

# Designer drug trends report

## **Synthetic cannabinoids, incense/smoking products**

*DEA-controlled substances are on the decline, while others are on the rise.*

- Between November 2011, and July 2012, Congress acted to pass federal standards scheduling the most popular synthetic drugs in use at the time. In July, President Barack Obama signed into law the Food and Drug Administration Safety and Innovation Act S.3187<sup>1</sup>, which bans over twenty-five specific synthetic cannabinoids and cathinones, and schedules certain drug classes, anticipating the appearance of analogs of the banned substances. These are now all Schedule I substances—the same designation as heroin.
- In the second quarter of 2012, JWH-018, JWH-073, JWH-250, and JWH-081 appear to have largely disappeared as major components in street products. Trace amounts of them may be present in materials containing novel drugs, as a result of contamination in manufacturing or packaging, or as reaction by-products.

Percentage of total positive findings at NMS Labs for various synthetic cannabinoid drugs in incense/smoking products. March – June 2012

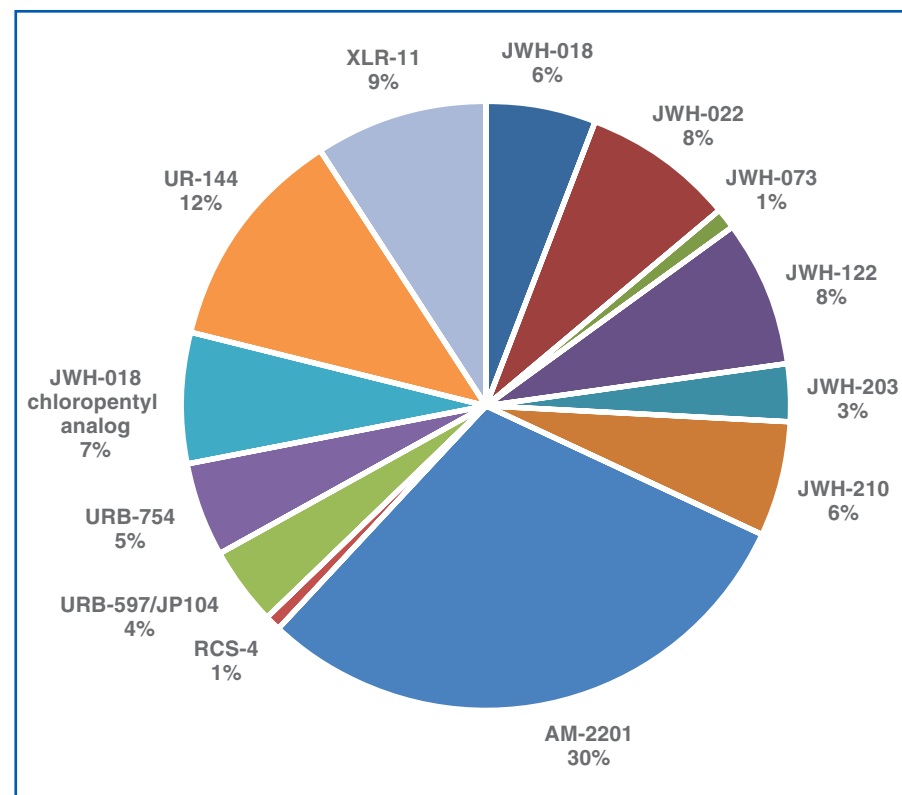


Figure 1

[1] <http://www.gpo.gov/fdsys/pkg/BILLS-112s3187enr/pdf/BILLS-112s3187enr.pdf>

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## Synthetic cannabinoids, incense/smoking products (continued)

- AM-2201, JWH-022, JWH-122, and JWH-210, all of which are analogs of JWH-018, continue to be the most popular and frequently detected drugs in street products. Trace amounts of the older legacy compounds persist in street drug material in spite of the fact that they are scheduled.
- The new law passed in July schedules drugs that are “cannabimimetic.” These are defined as CB1 receptor agonists as shown by binding studies and functional assays within the following classes (with examples): 2-(3-hydroxycyclohexyl)phenol (CP47,497), 3-(1-naphthoyl)indole or 3-(1-naphthylmethane) indole (JWH-175), 3-(1-naphthoyl)pyrrole (JWH-147), 1-(1-naphthylmethylene)indene (JWH-176), 3-phenylacetylindole (JWH-250), or 3-benzoylindole (RCS-4). Several of these drugs have only recently appeared in the US.
- The net effect of passing this law was distributors accelerating the development of new classes of drugs, specifically the 2,2,3,3-tetramethyl-cyclopropyl indoles, XLR-11 and UR-144. These compounds started to appear in the second quarter of 2012 and were responsible for 21% of the positive results in botanical materials tested by NMS Labs. Their popularity has increased over the first quarter while the popularity of the drugs now included in the federal schedule has begun to decline. (See figure 2.)

The increasing complexity and change in the mix of chemicals appearing in synthetic cannabinoid products since 2010.

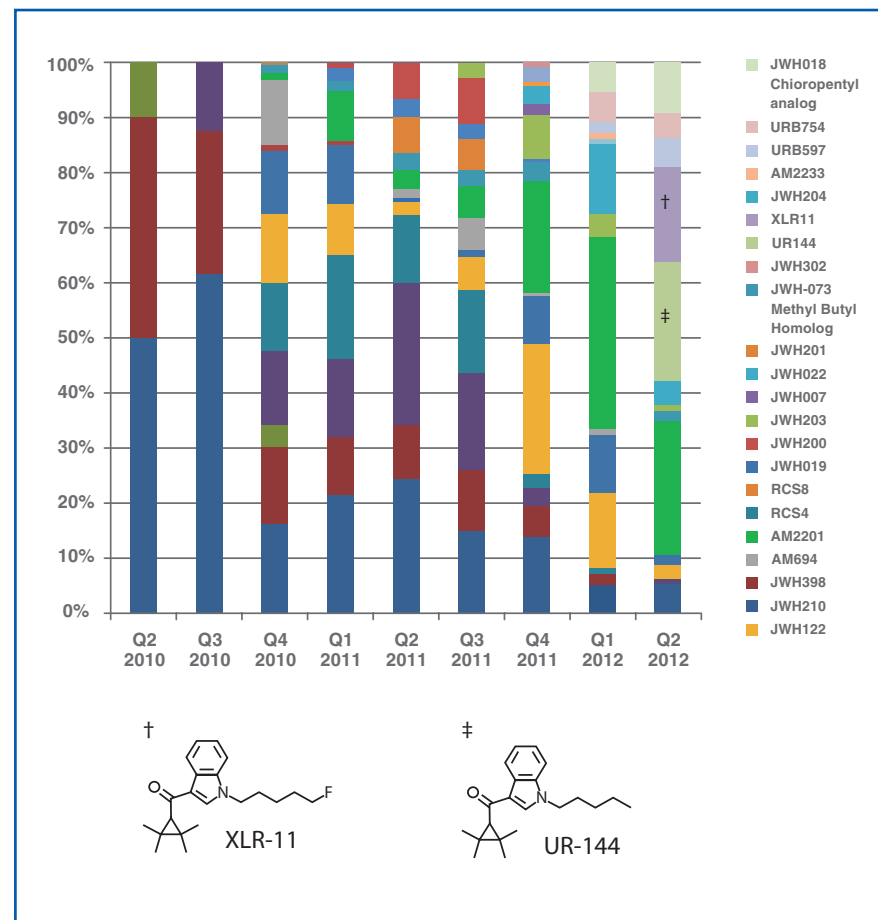


Figure 2

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## Synthetic cannabinoids – blood

*Patterns in toxicological analysis mirror the trends on the street.*

- Through the second quarter, positivity rates for synthetic cannabinoids in blood samples have consistently run around 40%, with the most popular drugs being AM-2201, JWH-022, JWH-122 and JWH-210. (See figure 3.)
- Other compounds, including JWH-250 and RCS-4 and RCS-8, have declined over the last two years to less than 3% positivity rate and are frequently present along with other major components.
- JWH-018 continues to be seen in around 12% of blood-positive cases.
- NMS Labs R&D efforts have confirmed the presence of the emergent XLR-11 and UR-144 compounds in blood samples and offers these as special request tests in cases where other compounds are ruled out. NMS Labs has developed tests and synthesized custom standards for clients for particular compounds of concern.
- As the market leader in designer drug research and test development, NMS Labs has committed the necessary resources, analytical and toxicology expertise and state-of-the-art instrumentation to keep up with the divergent and rapidly growing list of drugs. NMS Labs currently tests for the most comprehensive list of synthetic cannabinoids in blood, which includes a total of 22 compounds.

NMS Labs - Blood positivity rates. July 2011 – May 2012



Figure 3

*NMS Labs can be your partner in the fight against designer drugs. We offer real solutions to this very real problem.*

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## Synthetic cannabinoids – urine Expanding the scope of urine metabolite improves testing positivity rates.

- In July 2012, NMS Labs expanded the scope of its urine testing to include metabolites of JWH-122, JWH-081, JWH-210, and RCS-4. NMS Labs' urine synthetic cannabinoid test now includes fifteen metabolites of the most commonly encountered synthetic cannabinoids, and is constantly expanding its scope, with two projected updates each year.

NMS Labs - Urine positivity rates. September 2011 – April 2012

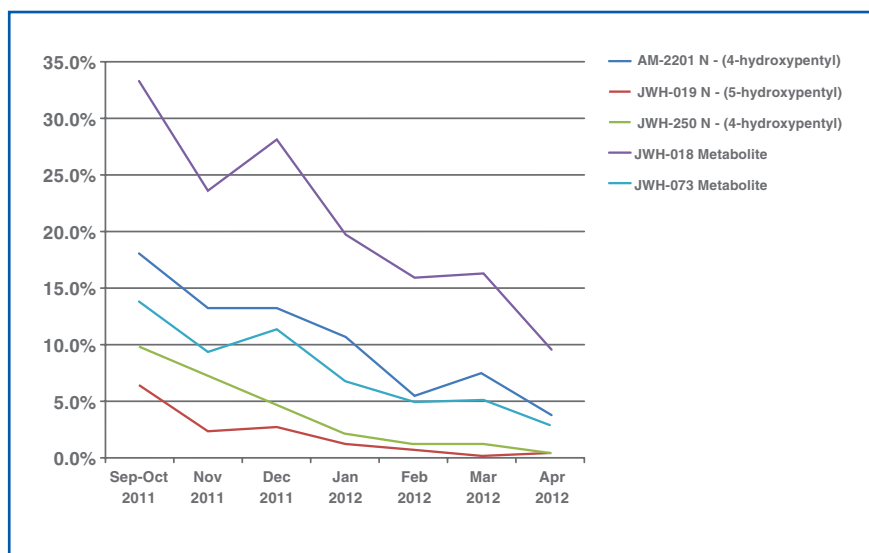


Figure 4

- Between September 2011 and April 2012, positivity rates in samples submitted for urine testing fell as more speculative and less for-cause testing was performed. More agencies and organizations are now ordering random synthetic cannabinoid screening as part of the deterrence and prevention efforts. Although the positivity rates are down, thousands of positive results are reported out each month—indicating the scale of the penetration of these drugs into the drug using population. (See figure 4.)
- Since introducing the expanded scope of urine drug testing, the procedure has disclosed rates of use of the newly added drugs as shown in table 1 below. The increased insight into what drugs are being used, disclosed by this broadened scope, emphasizes the need for a dynamic, frequent approach to urine synthetic cannabinoid testing.

Comparing positivity rates for use of prominent synthetic cannabinoids with the older reduced scope and new expanded scope.

	Any Analyte	JWH-018	JWH-019	JWH-073	JWH-250	AM-2201	JWH-081	JWH-122	JWH-210	RCS-4
Positive Rates May – June 2012	2.0	2.0	0.0	0.6	0.0	1.4	N/A	N/A	N/A	N/A
Positive Rates May – June 2012	7.2	7.2	0.8	2.5	0.5	4.2	0.7	2.3	0.7	0.0

Table 1

- In contrast to the trends in blood and smoking/incense materials, JWH-018 metabolites are still prevalent in urine samples, suggesting that the JWH-018 metabolites may be common metabolites to other synthetic drugs. Testing for the other metabolites, however, reveals the actual patterns of use and correlates better with other evidence of use.
- NMS Labs has been using a proprietary ELISA test for synthetic cannabinoids since April, 2012 and has refined its confirmatory procedures to be able to confirm the major drugs that cross-react with commercial immunoassay procedures. NMS Labs can provide cost-effective and up-to-date confirmatory testing, irrespective of laboratories doing their own in-house immunoassay screening on any platform.

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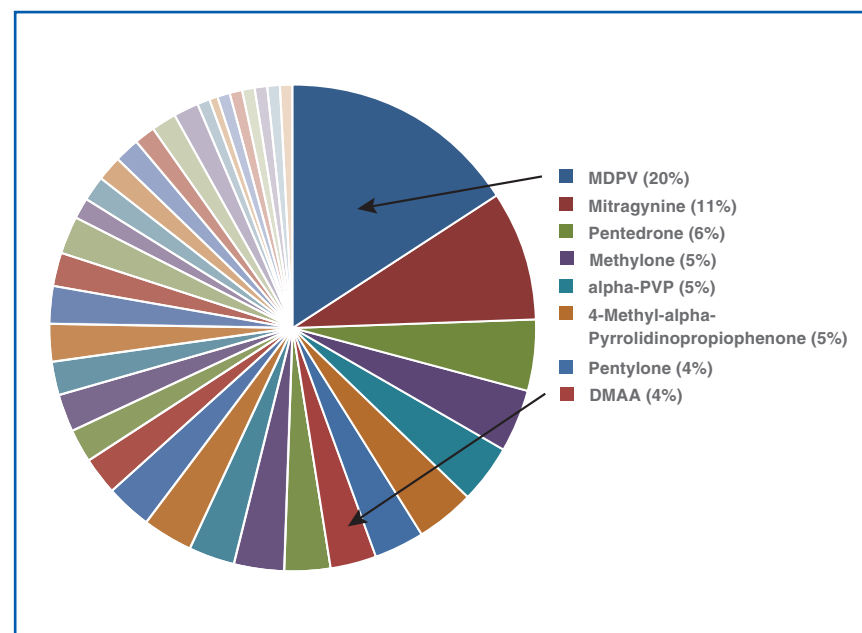
## Stimulants and hallucinogens

*Proliferation of “bath salts” products creates a challenge for enforcement and analysis.*

- NMS Labs trends data for synthetic stimulants, including those sold as “bath balts” type products. These trends show that MDPV, pentedrone, methylone, alpha-PVP, MPPP, and pentylone are the most common drugs in this class, but other compounds also appear in the products. These include mitragynine, a naturally occurring chemical in the plant Kratom; and DMAA, a nutritional supplement with stimulant properties at high doses. Between them, these compounds account for 62% of the drugs in these “bath salts” products.
- Figure 5 shows the diversity of compounds detected, besides those listed above. They include hallucinogenic tryptamines, other cathinone derivatives (buphedrone, mephedrone, ethylone, butylone, and pentylone), and some of the newly scheduled 2C compounds.
- MDPV is currently the most frequently detected designer stimulant detected in NMS Labs’ postmortem and DUI casework. In a total of 248 cases, the mean MDPV concentration was 139ng/mL (median 39ng/mL).
- NMS Labs developed a comprehensive new test to capture the major drugs that are now scheduled in the cathinone/designer phenethylamine categories to complement our traditional stimulants and hallucinogens testing. The scope is continually updated to ensure our ability to provide the most comprehensive and relevant testing available.

- The new Food and Drug Administration Safety and Innovation Act S.3187 signed into law in July, 2012 includes banning over twenty-five specific synthetic cannabinoids and cathinones, including eleven prominent “bath salts” chemicals: Mephedrone, MDPV, 2C-E, 2C-D, 2C-C, 2C-I, 2C-T-2, 2C-T-4, 2C-H, 2C-N, and 2C-P.
- In August 2012, NMS Labs launched new comprehensive tests for the many scheduled, emerging and traditional stimulant and hallucinogenic drugs. Testing for a total of 67 drugs is available in two separate panels that cover the majority of the most popular designer drugs. Additional compounds are being added to the scope of these procedures as they are identified through NMS Labs’ drug intelligence efforts.

**Illustration of the relative proportion of a diverse mix of chemicals present in “bath salts” products.**



**Figure 5**