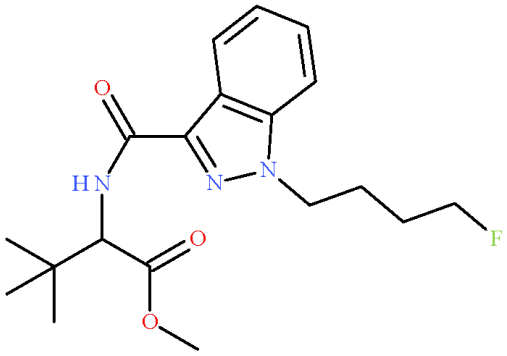
Trend Report: Q4 2018

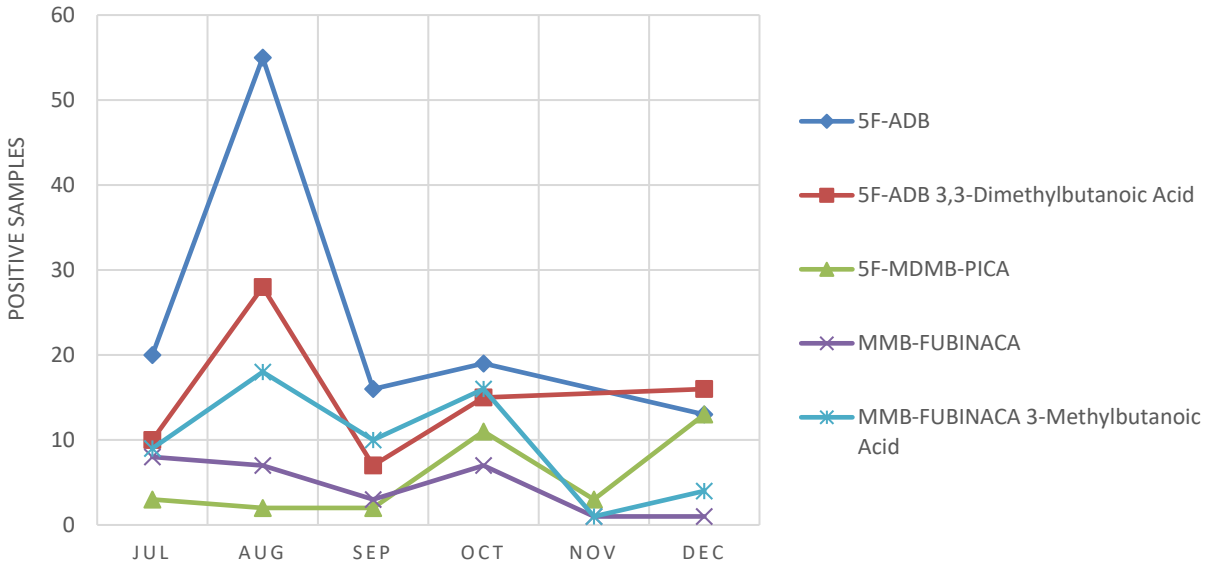
Synthetic Cannabinoids in the United States

New Synthetic Cannabinoid Identified in December 2018 in Heart Blood

4F-MDMB-BINACA



Synthetic Cannabinoid Positivity Between July and December 2018 (by Date Analyzed)



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.

Our laboratory has paired with various institutions to identify at-risk populations associated with synthetic cannabinoid use. Biological samples have been received from forensic laboratories, clinical partnerships, and/or correctional facilities from individuals involved in death investigations, driving under the influence scenarios, hospitalizations, and/or intoxications.

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.

Acknowledgements

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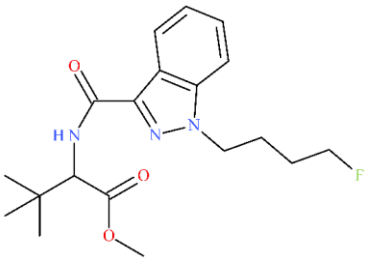
Disclaimer

All positive identifications were made based on extensive review of analytical data in comparison to acquired reference materials. Identifications of all chemically similar isobaric species may not have been achieved; therefore, reported analytes could encompass additional species not distinguishable solely by chromatographic or mass spectral features.

New Synthetic Cannabinoids

From October to December 2018, one new synthetic cannabinoid was identified in a biological sample extract; a compound that was not incorporated into the previous scope of testing and was concurrently reported for the first time in the United States.

4F-MDMB-BINACA



CHEMICAL INFORMATION

IUPAC Name: Methyl 2-[[1-(4-fluorobutyl)indazole-3-carbonyl]amino]-3,3-dimethyl-butanoate

CFR: Not Scheduled (01/2019)

CAS#: Not Available

Synonyms: 4F-MDMB-BUTINACA

SAMPLE INFORMATION

Positive Cases: 1

First Collection: Not available

First Received: 12/07/2018

Locations: Arkansas

REFERENCE

4F-MDMB-BINACA Monograph

Trend Analysis for Synthetic Cannabinoids

From October through December 2018, 11 synthetic cannabinoid parent compounds and 3 synthetic cannabinoid metabolites were positively identified in 141 (14.6%) biological specimens or sample extracts after the analysis of 964 total samples. 5F-ADB (or 5F-MDMB-PINACA, n=32) was detected in the highest frequency, followed by 5F-MDMB-PICA (n=27), MMB-FUBINACA (or FUB-AMB, n=9), and ADB-FUBINACA (n=7). Several samples were positive for more than one synthetic cannabinoid, including parent compounds and/or metabolites. These results are consistent with the national trend data reported by the National Forensic Laboratory Information System (NFLIS). The following tables and figures are based on data from October 2018 to December 2018, unless otherwise noted.

Table 1: Positive Findings for Synthetic Cannabinoids (Parent)

Analyte (Parent)	Positive Samples	Positivity (%)
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

Table 2: Positive Findings for Synthetic Cannabinoids (Metabolites)

Analyte (Metabolite)	Positive Samples	Positivity (%)
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

Table 3: Synthetic Cannabinoid Combinations

Analyte Combinations	Positive Samples
5F-ADB + 5F-MDMB-PICA + MMB-FUBINACA	3
5F-ADB + 5F-MDMB-PICA	3
5F-ADB + MMB-FUBINACA	2
5F-AB-PINACA + AB-FUBINACA	2
5F-ADB + 5F-EDMB-PINACA	1
4F-MDMB-BINACA + 5F-MDMB-PICA	1
5F-ADB + 5F-EDMB-PINACA + 5F-MDMB-PICA	1
5F-ADB + ADB-FUBINACA	1
MMB-FUBINACA + FUB-AKB-48 + 5Cl-AKB-48	1

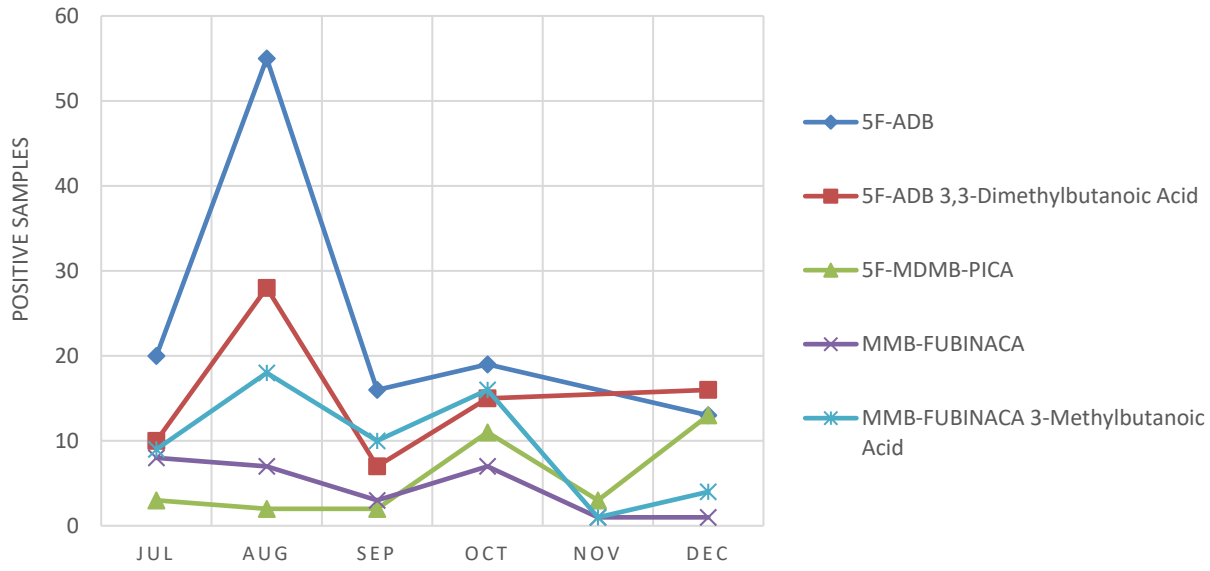


Figure 1: Synthetic Cannabinoids Positivity Trend Plot

(Top 5 Plotted by Date Analyzed; July to December 2018)

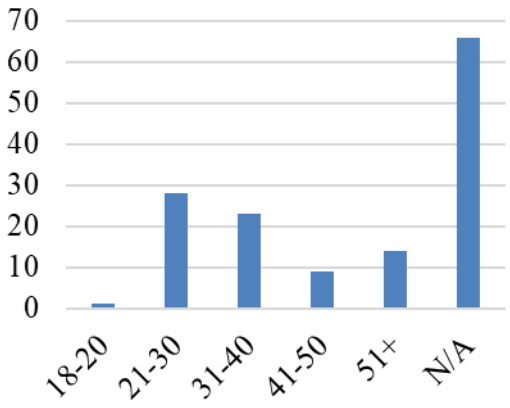


Figure 2: Age (n=141)

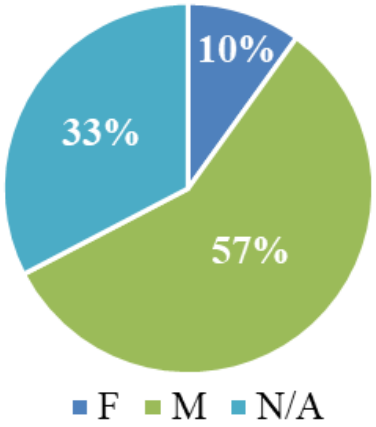


Figure 3: Sex (n=141)

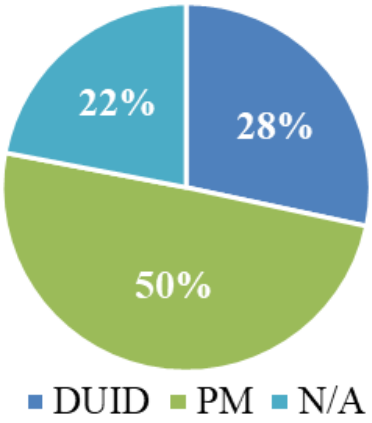


Figure 4: Case Type (n=141)

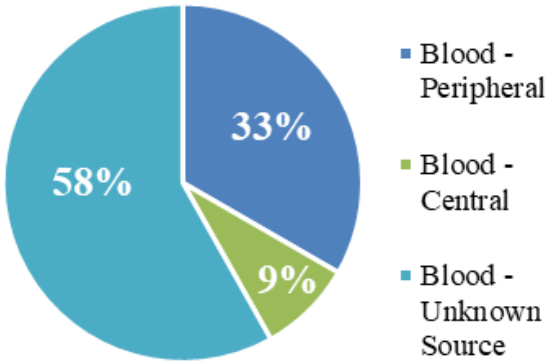


Figure 5: Matrix Type (n=141)

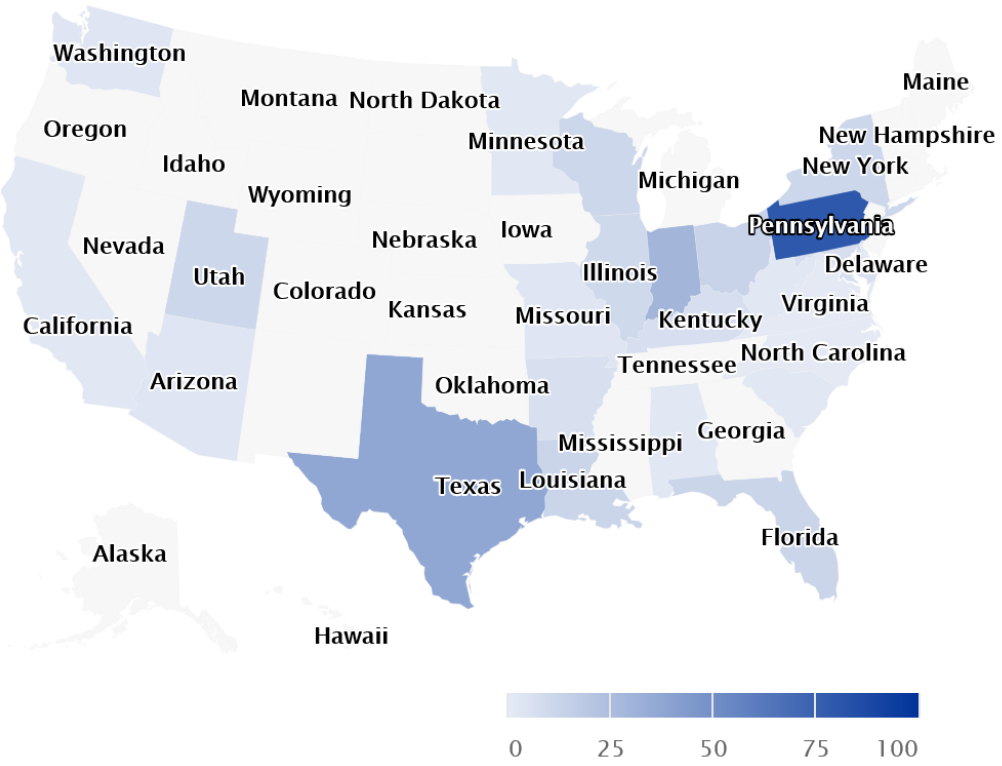


Figure 6: Heat Map of Synthetic Cannabinoid Positivity (July 2018 to December 2018)*

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

Glossary of Synonyms

Reported Name	Synonym(s)
5F-ADB	5F-MDMB-PINACA
MMB-FUBINACA	FUB-AMB, AMB-FUBINACA
FUB-AKB-48	AKB48 N-(4-Fluorobenzyl) Analogue, AFB-48, AFUBINACA, FUB-APINACA
4F-MDMB-BINACA	4F-MDMB-BUTINACA