. standard population. Deaths may involve other drugs in addition to cocaine and opioids. [Access data table for Figure 1](#) .

SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data file.





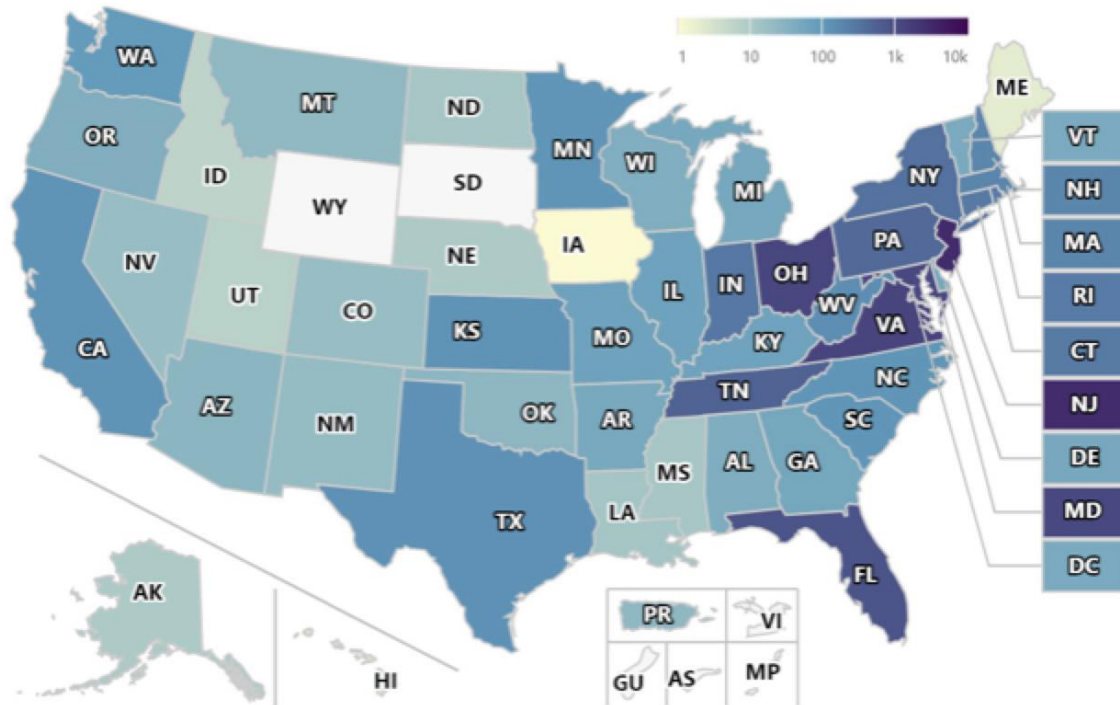
- Officials say drug suppliers are lacing the fentanyl and heroin supply with the animal tranquilizer because it is cheap and easy to get
- Xylazine is an unscheduled veterinary drug that's easy to obtain, not illegal, and not subject to strict monitoring
- Causes fast-moving necrotic wounds, mostly on extremities and not necessarily at injection sites
- In 2019, Xylazine had been detected in the drug supply of all but 16 states, and at the end of 2022 it was in all but 3 states.
- Doctors also tell us Narcan won't work to revive a person heavily sedated on "Tranq." Still, they say it should be administered since it's the opioids that are linked to the overdoses
- Averhealth can test via LCMS.



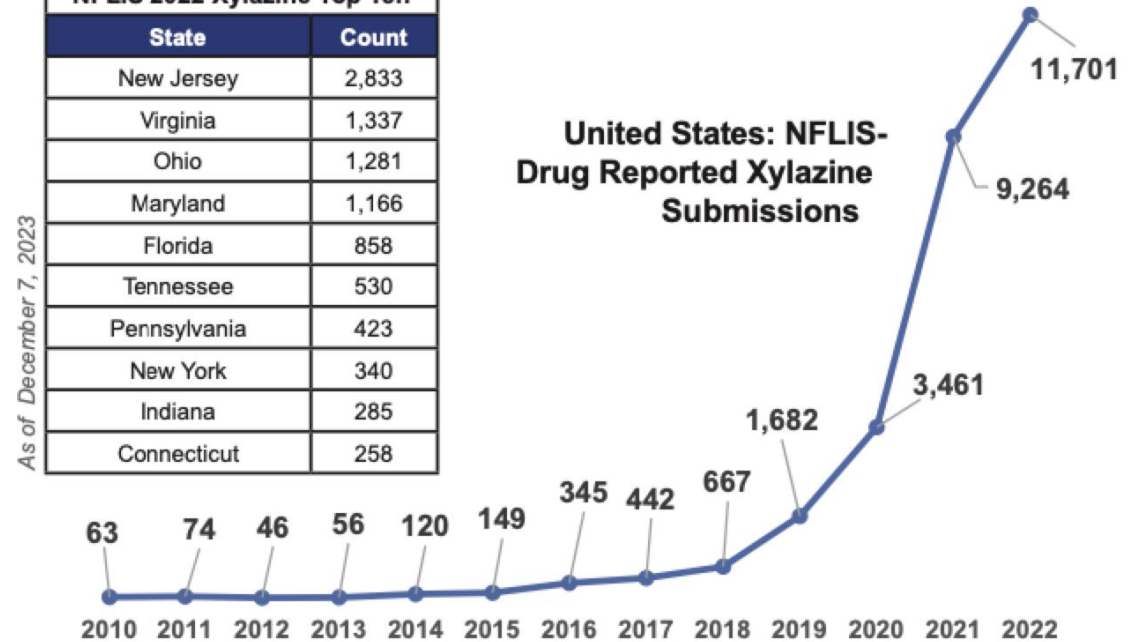
2019-2022 Overdose % by State as a total of all overdose numbers



Etonitazene, isotonitazine, clonitazene, and several additional nitazine analogs are Schedule 1 substances in the US.



State	Count
New Jersey	2,833
Virginia	1,337
Ohio	1,281
Maryland	1,166
Florida	858
Tennessee	530
Pennsylvania	423
New York	340
Indiana	285
Connecticut	258



Source: DEA National Forensic Laboratory Information System (NFLIS-Drug)



- ISO is short for isotonitazine, a deadly synthetic opioid that is 100x to 1000x stronger than morphine and 20x more potent than fentanyl
- ISO was first identified around 2019 in the Midwest but has moved south and towards the eastern seaboard since its discovery
- ISO can present in powder, tablet or solution form and can be snorted, injected and inhaled by smoking or vaporizing
- Similarly to fentanyl, ISO is often mixed into other drugs like heroin or counterfeit Xanax pills, so users don't know they're ingesting it
- Narcan can counteract the effects of ISO, but because it is still so new, there is currently no established dosing protocol.
- Averhealth does not have a test, specialty labs only.



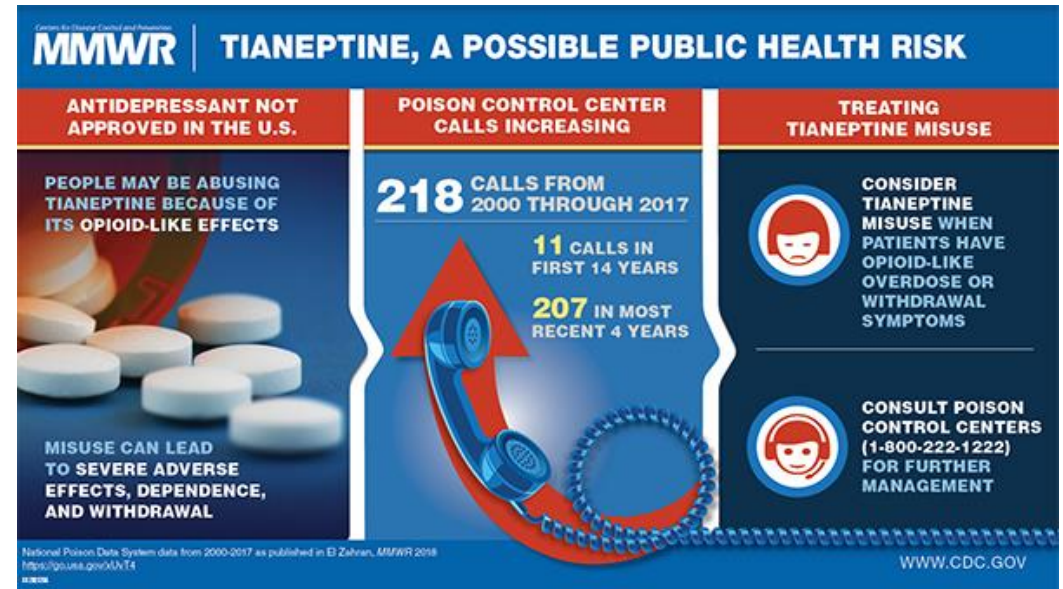


- Gabapentin is quickly becoming one of the most abused substances in the United States
- Also known as Gaby or Gabby is commonly prescribed for seizures, Restless Leg Syndrome (RLS), and shingles or diabetic nerve pain as well as alcohol withdrawals, sleep disorders, and other medical conditions
- When used in combination with other drugs such as opioids or benzodiazepines, the pair increases the potency and creates a sense of a euphoric high
- Many legitimate drugs such as Gabapentin are being misused due to the perceived ease of access from prescribers





- Developed in the 1960's, with street use in the US since around 2000 due to its opioid-like effects.
- CDC has labeled it an “emerging public health risk”
- Brand names **Stablon**, **Tatinol**, and **Coaxil**
- Street names Zaza, Tianna Red, Neptunes Elixir, Gas station heroin (N.E. is made by Neptune Resources in KC)
- Anti-depressant with some studies showing other uses in asthma, and IBS.
- Most deaths since 2018 involved ingestion of tianeptine with at least one other substance.
- Not a controlled substance yet in the US, but it is banned/schedule II drug in multiple states including AL, GA, FL, IN, KY, MI, MS, OH, & TN.
- Between June and Nov. 2023, there were 20 reported cases of tianeptine causing "severe clinical effects" in New Jersey, as noted in a Feb. 1 alert from the U.S. Centers for Disease Control and Prevention (CDC).
- Detectable in urine for about a day.
- Specialty labs have tests available, but very expensive.





- Developed in 1962 as an anesthetic for use in animals, approved by the FDA in 1970 for use in humans.
- It is a Schedule III substance under the controlled substance act.
- Being popularized by people like Elon Musk and Matthew Perry.
- Induces feelings of happiness, relaxation, and detachment. Can induce a state of sedation, immobility, relief from pain, and amnesia and is abused for the dissociative sensations and hallucinogenic effects.
- Ketamine has also been used to facilitate sexual assault due to its sedative affects and potential for memory loss.
- The risks associated with using Ketamine include bladder problems, incontinence, mental health problems and fatal overdose. An overdose can cause unconsciousness and dangerously slowed breathing.
- Street names: Cat Tranquilizer, Cat Valium, Jet K, Kit Kat, Purple, Special K, Special La Coke , Super Acid, Super K, Vitamin K
- Is attracting scientific attention as a potential treatment for depression, suicidal thoughts, and pain management.
 - In 2019, the FDA approved a nasal spray called esketamine (Brand name “Spravato”) that’s derived from ketamine for treatment-resistant depression, but only in certain people who also take oral antidepressants and only under strict controls in certified health care settings.
 - The [FDA has warned](#) that ketamine and compounded ketamine products aren’t approved to treat any psychiatric disorder. This means that they haven’t been proven to be safe or effective.
 - As of January 2024, there were between 500 and 750 ketamine clinics nationwide as it is legal for doctors to prescribe ketamine for “off label use”.
- Averhealth can screen and confirm.



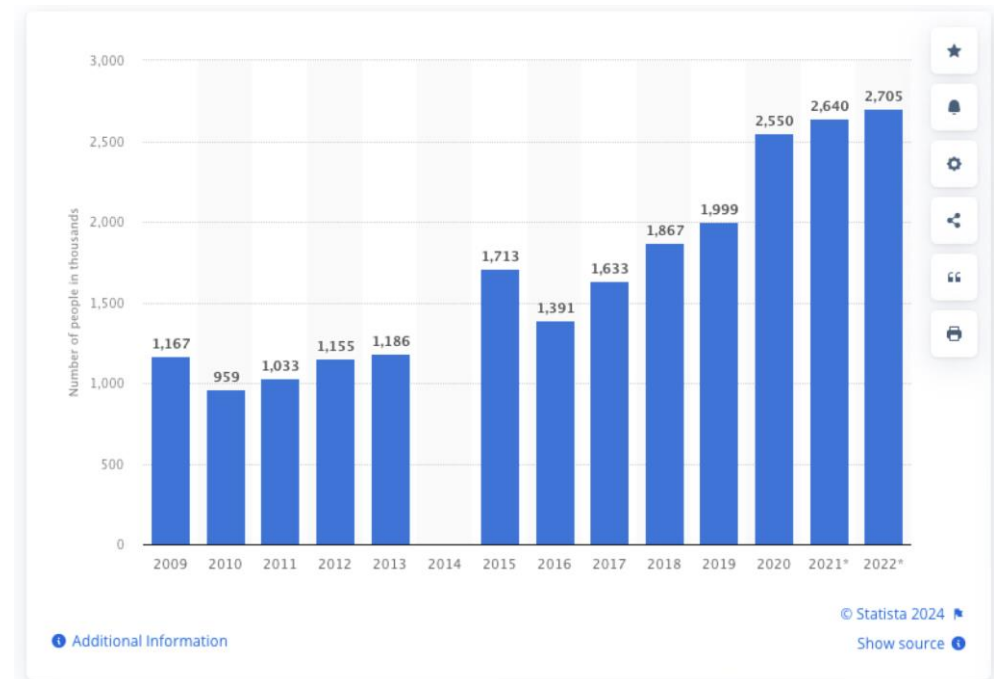


Methamphetamine



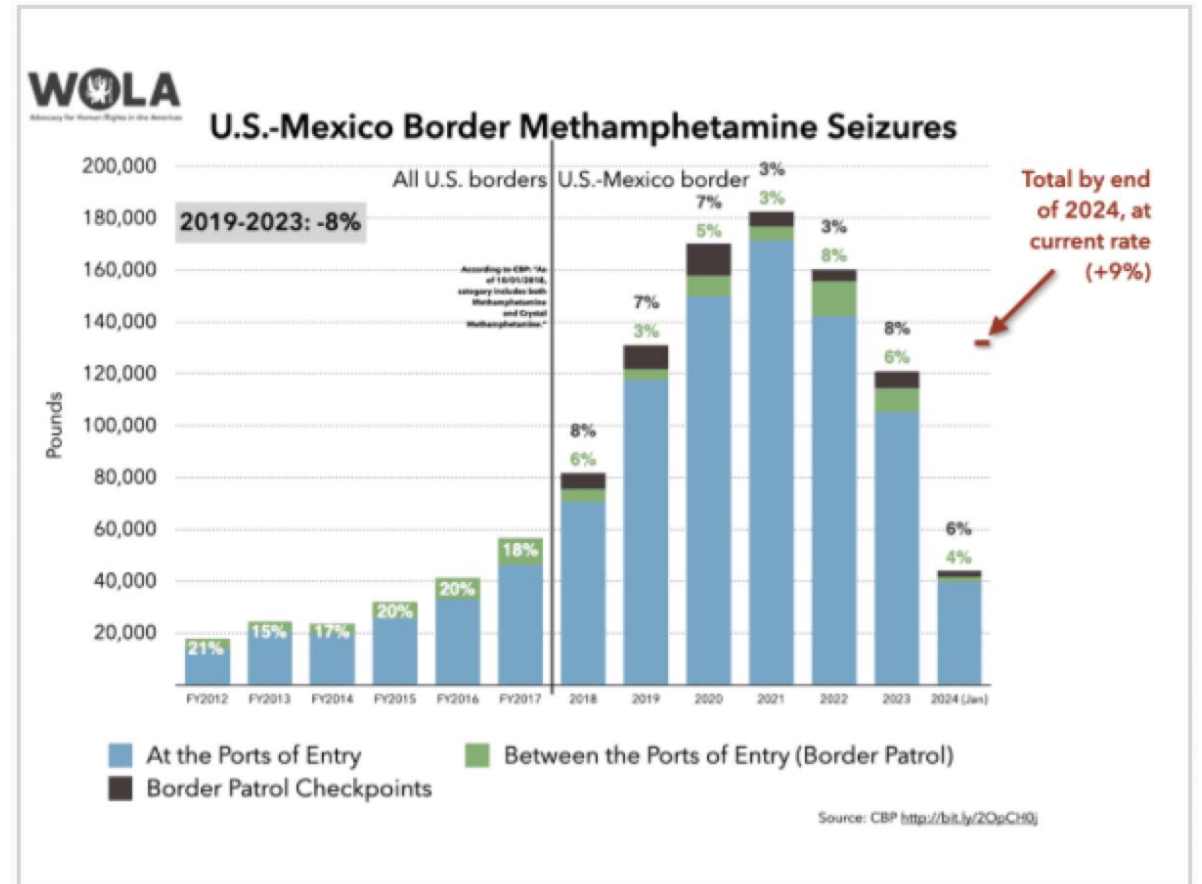
- According to the Substance Abuse and Mental Health Administration, **2.6 million Americans** reported using methamphetamines in the last year
- Number of people reporting methamphetamine use continues to rise every year primarily due to the ease of access and affordability.

Number of people in the U.S. who used methamphetamine in the past year from 2009 to 2022
(in 1,000)





- On May 7, 2022, the Office of National Drug Control Policy's (ONDCP) revised its plan to “address methamphetamine supply, use, and consequences.”
- This 6-pronged plan will address the following: Supply Reduction and Trafficking, Data and Research, Prevention, Harm Reduction, Training and Education, and Treatment.
- There is a downward trend in methamphetamine seizures at the border that began in 2022, but there are worries about an increase in the trend for 2024.





Synthetic and Over-the-Counter Drugs

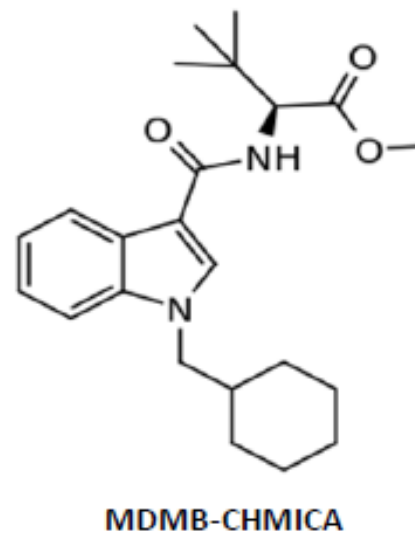
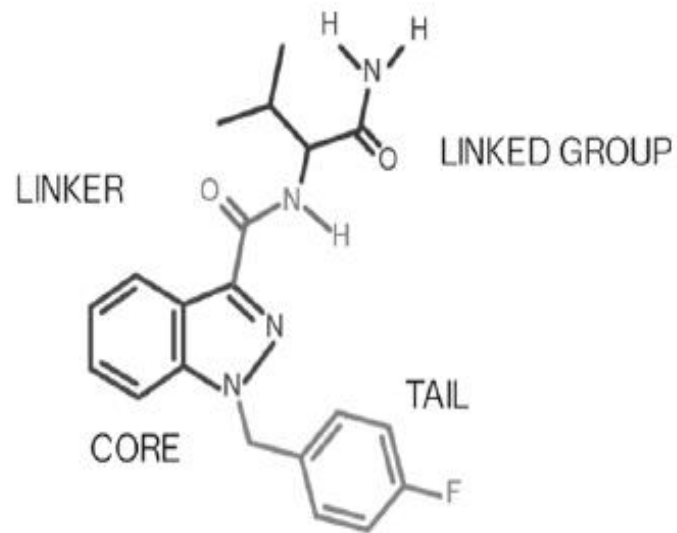
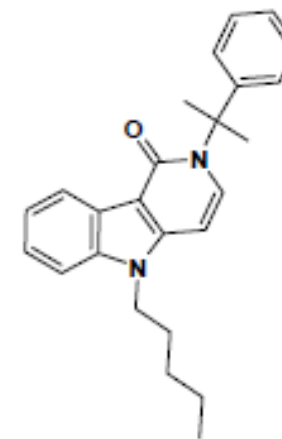


- Typically, pharmaceutical compounds not for sale in the US
 - Frequently sold in Europe or Asia and may be purchased over the internet
 - Black market rather than clandestine chemists – easier to identify
- Around since 2008, increasing in use since about 2015, although not as many as other synthetics:
 - Bromazolam
 - Estizolam
 - Phenazepam
 - Halazepam
 - Meclonazepam
- Effects are similar to those of other benzodiazepines (Xanax, Valium, Ativan)
- Pharmacokinetic data typically available





- Since around 2000. First ones called “Spice” or “K2”
- Over 25 different chemical families known, based on chemical structures
- 400 compounds and counting

**Cumyl-PEGACLONE**



- Higher affinity for cannabinoid receptors than cannabis itself:
 - More potent
 - Longer-lasting
 - Prolonged effects
- Some effects cannabis-like, some more typical of stimulants or hallucinogens, including agitation, seizures, hypertension, violent behavior
- **Physical Effects:** extremely high blood pressure (stroke, cardiac arrests reported), dilated pupils, rapid heart rate, kidney failure





Bath Salt Usage Emergencies



The Journal of Pharmacy & Therapeutics (P&T) reported a statistic of individuals who sought emergency department treatment for negative reaction to bath salts, including

**attempted harm of
themselves and others.**

Source: www.americanaddictioncenters.org



- Sold as “bath salts”
- Increased use from around 2010
- Several chemical classes (phenethylamines, tryptamines, cathinones, piperazines)
 - Methylenedioxypropylamphetamine (MDPV)
 - Flakka (alpha-PVP) – (“zombie drug”)
 - Methylone
 - Pentylone
 - Benzylpiperazine (BZP)
 - TFMPP
 - Mephedrone
 - 2-DPMP (Ivory Wave)
 - 3-methylmethcathinone (3MMC)
 - 4-methylethcathinone (4MEC)
 - Buphedrone
 - Ethylcathinone
 - Dimethyltryptamine (DMT)
 - Alphamethytryptamine (AMT)





- Meant to be **Methamphetamine** or **MDMA** (Ecstasy)-like
- **Stimulant Effects:**
 - Increased alertness
 - Euphoria
 - Agitations
 - Hallucinations
 - Tachycardia
 - Hyperthermia
 - Insomnia
 - Seizures/Tremors





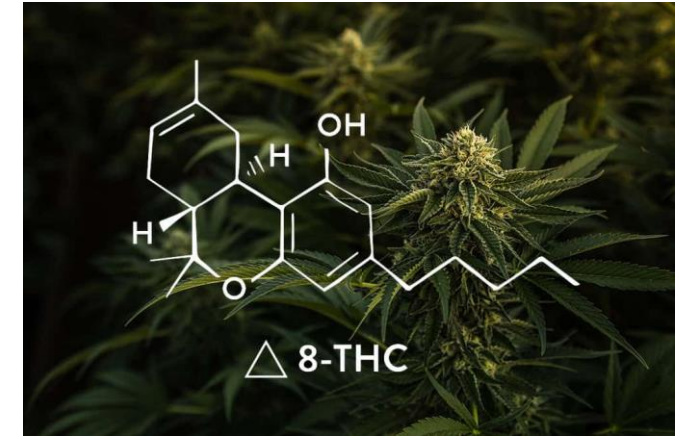
Kratom

- Kratom, an opioid-like substance with stimulant effects derivative of a Southeast Asian plant, has become an increasingly popular drug in the US over the past two decades
- Kratom's popularity can largely be accredited to its **growing availability in specialty stores and digital markets**
- Often used with CBD
- In 2019, the FDA warned consumers of kratom's addictive properties. While most states lack kratom restrictions, **six states have banned the drug**, and seven more are presently pending restrictive legislation





- Primarily found in states where recreational marijuana is not legal
- Markets towards teens and young adults
- Often found in gas stations and smoke shops
- Found in liquid and vape form
- **Current variants**
 - **Delta 8** *(Averhealth has test)*
 - **Delta 10** *(Averhealth does not test for, very difficult to detect)*
 - **THC 0** *(Averhealth does not test for, specialty labs do)*
 - **HHC** *(Averhealth does not test for, specialty labs do)*





Psychoactive Drugs



A **psychoactive drug, psychopharmaceutical, psychoactive agent, or psychotropic drug**, is a chemical substance that changes functions of the nervous system and results in alterations in perception, mood, consciousness, cognition or behavior.





An assortment of psychoactive drugs, including both street drugs and medications:

- LSD
- Methylphenidate (Ritalin)
- MDMA (ecstasy)
- Peyote (mescaline)
- Psilocybin mushroom (*Psilocybe cubensis*)



- **8%** of young adults reported using hallucinogens (LSD, MDMA, “shrooms,” PCP, etc.) in the past year
- The **highest percentage ever reported since hallucinogens were first included in the survey in 1988**
- In 2022, 8% of young adults between the ages of 19 to 30 reported past year use of hallucinogens, significantly higher than five years ago (5% in 2017) and 10 years ago (3% in 2012). Types of hallucinogens reported by participants included LSD, MDMA, mescaline, peyote, shrooms or psilocybin, and PCP.
- Adults 35 to 50 doubled from 2% to 4% from 2021 to 2022.



- Suite of drugs used ever-changing
- Pharmacology of most designer drugs not well known
- Many testing challenges
- Laboratories need to continue to update testing panels to cover the synthetic drugs being manufactured in clandestine laboratories
- Make sure you have broad testing panel and rotating in many drugs into your testing panel
- As case managers, if drug testing is suspected based on behavior, test broadly and address behavior





Dominique Delagnes
Chief Executive Officer
ddelagnes@averhealth.com

Thank You!