Q2 2024 Trend Reports

NPS Benzodiazepines, NPS Opioids, NPS Stimulants & Hallucinogens, and Synthetic Cannabinoids in the U.S.

PURPOSE: This report provides up-to-date information regarding the status of NPS benzodiazepine prevalence and positivity in the United States.

OVERVIEW: Novel psychoactive substances (NPS), including NPS benzodiazepines, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. NPS benzodiazepines have been implicated in an increasing number of adverse health events, marked by emergency room admissions and death investigations, especially when ingested in combination with opioids. Maintaining a current scope of analysis can be challenging, requiring comprehensive analytical methodologies and reference materials for identification(s).

OBJECTIVE: Our laboratory utilizes novel approaches for the analysis of drugs in toxicology specimens and drug materials using comprehensive non-targeted data acquisition by gas chromatography mass spectrometry (GC-MS) and liquid chromatography quadrupole time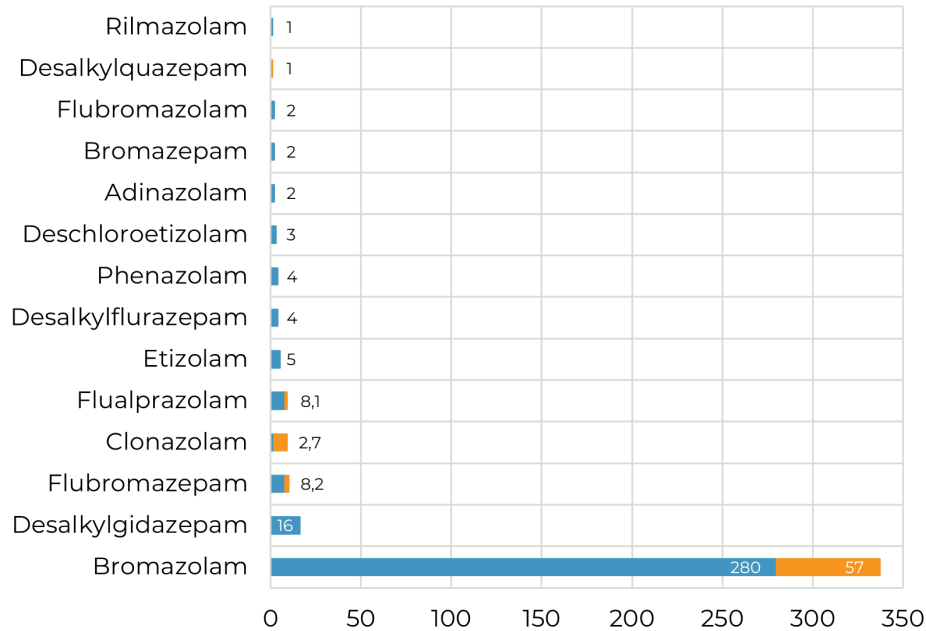-of-flight mass spectrometry (LC-QTOF-MS). The scope of analysis contains more than 1,200 drugs, including a vast majority of NPS and their metabolites. This approach allows for real-time identification of new benzodiazepines and further data analysis of important trends. Cases and sample types linked to these results originate from recreational drug use, medicolegal death investigations, clinical intoxications, and/or driving under the influence of drugs investigations, among other circumstances. The results in this report represent the total number of NPS identifications at the CFSRE during this quarter, including those from sample-mining, data-mining, routine testing, and esoteric testing.

Pie chart legend:
- **Benzodiazepines** — 47%
- Opioids — 25%
- Stimulants & Hallucinogens — 17%
- Synthetic Cannabinoids — 11%
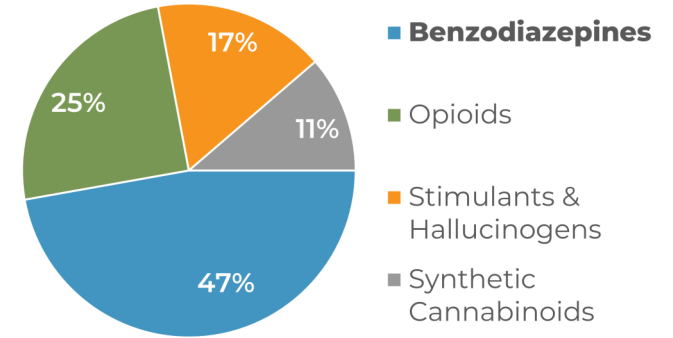
NPS BENZODIAZEPINES IDENTIFIED

Legend: ■ Toxicology Specimen ■ Drug Material

Substance	Toxicology Specimen	Drug Material
Rilmazolam	1	
Desalkylquazepam		1
Flubromazolam	2	
Bromazepam	2	
Adinazolam	2	
Deschloroetizolam	3	
Phenazolam	4	
Desalkylflurazepam	4	
Etizolam	5	
Flualprazolam	8	1
Clonazolam	2	7
Flubromazepam	8	2
Desalkylgidazepam	16	
Bromazolam	280	57

SELECT POSITIVITY: Q3 2021 TO Q2 2024

Positivity plots are derived from a select toxicology data source that has been consistently monitored since 2018.

Legend: Etizolam, Flualprazolam, Flubromazolam, Bromazolam, Flubromazepam, Desalkylgidazepam

cfsre | NPS DISCOVERY

PURPOSE: This report provides up-to-date information regarding the status of NPS opioid prevalence and positivity in the United States.

OVERVIEW: Novel psychoactive substances (NPS), including NPS opioids, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. NPS opioids have been implicated in an increasing number of emergency room admissions, death investigations, and mass intoxication events, and often appear in combination with other illicit opioids (e.g. fentanyl, heroin). Maintaining a current scope of analysis can be challenging, requiring comprehensive analytical methodologies and reference materials for identification(s).

OBJECTIVE: Our laboratory utilizes novel approaches for the analysis of drugs in toxicology specimens and drug materials using comprehensive non-targeted data acquisition by gas chromatography mass spectrometry (GC-MS) and liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QTOF-MS). The scope of analysis contains more than 1,200 drugs, including a vast majority of NPS and their metabolites. This approach allows for real-time identification of novel opioids and further data analysis of important trends. Cases and sample types linked to these results originate from recreational drug use, medicolegal death investigations, clinical intoxications, and/or driving under the influence of drugs investigations, among other circumstances. The results in this report represent the total number of NPS identifications at the CFSRE during this quarter, including those from sample-mining, data-mining, routine testing, and esoteric testing.
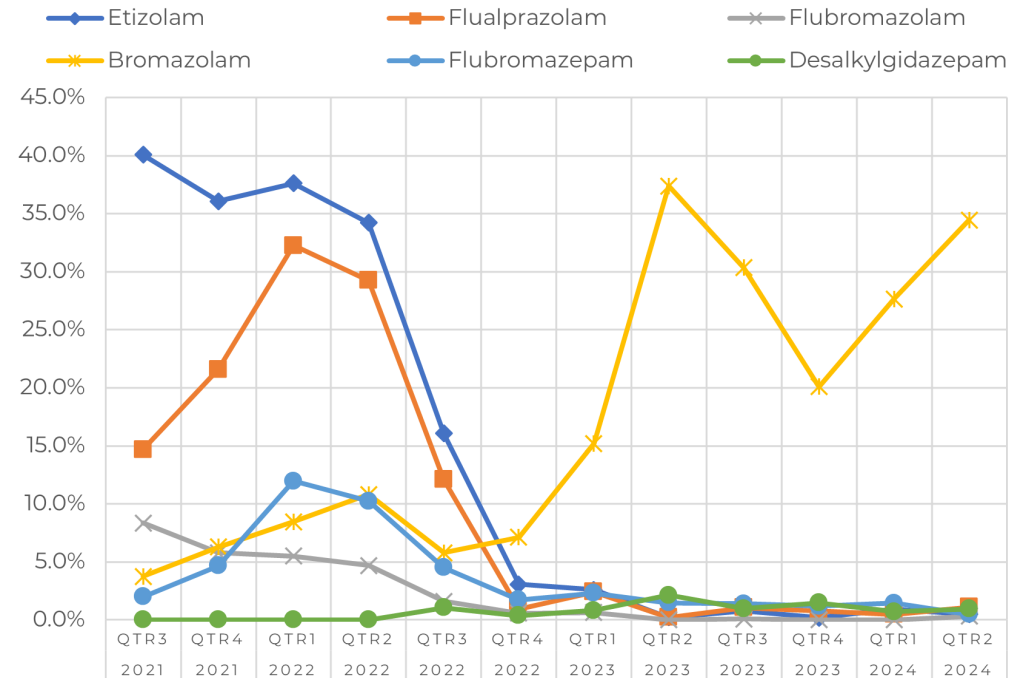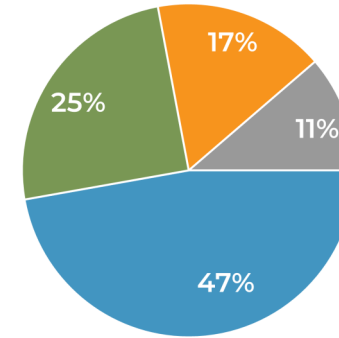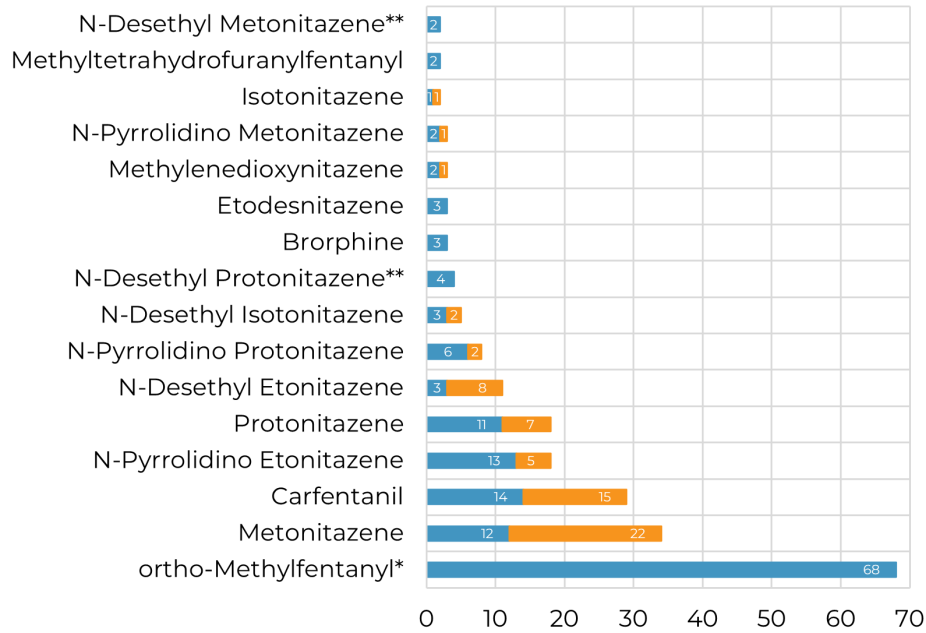
Pie chart:
- Benzodiazepines — 47%
- Opioids — 25%
- Stimulants & Hallucinogens — 17%
- Synthetic Cannabinoids — 11%

NPS OPIOIDS IDENTIFIED

Legend: ■ Toxicology Specimen ■ Drug Material

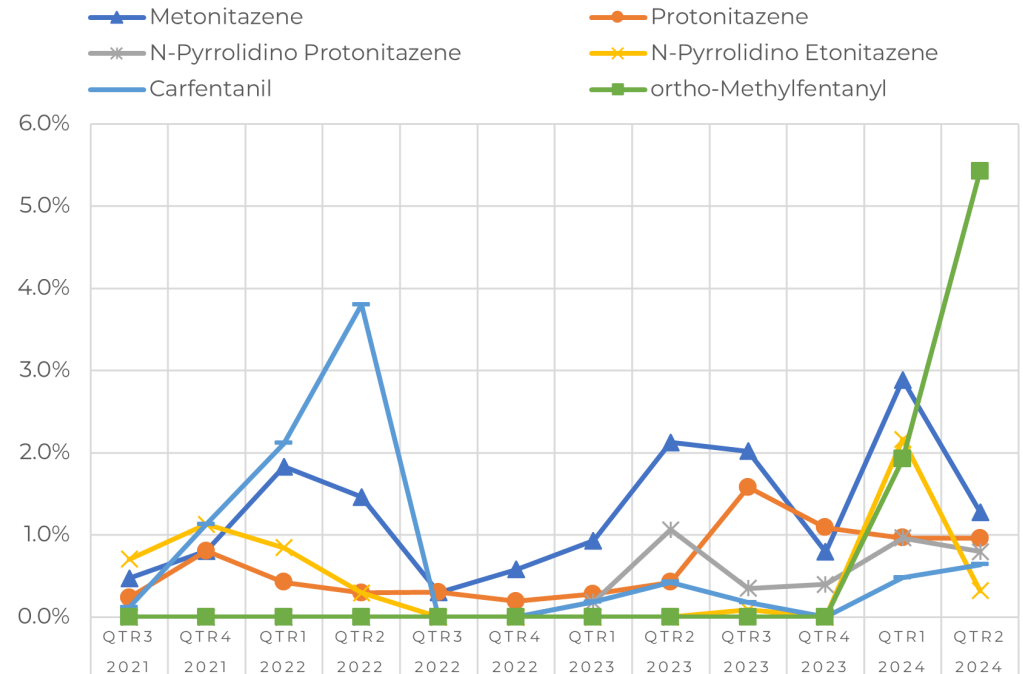| Substance	Toxicology Specimen	Drug Material
N-Desethyl Metonitazene**	2	
Methyltetrahydrofuranylfentanyl	2	
Isotonitazene	1	1
N-Pyrrolidino Metonitazene	2	1
Methylenedioxynitazene	2	1
Etodesnitazene	3	
Brorphine	3	
N-Desethyl Protonitazene**	4	
N-Desethyl Isotonitazene	3	2
N-Pyrrolidino Protonitazene	6	2
N-Desethyl Etonitazene	3	8
Protonitazene	11	7
N-Pyrrolidino Etonitazene	13	5
Carfentanil	14	15
Metonitazene	12	22
ortho-Methylfentanyl*	68	

**Detected only as metabolite to date. *Presumed primary isomer based on testing to date. — For Reference: Fluorofentanyl (n>300) & Fentanyl (n>600)

SELECT POSITIVITY: Q3 2021 TO Q2 2024

Positivity plots are derived from a select toxicology data source that has been consistently monitored since 2018.

Legend:
- Metonitazene
- Protonitazene
- N-Pyrrolidino Protonitazene
- N-Pyrrolidino Etonitazene
- Carfentanil
- ortho-Methylfentanyl

Line chart x-axis: QTR3 2021, QTR4 2021, QTR1 2022, QTR2 2022, QTR3 2022, QTR4 2022, QTR1 2023, QTR2 2023, QTR3 2023, QTR4 2023, QTR1 2024, QTR2 2024

y-axis: 0.0%, 1.0%, 2.0%, 3.0%, 4.0%, 5.0%, 6.0%

cfsre | NPS DISCOVERY

NPS Stimulants & Hallucinogens in the United States
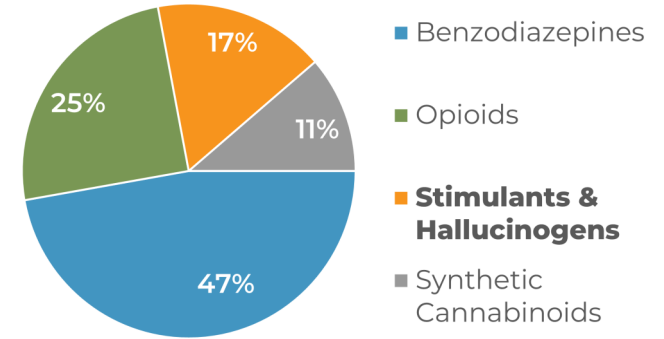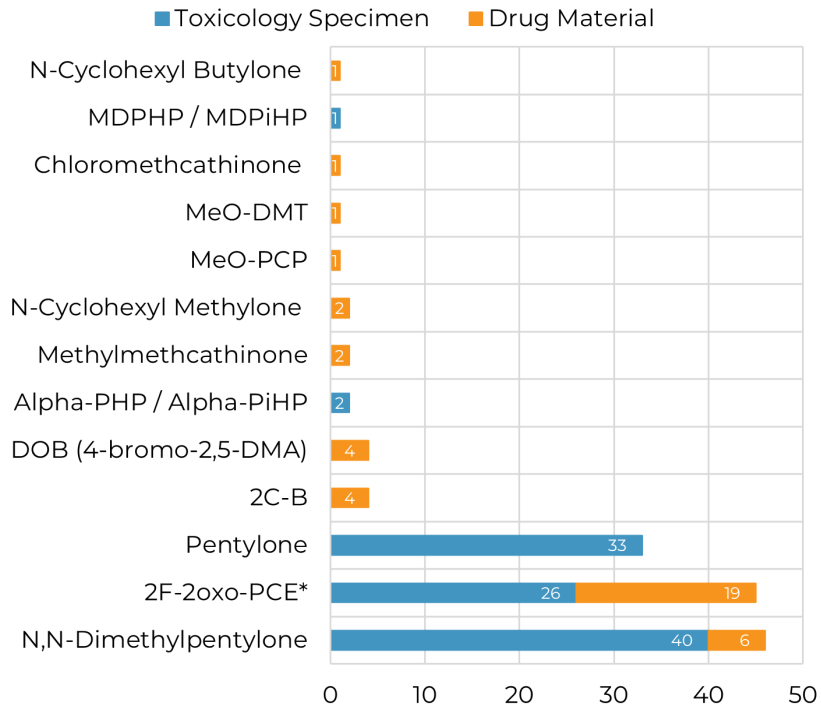
PURPOSE: This report provides up-to-date information regarding NPS stimulant & NPS hallucinogen prevalence and positivity in the United States.

OVERVIEW: Novel psychoactive substances (NPS), including NPS stimulants and NPS hallucinogens, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. Both NPS stimulants and NPS hallucinogens have been implicated in emergency room admissions, death investigations, and/or intoxication events associated with night clubs and music festivals. Maintaining a current scope of analysis can be challenging, requiring comprehensive analytical methodologies and reference materials for identification(s).

OBJECTIVE: Our laboratory utilizes novel approaches for the analysis of drugs in toxicology specimens and drug materials using comprehensive non-targeted data acquisition by gas chromatography mass spectrometry (GC-MS) and liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QTOF-MS). The scope of analysis contains more than 1,200 drugs, including a vast majority of NPS and their metabolites. This approach allows for real-time identification of emerging stimulants and hallucinogens and further data analysis of important trends. Cases and sample types linked to these results originate from recreational drug use, medicolegal death investigations, clinical intoxications, and/or driving under the influence of drugs investigations, among other circumstances. The results in this report represent the total number of NPS identifications at the CFSRE during this quarter, including those from sample-mining, data-mining, routine testing, and esoteric testing.
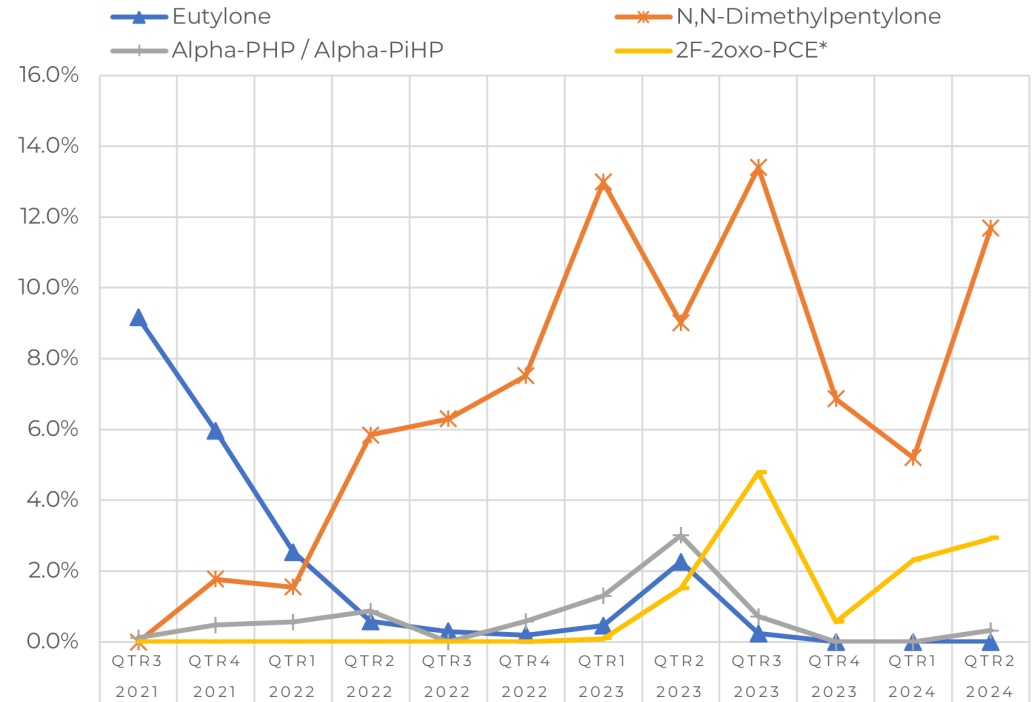
Pie chart:
- 47% Benzodiazepines
- 25% Opioids
- 17% **Stimulants & Hallucinogens**
- 11% Synthetic Cannabinoids

NPS STIMULANTS & HALLUCINOGENS IDENTIFIED

Legend: ■ Toxicology Specimen ■ Drug Material

Substance	Toxicology Specimen	Drug Material
N-Cyclohexyl Butylone		1
MDPHP / MDPiHP	1	
Chloromethcathinone		1
MeO-DMT		1
MeO-PCP		1
N-Cyclohexyl Methylone		2
Methylmethcathinone		2
Alpha-PHP / Alpha-PiHP	2	
DOB (4-bromo-2,5-DMA)		4
2C-B		4
Pentylone	33	
2F-2oxo-PCE*	26	19
N,N-Dimethylpentylone	40	6

*Presumed primary isomer based on testing to date.

SELECT POSITIVITY: Q3 2021 TO Q2 2024

Positivity plots are derived from a select toxicology data source that has been consistently monitored since 2018.

Legend: Eutylone, N,N-Dimethylpentylone, Alpha-PHP / Alpha-PiHP, 2F-2oxo-PCE*

cfsre | NPS DISCOVERY

PURPOSE: This report provides up-to-date information regarding the status of synthetic cannabinoid prevalence and positivity in the United States.
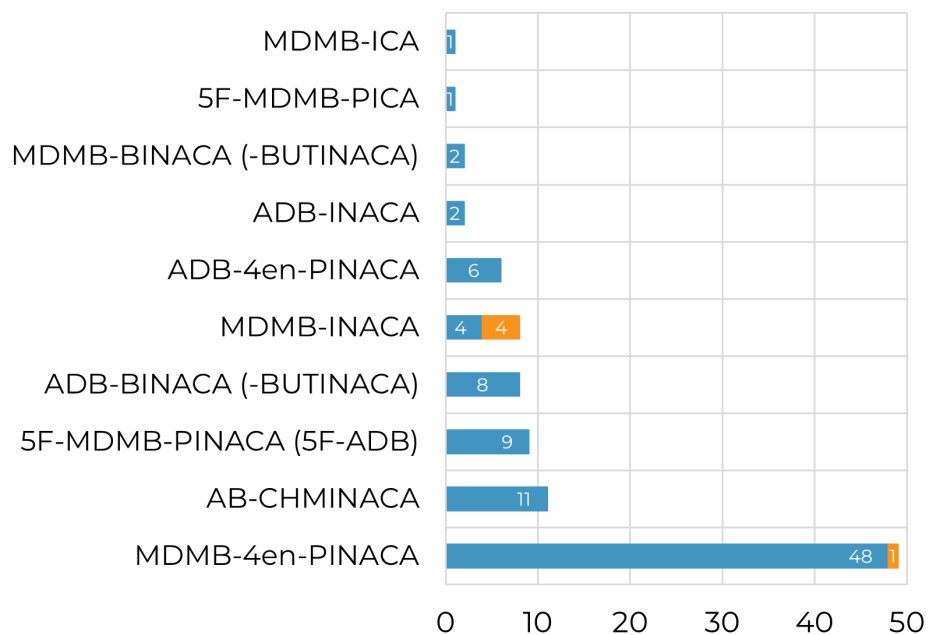
OVERVIEW: Novel psychoactive substances (NPS), including synthetic cannabinoids, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. Synthetic cannabinoids have been implicated in an increasing number of emergency room admissions, death investigations, and intoxication events in corrections populations. Maintaining a current scope of analysis can be challenging, requiring comprehensive analytical methodologies and reference materials for identification(s).

OBJECTIVE: Our laboratory utilizes novel approaches for the analysis of drugs in toxicology specimens and drug materials using comprehensive non-targeted data acquisition by gas chromatography mass spectrometry (GC-MS) and liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QTOF-MS). The scope of analysis contains more than 1,200 drugs, including a vast majority of NPS and their metabolites. This approach allows for real-time identification of novel synthetic cannabinoids and further data analysis of important trends. Cases and sample types linked to these results originate from recreational drug use, medicolegal death investigations, clinical intoxications, and/or driving under the influence of drugs investigations, among other circumstances. The results in this report represent the total number of NPS identifications at the CFSRE during this quarter, including those from sample-mining, data-mining, routine testing, and esoteric testing.

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- **Synthetic Cannabinoids** — 11%
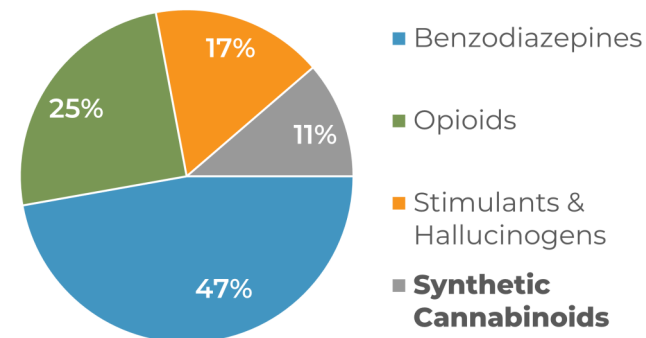
SYNTHETIC CANNABINOIDS IDENTIFIED

■ Toxicology Specimen   ■ Drug Material

Synthetic Cannabinoid	Toxicology Specimen	Drug Material
MDMB-ICA	1	
5F-MDMB-PICA	1	
MDMB-BINACA (-BUTINACA)	2	
ADB-INACA	2	
ADB-4en-PINACA	6	
MDMB-INACA	4	4
ADB-BINACA (-BUTINACA)	8	
5F-MDMB-PINACA (5F-ADB)	9	
AB-CHMINACA	11	
MDMB-4en-PINACA	48	1

SELECT POSITIVITY: Q3 2021 TO Q2 2024

Positivity plots are derived from a select toxicology data source that has been consistently monitored since 2018.
*Surrogate positivity calculated for Q4 2023 as the average of Q3 2023 and Q1 2024 due to no samples tested that quarter.

— 5F-MDMB-PICA   — MDMB-4en-PINACA   — ADB-BINACA   — 5F-ADB

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