Not for Human Consumption: Understanding Synthetic Cathinone Toxicity

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Education Disclaimer

The presenter(s) of this continuing education activity have made reasonable efforts to ensure that all information is accurate in accordance with the latest available scientific evidence at the time of presentation. However, because information regarding medications, treatment guidelines, laws/regulations, and other healthcare information is subject to constant change, the participant is advised to always confirm practice resources and information before applying any learned information in practice.

Use of AI Disclosure

During the preparation of this activity, the faculty used Microsoft Copilot, in order to assist with formatting and image creation. After using these tools, content was reviewed and edited. The presenter takes full responsibility for the validity and accuracy of the content of this activity.

Financial Disclosures

- Dr Baum has no relevant financial relationships with ineligible companies to disclose.

Program Objectives

At the completion of this activity, participants will be able to:

- Understand the evolving landscape of synthetic cathinone use in Kentucky, including variability in product composition
- Review the limitations of routine hospital toxicology testing in detecting synthetic cathinone and discuss the implications for clinical decision-making
- Recognize the common clinical presentations associated with synthetic cathinone exposure
- Outline management strategies for synthetic cathinone toxicity

Natural Cathinones

- Cathinone is a naturally occurring substance
- Found in the leaves of khat plant(*Catha edulis)*

De Felice LJ, Glennon RA, Negus SS. Synthetic cathinones: chemical phylogeny, physiology, and neuropharmacology. Life Sci. 2014;97(1):20-26.
Spyres MB, Jang DH. Amphetamines. In: Nelson LS, Howland MA, Lewin NA, Smith SW, Goldfrank LR, Hoffman RS, eds. Goldfrank's Toxicologic Emergencies. 11th ed. McGraw-Hill; 2019.

Synthetic Cathinones

- Derivatives of cathinone
- Production does not require a high degree of sophistication

<u>Products sold as:</u>

- Research chemicals
- Plant food
- Bath salts
- Glass cleaner
- Not for human consumption

https://www.euda.europa.eu/publications/eu-drug-markets/new-psychoactive-substances/distribution-and-supply/synthetic-cathinones_en#edmr24-nps-figure11-cathinonelabs

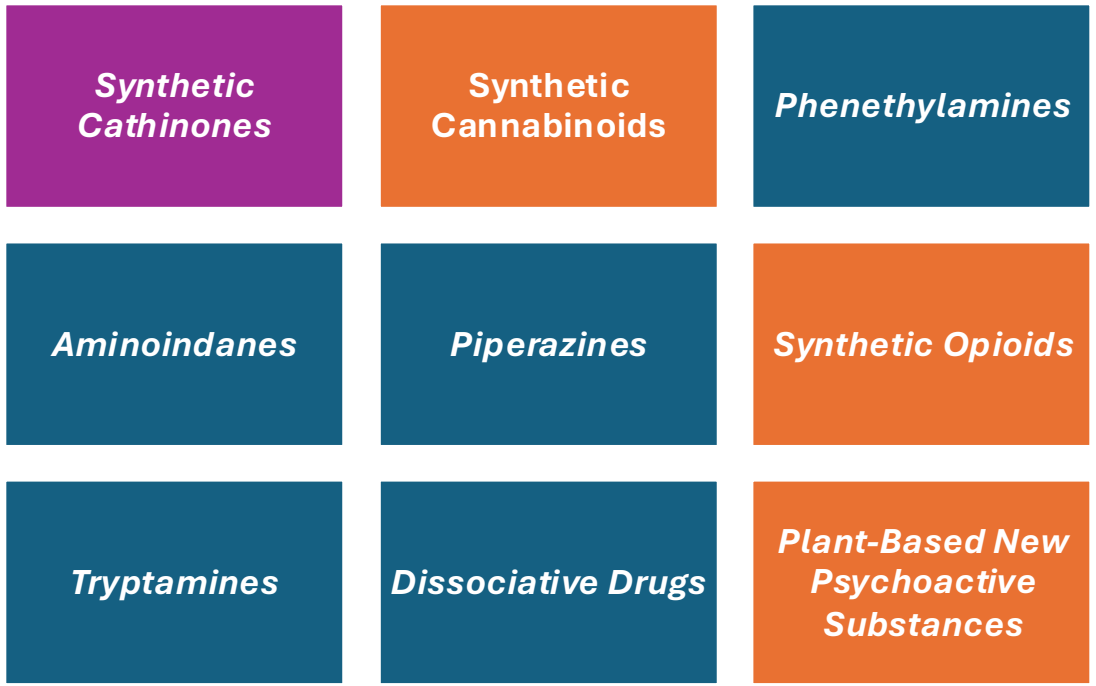
Classification – Designer Drugs

- Designer drugs
  - A chemical substance related to a currently controlled substance
  - The Controlled Substances Act, particularly with regard to “controlled analogs,” includes such agents that are “*intended for human consumption*”

Santos IC, Maia D, Dinis-Oliveira RJ, Barbosa DJ. New psychoactive substances: health and legal challenges. Psychoactives. 2024;3(2):285-302.
Glennon RA. Synthetic cathinones: a brief overview of overviews with applications to the forensic sciences. Ann Forensic Res Anal. 2017;4(2):1040.

Classifications - New Psychoactive Substances (NPSs)

- This group of substances encompasses a diverse range of synthetic compounds
- Designed to mimic the effects of traditional illicit substances
- Structural diversity poses additional challenges for regulatory agencies and authorities



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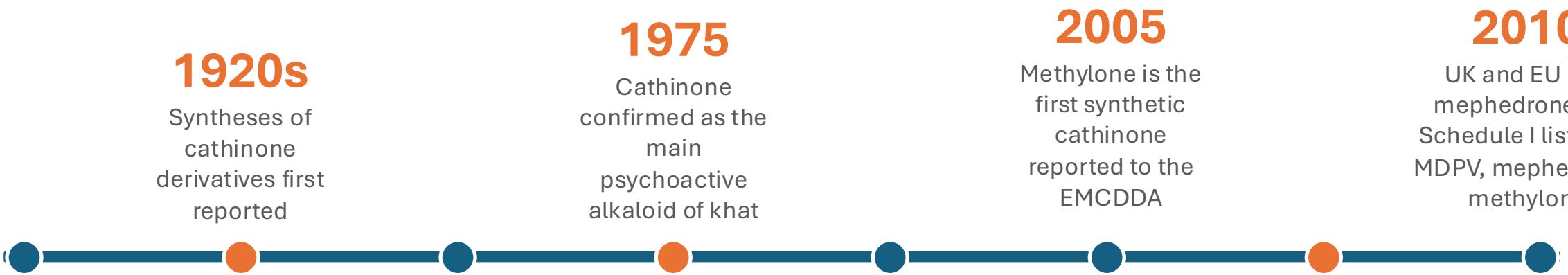
A Timeline of Cathinone and Its Synthetic Derivatives



De Felice LJ, Glennon RA, Negus SS. Synthetic cathinones: chemical phylogeny, physiology, and neuropharmacology. Life Sci. 2014;97(1):20-26.

A Timeline of Cathinone and Its Synthetic Derivatives

- Gain popularity across the US and Europe
- Restrictions on MDMA (ecstasy) precursor chemicals (2010)
- Increased media attention and wide Internet availability

Fitzgerald N. Trends in synthetic cathinone detection in seized drug samples submitted to the US DEA's National Forensic Laboratory Information System, 2010-2024. J Anal Toxicol. 2026;50(8):bkag073.

A Timeline of Cathinone and Its Synthetic Derivatives

October 2011 Schedule I substances under the Controlled Substances Act

- Mephedrone (4-methyl-*N*-methylcathinone)
- MDPV (methylenedioxypyrovalerone)
- Methylone 3,4-methylenedioxy-*N*-methylcathinone

- In July 2012, the U.S. Government passed the Synthetic Drug Abuse Prevention Act

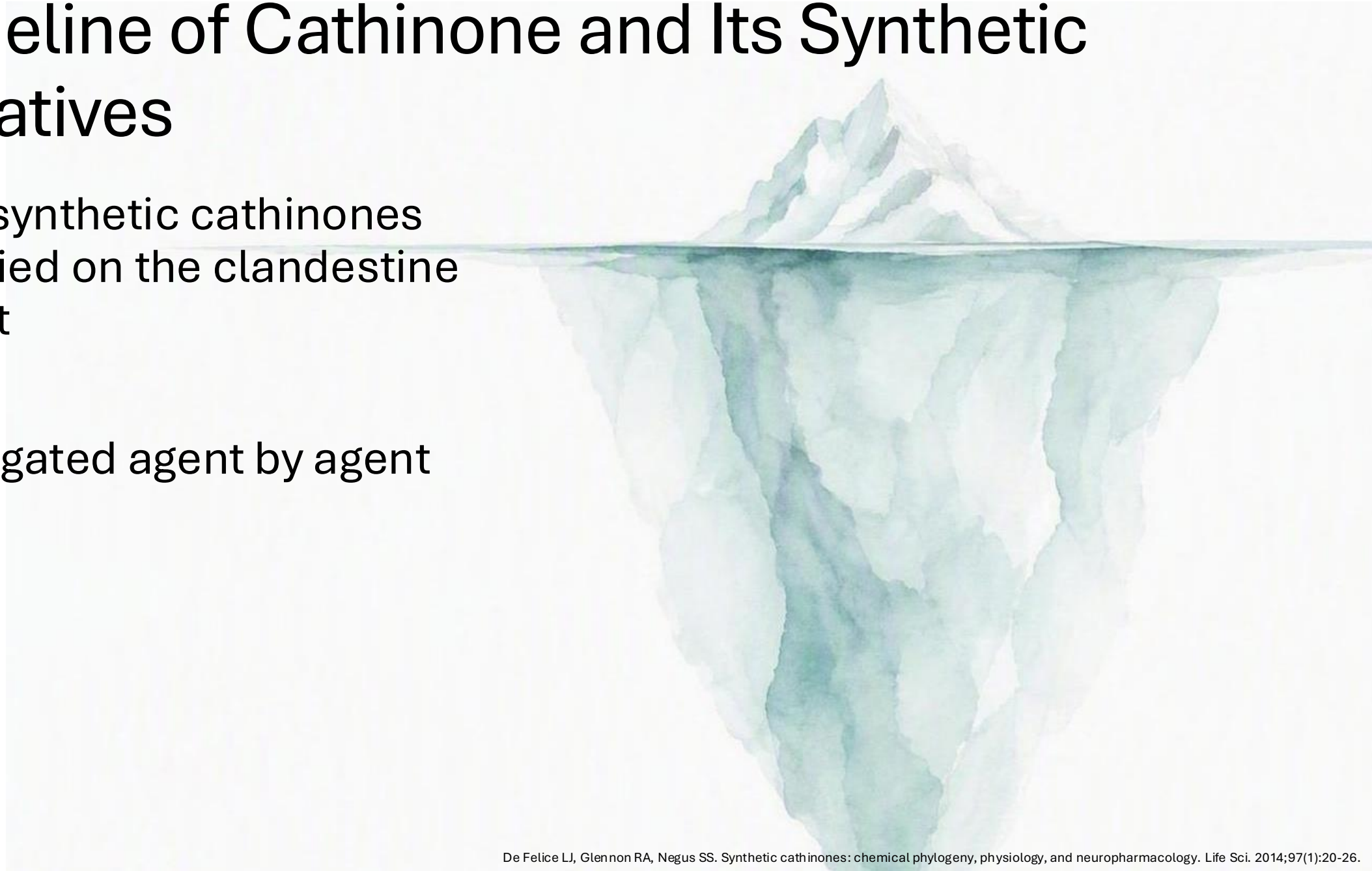
https://www.dea.gov/factsheets/bath-salts

Gershman JA, Fass AD. Synthetic cathinones ('bath salts'): legal and health care challenges. P T. 2012;37(10):571-595.

A Timeline of Cathinone and Its Synthetic Derivatives

- ~160 synthetic cathinones identified on the clandestine market

- Investigated agent by agent



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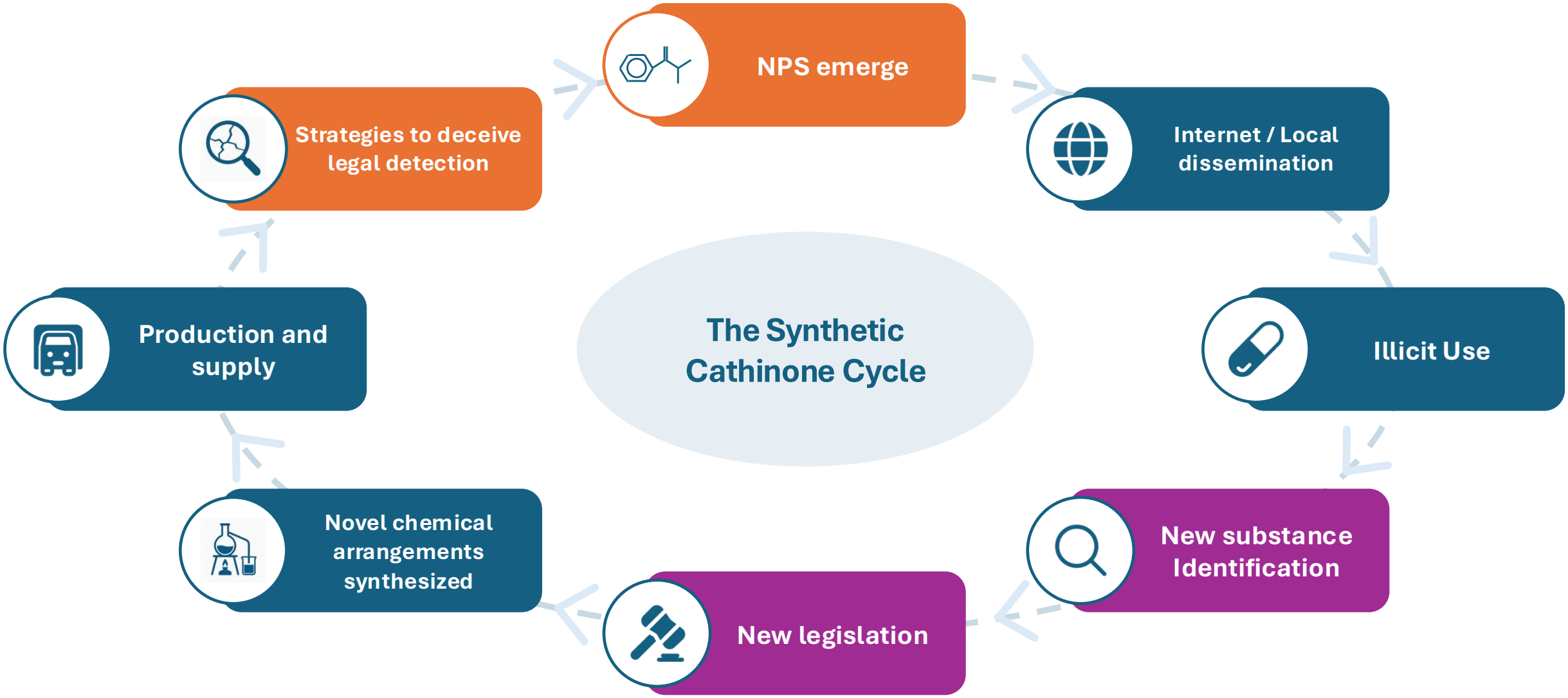
Staying Ahead of the Law



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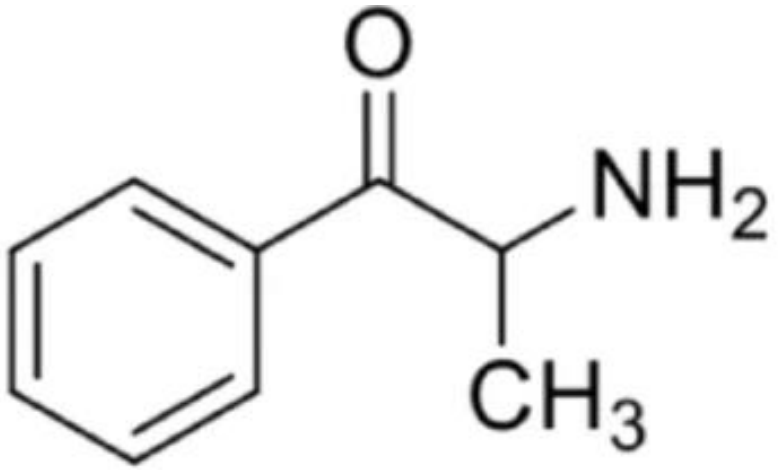
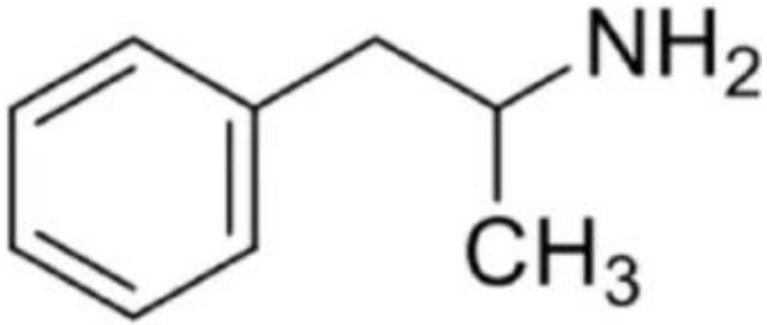
Structure

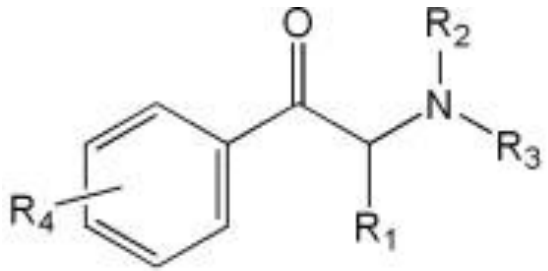


Cathinone



Amphetamine

Spyres MB, Jang DH. Amphetamines. In: Nelson LS, Howland MA, Lewin NA, Smith SW, Goldfrank LR, Hoffman RS, eds. Goldfrank's Toxicologic Emergencies. 11th ed. McGraw-Hill; 2019.
Boccuzzi S. Evaluating the stability of synthetic cathinones in liquid urine and dried urine spots: impact of pH and storage conditions. Arch Toxicol. 2025;100:931-941.



Common name	R_1	R_2	R_3	R_4	Regulation category in Japan (as of December, 2010)
Cathinone	CH_3	H	H	H	Narcotic
Methcathinone (Ephedrone)	CH_3	CH_3	H	H	Narcotic
Ethcathinone	CH_3	CH_2CH_3	H	H	Designated substance
Amfepramone (Diethylpropion)	CH_3	CH_2CH_3	CH_2CH_3	H	Psychotropic
4-Methylmethcathinone (Mephedrone)	CH_3	CH_3	H	4-CH_3	Designated substance
4-Methylethcathinone	CH_3	CH_2CH_3	H	4-CH_3	
4-Fluoromethcathinone (Flephedrone)	CH_3	CH_3	H	4-F	
3-Fluoromethcathinone	CH_3	CH_3	H	3-F	
4-Methoxymethcathinone (Methedrone)	CH_3	CH_3	H	4-OCH_3	
Buphedrone	CH_2CH_3	CH_3	H	H	
Methylone (bk-MDMA)	CH_3	CH_3	H	3,4-methylenedioxy	Narcotic
Ethylone (bk-MDEA)	CH_3	CH_2CH_3	H	3,4-methylenedioxy	Designated substance
Butylone (bk-MBDB)	CH_2CH_3	CH_3	H	3,4-methylenedioxy	Designated substance
Pentylone	$CH_2CH_2CH_3$	CH_3	H	3,4-methylenedioxy	
MPPP	CH_3	pyrrolidinyl		4-CH_3	
Pyrovalerone	$CH_2CH_2CH_3$	pyrrolidinyl		4-CH_3	Psychotropic
MDPDP	CH_2CH_3	pyrrolidinyl		3,4-methylenedioxy	
MDPV (3,4-Methylenedioxypyrovalerone)	$CH_2CH_2CH_3$	pyrrolidinyl		3,4-methylenedioxy	Designated substance
Naphyrone (Naphthylpyrovalerone)	$CH_2CH_2CH_3$	pyrrolidinyl		(naphthyl structure)	

Janis G. Designer drugs. In: Ketha H, Garg U, eds. Toxicology Cases for the Clinical and Forensic Laboratory. Academic Press; 2020:269-276.

Common Use

- Recreational purposes, including in nightclubs, music festivals, and parties, as they produce stimulant and empathogenic effects

Santos IC, Maia D, Dinis-Oliveira RJ, Barbosa DJ. New psychoactive substances: health and legal challenges.Psychoactives. 2024;3(2):285-302.

Packaging, Marketing and Routes of Use

- Sold as
  - Powder, pill, or capsule forms
- Mode of use
  - Insufflate (snort)
  - Orally ingest
  - Potentially inject (water soluble)
  - Unlikely smoked (lability)
- Compositions can be adulterated or pure
- Specific content is often not given on packaging

Santos IC, Maia D, Dinis-Oliveira RJ, Barbosa DJ. New psychoactive substances: health and legal challenges.Psychoactives. 2024;3(2):285-302.

Street Names and Shifting Branding

- To circumnavigate controls, suppliers market them under various brand names
- Names that change rapidly over time
- Example names:
  - Explosion
  - Blow
  - Recharge
  - Top Cat
  - Diablo

Chou HH. Synthetic cathinone poisoning from ingestion of drug-laced “instant coffee packets” in Taiwan. Hum Exp Toxicol. 2021;40(9):1403-1412.
Glennon RA. Synthetic cathinones: a brief overview of overviews with applications to the forensic sciences. Ann Forensic Res Anal. 2017;4(2):1040.

Why Effects Are Unpredictable

Chemical diversity

Dose unknown

Route of administration

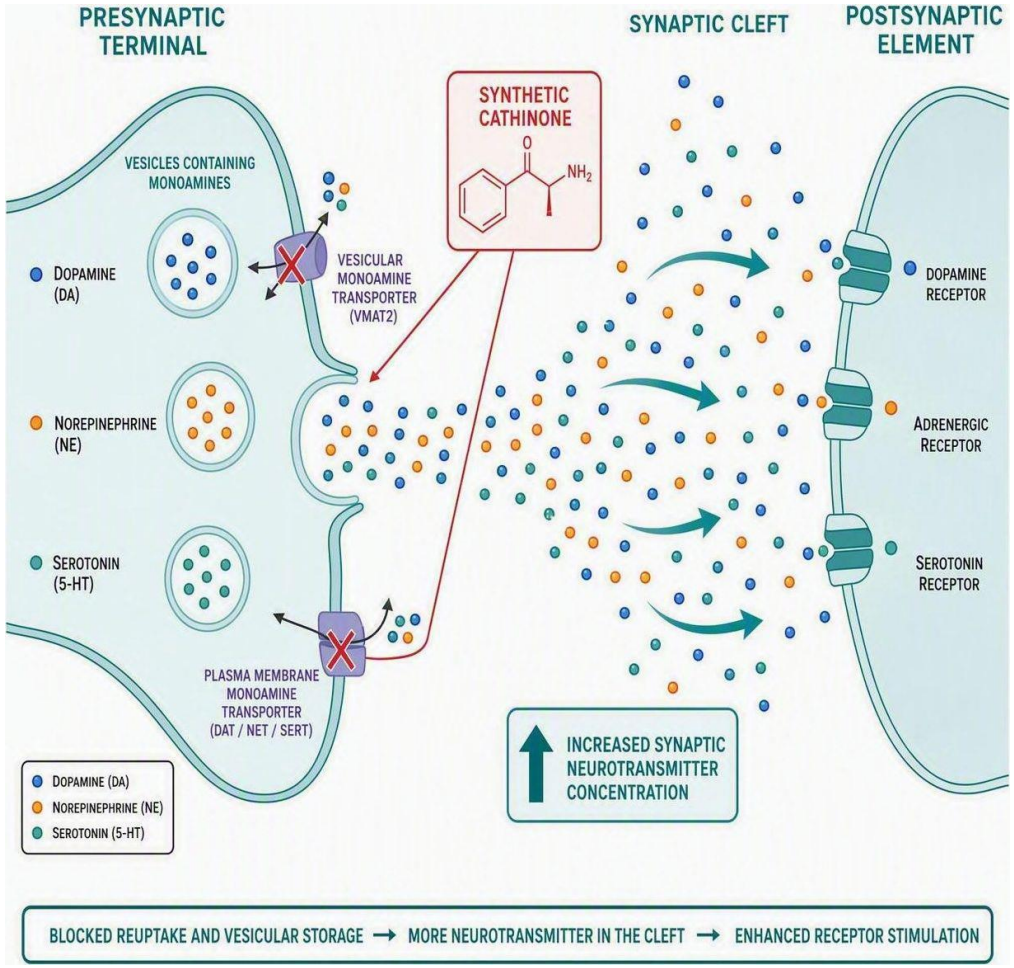
Individual susceptibility

Concomitant drugs

Santos IC, Maia D, Dinis-Oliveira RJ, Barbosa DJ. New psychoactive substances: health and legal challenges.Psychoactives. 2024;3(2):285-302.

Mechanism of Action

- CNS stimulants
- Little is known of their detailed pharmacology
- Not homogeneous and can vary from agent to agent



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Dose, Duration, Effects Ambiguity

- The long-term use can lead to tolerance
- Withdrawal and intense cravings
- Average doses vary widely
- Rapidly absorbed when ingested orally, peak at 1.5 hours
- Effects last for 3 to 12 hours
- Adulteration with other drugs

https://www.euda.europa.eu/publications/drug-profiles/synthetic-cathinones_en

What We Know Comes with Caveats

The current body of knowledge from:

- Case reports
- Data from surveillance sources
- Surveys of users
- Animal data

Data likely flawed:

- User reported accuracy of substances used
- User underreporting
- Accuracy of packaging
- Presence of co-ingestants

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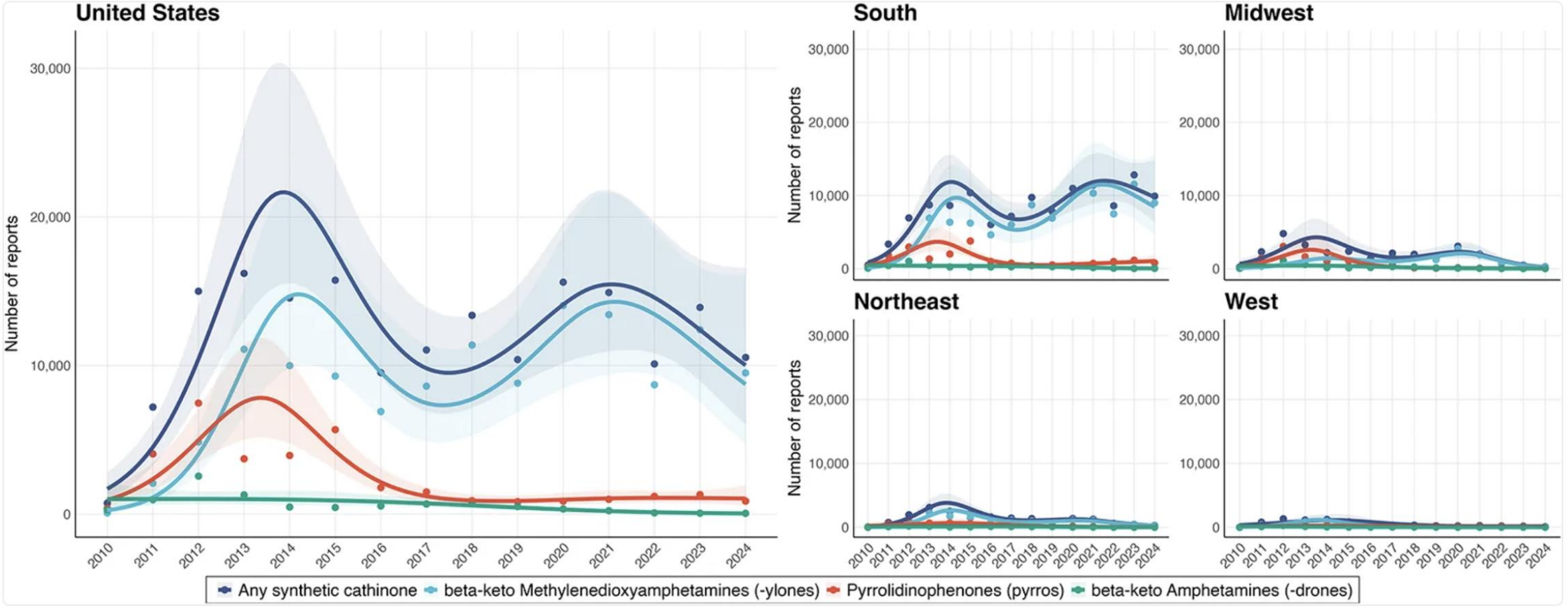
Glennon RA. Synthetic cathinones: a brief overview of overviews with applications to the forensic sciences. Ann Forensic Res Anal. 2017;4(2):1040.

Understanding Synthetic Cathinones

Understand the evolving landscape of synthetic cathinone use in Kentucky, including variability in product composition

DEA Drug Seizures



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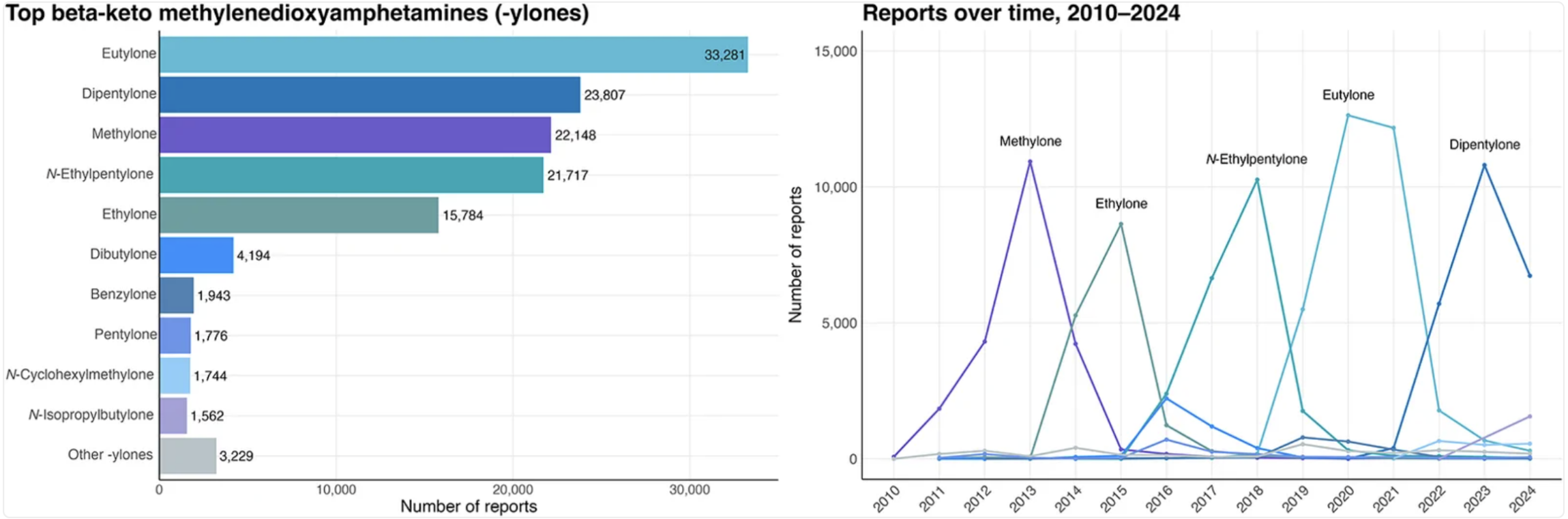
Overall counts and annual trends in reports submitted to the U.S. Drug Enforcement Administration’s National Forensic Laboratory Information System, 2010–2024.

Figure 2.



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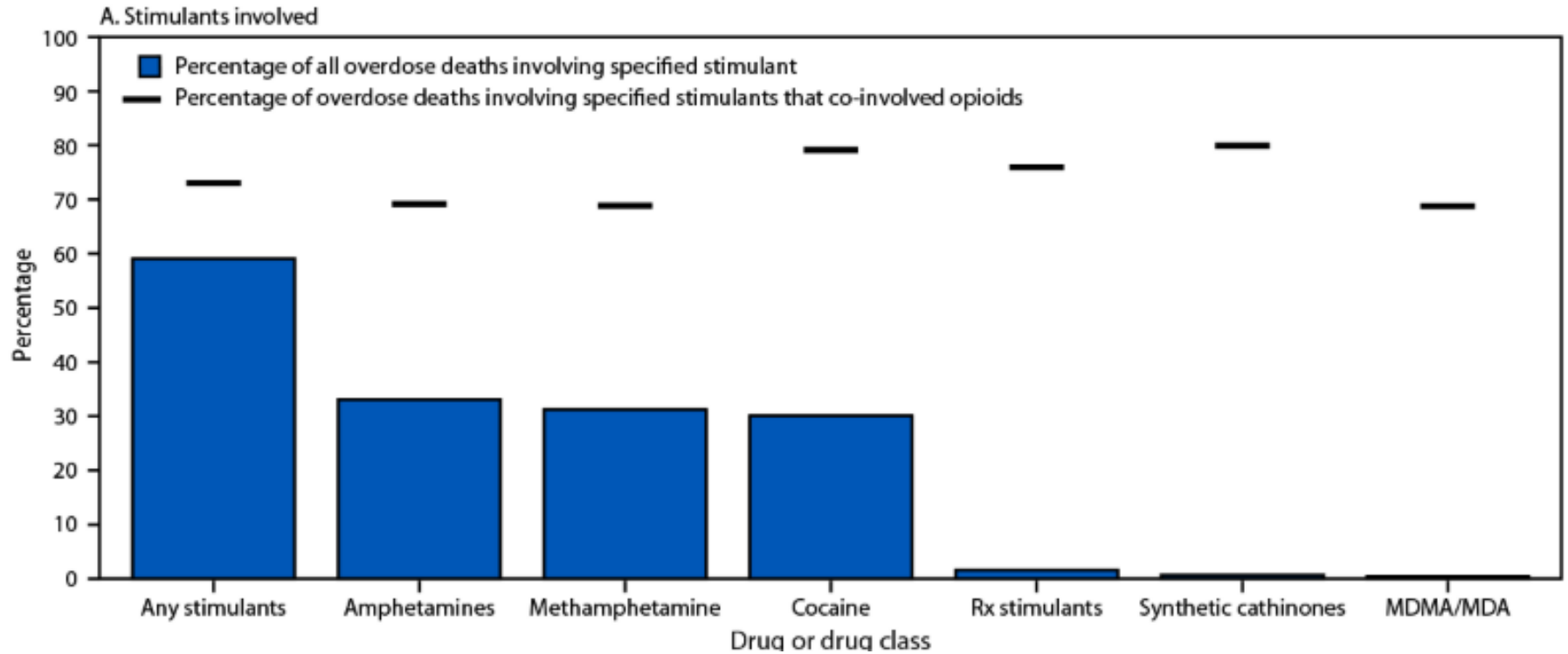
Drug Overdose Deaths Involving Stimulants — United States, January 2018–June 2024

Weekly / August 28, 2025 / 74(32);491–499

FIGURE 1. Percentage of overdose deaths (N = 309,274), by type of stimulant[*,†,§,¶,,††] involved[§§] (A) and by combinations of stimulants involved (B) — State Unintentional Drug Overdose Reporting System, United States,[¶¶] January 2021–June 2024**

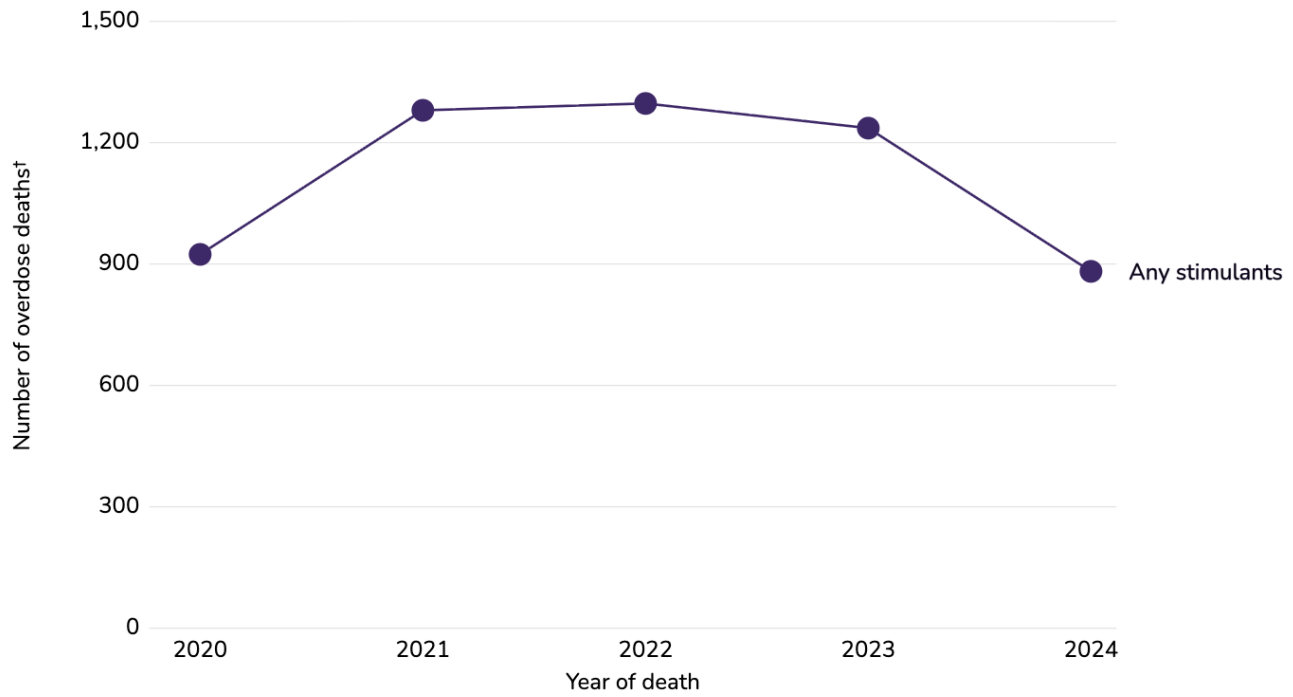


Number[1] of overdose deaths involving select drugs and drug classes, 2020–2024, *Kentucky*

Metric: ◉ Number ○ Rate ○ Percent

Line Chart ⬭ Bar Chart

Click a line or label below to view the change in overdose deaths, from 2020 to 2024, involving the selected drug/drug class.



Interactive legend: Click on the drug(s)/drug class(es) below to show or hide the corresponding line(s) on the chart above

This category includes cocaine, methamphetamine, and any other central nervous system stimulants (e.g., cathinones, prescription dextroamphetamine/amphetamine, 3,4-methylenedioxymethamphetamine).

Centers for Disease Control and Prevention. State Unintentional Drug Overdose Reporting System (SUDORS): Final Data. US Department of Health and Human Services, CDC; 2024.

Testing Modalities

Review the limitations of routine hospital toxicology testing in detecting synthetic cathinone and discuss the implications for clinical decision-making

Types of Toxicology Testing

Presumptive testing by immunoassay

- Presence of drug classes and/or their metabolites Detected in a urine sample
- Detected only if the drug concentration is high enough
- Typically, the first test used to identify drug classes in the urine
- Available in most hospitals and clinics

Confirmatory targeted testing by gas or liquid chromatography

- Used to confirm a positive drug screen result or to definitively identify a detected substance
- Detects the presence of specific drugs and/or metabolites in a urine sample
- Available at larger institutions

Confirmatory nontargeted testing by quadrupole time-of-flight mass spectrometry

- Extensive processing, high level of laboratory skill
- Available at larger institutions

Allen DR, McWhinney BC. Quadrupole time-of-flight mass spectrometry: a paradigm shift in toxicology screening applications. Clin Biochem Rev. 2019;40(3):135-146.

Common Hospital Testing

Immunoassay	Gas chromatography/mass spectrometry (GC-MS)	Liquid chromatography tandem mass spectrometry (LC-MS/MS)	Quadrupole time-of-flight mass spectrometry (Q-TOF-MS)
• Antibodies to detect the presence of selected drugs and/or metabolites	• Chromatography • Confirmatory or definitive testing	• Chromatography • Requires small volumes of substrate	• Non-targeted testing
• Fast	• Slower (6-24 hours)	• Slower (12-24 hours)	• Slower
• Cheap	• Expensive	• Expensive	• Very expensive
• Qualitative	• Qualitative	• Quantitative	• Quantitative
• Limited library • Known detection thresholds	• Lower detection thresholds	• Lower detection thresholds	• Lower detection thresholds
• Lacks specificity • Followed by a confirmatory test	• Low likelihood of false results	• Analysis has a second analytical separation step • Lower susceptibility to false results caused by concomitant usage	• Allows methods to be rapidly updated for newly emerging psychoactive agents.
• NIDA 5: marijuana, cocaine, opiates, amphetamines, and phencyclidine • 10-panel • Drugs of Abuse Screens	• Comprehensive urine drug screen	• Pain management drug screens • Drugs of abuse screen (reflex confirmatory test)	• Research only

Allen DR, McWhinney BC. Quadrupole time-of-flight mass spectrometry: a paradigm shift in toxicology screening applications. Clin Biochem Rev. 2019;40(3):135-146.

Immunoassay	Gas chromatography/mass spectrometry (GC-MS)	Liquid chromatography tandem mass spectrometry (LC-MS/MS)	Quadrupole time-of-flight mass spectrometry (Q-TOF-MS)
• Amphetamines • Benzodiazepines • Cannabinoids (Phytocannabinoids) • Cocaine • Barbiturate • Opiate • Methadone • Buprenorphine • Fentanyl • Oxycodone	• >500 substances • Many prescription and OTC medications • Common opioids • Common stimulants • Common benzodiazepines • MDMA • Ketamine • PCP • Xylazine • Naloxone • Medications for Opioid Use Disorder (MOUD)	• Detects both prescription and illicit substances and metabolites • Opioids • Benzodiazepines • Stimulants • Barbiturates • Marijuana • Phencyclidine • Medications for opioid use disorder	• Non-targeted testing
Not detected on Immunoassays due to structural differences	Detection is unlikely unless specifically added to libraries		Ideal for novel substances

Allen DR, McWhinney BC. Quadrupole time-of-flight mass spectrometry: a paradigm shift in toxicology screening applications. Clin Biochem Rev. 2019;40(3):135-146.

Commercial Testing

- ARUP
  - Bath Salts Panel
    - N,N-Dimethylpentylone
    - Dipentylone
    - bk-DMBDP
    - Pentylone
    - beta-keto-Methylbenzodioxolylpentanamine
    - bk-MBD
- Labcorp
  - Cathinone
  - Methcathinone
- Quest Diagnostics
  - Designer Stimulants

https://ltd.aruplab.com/Tests/Pub/2008650
https://medtox.labcorp.com/tests/738708/cathinone-and-methcathinone-urine
https://testdirectory.questdiagnostics.com/test/test-detail/13797/drug-monitoring-synthetic-cannabinoids-qualitative-urine?p=r&cc=MASTER

Clinical Presentations

Recognize the common clinical presentations associated with synthetic cathinone exposure

Comparing Clinical Presentations

Synthetic Cathinones

Synthetic Cannabinoids

Plant-Based New Psychoactive Substances

Classified as Novel Psychoactive Substances

- Mimic illicit drugs: Cannabis, Cocaine, MDMA, LSD, PCP
- Constantly changing chemical structures to evade legal action

Synthetic cathinones

Phenethylamines

Synthetic cannabinoids

Tryptamines

Piperazines

Novel benzodiazepines

New kratom-related products:

- 7-hydroxy mitragynine
- mitragynine pseudoindoxyl

Mitragynine

Comparing Clinical Presentations

Synthetic Cathinones

- Common names:
  - Bath salts, plant food, jewelry cleaner, phone screen cleaner
- Origin:
  - Laboratory-made chemicals
  - Khat shrub in East Africa
- Formulation:
  - White or brown crystal-like powder
  - Abused by ingestion, insufflation, inhalation, injection

Synthetic Cannabinoids

- Common names:
  - Spice, synthetic marijuana, K2, Joker, Black Mamba, Kronic, herbal or liquid incense
- Origin:
  - Laboratory-made chemicals
- Formulation:
  - Liquid – sprayed onto plant material or used in e-cigarettes / vape juices

Mitragynine

- Common names:
  - Kratom
- Origin:
  - Plant derived and laboratory synthetics
- Formulation:
  - Tablets / capsules
  - Powders
  - Liquid extracts
  - Gummies

Pharmacol Toxicol 1992 Feb; 70(2):77-86
Clin Pharmacol. 2013;5:109-115.
Crit Rev Toxicol. 2020;50(5):359-382.

Comparing Clinical Presentations
Mechanism of Action

Synthetic Cathinones	Synthetic Cannabinoids	Mitragynine

• Effects on:
  • Dopamine
  • Norepinephrine
  • Serotonin
 	
Amphetamine like
	• Effects on:
	  • CB1 and CB2 receptors
	  • With higher potency and efficacy
		• Effects on:
		  • Mixed opioid receptor agonist / antagonist
		  • Noradrenergic and serotonergic involvement
		  • Obstruction of neuronal calcium channels
		  • Alpha-2 adrenergic receptors

Comparing Clinical Presentations
Common Symptoms

Synthetic Cathinones

Sympathomimetic

- Tachycardia
- Hypertension

Neurologic Symptoms

- Agitation/irritability (40%)
- Lethargy (7%)
- Altered mental status (13%)
- Hallucinations/Delusions (18%)
- Seizures (3%)

Synthetic Cannabinoids

Mixed toxidromes

- Sympathomimetic
  - Tachycardia
  - Hypertension
- Anticholinergic
  - Dry mouth, dry skin
  - Blurred vision
  - Urinary retention

Neurologic Symptoms

- Agitation/irritability (25%)
- Lethargy (14%)
- Altered mental status (12%)
- Hallucinations/Delusions (11%)
- Seizures (4%)

Mitragynine

Mixed toxidromes

Sympathomimetic

- Tachycardia
- Hypertension

Neurologic Symptoms

- Agitation/irritability (23%)
- Confusion (11%)
- Drowsiness/lethargy (14%)
- Seizures

- Respiratory depression

Heizer J, et al. Pediatr Emerg Care. 2018;34(7):457-462.
Hassamal S, et al. Psychiatr Times. 2021;38(7).

Case 1: 31 y/o with Prolonged AMS

Pre-Hospital

Not acting normally

Pt believed he snorted heroin or PCP

"I had side effects I don't get with that"

Emergency Department

Presented 2 days in a row for continued symptoms

Broad work-up

In House Testing

DAS (Urine):

- **Benzodiazepines**
- Cannabinoids
- Fentanyl

UDS (Urine):

- Not performed

Pain Mgmt (Urine):

- 9 carboxy THC glu
- Fentanyl
- Norfentanyl*

Send Out Testing

Whole Blood Sample:

- **Bromazolam**
- **N,N-Dimethylpentylone**
- **Pentylone**
- Quinine
- Fentanyl
- Norfentanyl*

Journal of Analytical Toxicology, 2023, **47**, 753–761
DOI: https://doi.org/10.1093/jat/bkad037
Advance Access Publication Date: 17 June 2023
Article

OXFORD

N,N-Dimethylpentylone (dipentylone)—A new synthetic cathinone identified in a postmortem forensic toxicology case series

Melissa F. Fogarty[1,*], Alex J. Krotulski[1], Donna M. Papsun[2], Sara E. Walton[1], Michael Lamb[2], Michael T. Truver[3], Chris W. Chronister[3], Bruce A. Goldberger[3], Barry K. Logan[1,2]

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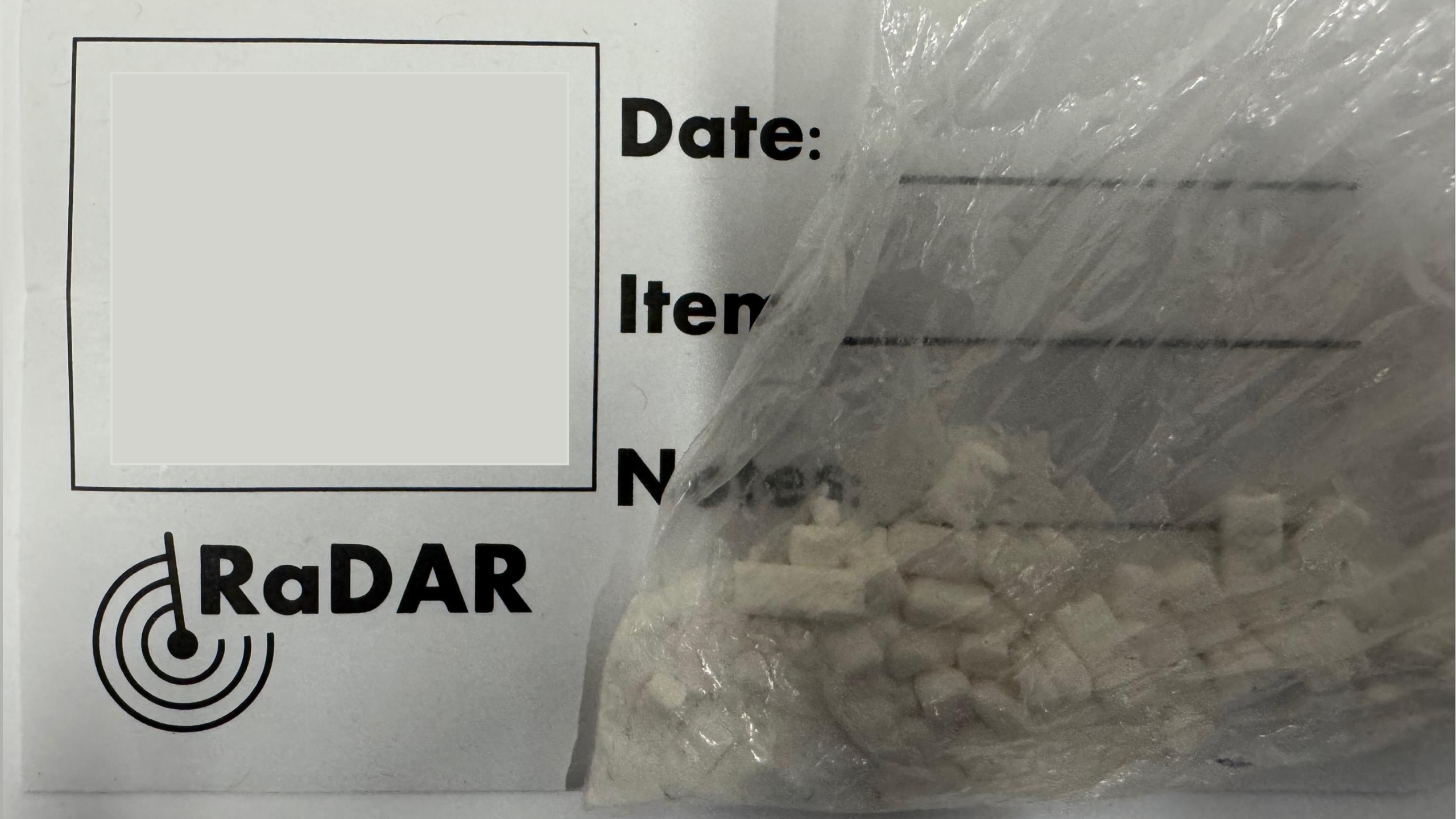
[2]NMS Labs, 200 Welsh Road, Horsham, PA 19044, USA
[3]Forensic Toxicology Laboratory, Department of Pathology, Immunology, and Laboratory Medicine, University of Florida College of Medicine, 4800 SW 35th Drive, Gainesville, FL 32608, USA

*Corresponding author: Center for Forensic Science Research and Education, Fredric Rieders Family Foundation, 2300 Stratford Avenue, Willow Grove, PA 19090, USA. Email: melissa.fogarty@cfsre.org


Date:
Item
RaDAR

Case 2: 39 y/o Found Down

Pre-Hospital

Found unresponsive

Family administered IN naloxone, no change

EMS administered naloxone IN, combative enroute

Emergency Department

GCS 1-4-5, somnolent, protecting airway

Tachycardic but otherwise hemodynamically stable and afebrile

Intermittent combativeness

Droperidol 5 mg administered

In House Testing

DAS (Urine):

Negative

UDS (Urine):

Not performed

Pain Mgmt (Urine):

7-Aminoclonazepam*

Clonazepam

Desmethyl Tramadol

Naloxone

Tramadol

Send Out Testing

Urine Sample:

Alpha-Piperidinobutiophenone

N-ethyl Hexylone

Tramadol

Clonazepam

7-Aminoclonazepam*

Naloxone

Emtricitabine

Tenofovir

Risperidone

Furosemide

Lamotrigine

Case 3: 33 y/o Combative

Pre-Hospital

Combative on scene and altered

EMS administered IM Ketamine

Emergency Department

GCS 9, somnolent, protecting airway

Tachycardic but otherwise hemodynamically stable and afebrile

Intermittent combativeness

Lorazepam 2 mg IV administered

In House Testing

DAS (Urine):

Amphetamines

Benzodiazepines

UDS (Urine):

Not performed

Pain Mgmt (Urine):

Not performed

Send Out Testing

Plasma Sample:

- Methamphetamine
- Caffeine
- Cotinine*
- **Ketamine**
- Lidocaine
- **Lorazepam**

Urine:

- Methamphetamine
- Amphetamine
- **Methcathinone**
- Buprenorphine
- **Ketamine**
- **Lorazepam**
- Nicotine
- Pseudoephedrine

Patient Case Take-aways

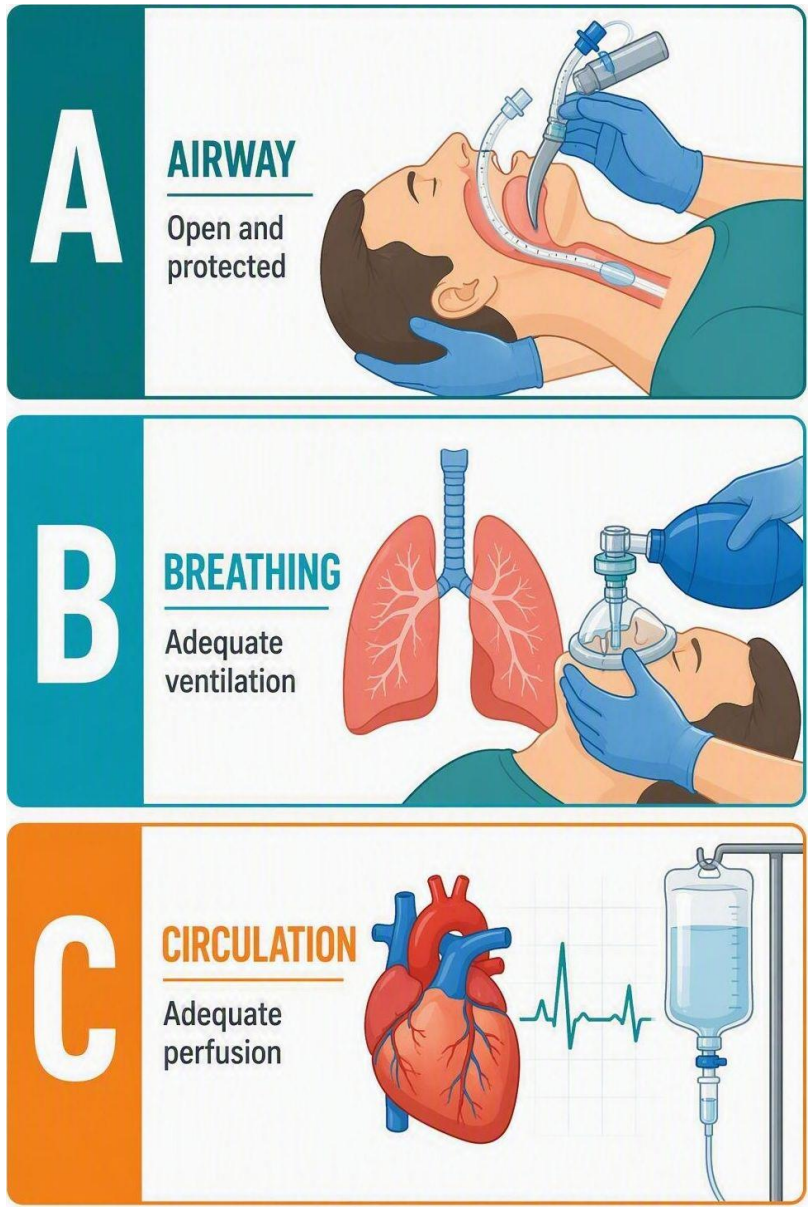
- Multiple substances involved
- Limitations in testing
- Large differential diagnosis requiring work up
- Coding may not adequately capture exposures

Management

Outline management strategies for synthetic cathinone toxicity

Symptomatic and Supportive Care

- No targeted antidotal therapy
- Decontamination measures not recommended



Schaffer DH, Richards JR. Sympathomimetic toxicity. In: StatPearls. StatPearls Publishing; 2025.

Differential Diagnosis

- Other intoxication
- Withdrawal syndromes
- Hypertensive emergencies
- Psychological disorders
- Thyrotoxicosis
- Sepsis
- Trauma

Schaffer DH, Richards JR. Sympathomimetic toxicity. In: StatPearls. StatPearls Publishing; 2025.

Clinical Management

Respiratory	• Tachypnea
Cardiovascular	• Hypertension • Tachycardia • Arrhythmias
Neurologic	• Agitation, aggression, psychosis • Seizures

- **Benzodiazepines (first line)**
  - Hypertension
    - Antihypertensives
  - Sinus tachycardia
    - Rarely requires additional treatment
  - Supraventricular tachycardia
    - Responds to typical treatments
  - Agitation
    - Antipsychotics
  - Seizures
    - GABA receptor agonists
    - Other AED minimal benefit

Schaffer DH, Richards JR. Sympathomimetic toxicity. In: StatPearls. StatPearls Publishing; 2025.

Clinical Management

Hyperthermia	• Poor prognostic indicator
Renal	• Acute kidney injury • Rhabdomyolysis
Electrolyte abnormalities	• Dehydration

- **Benzodiazepines (first line)**
  - Hyperthermia
    - External cooling
    - Dantrolene
  - Hydration and electrolyte replacement

Schaffer DH, Richards JR. Sympathomimetic toxicity. In: StatPearls. StatPearls Publishing; 2025.

Bupropion Therapy

- At therapeutic doses, adverse effects are nonspecific:
  - Dry mouth
  - Constipation
  - Headache
  - Nausea
  - Agitation
  - Insomnia
  - Weight loss
- Norepinephrine–dopamine reuptake inhibitor with active metabolite
- Widespread prescribing
- Lowers seizure threshold; dose-dependent

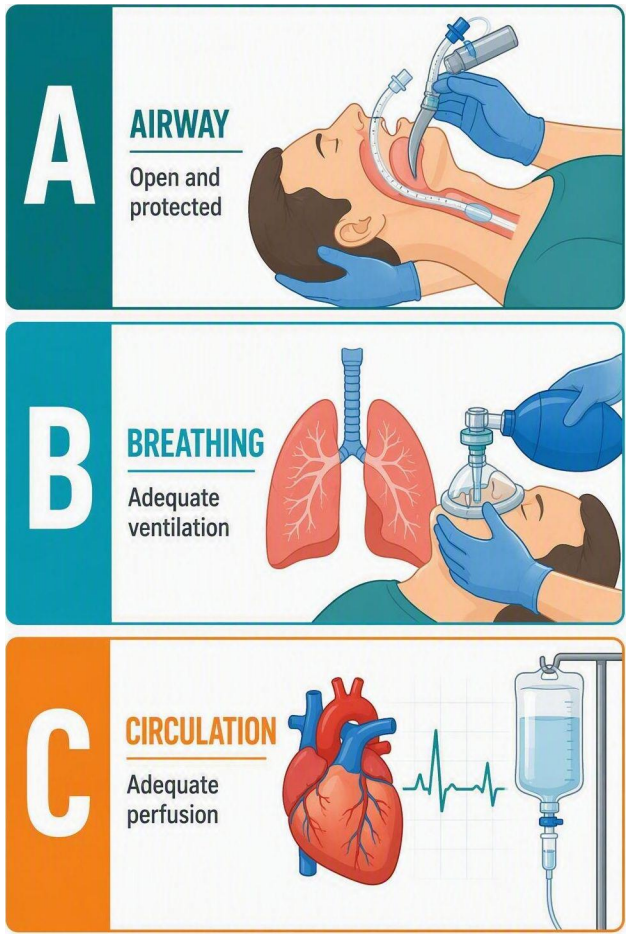
Alberter AA, Chambers AJ, Schaffer DH. Bupropion toxicity. In: StatPearls. StatPearls Publishing; 2026.
Stork CM. Serotonin reuptake inhibitors and atypical antidepressants. In: Nelson LS, Howland MA, Lewin NA, Smith SW, Goldfrank LR, Hoffman RS, eds. Goldfrank's Toxicologic Emergencies. 11th ed. McGraw-Hill; 2019.

Bupropion Toxicity

- Supratherapeutic doses:
  - Seizures — including status epilepticus
  - Tachycardia — can progress to cardiogenic shock and death
    - Prolongation of the QT interval and widening of the QRS complex
  - Agitation
- Extended-release formulations can cause delayed-onset toxicity, occurring up to 24 hours after ingestion

Alberter AA, Chambers AJ, Schaffer DH. Bupropion toxicity. In: StatPearls. StatPearls Publishing; 2026.
Stork CM. Serotonin reuptake inhibitors and atypical antidepressants. In: Nelson LS, Howland MA, Lewin NA, Smith SW, Goldfrank LR, Hoffman RS, eds. Goldfrank's Toxicologic Emergencies. 11th ed. McGraw-Hill; 2019.

Bupropion Toxicity Treatment



- Symptomatic and supportive care
- No specific antidote
- GI decontamination (case-by-case)
- Benzodiazepines (first line)
- Refractory seizures: GABA agents (propofol, phenobarbital)
- Life-threatening arrhythmias treated in accordance with ACLS guidelines
- IV fluids and vasopressors for cardiogenic shock

Alberter AA, Chambers AJ, Schaffer DH. Bupropion toxicity. In: StatPearls. StatPearls Publishing; 2026.
Stork CM. Serotonin reuptake inhibitors and atypical antidepressants. In: Nelson LS, Howland MA, Lewin NA, Smith SW, Goldfrank LR, Hoffman RS, eds. Goldfrank's Toxicologic Emergencies. 11th ed. McGraw-Hill; 2019.

Bupropion Life-Threatening Toxicity

- Bupropion-induced QRS prolongation may not respond to sodium bicarbonate
  - Related to impaired myocardial gap junction communication rather than sodium channel inhibition
- Intravenous lipid emulsion (ILE)
  - Severe, life-threatening toxicity, including refractory status epilepticus or hemodynamic instability
- ILE is generally reserved for rescue therapy

Alberter AA, Chambers AJ, Schaffer DH. Bupropion toxicity. In: StatPearls. StatPearls Publishing; 2026.
Stork CM. Serotonin reuptake inhibitors and atypical antidepressants. In: Nelson LS, Howland MA, Lewin NA, Smith SW, Goldfrank LR, Hoffman RS, eds. Goldfrank's Toxicologic Emergencies. 11th ed. McGraw-Hill; 2019.

Value of Poison Centers

Direct patient care recommendations

- Up-to-date
- Evidence-based

Public health

- Ongoing, real-time database
- Improves understanding of public health crisis
- Early identification of patterns

Nationwide Poison Control Center
1-800-222-1222

Synthetic Cathinone Conclusions

- The landscape of the current drug supply is complicated
- It is difficult to distinguish clinically between novel psychoactive substances
- Testing for all substances is limited
- Symptomatic and supportive care is the mainstay of treatment
- Reporting to Poison Control is important

Not for Human Consumption: Understanding Synthetic Cathinone Toxicity

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