Current & Emerging Substances: What Judges Need to Know

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5/20/26

School of Medicine

Disclosures

School of Medicine

None

Learning Objectives

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•Describe current overdose and drug supply trends, including fentanyl involvement, counterfeit pills, and recent overdose trend data.

•Differentiate FDA-approved medications for addiction treatment—especially MOUD

•Summarize the clinical effects of stimulant use (cocaine, methamphetamine) and identify evidence-based treatment approaches, including contingency management and emerging pharmacotherapy evidence.

•Recognize key emerging illicit substances and explain how drug checking supports harm reduction and safety.

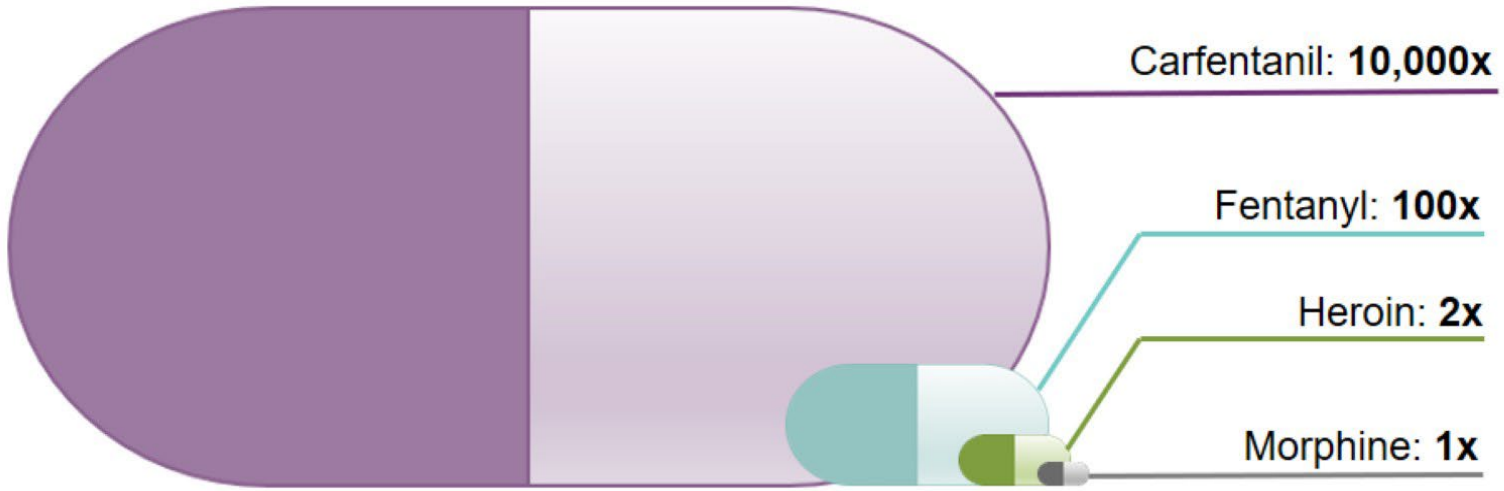
Requested Substances:

- Fentanyl (4 judges)
- Opioids (2 judge)
- MAT/methadone (4 judges);
- Methamphetamines (2 judges)
- Marijuana (1 judge)
- Synthetic cannabinoids (1 judge)
- “Crack” cocaine (1 judge)
- Alcohol (1 judge)

Anything else?

FENTANYL

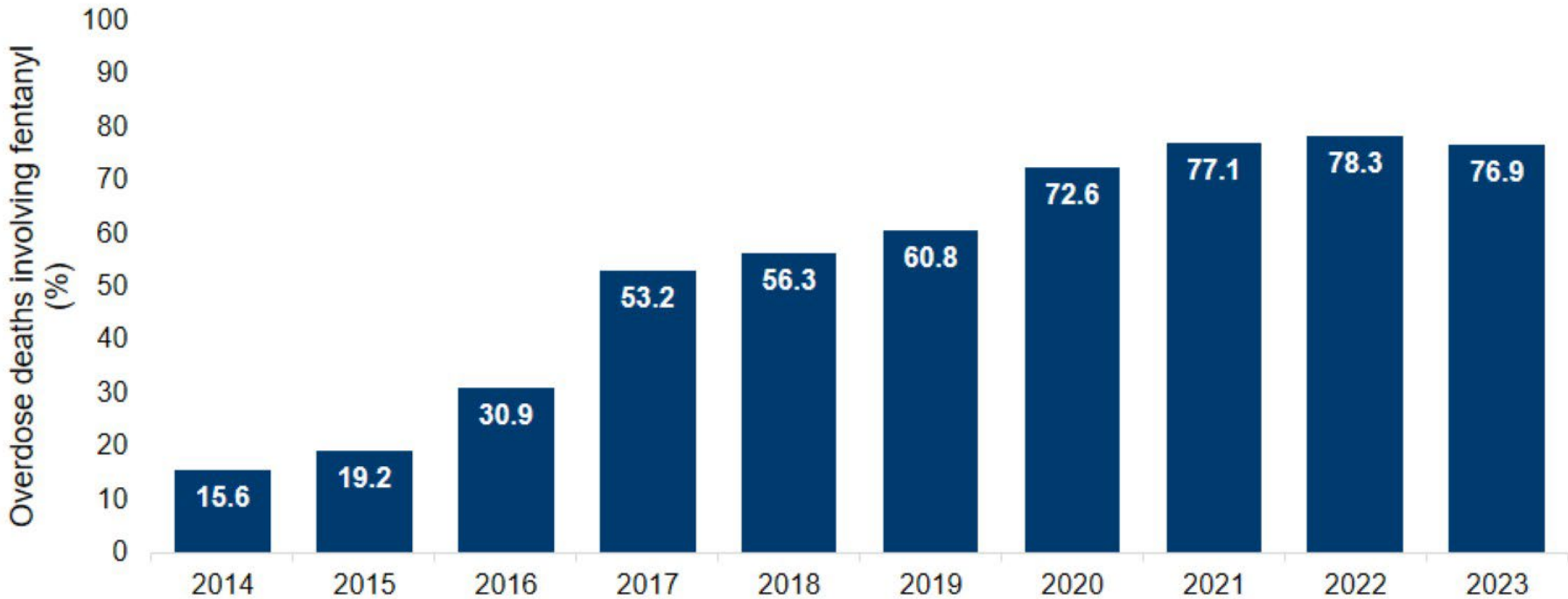
Fentanyl, a synthetic opioid, is **50 times** stronger than heroin and **100 times** stronger than morphine. It was involved in 83% of fatal medication/drug overdoses in North Carolina in 2021.



Opioid Potency

Technical Notes: All intent medication/drug poisoning: X40-X44, X60-64, Y10-Y14, X85 with any mention of T40.4; limited to NC residents
Source: Deaths-NC State Center for Health Statistics, Vital Statistics, 2021
Analysis by Injury Epidemiology and Surveillance Unit

Since 2021, fentanyl has been involved in 75% or more of overdose deaths in North Carolina



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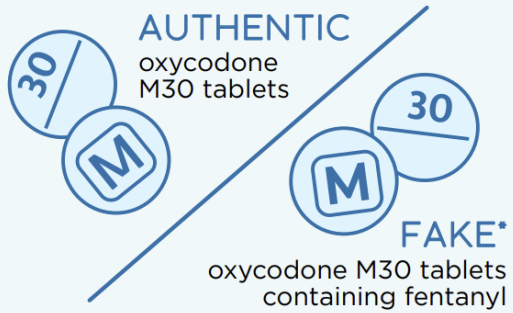
Counterfeit Pills

Know What's in Your Drugs

COUNTERFEIT PILLS



>>> CLICK HERE for real examples of authentic and fake pills.

WHAT *are counterfeit pills?*

Counterfeit pills are fake medications that have different ingredients than the actual medication. Even if a pill "looks" correct, if purchased illicitly, it still may be counterfeit.

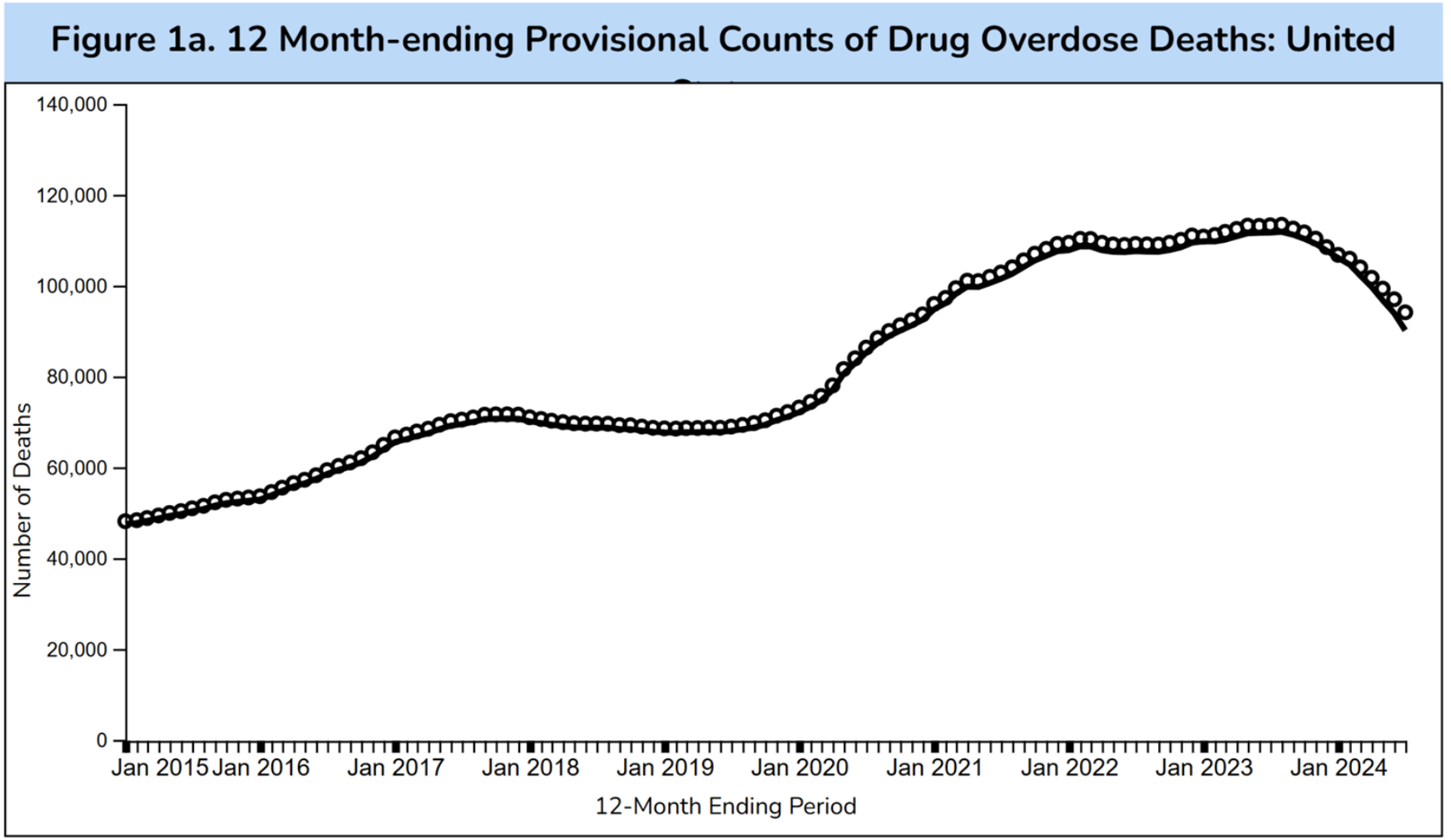
Many fake pills are made to look like prescription opioids or stimulants and contain no legitimate medication.

7 OUT OF 10
CONTAINED FENTANYL*

Prescription pills purchased outside of a licensed pharmacy are illegal, dangerous, and potentially lethal. Nationally, evidence of counterfeit pill use in overdose deaths has more than doubled in recent years. These fake pills have been increasingly easy to purchase, with sales taking to the internet and social media. In 2023, **7 out of 10** DEA-tested fentanyl-laced counterfeit pills contained a **potentially lethal dose of fentanyl.**

*Source: United States Drug Enforcement Administration; CDC MMWR: Drug Overdose Deaths with Evidence of Counterfeit Pill Use

Recent Positive Trends - Drug Overdoses



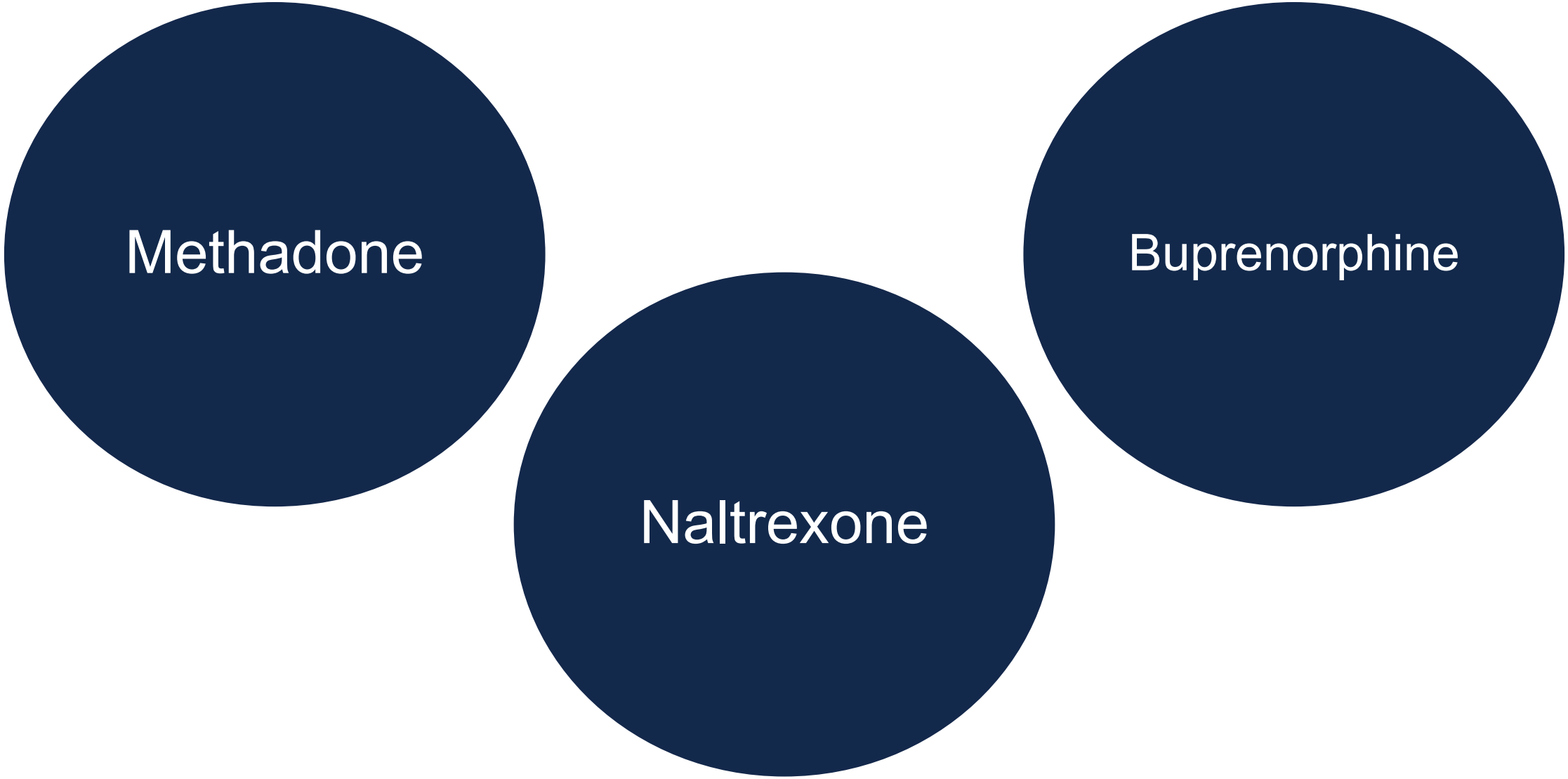
https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm

FDA Approved Medications for Addiction Treatment (MAT)*

Alcohol	Disulfiram Naltrexone (PO, IM) Acamprosate
Benzos	None
Cannabis	None
Cocaine and Methamphetamines	None
Opioids: Agonist	Methadone Buprenorphine (SL, SC)
Opioids: Antagonist	Naltrexone (PO, IM)
Nicotine	Nicotine Replacement Therapy (gum, patch, inhaler, etc.) Buproprion, Varenicline

- Studies show increased efficacy when used in combination with behavioral treatment.

MOUD – Medications for OUD



Methadone MUSTS

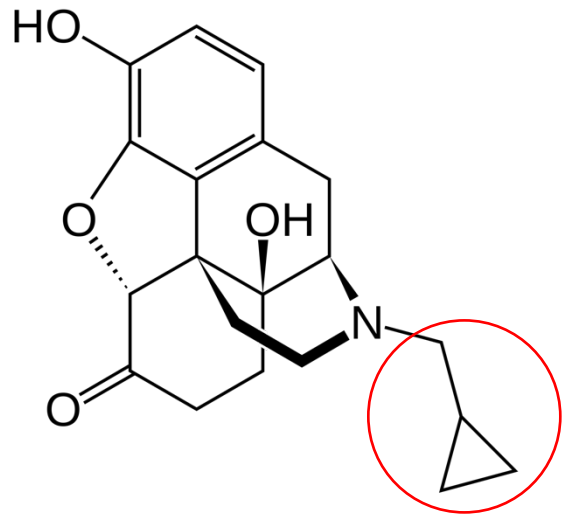
- NOT to be prescribed by PCPs for OUD
- Initial & Ongoing ECG (Electrocardiogram) Monitoring
- Discuss respiratory issues & changes
- Assess drug & food interactions continually
- Minimize initial dosage & adjust dosage gradually

Adapted from: Chou R. et al. Methadone Safety: A Clinical Practice Guidelines From the American Pain Society and College on Problems of Drug Dependence, in Collaboration with the Heart Rhythm Society. J Pain. 2015. 14 (4). 321-337.

Naltrexone*

Pharmacology

- Opioid Receptor Antagonist developed in 1963
- PO administration is effective
- Long duration of action
- 50 mg PO Tablet (Revia®)
  - FDA approvals: OUD (1984) & AUD (1995)
- 380 mg IM Once Monthly (Vivitrol®)
  - FDA approvals: AUD (2006) & OUD (2010)

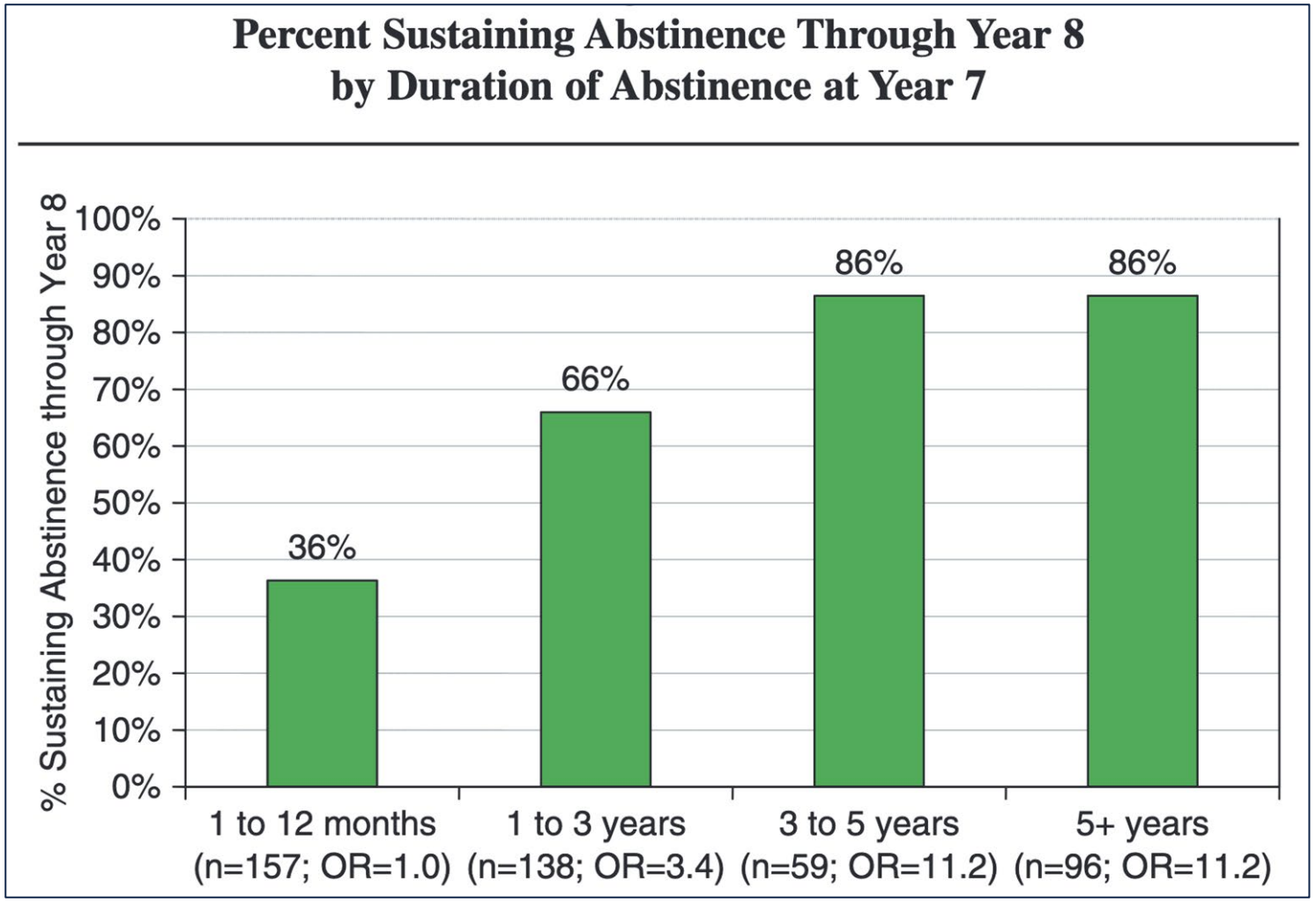


Clinical Pharmacology Online Database.
*2nd line?

Buprenorphine Formulations

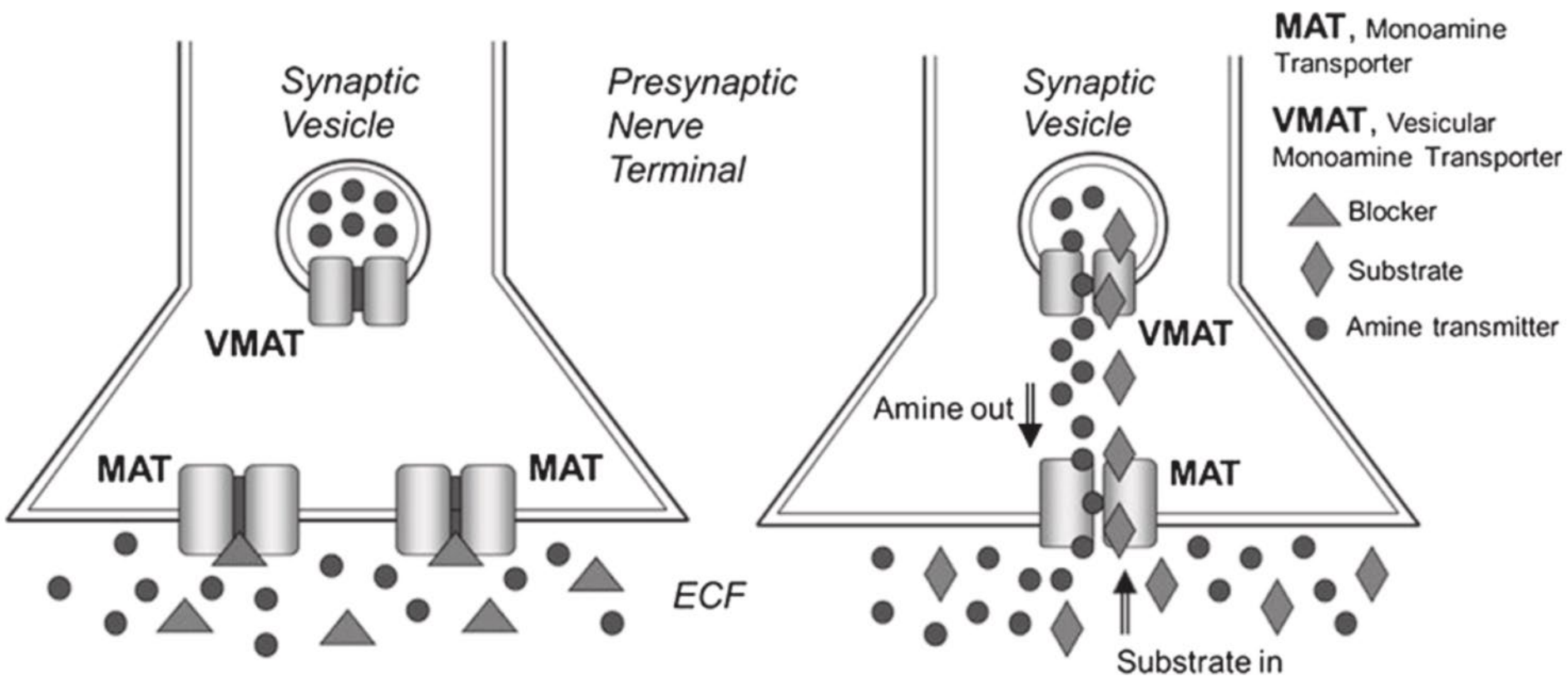
Content	Route	Product
Buprenorphine With Naloxone (combo product)	SL	Suboxone® (film/tablet)
	SL	Zubsolv® (tablet)
	Buccal	Bunavail® (film)
Buprenorphine Without Naloxone (mono product)	SL	Subutex® (tablet) - generic
	Implant – every 6 months	Probuphine®
	SC injection – every 7days/30days	Brixadi®/Sublocade®
FDA Approved – Pain	IV	Buprenex®
	Transdermal – every 7 days	BuTrans®
	Buccal	Belbuca® (film)

Minimum SUD Treatment???



Michael L. Dennis, Mark A. Foss, and Christy K. Scott. An Eight-Year Perspective on the Relationship Between the Duration of Abstinence and Other Aspects of Recovery. Evaluation Review 2007 31:6, 585-612.

Stimulant Use: Mechanism of Action



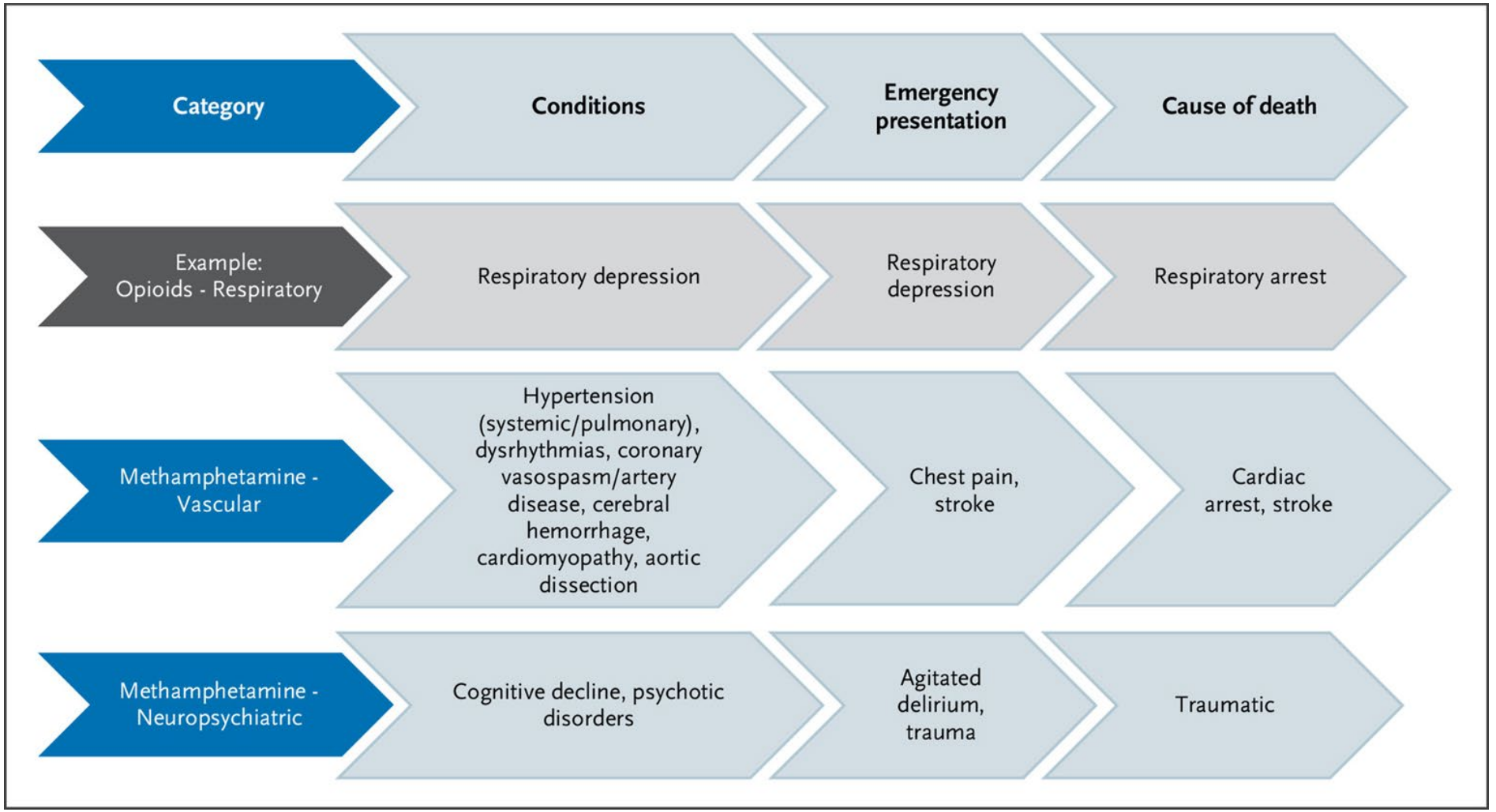
Cocaine **Methamphetamines**

Cocaine: Forms and How Used

- **Cocaine Hydrochloride** (snorted or injected)
  - 90% cocaine
  - traditional powder form

- **Cocaine Base** (“crack”: smoked)
  - 95% cocaine
  - small pebble sized/easily marketable

Methamphetamines



https://evidence.nejm.org/doi/full/10.1056/EVIDra2300160

Pharmacotherapy (Off-Label)

Table 1. Off-Label Pharmacotherapies for Methamphetamine Use Disorder.*

Regimen	Initiation of Therapy	Selected Contraindications	Comments
Mirtazapine 30 mg orally daily at bedtime	Start at 15 mg; increase to 30 mg after 1 week	Concomitant use of monoamine oxidase inhibitors; use with caution in patients with hepatic or renal dysfunction	May help with sleep disruptions in a dose-dependent manner; most data among sexual/gender minorities[35-37]; 45-mg dose associated with substantial weight gain; adherence concerns with daily dosing
Bupropion SR 300 to 450 mg daily	Start at 150 mg SR daily; increase in 150-mg increments every 3 days	Concomitant use of monoamine oxidase inhibitors, seizure disorder, hypertension or related cardiovascular disease, eating disorder, prolonged QTc interval; use caution in patients with hepatic impairment as extensively metabolized in the liver	Data are mixed[38-41]; adrenergic properties may function similar to "agonist" therapy; consider to treat comorbid tobacco use disorder; confirm QTc interval within normal range if increasing to 450 mg; adherence concerns with daily dosing
Naltrexone 50 mg orally daily	Starting at 25 mg may reduce initial nausea; increase to 50 mg after 3–5 days	Active opioid use disorder (typically requires 7–10 days opioid free prior to use of naltrexone) or medical need for opioids; acute hepatitis or hepatic failure; use caution with CrCl <50 ml/min/1.73 m^2	Data are limited for oral therapy[42] and less promising for monotherapy with the intramuscular formulation[43,44]; monitor liver enzymes, may cause dose-related increases in LFTs; consider "as-needed" therapy for persons with sporadic use; can be used in combination with other agents; possible benefit if comorbid alcohol use disorder or if alcohol use is a trigger for methamphetamine use
Bupropion extended release 450 mg orally daily plus naltrexone extended release 380 mg intramuscularly every 3 weeks	Start at 150 mg and increase by 150 mg every 3 days	For bupropion, concomitant use of monoamine oxidase inhibitors, seizure disorder, hypertension or other significant cardiovascular disease, eating disorder, prolonged QTc interval; use caution in patients with hepatic impairment For naltrexone, active opioid use or medical need for opioids; acute hepatitis or hepatic failure; use caution with CrCl <50 ml/min/1.73 m^2 because naltrexone and metabolite are primarily renally cleared	Phase 3 trial showed benefit in very heavy use when adherence to oral therapy supported by payment for successful video directly observed therapy[45]; monitor QTc interval and renal and liver enzymes; insurance coverage for intramuscular naltrexone in the treatment of methamphetamine use disorders may be challenging based on the off-label indication and more frequent dosing than is recommended in package labeling for the management of alcohol or opioid use disorder
Methylphenidate SR at or near maximum approved dose of 60 mg total per day given as a divided dose twice daily	Start at 15–20 mg divided twice daily; increase total dose by 15–20 mg weekly	Concomitant use of monoamine oxidase inhibitors; cardiovascular disease; coronary artery disease; anxiety disorder; glaucoma	Data are mixed; may be most effective with comorbid attention-deficit disorder
Topiramate 200 mg orally daily	Start at 50 mg; increase by 50 mg each week in 1 or 2 divided doses based on chosen formulation; reduce dose by 50% if CrCl is <70 ml/min/1.73 m^2	Hypersensitivity to topiramate	Data are mixed and weak[46,47]; hypothetical benefit with comorbid alcohol use disorder; concerning adverse events include cognitive slowing, paresthesia, and appetite suppression; may cause fetal harm in pregnant patients; significant drug–drug interactions

* CrCl denotes creatinine clearance; LFTs, liver function tests; and SR, sustained release.

https://evidence.nejm.org/doi/full/10.1056/EVIDra2300160#t1

Contingency Management

https://www.health.ny.gov/health_care/medicaid/ebbrac/2025/docs/2025-04-02_contingency_mgmt_sud_rpt.pdf

Cannabis 101

> 500

Individual chemicals

delta-9-THC

- Primary psychoactive component
- Causes the “high”
- Can cause psychosis

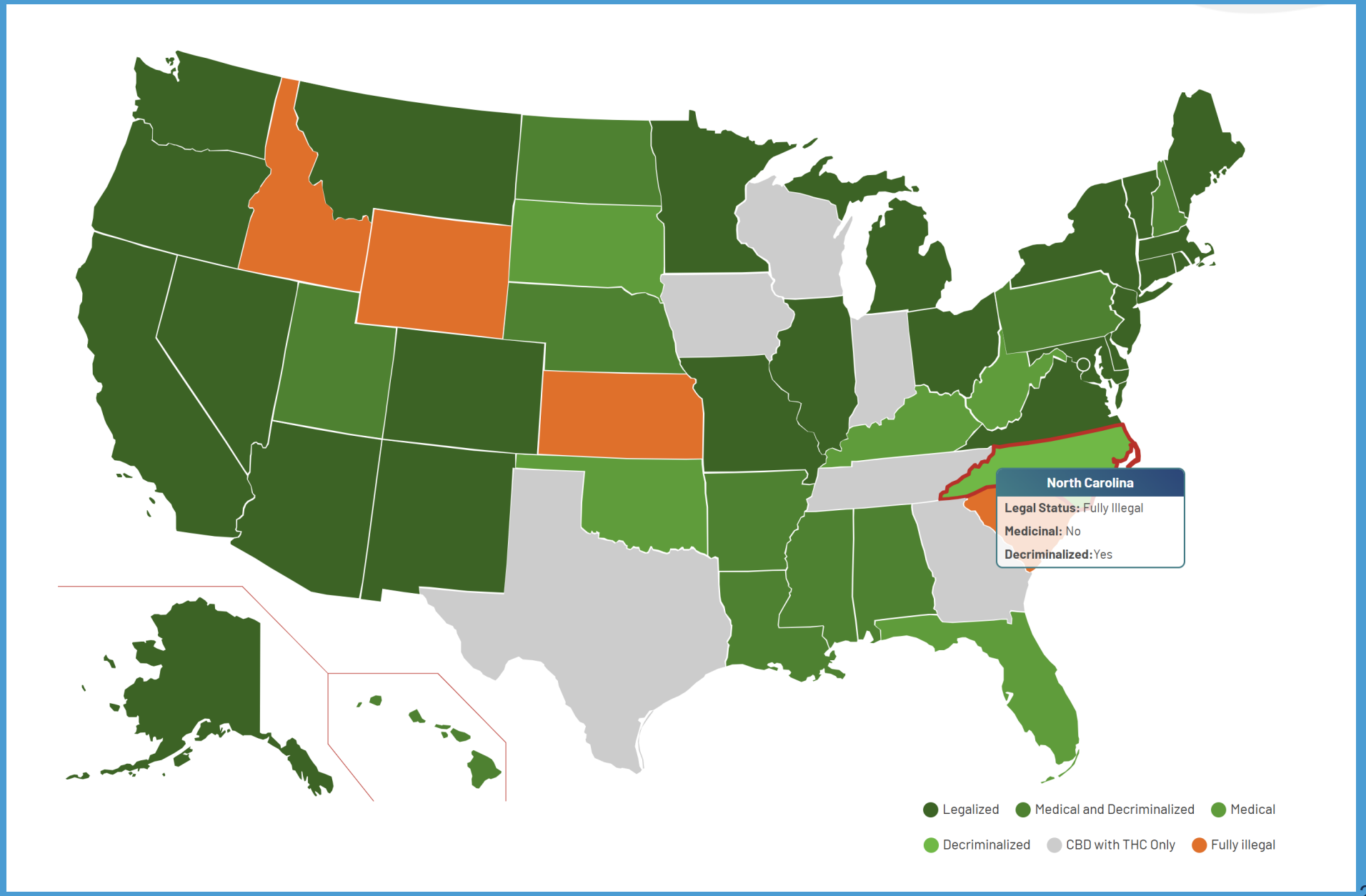
CBD

- Calming effect
- No euphoria or “high”
- Antipsychotic properties

Synthetic cannabinoids

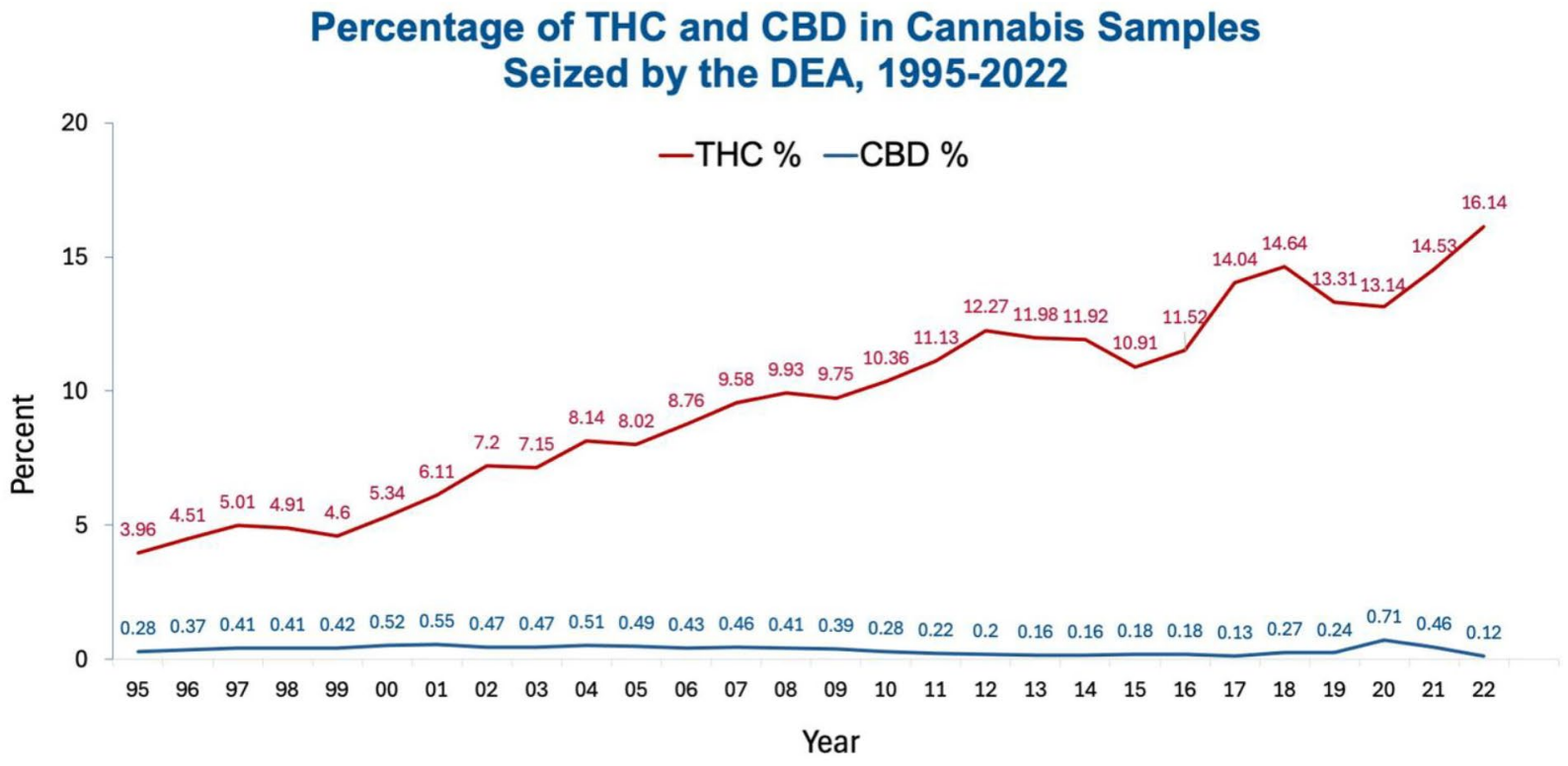
“Spice, K2”

AS OF JAN 2026



[Marijuana Legality by State 2025 | Where Is Weed Legal? | DISA]

THC potency has increased significantly. Today's cannabis products regularly contain 20-30% THC.



SOURCE: U Miss, Potency Monitoring Project

Avg THC content (Cannabis plant)

1970s: ~2%

2025: 15-30%

https://nida.nih.gov/research/research-data-measures-resources/cannabis-potency-data

12

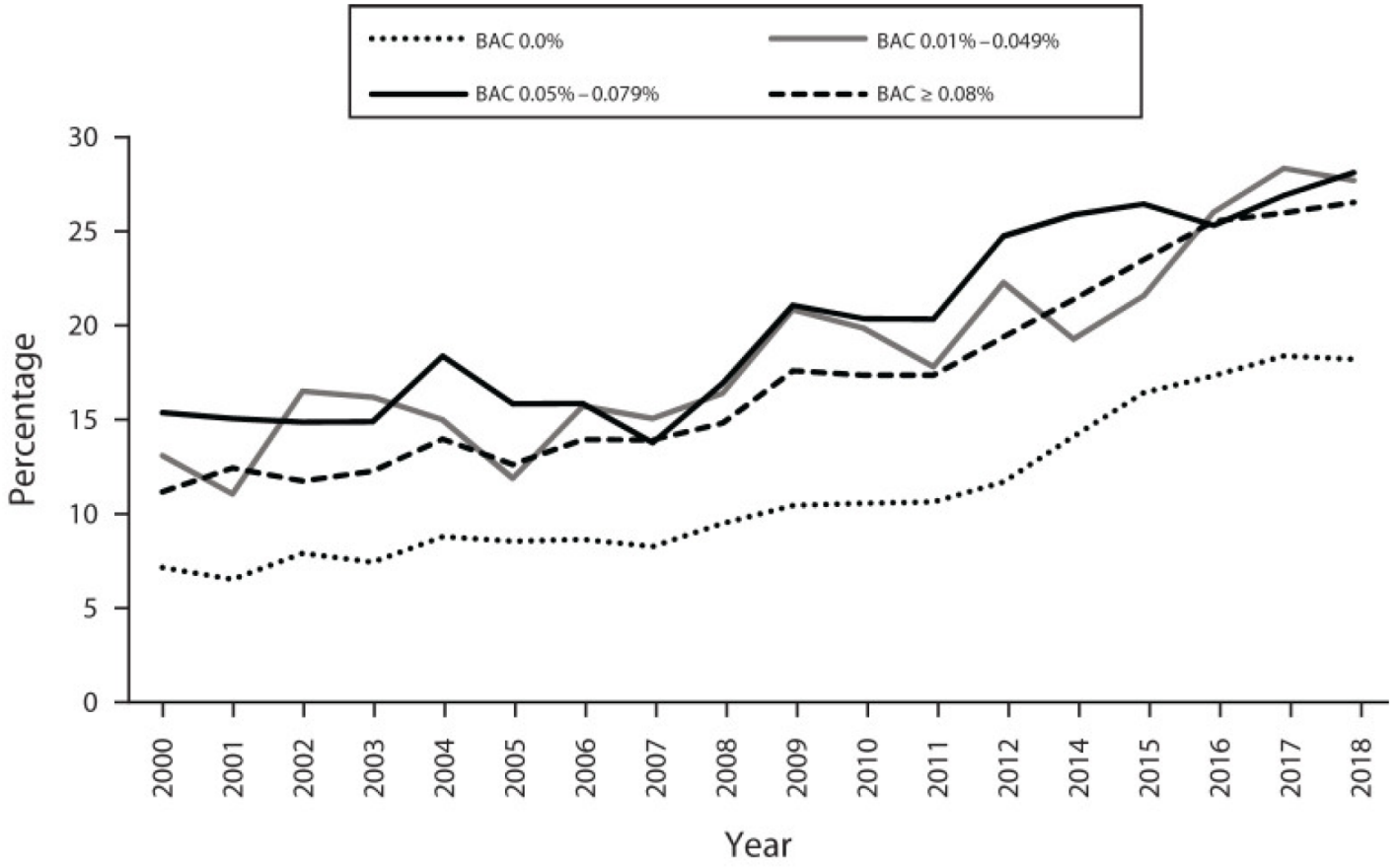
Rates of traffic fatalities involving cannabis are increasing.

Change in fatal car accidents from 2000-2018 involving:

THC alone: 9% to 21.5%

THC + alcohol: ~5% to 10%

However, testing positive for THC ≠ impairment.



Lira MC, Heeren TC, Buczek M, et al. Trends in Cannabis Involvement and Risk of Alcohol Involvement in Motor Vehicle Crash Fatalities in the United States, 2000–2018. *Am J Public Health*. 2021;111(11):1976-1985.

Cannabis withdrawal can occur after heavy or prolonged use. Rates of withdrawal are variable (> 50% in chronic pain).

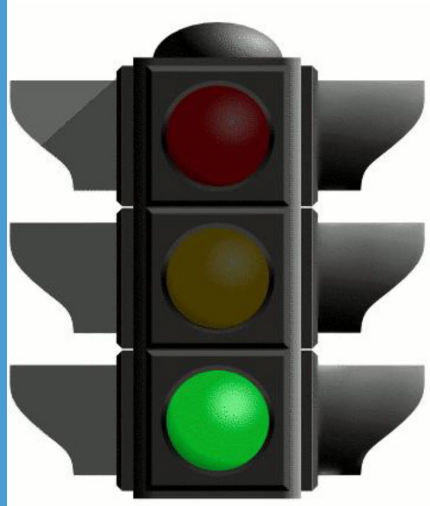
Psychological Symptoms

- Cravings
- Sleep disturbance
- Poor appetite
- Anxiety
- Depression
- Irritability
- Brain fog
- Concentration difficulties

Physical Symptoms

- Headache
- Nausea / upset stomach
- Sweating
- Hot flashes
- Restlessness
- Muscle tension
- Tremor / shakiness

Coughlin et al. Progression of cannabis withdrawal symptoms in people using medical cannabis for chronic pain. *Addiction*. 2021;116(8):2067-2075.



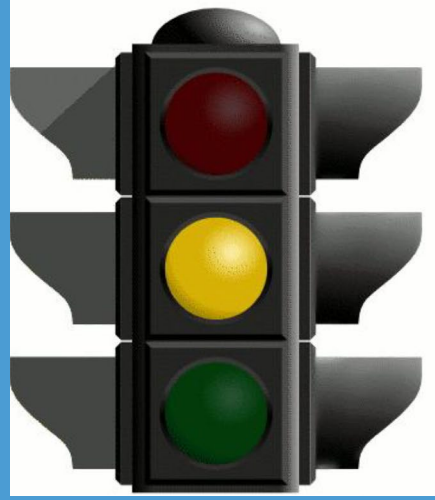
Strong and Conclusive Evidence
FDA Approved Use

- ★ Chemotherapy induced nausea and vomiting
  - ○ Dronabinol (synthetic THC, oral capsule)
  - ○ Nabilone (synthetic THC, oral capsule)
- ★ Appetite stimulation and weight loss in HIV
  - ○ Dronabinol (synthetic THC, oral capsule)
- ★ Certain seizure disorders
  - ○ Epidiolex (plant-derived CBD liquid)

25

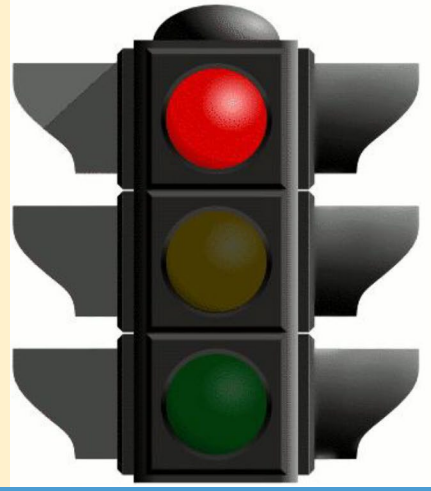
Substantial Evidence
No FDA Approval

- ★ Muscle spasticity in Multiple Sclerosis
  - ○ Nabiximols (plant-derived THC/CBD mix, oral spray)
- ★ Chronic neuropathic pain
  - ○ inhaled herbal cannabis, low THC concentration



Mixed or Conflicting Evidence

- Reduce opioids in chronic pain?
- Short-term sleep problems in select patients with fibromyalgia, sleep apnea, or chronic pain



Limited, Weak, or No Evidence

- Eye disease (glaucoma)
- Irritable Bowel Syndrome
- Depression
- Insomnia (general public)
- Tourette Syndrome

Cannabis increases the risk of psychosis and schizophrenia later in life.

- Risk of psychosis is higher with high potency (> 10%) THC products.
- 4x risk of schizophrenia with early use (adolescence or early adulthood).
  - 4% will develop schizophrenia compared to 1% of non-users
- Risk is likely due to underlying genetic / biologic vulnerability.
- Risk may relate to ***amount*** of THC and ***ratio*** of THC to CBD.
- Once schizophrenia develops, continued use of cannabis is associated with relapse, rehospitalization, and worse outcomes.

Godin SL, Shehata S. Adolescent cannabis use and later development of schizophrenia: An updated systematic review of longitudinal studies. *J Clin Psychol*. 2022;78(7):1331-1340.

Cannabidiol (CBD)

Not regulated

Often mislabeled

Limited evidence for sleep

Topical CBD cream not absorbed into bloodstream… expensive OTC cream!

Companies make often outrageous claims

Concerns for liver toxicity

Concerns when used in lieu of evidence based treatments

Can be expensive!

Emerging Illicit Substances

Emerging Illicit Substances

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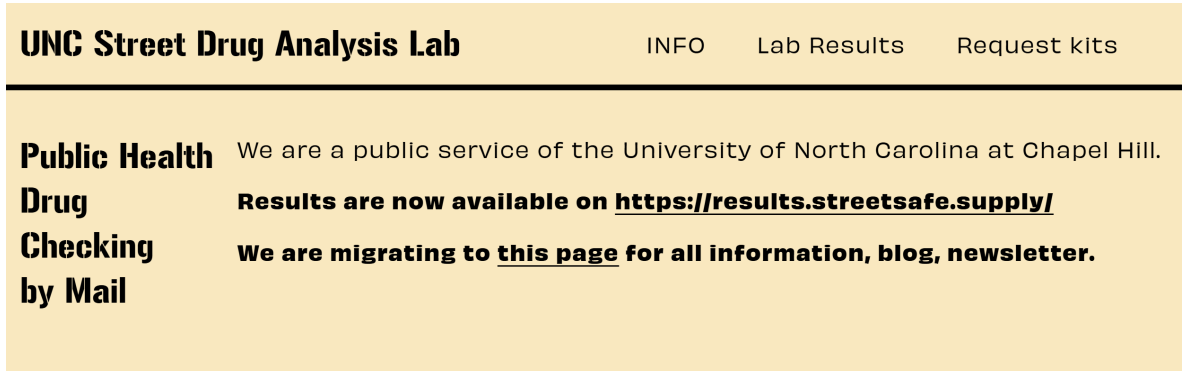
- Tianeptine
- New synthetic opioids
- Illicit benzodiazepines
- Medetomidine



- **CDC SUDORS Dashboard**: National Drug Overdose Fatality Data Source
- **CSFRE NPS Discovery**: Drug and Forensic Toxicology Testing Results, Trend Reports, Emerging New Substances Data
- **Drug Overdose Toxico-Surveillance**: Emergency Department Overdose Biosurveillance Project conducted by the American College of Medical Toxicology in collaboration with CSFRE
- **National Forensic Laboratory Information System (NFLIS)**: Forensic Drug Chemistry Laboratory Data, Medical Examiner and Coroner Data, Toxicology Laboratory Data
- **National Drug Early Warning System (NDEWS)**: Collaboration between University of Florida, New York University, and Florida Atlantic University
- **Toronto Drug Checking Service**: Drug Checking Data Source- Key Findings, Updates, Testing Methods
- **New York State Dept. of Health Checking Service**: Drug Checking Data Source- Key Findings, Updates, Alerts
- **Drug Checking Programs in Pennsylvania: Philadelphia Dept. of Health Checking Service and PA Groundhogs Drug Checking Services**: in collaboration with CSFRE
- **Street Check**: Community Drug Checking

https://www.streetsafe.supply/

Drug Checking

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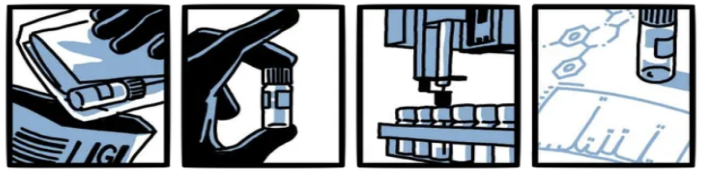
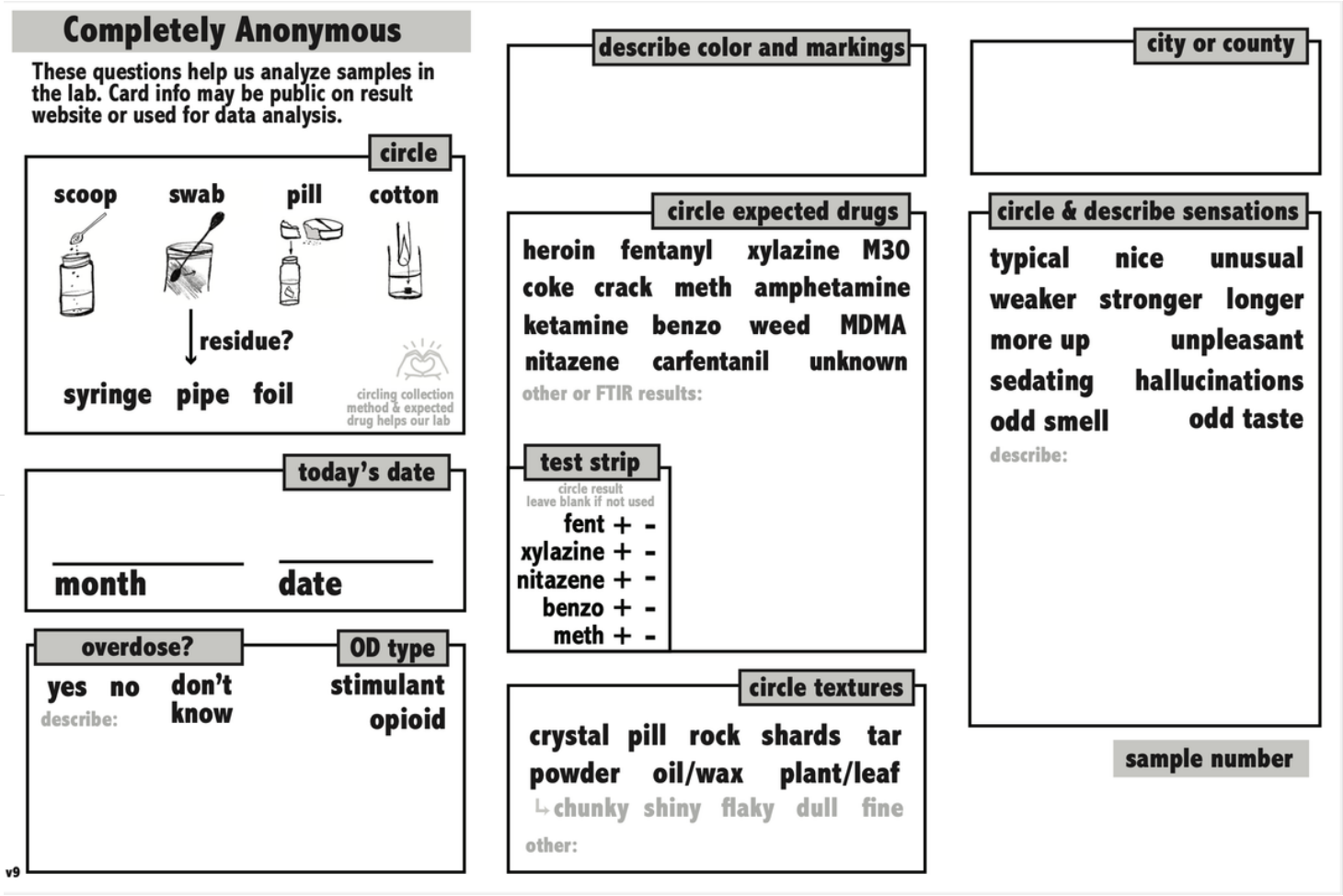


18,888 samples completed from **41** states.

Nabarun Dasgupta of the University of North Carolina at Chapel Hill, is an epidemiologist who brings "compassion, collaboration, and creative vision" to his work reducing the harms and deaths from drug use. Dasgupta told the news organization *Tradeoffs* he started analyzing overdose death data two decades ago when a close friend died of a heroin overdose.

NEWS

Scientist on front lines of overdose crisis receives MacArthur 'genius' award



Completely Anonymous

These questions help us analyze samples in the lab. Card info may be public on result website or used for data analysis.

circle

scoop swab pill cotton

residue?

syringe pipe foil

circling collection method & expected drug helps our lab

today's date

month date

overdose?

yes no don't know

describe:

OD type

stimulant opioid

v9

describe color and markings

city or county

circle expected drugs

heroin fentanyl xylazine M30
coke crack meth amphetamine
ketamine benzo weed MDMA
nitazene carfentanil unknown

other or FTIR results:

test strip

circle result
leave blank if not used

fent + -
xylazine + -
nitazene + -
benzo + -
meth + -

circle & describe sensations

typical nice unusual
weaker stronger longer
more up unpleasant
sedating hallucinations
odd smell odd taste

describe:

circle textures

crystal pill rock shards tar
powder oil/wax plant/leaf
↳ chunky shiny flaky dull fine

other:

sample number

https://www.streetsafe.supply/
https://www.npr.org/2025/10/08/nx-s1-5553390/macarthur-fellow-genius-grant-2025

Emerging Illicit Substances

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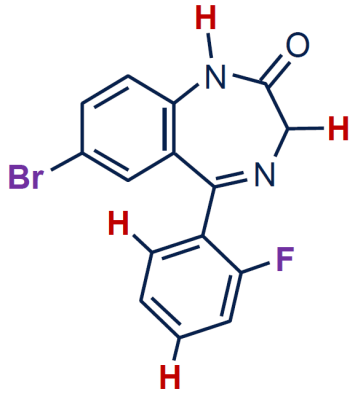
- Tianeptine
  - Tricyclic antidepressant
  - “Gas station heroin”
  - Withdrawal syndrome
  - Negative on TCA assay

- Illicit Benzodiazepines
  - “designer” BZDs
  - First appeared 2010-2015
  - Some testing is available
  - Many available
    - Variable potency/duration



flubromazepam

Counts CJ, et al. (MMWR 2024); El Zahran T, et al. (MMWR 2018)

Alpha-2 Receptor Agonists

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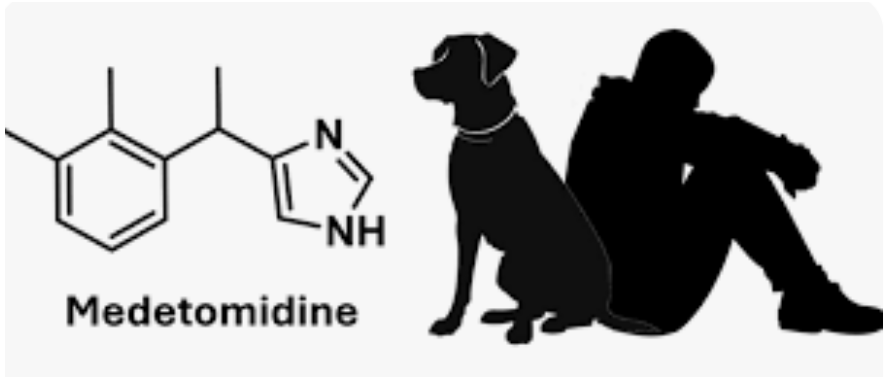
- Xylazine – “Tranq”
  - Seeing less in the drug supply
  - Associated with wounds
  - Not approved for human use

- Medetomidine
  - 100x more potent than Xylazine
  - Sedation, slow heart rate, low blood pressure
  - Severe withdrawal syndrome
    - High BP
    - High HR
    - Agitated



https://penncamp.org/medetomidine/

Thank you!
Questions?

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