



## Special Report: Synthetic Cannabinoids and Synthetic Cathinones Reported in NFLIS, 2010–2013

### Highlights

During the first half of 2010, there were an estimated 469 reports of synthetic cannabinoids to NFLIS, which increased to a high of 23,123 reports during the first half of 2012 and decreased to 17,241 reports in the first half of 2013. The majority of synthetic cannabinoids reported during the first half of 2010 were JWH compounds, mostly JWH-018 (86%). AM-2201 (45%) was the most commonly reported synthetic cannabinoid during the first half of 2012, while XLR11 (65%) was the most commonly reported during the first half of 2013.

Reports of synthetic cathinones increased from 142 reports during the first half of 2010 to 7,997 reports during the first half of 2013. Mephedrone (54%) and MDPV (38%) were the most commonly reported synthetic cathinones during the first half of 2010. By the first half of 2013, methylenone accounted for 65% of those reports.

The NFLIS Alert System identifies newly reported substances to the NFLIS database. During the first half of 2011, JWH-250 and AM-2201 were the most commonly reported new synthetic cannabinoids and synthetic cathinones, respectively. Newly reported cannabinoid substances in the first half of 2013 were mainly represented as PB-22 and 5F-PB-22. During this same period, two synthetic cathinones were newly reported to NFLIS—4-EMC and 3-MMC.

The number of exposure mentions (Poison Control Center) for synthetic cannabinoids peaked at 3,895 during the July through December 2011 period and have since declined. Synthetic cathinone exposure mentions increased to 3,505 during the January through June 2011 period and have since declined.

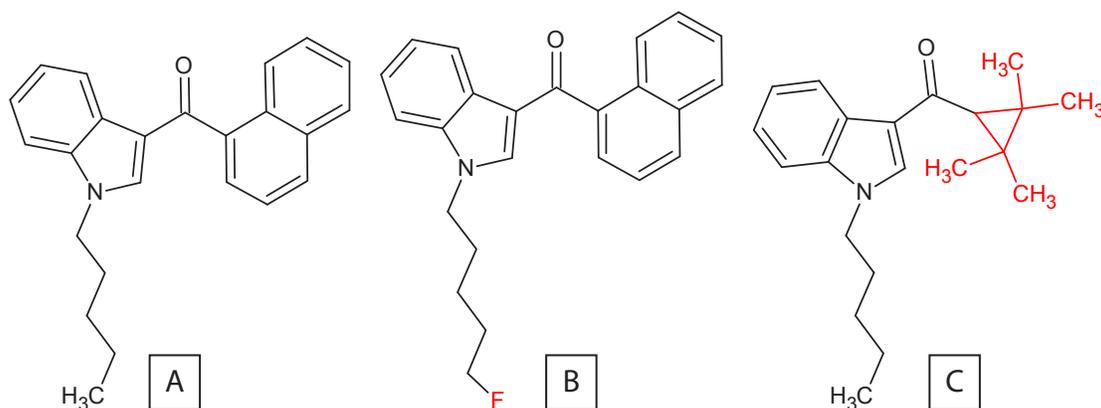


### Introduction

The National Forensic Laboratory Information System (NFLIS) is a program of the Drug Enforcement Administration (DEA), Office of Diversion Control that collects drug identification results and associated information from drug cases submitted to and analyzed by Federal, State and local forensic laboratories. This NFLIS special report presents updated findings previously published in September 2011 on two categories of drugs: synthetic cannabinoids and synthetic cathinones. NFLIS semiannual national estimates for 2010 through 2013 are presented, along with maps showing State-level reports. Federal data from DEA's System To Retrieve Information from Drug Evidence II (STRIDE) and from U.S. Customs and Border Protection (CBP) laboratories, as well as data from the American Association of Poison Control Centers (AAPCC), are also presented.

Synthetic cannabinoids are laced on plant material and abused for their marijuana-like effects. Synthetic cathinones have stimulant properties related to cathinone, the psychoactive substance found in the shrub *Catha edulis* (khat) and produce pharmacological effects similar to methamphetamine. Availability of synthetic cannabinoids and synthetic cathinones contained in products sold as “Spice,” “legal highs,” “research chemicals,” “plant food,” or “bath salts” has surged since 2010. The abuse of these substances led to an increasing number of calls to poison control centers in 2010 and 2011. The abuse of both groups represents an emerging and ongoing drug problem in the United States.

The DEA and State drug control agencies have recognized the need to monitor and, when necessary, to control these substances. Many States have either banned or have legislation pending for synthetic cannabinoids and synthetic cathinones (see Table 1). Some States control specific compounds, while others have passed laws that control more broadly by structural class. In 2011, the Federal Government temporarily categorized the first five synthetic cannabinoids and three synthetic cathinones as Schedule I substances under the Controlled Substances Act. Since then, an additional 27 compounds have either been temporarily or permanently placed into Schedule I (as of June 6, 2014). Many of these compounds only have slight modifications in their chemical structures (Figure 1). Synthetic cannabinoids JWH-018 and AM-2201 only differ by the addition of fluorine on the alkyl side chain. One of the newer emerging compounds, UR-144, has a tetramethylcyclopropyl structure modification. These structure modifications are used by clandestine manufacturers to evade legislation.

**Figure 1** Structures of JWH-018 (A), AM-2201 (B), and UR-144 (C)

## State Controls of Synthetic Cannabinoids and Synthetic Cathinones

The most recent list of enactments shows that the majority of States, along with Washington, DC, have legislation for synthetic cannabinoids and synthetic cathinones. As of April 9, 2014, Massachusetts has legislation pending for synthetic cannabinoids. New Hampshire has pending legislation for both synthetic cannabinoids and synthetic cathinones. States vary on their strategy for banning these groups of compounds. Some ban them by general class, while others list specific substances. Table 1 only lists States as “pending” if no prior legislation was identified. It does not reflect States that have pending legislation that amends or adds additional substances or classes to their current legislation.

### Synthetic Cannabinoids and Synthetic Cathinones Reported by Federal Laboratories

NFLIS collects the results of drug evidence from DEA’s STRIDE and from the seven CBP laboratories. STRIDE reflects results of substance evidence from drug seizures, undercover drug buys, and other evidence analyzed at DEA laboratories located across the country.

During the first half of 2013, a total of 24,992 drug reports were submitted to DEA and CBP laboratories and analyzed by September 30, 2013. Of these, there were 365 reports of synthetic cannabinoids. Synthetic cannabinoids were most commonly identified as XLR11 (120 reports or 33%) and AM-2201 (76 reports or 21%). During the first half of 2010, there were only 21 reports of synthetic cannabinoids, of which 19 were JWH-018. A total of 518 synthetic cathinones were submitted to DEA and CBP laboratories during the first half of 2013. These were most commonly identified as methylone (265 reports or 51%) and alpha-PVP (105 reports or 20%). No synthetic cathinones were reported during the first half of 2010 and analyzed within three months.

**Table 1****STATE CONTROLS OF SYNTHETIC CANNABINOIDS AND SYNTHETIC CATHINONES**

Controlled	Yes	No	Pending
Synthetic cannabinoids	AL, AK, AZ, AR, CA, CO, CT, DC, DE, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MI, MN, MS, MO, MT, NE, NV, NJ, NM, NY, <sup>1</sup> NC, ND, OH, OK, OR, <sup>1</sup> PA, RI, SC, SD, TN, TX, UT, VT, VA, WA, <sup>1</sup> WV, WI, WY		MA, NH
Synthetic cathinones	AL, AK, AZ, AR, CO, CT, DC, DE, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NV, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY	CA	NH

Note: In this table, Washington, DC, is considered to be a State.

<sup>1</sup> State is not controlling the substance with legislation; however, bans are in place via other means (e.g., State Pharmacy Board).

Sources: (a) National Conference of State Legislatures. (2012, November 28). Enacted legislation. Retrieved on April 9, 2014, from <http://www.ncsl.org/issues-research/justice/substituted-cathinones-enactments.aspx> (synthetic cathinones) and <http://www.ncsl.org/issues-research/justice/synthetic-cannabinoids-enactments.aspx> (synthetic cannabinoids). (b) National Alliance for Model State Drug Laws. (2012, September 6). *Summary of synthetic drugs bills and proposed regulations*. Retrieved on April 9, 2014, from <http://www.namsdl.org/synthetic-substances.cfm>. (c) An Act relative to synthetic marijuana, S. 919, The 188th General Court of The Commonwealth of Massachusetts. (2013). Retrieved on April 9, 2014, from <https://malegislature.gov/Bills/188/Senate/S919>. (d) An Act relative to synthetic marijuana, H.B. 1446, New Hampshire General Court. (2014). Retrieved on April 9, 2014, from <http://legiscan.com/NH/bill/HB1446/2014>. (e) An Act adding certain products to the controlled drug act, H.B. 1611, New Hampshire General Court (2014). Retrieved on April 9, 2014, from <http://legiscan.com/NH/text/HB1611/2014>.

# National Estimates

This section presents semiannual national estimates for reports of synthetic cannabinoids and synthetic cathinones that were submitted to State and local forensic laboratories from January 2010 through June 2013 during each six-month reference period (January through June and July through December) and analyzed within three months of the end of each six-month period. According to NFLIS, synthetic cannabinoids represented an estimated 469 drug reports during the first half of 2010, increased to a high of 23,123 reports during the first half of 2012, then decreased to 17,241 reports during the first half of 2013 (Table 2). Prior to 2010, synthetic cannabinoids were not controlled by any State or at the Federal level.

During the first half of 2010, the vast majority of the synthetic cannabinoid reports were identified as JWH compounds, mostly

JWH-018 (86%). By the first half of 2012, less than a quarter of synthetic cannabinoids were JWH compounds, and by 2013, that percentage dropped to less than 10%. During the first half of 2012, almost half of the synthetic cannabinoid reports were AM-2201 (45%). By the first half of 2013, almost two-thirds were XLR11 (65%). XLR11 was first reported to NFLIS in 2012.

Synthetic cathinones represented 142 reports during the first half of 2010, increasing to 7,997 reports during the first half of 2013 (Table 3). During the first half of 2010, most synthetic cathinone reports were either mephedrone (54%) or MDPV (38%). By the first half of 2013, less than 10% of reports were mephedrone or MDPV. The majority of synthetic cathinone reports during the first half of 2013 were identified as methylone (65%).

**Table 2** NATIONAL SEMIANNUAL ESTIMATES OF SYNTHETIC CANNABINOID REPORTS IN NFLIS, 2010–2013

Synthetic Cannabinoid Reports <sup>1</sup>	Total		2010				2011				2012				2013	
	Number	Percent	Jan–June		Jul–Dec		Jan–June		Jul–Dec		Jan–June		Jul–Dec		Jan–June	
AM-2201	20,515	24.65%	0	0.00%	8	0.33%	802	10.01%	5,425	38.54%	10,457	45.22%	2,939	16.44%	884	5.13%
XLR11	19,795	23.79%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1,474	6.38%	7,047	39.43%	11,273	65.38%
UR-144	6,850	8.23%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1,841	7.96%	3,765	21.06%	1,243	7.21%
JWH-018 (AM-678)	6,486	7.79%	402	85.73%	1,437	59.29%	2,336	29.15%	1,118	7.95%	705	3.05%	314	1.76%	173	1.00%
JWH-122	4,908	5.90%	0	0.00%	0	0.00%	611	7.62%	1,774	12.60%	1,900	8.22%	499	2.79%	125	0.73%
JWH-250	3,607	4.33%	1	0.21%	415	17.12%	1,380	17.22%	1,021	7.25%	538	2.33%	135	0.75%	118	0.68%
JWH-210	3,526	4.24%	0	0.00%	9	0.38%	633	7.90%	1,086	7.72%	1,410	6.10%	278	1.55%	111	0.64%
JWH-081	1,566	1.88%	1	0.21%	147	6.08%	558	6.96%	401	2.85%	282	1.22%	123	0.69%	55	0.32%
MAM-2201	1,327	1.59%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	769	3.32%	495	2.77%	64	0.37%
JWH-073	954	1.15%	64	13.63%	170	7.01%	353	4.40%	246	1.75%	68	0.29%	50	0.28%	4	0.02%
AKB48	767	0.92%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	236	1.02%	246	1.38%	285	1.65%
RCS-4	753	0.90%	0	0.00%	15	0.64%	234	2.92%	291	2.07%	135	0.59%	52	0.29%	25	0.14%
JWH-203	736	0.88%	0	0.00%	0	0.00%	175	2.18%	324	2.31%	145	0.63%	72	0.40%	21	0.12%
PB-22	668	0.80%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	668	3.87%
5F-PB-22	544	0.65%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	544	3.16%
5F-AKB48	531	0.64%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	115	0.64%	417	2.42%
JWH-019	261	0.31%	0	0.00%	11	0.47%	66	0.83%	75	0.53%	66	0.28%	29	0.16%	14	0.08%
STS-135	170	0.20%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	5	0.02%	81	0.45%	84	0.49%
AM-694	165	0.20%	0	0.00%	4	0.17%	67	0.83%	44	0.32%	23	0.10%	9	0.05%	18	0.10%
AM-2233	158	0.19%	0	0.00%	0	0.00%	0	0.00%	15	0.11%	98	0.42%	35	0.19%	10	0.06%
RCS-8	142	0.17%	0	0.00%	0	0.00%	8	0.10%	60	0.43%	57	0.25%	15	0.09%	2	0.01%
JWH-200	118	0.14%	1	0.21%	54	2.22%	32	0.40%	25	0.18%	4	0.02%	2	0.01%	0	0.00%
A-796,260	100	0.12%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	47	0.20%	37	0.21%	16	0.10%
CB-13	95	0.11%	0	0.00%	0	0.00%	0	0.00%	8	0.06%	56	0.24%	23	0.13%	8	0.04%
JWH-022	74	0.09%	0	0.00%	0	0.00%	0	0.00%	9	0.07%	26	0.11%	19	0.10%	20	0.12%
AM-1248	47	0.06%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	35	0.15%	7	0.04%	5	0.03%
JWH-018 adamantyl carboxamide	44	0.05%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	23	0.10%	16	0.09%	5	0.03%
Other synthetic cannabinoids	8,310	9.99%	0	0.00%	153	6.31%	759	9.47%	2,151	15.28%	2,725	11.78%	1,473	8.24%	1,050	6.09%
<b>Total Synthetic Cannabinoids<sup>2</sup></b>	<b>83,217</b>	<b>100.00%</b>	<b>469</b>	<b>100.00%</b>	<b>2,423</b>	<b>100.00%</b>	<b>8,013</b>	<b>100.00%</b>	<b>14,074</b>	<b>100.00%</b>	<b>23,123</b>	<b>100.00%</b>	<b>17,874</b>	<b>100.00%</b>	<b>17,241</b>	<b>100.00%</b>

<sup>1</sup> For further information on these drugs, see the DEA's drug and chemical information at [http://www.deadiversion.usdoj.gov/drug\\_chem\\_info/index.html](http://www.deadiversion.usdoj.gov/drug_chem_info/index.html) and a forensic cheminformatic database at <https://www.forensicdb.org/>. See this report's Appendix A for the chemical names of these drugs.

<sup>2</sup> Numbers and percentages may not sum to totals because of rounding.

**Table 3**

*NATIONAL SEMIANNUAL ESTIMATES OF SYNTHETIC CATHINONE REPORTS IN NFLIS, 2010–2013*

Synthetic Cathinone Reports <sup>1</sup>	Total		2010				2011				2012				2013	
	Number	Percent	Jan–June		Jul–Dec		Jan–June		Jul–Dec		Jan–June		Jul–Dec		Jan–June	
Methylone (MDMC)	11,795	39.78%	7	4.92%	48	10.43%	516	29.00%	1,306	27.42%	1,843	26.52%	2,859	37.84%	5,215	65.22%
MDPV	7,990	26.95%	54	37.85%	193	41.99%	934	52.47%	2,575	54.08%	2,036	29.29%	1,574	20.83%	624	7.80%
alpha-PVP	4,262	14.38%	0	0.00%	0	0.00%	0	0.00%	5	0.10%	1,289	18.54%	1,767	23.38%	1,202	15.03%
4-MEC	1,934	6.52%	0	0.00%	3	0.65%	32	1.78%	125	2.63%	497	7.16%	697	9.22%	580	7.25%
Pentedrone	1,038	3.50%	0	0.00%	0	0.00%	0	0.00%	94	1.98%	543	7.82%	275	3.64%	125	1.57%
Mephedrone (4-MMC)	668	2.25%	77	53.89%	208	45.31%	206	11.55%	107	2.25%	26	0.37%	25	0.33%	20	0.24%
Butylone	504	1.70%	0	0.00%	2	0.53%	47	2.65%	161	3.37%	172	2.48%	78	1.03%	43	0.54%
Fluoromethcathinone	353	1.19%	0	0.00%	3	0.65%	39	2.19%	168	3.52%	76	1.10%	47	0.62%	20	0.25%
Pentylone	230	0.78%	0	0.00%	0	0.00%	0	0.00%	34	0.72%	109	1.56%	54	0.72%	33	0.41%
4-MePPP	229	0.77%	0	0.00%	0	0.00%	0	0.00%	57	1.19%	128	1.85%	29	0.38%	15	0.19%
alpha-PBP	108	0.36%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	29	0.42%	36	0.47%	43	0.53%
Ethylone	105	0.35%	0	0.00%	0	0.00%	0	0.00%	9	0.19%	65	0.94%	24	0.31%	7	0.08%
Buphedrone	41	0.14%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	16	0.23%	11	0.14%	15	0.18%
Methcathinone	38	0.13%	5	3.35%	1	0.22%	5	0.26%	10	0.20%	15	0.22%	2	0.03%	0	0.00%
Naphyrone	25	0.08%	0	0.00%	0	0.00%	0	0.00%	9	0.18%	8	0.12%	7	0.09%	1	0.01%
MDPBP	24	0.08%	0	0.00%	0	0.00%	0	0.00%	6	0.13%	17	0.24%	0	0.00%	1	0.01%
MPPH	23	0.08%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	9	0.12%	14	0.18%
Ethylcathinone	23	0.08%	0	0.00%	0	0.00%	0	0.00%	1	0.02%	14	0.20%	5	0.06%	3	0.04%
3,4-DMMC	22	0.08%	0	0.00%	0	0.00%	0	0.00%	4	0.09%	15	0.22%	2	0.03%	1	0.01%
Methedrone	21	0.07%	0	0.00%	0	0.00%	2	0.09%	5	0.11%	11	0.16%	2	0.03%	1	0.01%
4-Methylbuphedrone	17	0.06%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	3	0.04%	12	0.16%	3	0.03%
MDPPP	13	0.04%	0	0.00%	1	0.22%	0	0.00%	0	0.00%	5	0.07%	7	0.09%	0	0.00%
3-MEC	10	0.03%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	8	0.11%	2	0.03%	0	0.00%
Other synthetic cathinones	176	0.59%	0	0.00%	0	0.00%	0	0.00%	86	1.81%	25	0.36%	33	0.44%	32	0.40%
<b>Total Synthetic Cathinones<sup>2</sup></b>	<b>29,648</b>	<b>100.00%</b>	<b>142</b>	<b>100.00%</b>	<b>460</b>	<b>100.00%</b>	<b>1,780</b>	<b>100.00%</b>	<b>4,762</b>	<b>100.00%</b>	<b>6,950</b>	<b>100.00%</b>	<b>7,557</b>	<b>100.00%</b>	<b>7,997</b>	<b>100.00%</b>

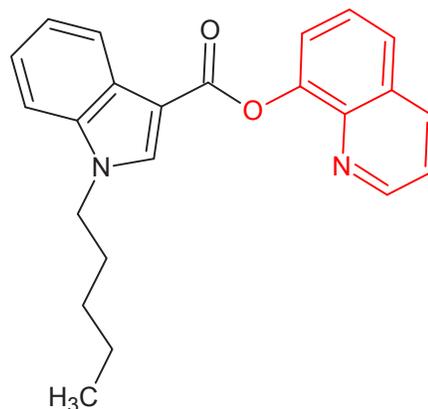
<sup>1</sup> For further information on these drugs, see the DEA's drug and chemical information at [http://www.deadiversion.usdoj.gov/drug\\_chem\\_info/index.html](http://www.deadiversion.usdoj.gov/drug_chem_info/index.html) and a forensic cheminformatic database at <https://www.forensicdb.org/>. See this report's Appendix A for the chemical names of these drugs.

<sup>2</sup> Numbers and percentages may not sum to totals because of rounding.

## Newly Emerging Drugs

The NFLIS Data Query System (DQS) provides participating laboratories with the ability to search NFLIS data at the national, regional, State, or local level. The Alert System is a component of the DQS that provides information on emerging drugs that were newly reported to NFLIS during specific time periods. Tables 4 and 5 list the synthetic cannabinoids and synthetic cathinones, respectively, that were first reported to NFLIS during the first six months of 2011 and 2013. JWH compounds and AM-2201 were the most prevalent emerging drugs identified by the Alert System during the first six months of 2011. PB-22 and its fluorinated analog, 5F-PB-22, were the most commonly reported new drugs during the first six months of 2013. During both time points, more emerging synthetic cannabinoids were observed than new drugs. Figure 2 shows the 8-hydroxyquinoline structure modification (highlighted in red) of PB-22 compared with the previously reported synthetic cannabinoids JWH-018 and AM-2201 (Figure 1).

**Figure 2** PB-22 synthetic cannabinoid structure



**Table 4** NEWLY REPORTED EMERGING DRUGS, JANUARY–JUNE 2011

Substance	Count
<b>Synthetic Cannabinoids</b>	
JWH-250	1,528
AM-2201	975
JWH-122	694
JWH-210	663
RCS-4	257
JWH-203	199
JWH-019	75
AM-694	71
Pravadoline	11
RCS-8	8
JWH-015	4
CP 47,497	3
<b>Synthetic Cathinones</b>	
MDPV	1,084
Methylone	568
Mephedrone (4-MMC)	211
Fluoromethcathinone	45
4-MEC	32

**Table 5** NEWLY REPORTED EMERGING DRUGS, JANUARY–JUNE 2013

Substance	Count
<b>Synthetic Cannabinoids</b>	
PB-22	817
5F-PB-22	417
5-Chloro-UR-144	19
A-834,735	8
UR-144 N-heptyl homolog	1
<b>Synthetic Cathinones</b>	
4-EMC	8
3-MMC	4

Note: Data presented in Tables 4 and 5 should not be compared with the data presented in Tables 2 and 3. Data in Tables 2 and 3 are estimates based on reports submitted from January to June and analyzed by September 30 of the referenced year. Data presented in Tables 4 and 5 are counts based on reports submitted from January to June without a specified analysis date.

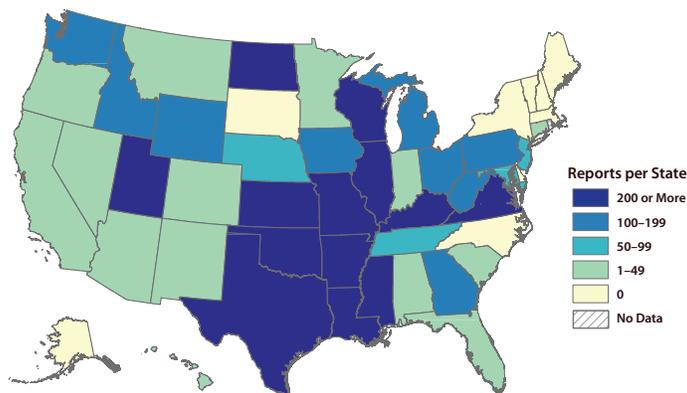
## Synthetic Cannabinoids and Synthetic Cathinones, by State in NFLIS, January–June 2011 and 2013

This section presents NFLIS data at the State level on the number of drug reports identified as synthetic cannabinoids and synthetic cathinones during two time periods—January through June 2011 and January through June 2013. As shown in Figure 3, a total of 40 States, mostly in the central United States, reported synthetic cannabinoids during the first half of 2011. Thirteen States had synthetic cannabinoid reports of 200 or more, and nine States had between 100 and 199 reports. By the first half of 2013,

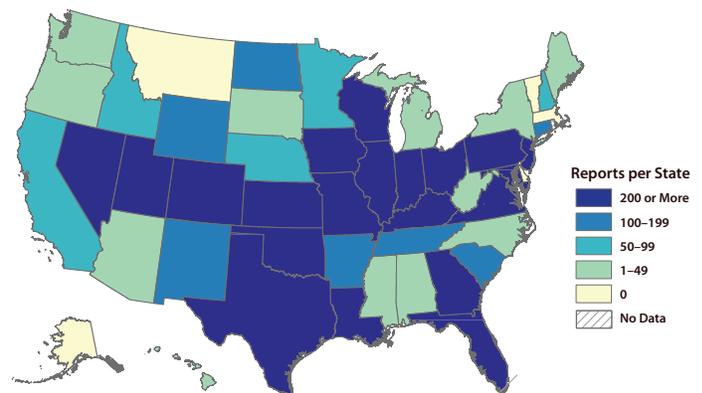
44 States reported synthetic cannabinoids, and the number with 200 or more reports increased to 20 (Figure 4).

As shown in Figure 5, a total of 41 States reported synthetic cathinones to NFLIS during the first half of 2011. Of these, two States reported cathinone counts of 200 or greater. By the first half of 2013, the number of States that reported synthetic cathinones increased to 44. Of these, the number that reported 200 or more reports more than quadrupled to nine (Figure 6).

**Figure 3** Synthetic cannabinoid reports in NFLIS, by State, January–June 2011\*

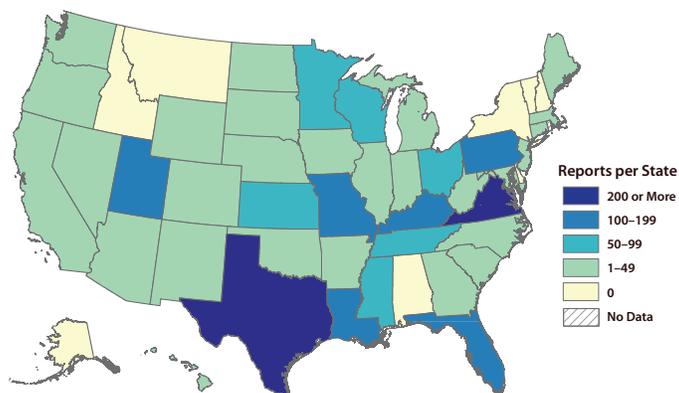


**Figure 4** Synthetic cannabinoid reports in NFLIS, by State, January–June 2013\*

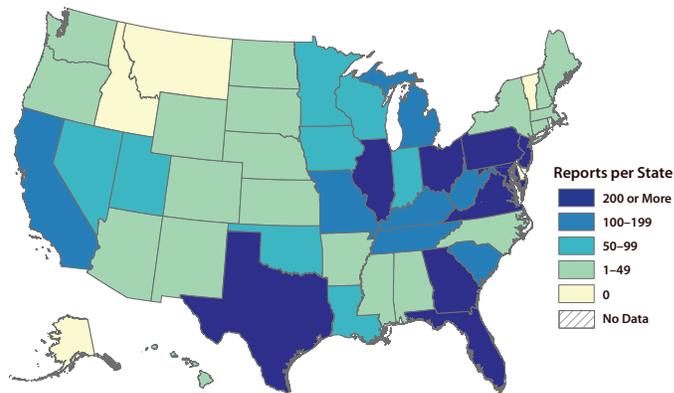


\*Includes synthetic cannabinoid reports submitted from January through June and analyzed by September 30 of the referenced year.

**Figure 5** Synthetic cathinone reports in NFLIS, by State, January–June 2011\*



**Figure 6** Synthetic cathinone reports in NFLIS, by State, January–June 2013\*



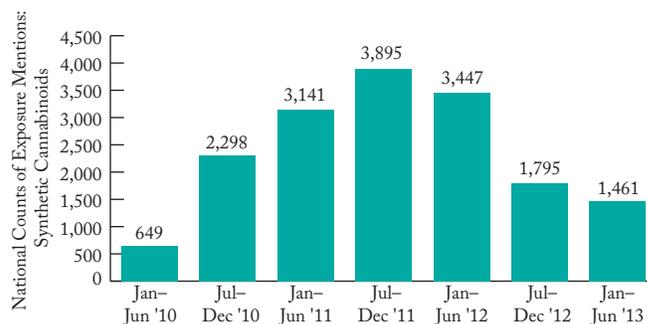
\*Includes synthetic cathinone reports submitted from January through June and analyzed by September 30 of the referenced year.

## National Poison Control Center Data

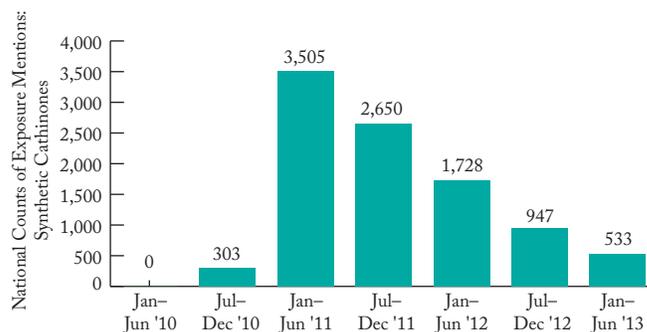
AAPCC data from January 2010 through June 2013 were analyzed to obtain information on “exposures” to synthetic cannabinoids and synthetic cathinones that were reported to poison control centers across the United States. The term “exposure” refers to instances in which an individual had contact with the substance (e.g., ingested, inhaled, absorbed by the skin or eyes), but the exposure does not necessarily signify a poisoning or overdose. The data presented here may differ from AAPCC data presented in other publications because of differences in when cases were updated and when a data file was prepared and finalized for use. Figures 7 and 8 show national counts of exposure mentions in six-month increments for synthetic cannabinoids and synthetic cathinones, respectively.

Poison control center mentions for synthetic cannabinoid exposures were observed in the first six months of 2010 (January through June; 649 reports), followed by the emergence of synthetic cathinone mentions in the last six months of 2010 (July through December; 303 reports). Mentions gradually increased for each six-month period for synthetic cannabinoids, with the greatest number of mentions occurring in the last six months of 2011 (3,895 reports). There was a considerable decrease in synthetic cannabinoid mentions beginning in January 2012 through June 2013. A spike in synthetic cathinone exposure mentions was observed between 2010 and the first six months of 2011, after which the mentions steadily decreased for each six-month interval. Based on the presented data, synthetic cannabinoids and synthetic cathinones had the lowest exposure reports to the AAPCC in the first six months of 2013, with the exception of their first appearances in 2010.

**Figure 7** National semiannual counts of exposure mentions to poison control centers: Synthetic cannabinoids, January 2010–June 2013



**Figure 8** National semiannual counts of exposure mentions to poison control centers: Synthetic cathinones, January 2010–June 2013



## Appendix A: Chemical Names of Synthetic Cannabinoids and Synthetic Cathinones

Synthetic Cannabinoids	
Common Name	Chemical Name
5-Chloro-UR-144	[1-(5-Chloropentyl)-1H-indol-3-yl](2,2,3,3-tetramethylcyclopropyl)methanone
5F-AKB48 (5F-APINACA)	N-(1-Adamantyl)-1-(5-fluoropentyl)-1H-indazole-3-carboxamide
5F-PB-22	Quinolin-8-yl 1-(5-fluoropentyl)-1H-indole-3-carboxylate
A-796,260	1-(2-morpholin-4-ylethyl)-1H-indol-3-yl]-(2,2,3,3-tetramethylcyclopropyl)methanone
A-834,735	[1-(Tetrahydro-2H-pyran-4-ylmethyl)-1H-indol-3-yl](2,2,3,3-tetramethylcyclopropyl)methanone
AKB48 (APINACA)	N-(1-Adamantyl)-1-pentyl-1H-indazole-3-carboxamide
AM-1248	1-[(N-methylpiperidin-2-yl)methyl]-3-(adamant-1-oyl)indole
AM-2201	1-(5-Fluoropentyl)-3-(1-naphthoyl)indole
AM-2233	1-[(N-methylpiperidin-2-yl)methyl]-3-(2-iodobenzoyl)indole
AM-694	1-(5-Fluoropentyl)-3-(2-iodobenzoyl)indole
CB-13 (SAB-378)	Naphthalen-1-yl-(4-pentylloxynaphthalen-1-yl)methanone
CP-47, 497	5-(1,1-Dimethylheptyl)-2-[(1R,3S)-3-hydroxycyclohexyl]-phenol
JWH-015	1-Propyl-2-methyl-3-(1-naphthoyl)indole
JWH-018 (AM-678)	1-Pentyl-3-(1-naphthoyl)indole
JWH-018 adamantyl carboxamide (APICA)	N-adamantyl-1-pentylindole-3-carboxamide
JWH-019	1-Hexyl-3-(1-naphthoyl)indole
JWH-022	1-(Penta-4-ene)-3-(1-naphthoyl)indole
JWH-073	1-Butyl-3-(1-naphthoyl)indole
JWH-081	1-Pentyl-3-(1-(4-methoxynaphthoyl))indole
JWH-122	1-Pentyl-3-(4-methyl-1-naphthoyl)indole
JWH-200	1-[2-(4-Morpholinyl)ethyl]-3-(1-naphthoyl)indole
JWH-203	1-Pentyl-3-(2-chlorophenylacetyl)indole
JWH-210	1-Pentyl-3-(4-ethyl-1-naphthoyl)indole
JWH-250	1-Pentyl-3-(2-methoxyphenylacetyl)indole
MAM-2201	1-(5-Fluoropentyl)-3-(4-methyl-1-naphthoyl)indole
PB-22 (QUPIC)	Quinolin-8-yl 1-pentyl-1H-indole-3-carboxylate
Pravadoline (WIN 48, 098)	(4-methoxyphenyl)[2-methyl]-1-[2-(4-morpholinyl)ethyl]-1H-indol-3-yl]-methanone
RCS-4 (SR-19)	1-Pentyl-3-[(4-methoxy)-benzoyl]indole
RCS-8 (SR-18)	1-Cyclohexylethyl-3-(2-methoxyphenylacetyl)indole
STS-135	N-Adamantyl-1-fluoropentylindole-3-carboxamide
UR-144	(1-Pentyl-1H-indol-3-yl)-(2,2,3,3-tetramethylcyclopropyl)methanone
UR144 N-heptyl analog	(1-Heptyl-1H-indol-3-yl)(2,2,3,3-tetramethylcyclopropyl)methanone
XLR11	[1-(5-Fluoro-pentyl)-1H-indole-3-yl](2,2,3,3-tetramethylcyclopropyl)methanone

Synthetic Cathinones	
Common Name	Chemical Name
3,4-DMMC	3,4-Dimethylmethcathinone
3-MEC	3-Methyl-N-ethylcathinone
3-MMC	3-Methylmethcathinone
4-EMC	4-Ethylmethcathinone
4-MEC	4-Methyl-N-ethylcathinone
4-MePPP	4-Methyl-alpha-pyrrolidinopropiophenone
4-Methylbuphedrone	2-Methylamino-1-(4-methylphenyl)butan-1-one (4-MeBP)
alpha-PBP	Alpha-pyrrolidinobutiophenone
alpha-PVP	Alpha-pyrrolidinopentiophenone
Buphedrone	2-(methylamino)-1-phenylbutan-1-one
Butylone	1-(1,3-benzodioxol-5-yl)-2-(methylamino)butan-1-one
Ethylcathinone	2-Ethylaminopropiophenone
Ethylone	3,4-Methylenedioxy-N-ethylcathinone
Fluoromethcathinone	Fluoro-N-methylcathinone
MDPBP	3,4-Methylenedioxy-alpha-pyrrolidinobutiophenone
MDPPP	3,4-Methylenedioxy-alpha-pyrrolidinopropiophenone
MDPV	3,4-Methylenedioxyprovalerone
Mephedrone (4-MMC)	4-Methyl-N-methylcathinone
Methcathinone	N-Methylcathinone
Methedrone	4-Methoxy-methcathinone
Methylone	3,4-Methylenedioxy-N-methylcathinone
MPHP	4-Methyl-alpha-pyrrolidinohexanophenone
Naphyrone	Naphthylprovalerone
Pentedrone	2-(methylamino)-1-phenylpentan-1-one
Pentylone	1-(1,3-benzodioxol-5-yl)-2-(methylamino)pentan-1-one

**Methodology:** A summary of the NFLIS estimation methodology can be found in the *NFLIS Statistical Methodology* publication at <https://www.nflis.deadiversion.usdoj.gov/Reports.aspx>.

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**American Association of Poison Control Centers (AAPCC) Disclaimer and Statement on AAPCC Data**

The content of this report does not necessarily reflect the opinions or conclusions of the American Association of Poison Control Centers. The American Association of Poison Control Centers (AAPCC; <http://www.aapcc.org>) maintains the national database of information logged by the country's Poison Control Centers (PCCs). Records in this database are from self-reported cases: they reflect only information provided when the public or healthcare professionals report an actual or potential exposure to a substance (e.g., an ingestion, inhalation, or topical exposure, etc.), or request information/educational materials. Exposures do not necessarily represent a poisoning or overdose. The AAPCC is not able to completely verify the accuracy of every report made to member centers. Additional exposures may go unreported to PCCs and data referenced from the AAPCC should not be construed to represent the complete incidence of national exposures to any substance(s).

**Special Report:**

**Synthetic Cannabinoids and Synthetic Cathinones Reported in NFLIS, 2010–2013**



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