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The Center for Forensic
Science Research & Education



NPS

DISCOVERY

Q1 2024 Trend Reports

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

About: With funding from the National Institute of Justice (NIJ), the Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation is developing quarterly trend reports in relation to novel psychoactive substance (NPS) use in the United States, with a focus on four main classifications: benzodiazepines, opioids, stimulants and hallucinogens, and synthetic cannabinoids. The goal of this specific initiative is to provide near real-time information regarding NPS prevalence and positivity based on the analysis of authentic forensic samples.

Acknowledgements: This report was prepared by Alex J. Krotulski, PhD; Sara E. Walton, MS; Joshua S. DeBord, PhD; Amanda L.A. Mohr, MSFS, D-ABFT-FT; and Barry K. Logan, PhD, F-ABFT. CFSRE's NPS Discovery program acknowledges scientists at the CFSRE, NMS Labs, and other collaborating agencies for their involvements and contributions. For more information about our programs and reports, please contact NPS Discovery at npsdiscovery@cfsre.org or visit our website at www.npsdiscovery.org.

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NPS Benzodiazepines in the United States

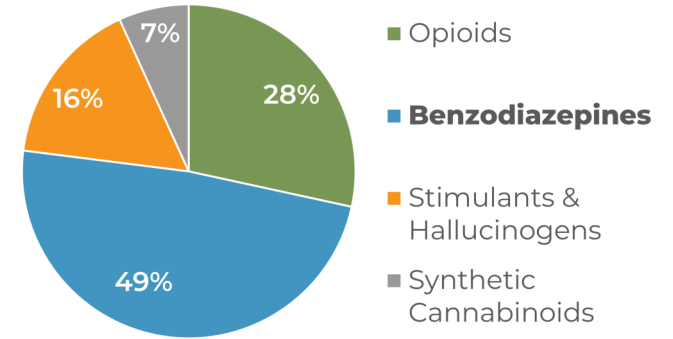
**TREND
REPORT**

**Q1
2024**

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

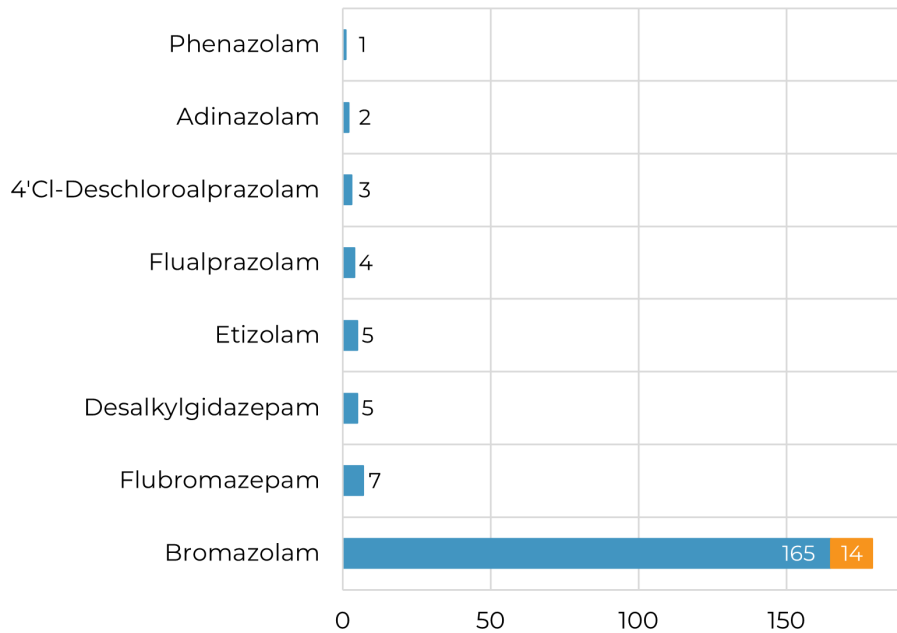
OVERVIEW: Novel psychoactive substances (NPS), including NPS benzodiazepines, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. NPS benzodiazepines have been implicated in an increasing number of adverse health events, marked by emergency room 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.



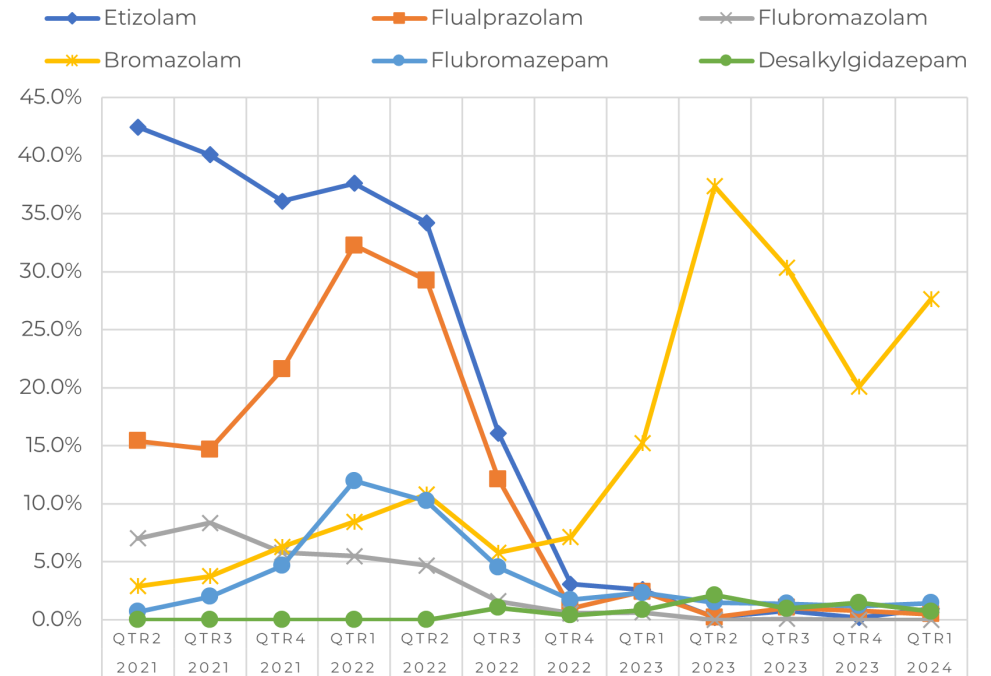
NPS BENZODIAZEPINES IDENTIFIED

■ Toxicology Specimen ■ Drug Material



SELECT POSITIVITY: Q2 2021 TO Q1 2024

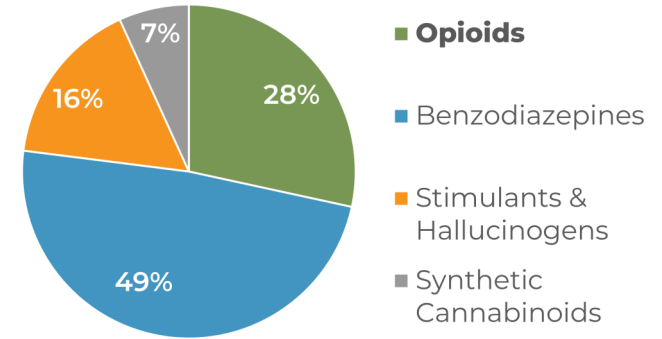
Positivity plots are derived from a select toxicology data source that has been consistently monitored since 2018.



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

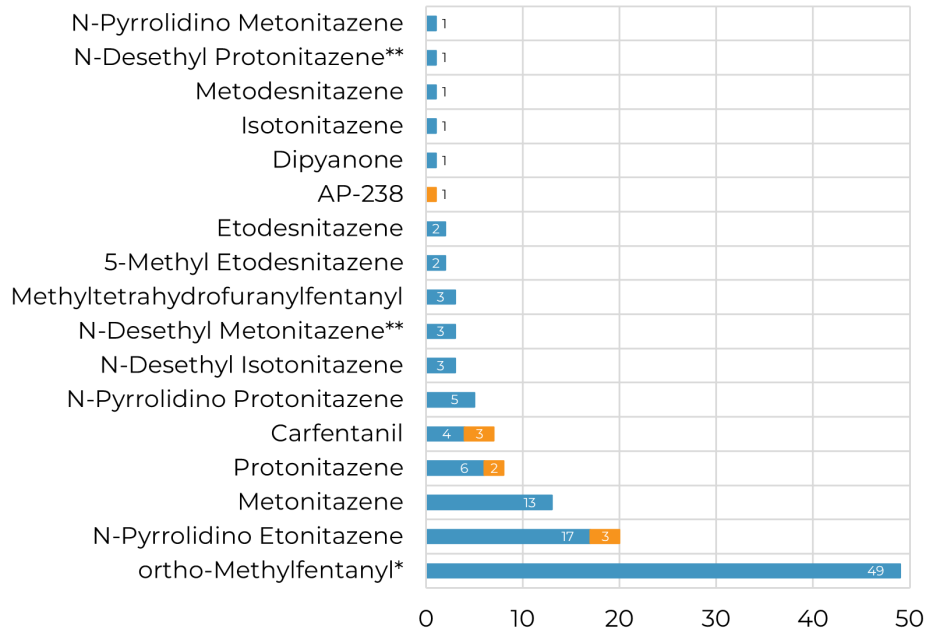
OVERVIEW: Novel psychoactive substances (NPS), including NPS opioids, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. NPS opioids have been implicated in an increasing number of emergency room admissions, death investigations, and mass intoxication 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.



NPS OPIOIDS IDENTIFIED

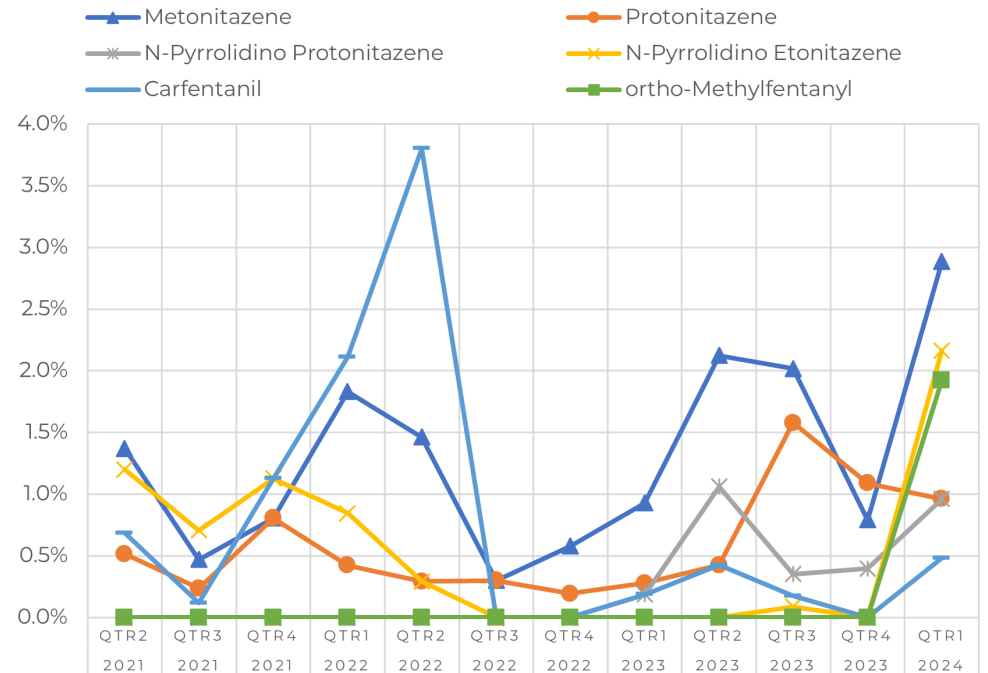
■ Toxicology Specimen ■ Drug Material



**Detected only as metabolite to date. *Presumed primary isomer based on testing to date. — For Reference: Fluorofentanyl (n=330) & Fentanyl (n>400)

SELECT POSITIVITY: Q2 2021 TO Q1 2024

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



NPS Stimulants & Hallucinogens in the United States

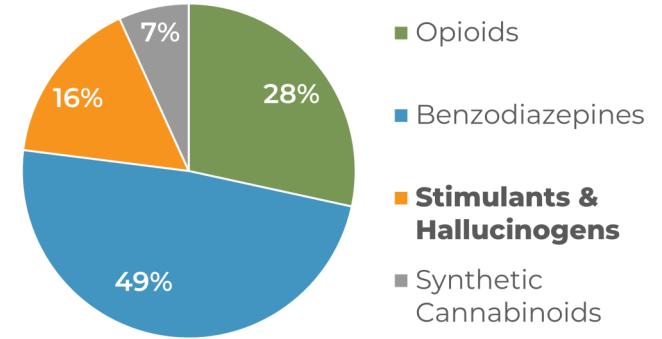
TREND
REPORT

Q1
2024

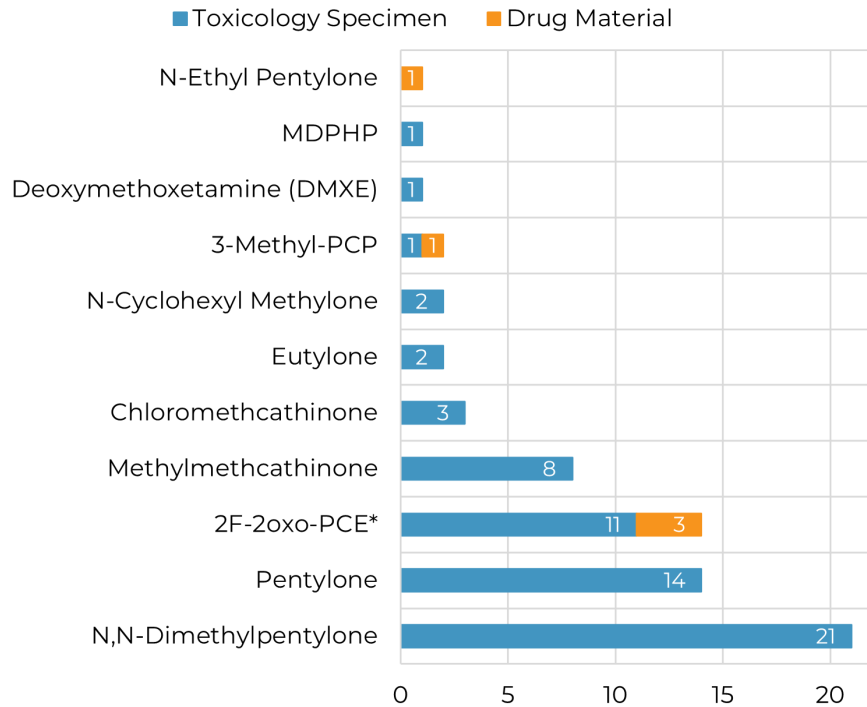
PURPOSE: This report provides up-to-date information regarding NPS stimulant & NPS hallucinogen prevalence and positivity in the United States.

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.



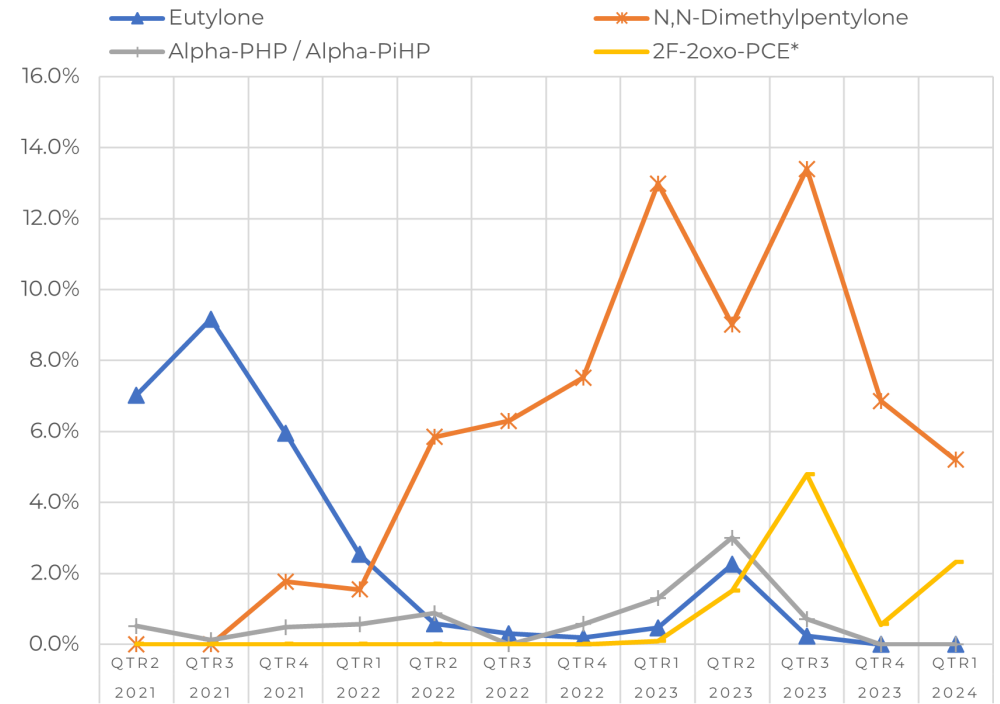
NPS STIMULANTS & HALLUCINOGENS IDENTIFIED



*Presumed primary isomer based on testing to date.

SELECT POSITIVITY: Q2 2021 TO Q1 2024

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



Synthetic Cannabinoids in the United States

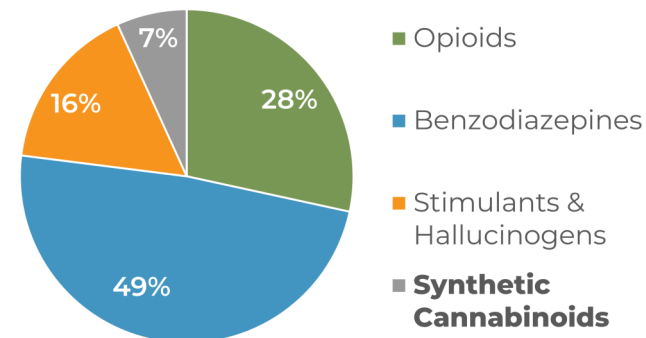
TREND
REPORT

Q1
2024

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

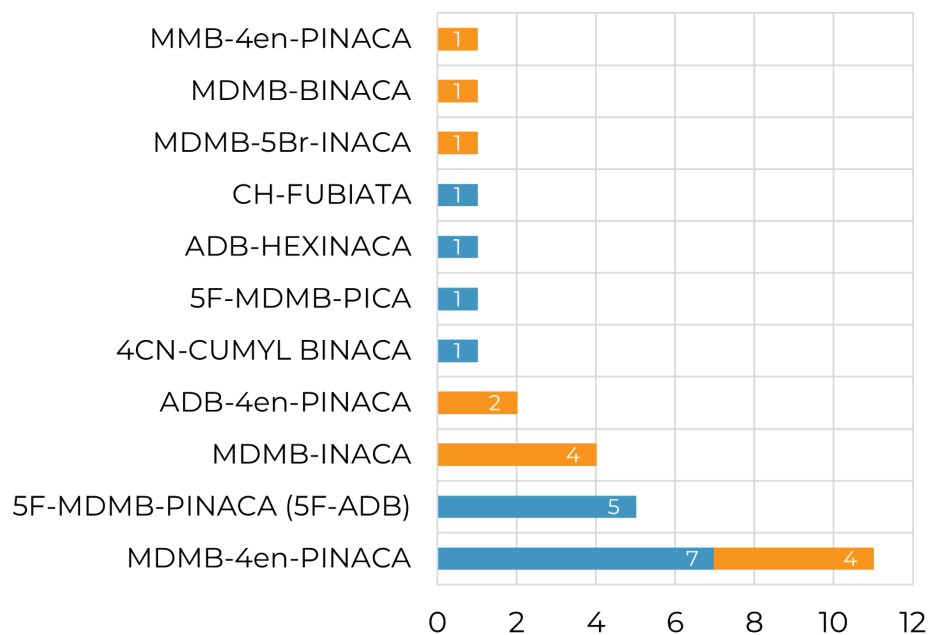
OVERVIEW: Novel psychoactive substances (NPS), including synthetic cannabinoids, continue to pose great challenges for forensic scientists, clinicians, and public health and safety personnel. Synthetic cannabinoids have been implicated in an increasing number of emergency room admissions, death investigations, 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.



SYNTHETIC CANNABINOIDS IDENTIFIED

■ Toxicology Specimen ■ Drug Material



SELECT POSITIVITY: Q2 2021 TO Q1 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.

