

Synthetic Drug Threats in the United States: *2018 Update*

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SPECIAL TESTING AND RESEARCH LABORATORY
DRUG ENFORCEMENT ADMINISTRATION



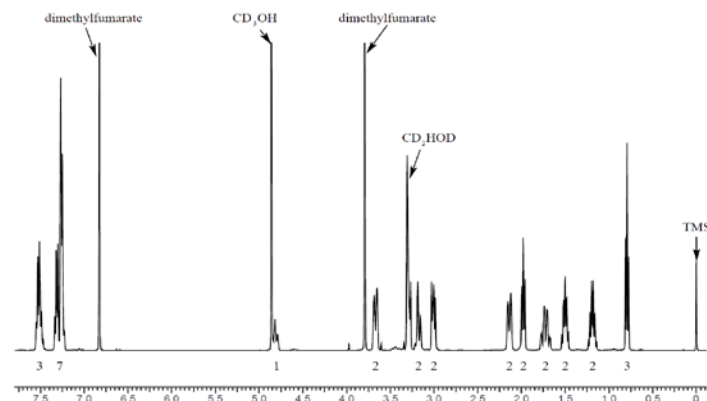
Objectives

1. Overview of the DEA Emerging Trends & Reference Materials Programs
2. Emerging Threat Report data for CY2017
3. Synthetic opioid seized drug composition
4. Drug Monograph and FTIR Instrument Library Updates



Emerging Trends and Reference Material Programs

1. Analysis of domestic and foreign drug seizures
2. Research and method development for identification and quantitation
3. *Authentication* of reference materials
4. Structural Elucidation of unknown drugs
5. Authors SWGDRUG monographs
6. Monitors past/current trends to predict future needs
7. Publishes Emerging Threat Report

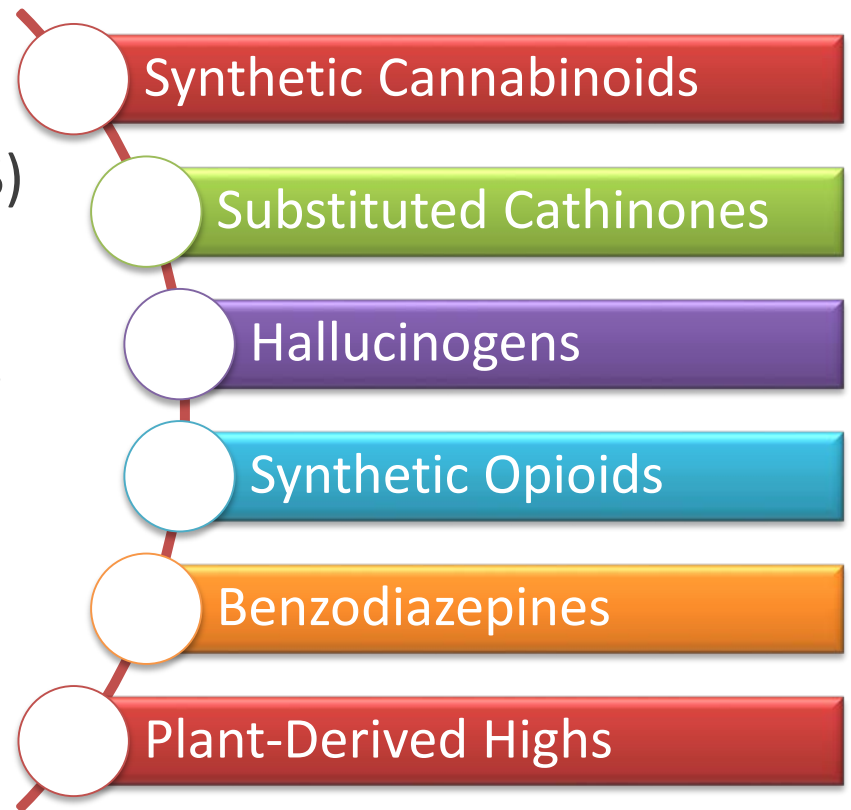




Emerging Threats

New Psychoactive Substances (NPS)

- A new narcotic or psychotropic drug, in pure form or in preparation, that is not controlled by the UN drug conventions, but which may pose a public health threat

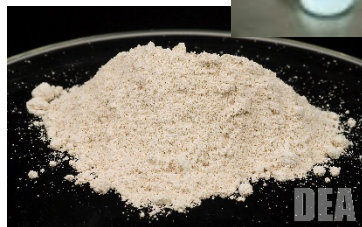
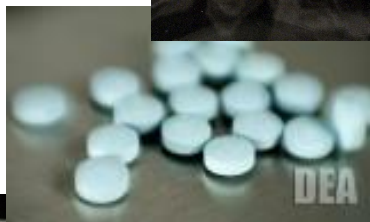


Forensic Chemistry Analysis

WHAT IT IS

Seized drug samples

Parent drug

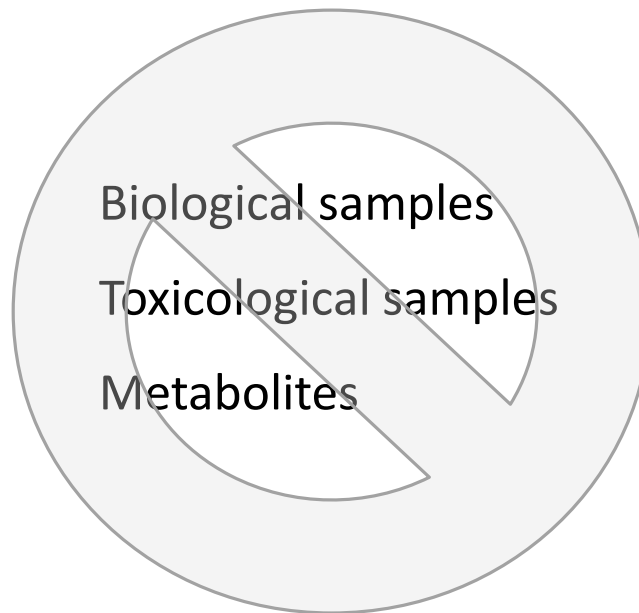


WHAT IT IS NOT

Biological samples

Toxicological samples

Metabolites



Data Sources

EMERGING THREAT REPORT

The Special Testing and Research Laboratory's Emerging Trends Program compiled the data for this report through a query of archived seizure and analysis information from drug evidence analyzed by the Drug Enforcement Administration's laboratory system. This data is representative of drug evidence seized and analyzed in the date ranges annotated. This is not a comprehensive list of all new psychoactive substances and is not representative of all evidence analyzed

by DEA. This data is a quarterly snapshot of the substance market in the United States.

The term new psychoactive substance refers to a drug that may pose a public health risk, such as cannabinoids, substituted cathinones, tryptamines, benzodiazepines, and a variety of other substances. This report is based on the recent increase in seizures, fen

DEA Reporting

- Laboratory Information Management System (LIMS)
- Seized: 01/01/2017 – 12/31/2017, Analyzed by 12/31/2017

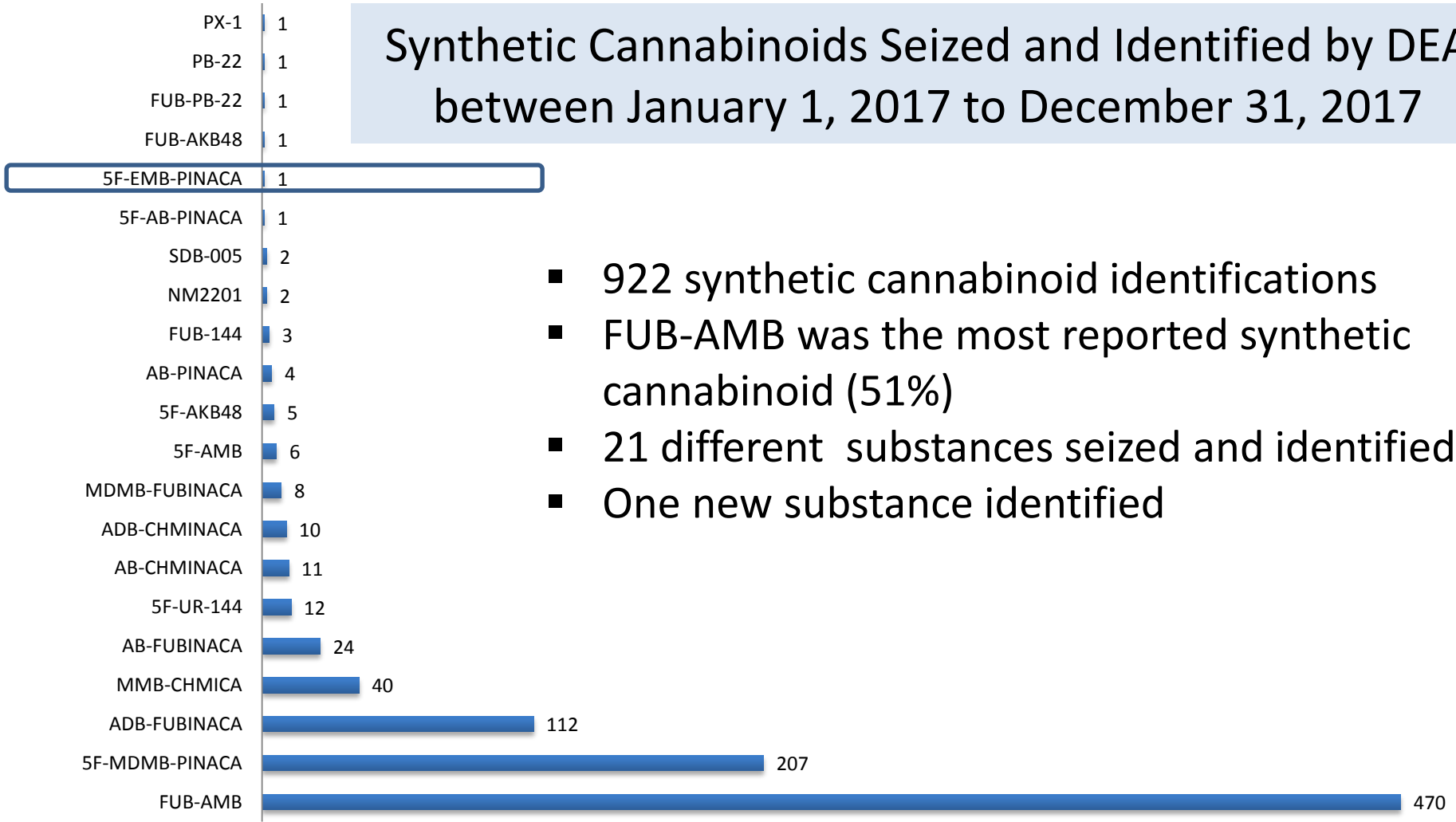
Considerations

- Backlogs
- Availability of reference materials
- Excludes analyses performed at DEA Special Testing and Research Laboratory





Synthetic Cannabinoids Seized and Identified by DEA between January 1, 2017 to December 31, 2017



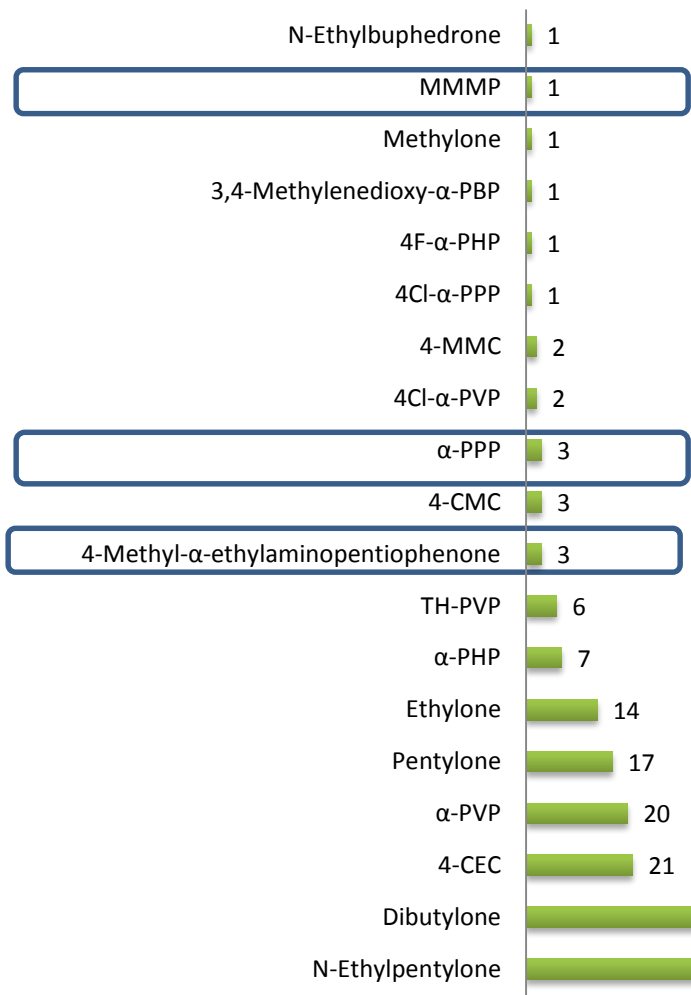
- 922 synthetic cannabinoid identifications
- FUB-AMB was the most reported synthetic cannabinoid (51%)
- 21 different substances seized and identified
- One new substance identified

Notes:

1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits seized 01/01/2017 through 12/31/2017 that were analyzed by 12/31/2017. The data was retrieved on 01/08/2018.



Synthetic Cathinones Seized and Identified by DEA between January 1, 2017 to December 31, 2017

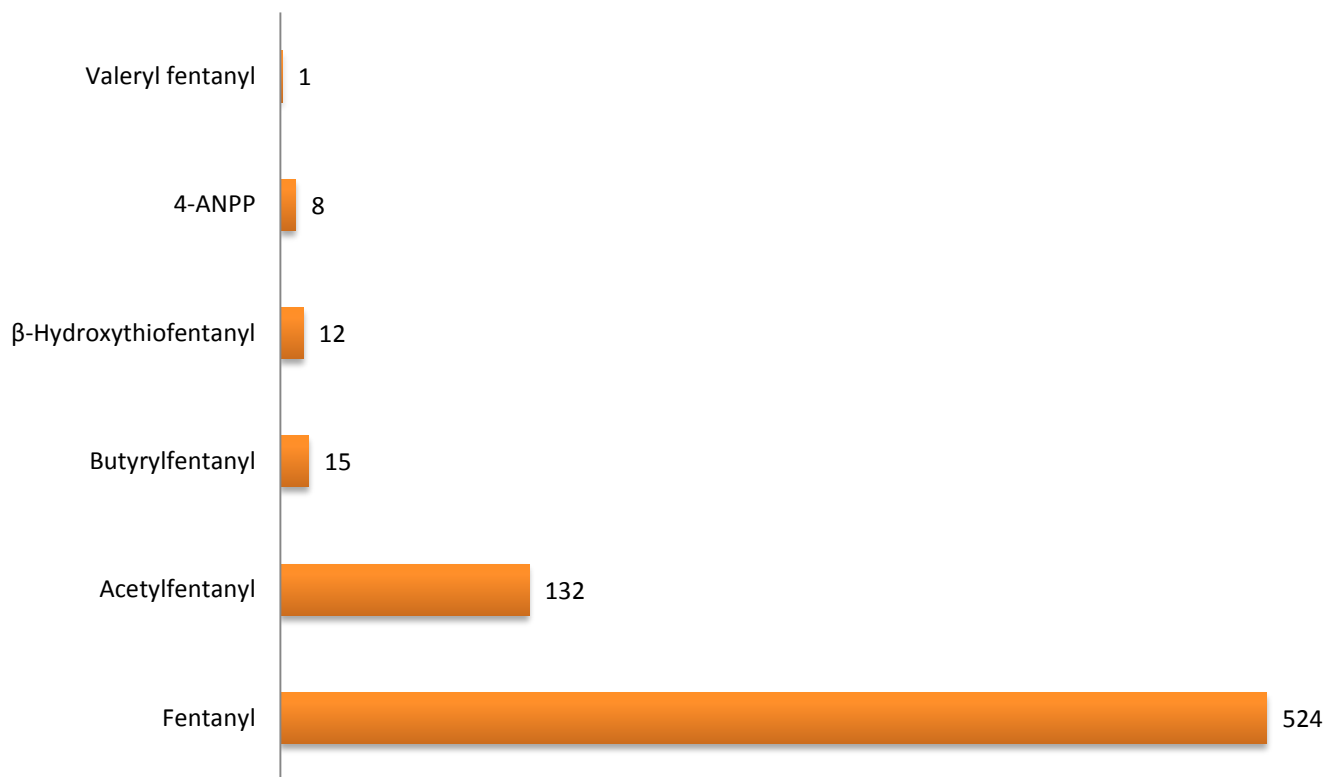


- 369 synthetic cathinone identifications
- N-Ethylpentylone was the most reported cathinone (54%)
- 19 different substances seized and identified
- 3 cathinones seized and identified for the first time

Notes:
1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits seized 01/01/2017 through 12/31/2017 that were analyzed by 12/31/2017. The data was retrieved on 01/08/2018.



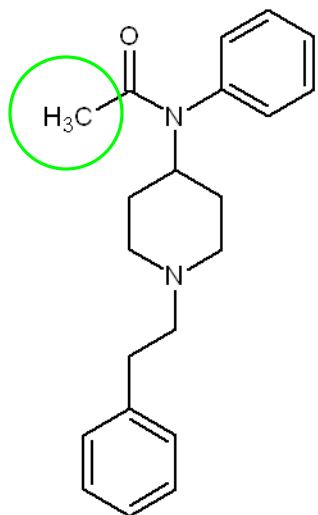
Synthetic Opioids Seized in 2015



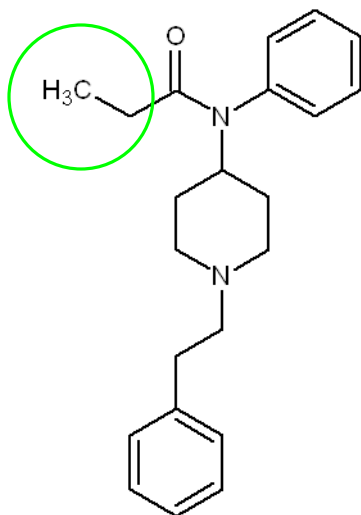
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1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits seized 01/01/2015 through 12/31/2015 that were analyzed by 12/31/2016. The data was retrieved on 01/04/2017.

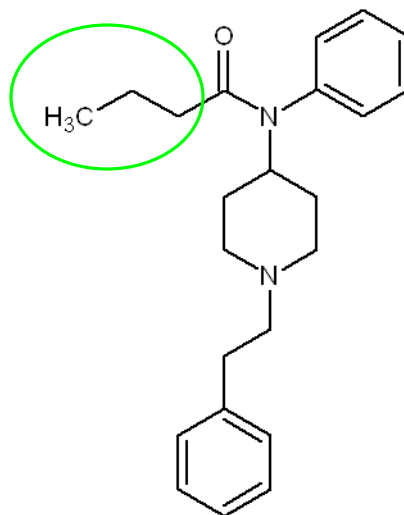
Fentanyl-type substances



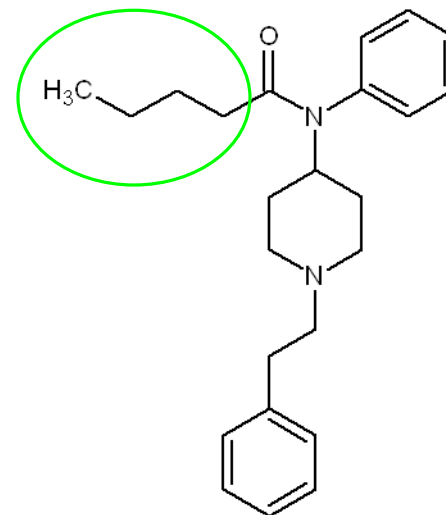
Acetyl fentanyl



Fentanyl



Butyryl fentanyl

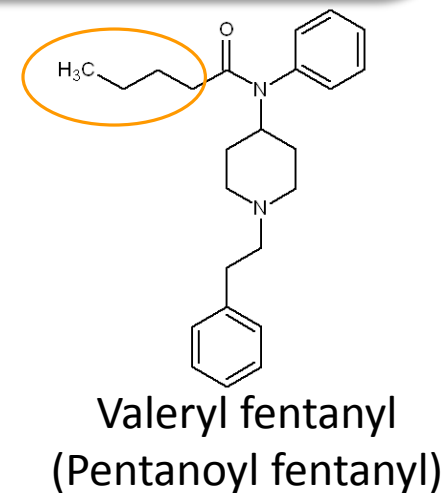
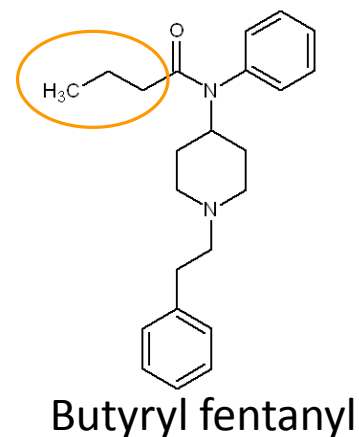
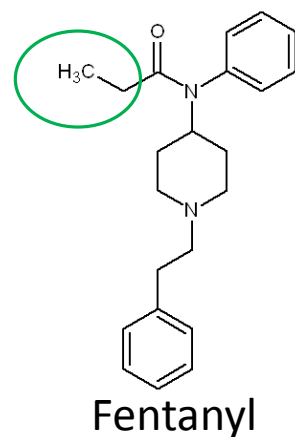
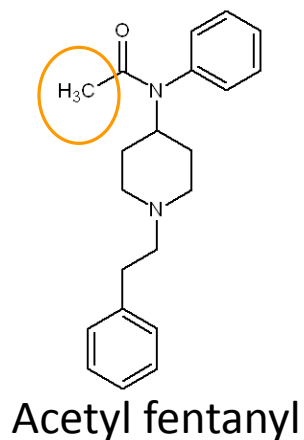
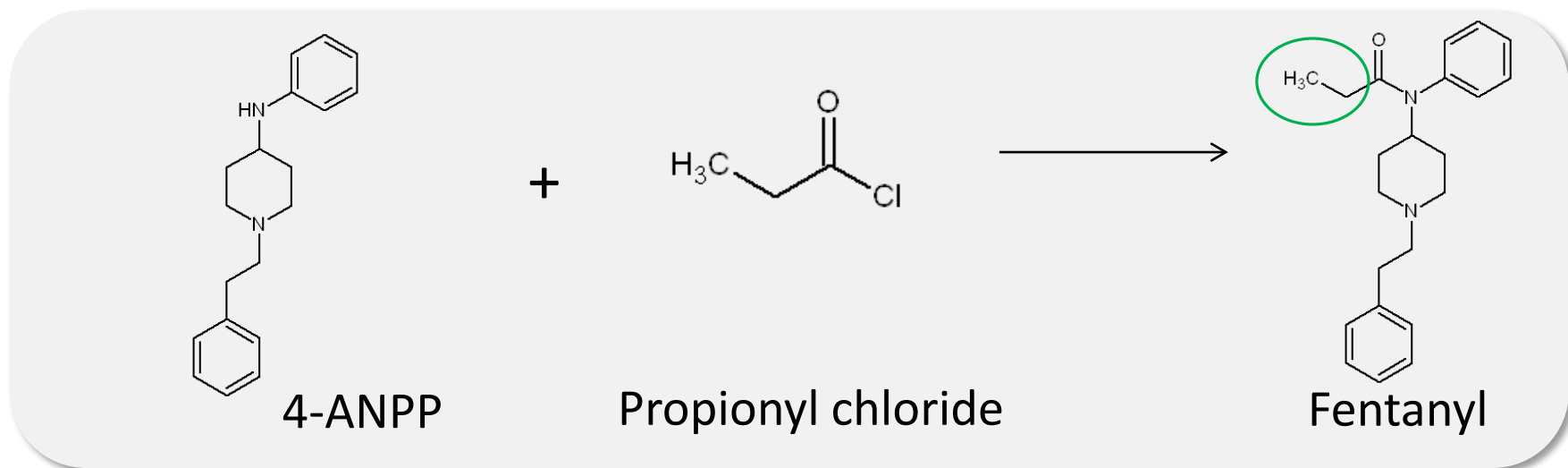


Valeryl fentanyl
(Pentanoyl fentanyl)



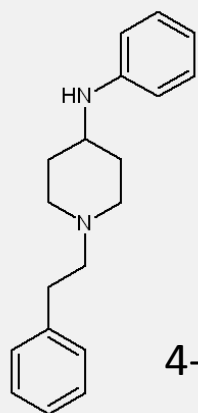
Synthetic Opioid Synthesis

4-ANPP Precursor



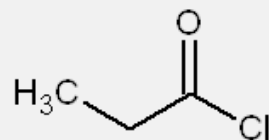
Synthetic Opioid Synthesis

4-ANPP Precursor

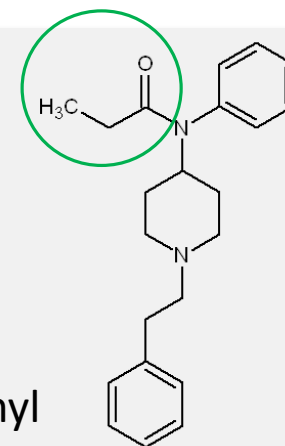


4-ANPP

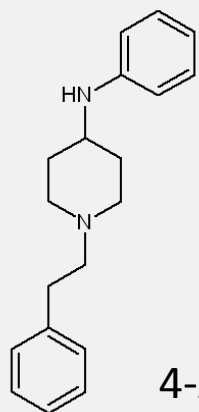
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Propionyl chloride

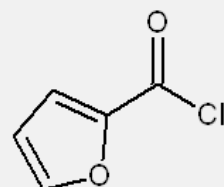


Fentanyl

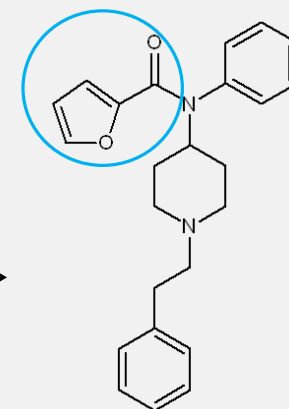
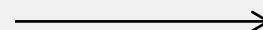


4-ANPP

+



2-Furoyl chloride



Furanyl Fentanyl



Opioid & “Fentanyl-like” CY 2016 Identifications

- 15 different substances seized and identified in 2016
- ~60% of these substances were seized and reported for the first time in 2016

Acetyl norfentanyl	1
3-Methylfentanyl	2
p-Fluorobutyrylfentanyl	3
Benzylfentanyl	3
o-Fluorofentanyl	4

Valeryl fentanyl 10

Butyryl fentanyl 13

Acryl fentanyl 13

Carfentanil 17

4-Fluoroisobutyrylfentanyl 20

4-ANPP 32

U-47700 50

Acetylfentanyl 112

Furanyl fentanyl 142

Fentanyl 877

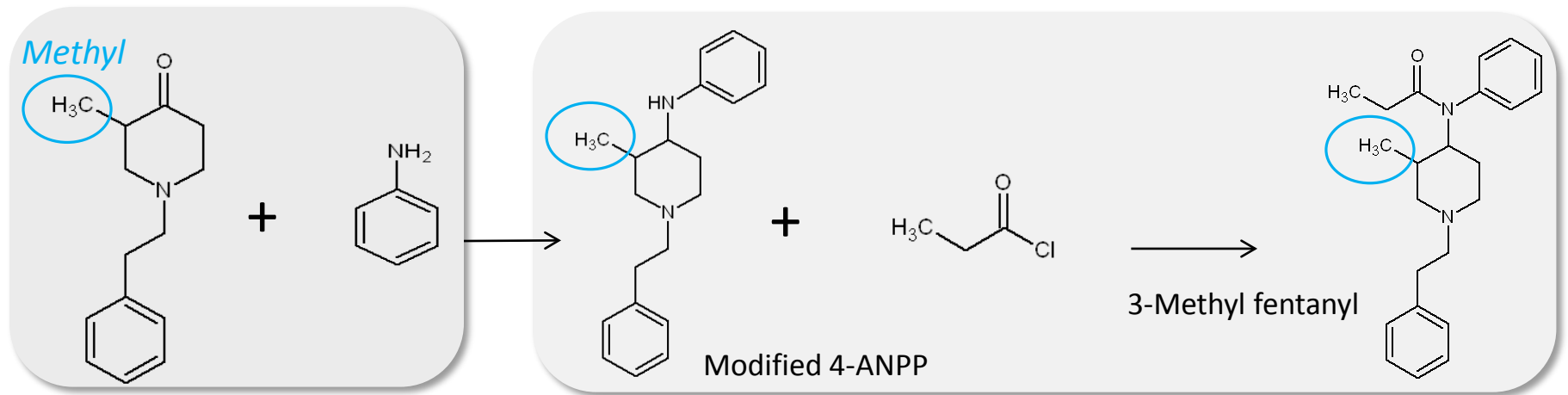
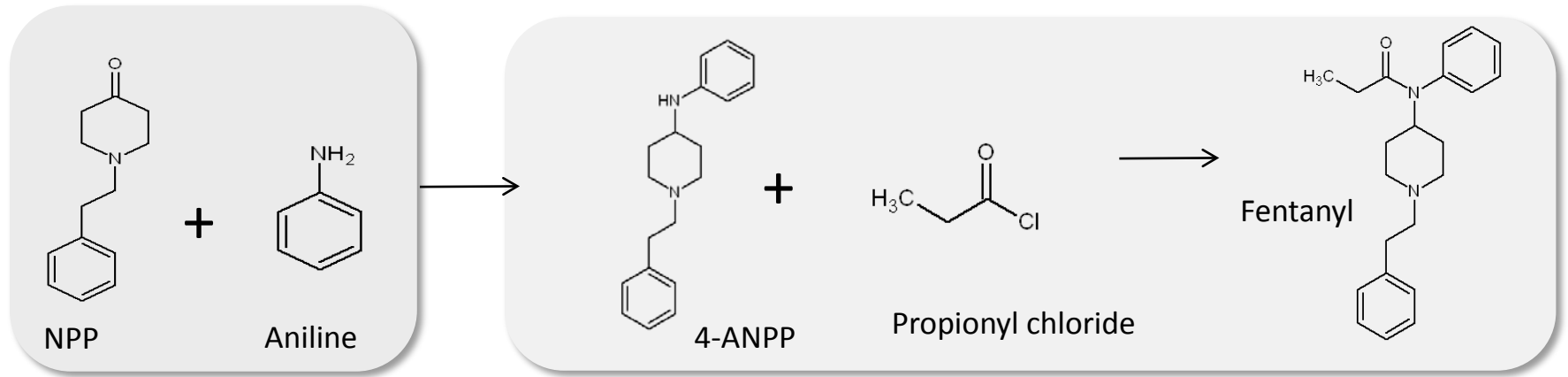
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Notes:

- 1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits seized 01/01/2016 through 12/31/2016 that were analyzed by 12/31/2016. The data was retrieved on 01/04/2017.

Synthetic Opioid Synthesis

Modified 4-ANPP Precursor



Modified NPP

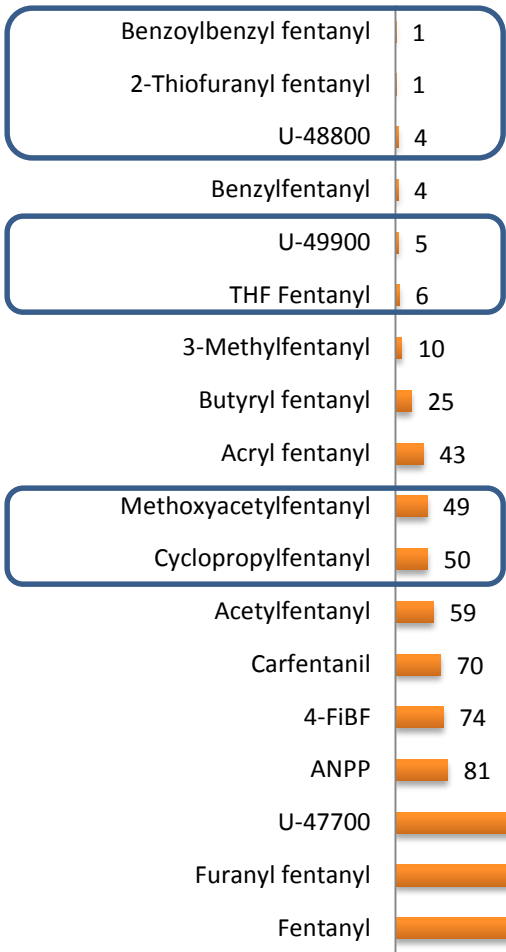
Modified 4-ANPP

3-Methyl fentanyl





Synthetic Opioids Seized and Identified by DEA in CY2017



- ~117% increase in identifications in CY2017
- 18 different substances seized and identified
- 7 substances seized and identified for the first time

Notes:

1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits seized 01/01/2017 through 12/31/2017 that were analyzed by 12/31/2017. The data was retrieved on 01/08/2018.

Synthetic Opioids

A LOOK AT SEIZED DRUG MIXTURES



Mid-Atlantic Region:

17 synthetic opioid identifications

Fentanyl (15)

- Fentanyl only (6)

Fentanyl and heroin (9)

- with tramadol (3)
- with methamphetamine (1)
- with 4-fluoroisobutyryl and 2-furanyl fentanyl (1)

Other synthetic opioids (2)

- 2-furanyl fentanyl (1)
- 2-methoxyacetyl fentanyl (1)

Notes:

- 1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits analyzed 10/15/2017 through 10/28/2017.



Southeastern Region:

12 synthetic opioid identifications

Fentanyl (11)

- Fentanyl only (1)
- Fentanyl and 2-methoxyacetylfentanyl (1)

Fentanyl and heroin (9)

- Fentanyl and heroin only (2)
 - with ketamine (3) → also with tramadol (2)
 - with acetylfentanyl and gabapentin (1)
 - with U-47700 (1)
 - with an unconfirmed substance (1)

Other synthetic opioids (1)

- 2-furanyl fentanyl and heroin

Notes:

- 1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits analyzed 10/15/2017 through 10/28/2017.



North Central Region:

18 synthetic opioid identifications

Fentanyl (17)

- Fentanyl only (6)

Fentanyl and heroin (11)

- Fentanyl and heroin only (8)
 - with ketamine (1)
 - with cocaine (1)
 - with acrylfentanyl (1)

Other synthetic opioids (1)

- 2-furanyl fentanyl, heroin, carfentanil

Notes:

- 1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits analyzed 10/15/2017 through 10/28/2017.



Northeastern Region:

76 synthetic opioid identifications

Fentanyl (63)

- Fentanyl only (31)
- with tramadol (5) → also with acetylfentanyl (1); also with ketamine (1)
- with 4-ANPP (2)
- with methorphan (1)

Fentanyl and heroin (24)

- Fentanyl and heroin (12)
- with tramadol (7) → also with ketamine (1); also with cocaine (1)
- with cocaine (1)
- with acetyl fentanyl (1)
- with U-47700 and 2-furanyl fentanyl (1)
- with methamphetamine (1)
- with butyryl fentanyl, 2-furanyl fentanyl, U-47700, and ADB-FUBINACA (1)

Other synthetic opioids (13)

- 4-fluoroisobutyryl fentanyl (4) → also with heroin (2)
- 2-furanyl fentanyl (4)
- acetylfentanyl (3) → also with fentanyl (1)
- Cyclopropyl fentanyl (1)
- Butyryl fentanyl (1)

Notes: This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits analyzed 10/15/2017 through 10/28/2017.



Southwestern Region:

6 synthetic opioid identifications

Fentanyl (5)

- Representing ~19kg

Other (1)

- 4-ANPP (1)

Notes:

- 1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits analyzed 10/15/2017 through 10/28/2017.



Southwestern Region:

20 synthetic opioid identifications

Fentanyl (20)

- Fentanyl only (16)
- with Tramadol (3)
- with Heroin (1)

Other synthetic opioids (0)

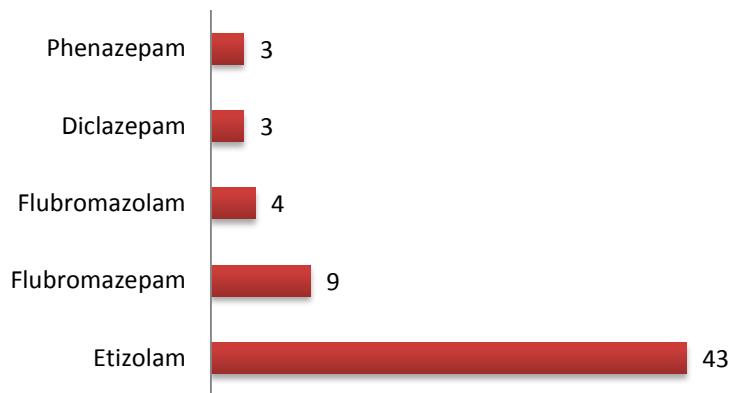
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- 1) This data was compiled from analytical results from the DEA laboratory system. It encompasses exhibits analyzed 11/12/2017 through 11/25/2017.

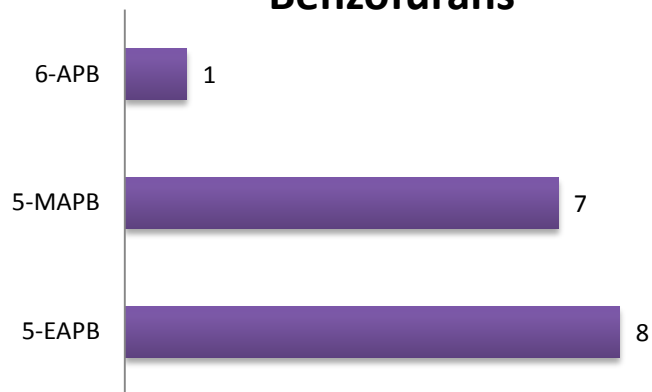




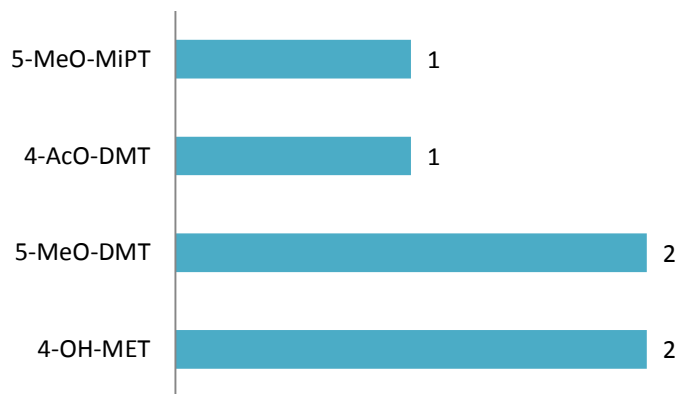
Benzodiazepines



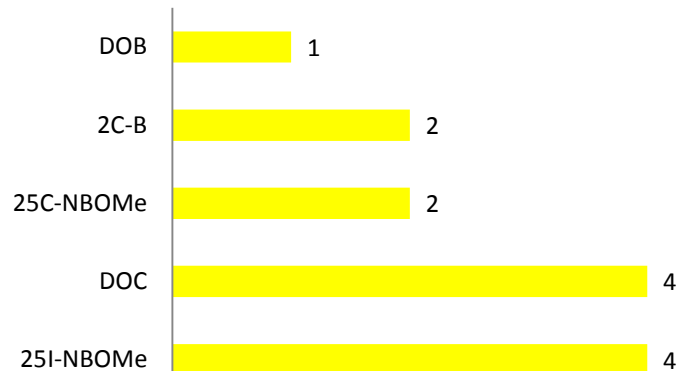
Benzofurans



Tryptamines



Hallucinogens



Notes:

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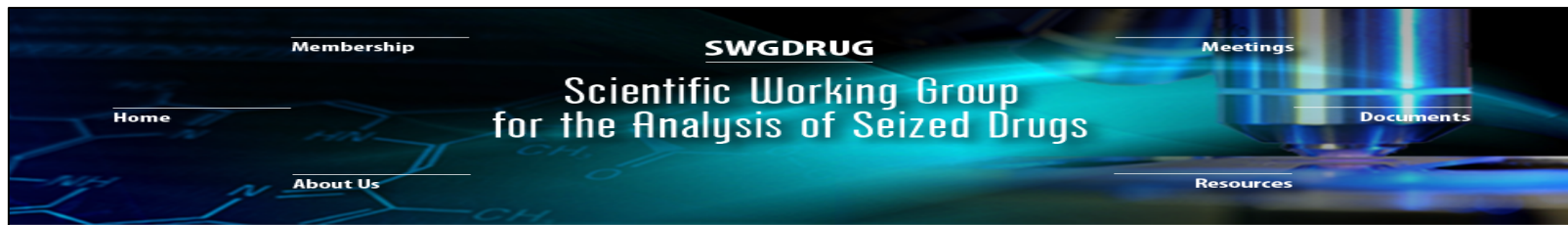


“Other” Substances Seized and Identified in CY2017

Substance Unconfirmed	53
3-Methoxy-PCP	17
Mitragynine	10
3-Fluorophenmetrazine	7
Methoxetamine	7
Deschloroketamine	6
DMAA	4
2-Oxo-PCE	3
Methoxphenidine	3
4-FA	2

Notes:

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Monographs:
 The Drug Enforcement Administration's Special Testing and Research Laboratory generated the following monographs using structurally confirmed reference materials. These monographs are intended to be used for the verification of acquired reference materials. Monographs are being uploaded as they are technically reviewed and approved for publication. In addition, links to monographs authored by Forensic Drug Review are provided below.

- 299 Drug Monographs created by the Special Testing and Research Laboratory
- Newer monographs will only include references used in the authentication of that reference material (no links to external sites)
- 41 new monographs published in 2017:

Deschloroketamine	N-Methyl-1-(6-methylpyridin-2-yl)propan-2-amine	Midazolam	4-estren-3,17-dione
Flubromazolam	3-desoxy-3,4-methylenedioxypropylvalerone	5-Fluoropentyl-3-pyridinoylindole	Nandrolone undecanoate
N-tert-butyl-3,4-methylenedioxcathinone	4-Methyl-alpha-ethylaminopentiophenone	Tetrahydrofuran fentanyl	para-fluorobutyl fentanyl
alpha-ethyltryptamine	Yangonin	Isobutyl fentanyl	Hexanoyl fentanyl
ADB-FUBINACA	EMB-FUBINACA	3-Bromomethcathinone	Diclazepam
3-Chloromethcathinone	6-methoxy methylone	Phenylpiracetam	Phenmetrazine
4-Fluoromethylphenidate	N-ethyl-N-methyl-1,2-diphenylethanamine	N-(2-Methoxyethyl)-3,4-methylenedioxyamphetamine	4-Fluoropentedrone
4-Methoxy-phencyclidine	Barbital	Testosterone Caproate	alpha-PPP
Bupropion	N,N-Dimethylpentylone	3-Fluorophenmetrazine	Crotonyl fentanyl
			Benzoylbenzyl fentanyl



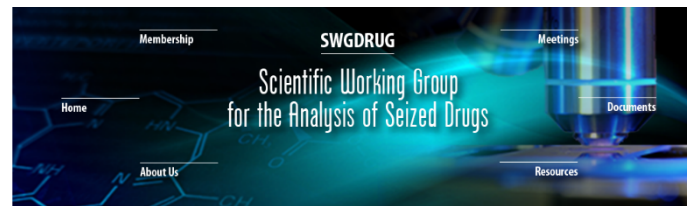
SWGDRUG FTIR Instrument Library: *Update*

Version 1.6 - Updated in December 3, 2017

Over 200 compounds

- All compounds are authenticated RMs from DEA
- Mostly emerging drug type compounds
- Addition of all classes of controlled substances in the future

Downloadable library available in different formats



SWGDRUG Infrared Library:
SWGDRUG has compiled an infrared library that is available for download from this website. The Drug Enforcement Administration's Special Testing and Research Laboratory generated the following library using structurally confirmed reference materials.

For updates on when the library is updated, follow us on Twitter. [Follow @awgdrug](#)

The SWGDRUG library is provided in the following formats. Click on the appropriate link below to download the compressed file.

[SWGDRUG IR Library Version 1.6 \(December 3, 2017\):](#)

Omicron Format



Opus Format



Perkin Elmer Format



JCAMP Format



Compound List



Thank You!

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