**Purpose:** The objective of this report is to provide up-to-date information regarding the status of synthetic cannabinoid prevalence, positivity, and discovery within the United States.

Project Overview: Novel psychoactive substances (NPS), including synthetic cannabinoids, continue to provide 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, often requiring availability of comprehensive analytical methodologies and reference materials for identifications. This project employs a novel approach to analysis of biological samples and extracts by comprehensive non-targeted data acquisition using liquid chromatography high resolution quadrupole time-of-flight mass spectrometry (LC-QTOF). The scope of analysis contains more than 250 synthetic cannabinoid parent compounds and metabolites. Sample analysis and data processing occur on a weekly basis. In addition, retrospective analysis of datafiles is conducted as new synthetic cannabinoid standards become available. This model allows for real-time identification of novel synthetic cannabinoids and trend analyses. In collaboration with NMS Labs, sample extracts were received during this reporting period from forensic casework where for cause testing was directed for synthetic cannabinoids using a regularly updated panel. In total, cases were submitted from 24 states and the District of Colombia.
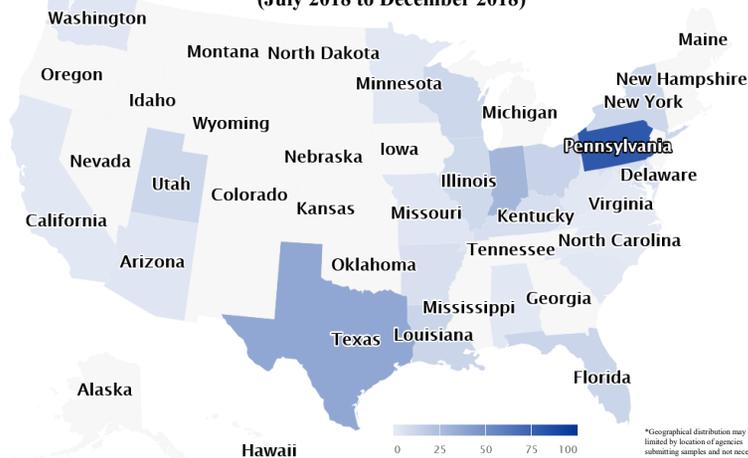
New Synthetic Cannabinoid Identified In December 2018

4F-MDMB-BINACA
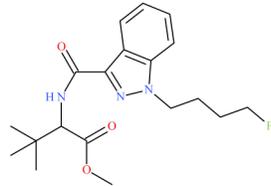
Heat Map of Synthetic Cannabinoid Positivity*

(July 2018 to December 2018)

*Geographical distribution may be limited by location of agencies submitting samples and not necessarily representative of all jurisdictions.

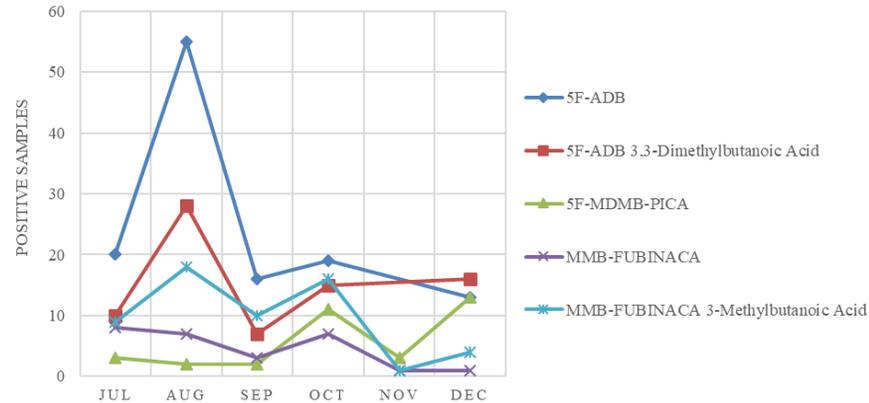## Synthetic Cannabinoid Positivity

(October 2018 to December 2018)

Analyte (Parent)	Positive Samples (n=141)	% Positivity (n=964)
5F-ADB	32	3.3
5F-MDMB-PICA	27	2.8
MMB-FUBINACA	9	0.9
ADB-FUBINACA	7	0.7
AB-FUBINACA	2	0.2
FUB-AKB-48	1	0.1
5F-EDMB-PINACA	2	0.2
5Cl-AKB-48	1	0.1
5F-AB-PINACA	2	0.2
MAB-CHMINACA	1	0.1
4F-MDMB-BINACA	1	0.1

Analyte (Metabolite)	Positive Samples (n=141)	% Positivity (n=964)
5F-ADB 3,3-Dimethylbutanoic Acid	31	3.2
MMB-FUBINACA 3-Methylbutanoic Acid	21	2.2
5F-MDMB-PICA 3,3-Dimethylbutanoic Acid	4	0.4

Synthetic Cannabinoid Trends
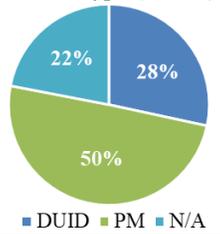
(Plotted by Month Analyzed; July 2018 to December 2018)

- 5F-ADB
- 5F-ADB 3,3-Dimethylbutanoic Acid
- 5F-MDMB-PICA
- MMB-FUBINACA
- MMB-FUBINACA 3-Methylbutanoic Acid

Demographics

(Oct. 2018 to Dec. 2018)

Case Type (n=141)

28% / 22% / 50%
- DUID ■ PM ■ N/A

Sex (n=141)

10% / 33% / 57%
- F ■ M ■ N/A
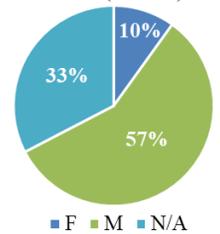
Age (n=141)

Matrix Type (n=141)

58% / 33% / 9%
- Blood – Peripheral
- Blood – Central
- Blood – Unknown Source

NPS DISCOVERY

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