

March 2015

# Designer Drug Testing

at NMS Labs



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## EMERGING

*Threat Unfolds from Designer Drug Trends*

### DESIGNER DRUGS THE TRENDS REPORT

*Our mission is to provide a comprehensive resource in the incredibly dynamic and quickly growing designer/synthetic drug market. For over 40 years we have been cutting through the noise and sensationalized stories to bring you a single and authoritative information source on the rapidly evolving designer drug epidemic.*

READ MORE

NMS Labs offers a wide range of topics and tools to help law enforcement, healthcare professionals and parents understand this illicit market and provide insights into the dynamic nature of designer drug trends.

Visit [DesignerDrugTrends.org](http://DesignerDrugTrends.org) to find current information about local laws, national drug scheduling laws, drug sightings, scientific changes, emerging designer drugs and testing trends.

**Knowledge sharing keeps us one step ahead of drug manufactures and dealers.**



# Testing for Designer Drugs

***Most laboratories simply don't have the time or resources to keep up with the designer drug marketplace. NMS Labs has the solution.***

The headlines are full of alarming and horrific stories—assaults on police officers, violence, suicides, psychosis—all attributed to individuals under the influence of the latest round of designer drugs, or so-called “legal highs.” We’re committed to continually investing in research and development to meet the challenge of the designer drug epidemic. Our team of leading forensic chemists and toxicologists provide key insights that identify designer drugs as they emerge.

- Emerging ELISA tests do not detect the most current designer drugs and are a barrier for forensic laboratories in keeping up with the diversity of new drugs on the street, requiring comprehensive mass spectrometry testing.
- Using an older drug screen or confirmation test is not useful. As financial constraints impact most budgets for businesses and organizations, selecting the most current test is more important than ever.

***Are you worried that your current synthetic cannabinoid test isn't picking up the latest drugs?***

Send us some samples that you have already tested and see the difference. When we updated the scope of our test recently, positivity rates in some populations more than doubled as a result of the shift to new drugs on the market.



### *Designer Drugs, in a nutshell*

NMS Labs proactive, comprehensive portfolio of designer drug testing keeps you one step ahead. We are committed to continually investing in R&D to meet the challenges of the designer drug epidemic.

#### **Synthetic cannabinoids**

Known on the street as K2 or “fake weed”, these drugs are very real. The newest compounds on the street are chemically different than the first generation compounds. They are potent, impairing and addictive, but their chemistry makes them invisible to older designer drug screens and traditional drug tests.

#### **Bath salts**

Data becoming available shows “bath salts” are deadly. Of the 459 blood samples recently submitted to NMS Labs, 28% confirmed positive for 1 or more analytes in our Expanded Bath Salts & Stimulants Panel. Other next generation compounds, 25I-NBOMe, 25C-NBOMe, 25H-NBOMe, are commonly found in “bath salts” and have been recently linked to deaths in the United States. Although labeled as “not for human consumption,” these substances often come as a powder to be snorted, injected or smoked by users.

# NMS Labs Center for Innovation

*The leader in identifying designer drug trends and toxicology*

- The Center's mission is to monitor the state of analytical science practice in the United States and internationally; to steer the development of new tests and technologies; and ensure that the needs of both public safety and public health are being met in a timely manner.
- The Center explores developments in designer drugs. Stay ahead of the ever-changing landscape of the designer drug market. NMS Labs assists law enforcement and healthcare professionals in their struggle against designer drugs.
- The Center has a dedicated, interdisciplinary staff to draw on, with expertise in clinical and forensic toxicology, criminalistics, forensic biology, and research and development. It brings both academic and professional perspectives to the table.



## **Strategic Partnerships**

At NMS Labs, we value collaborative partnerships. We are always looking for strategic partners who can help us bring innovation and testing closer to patient point-of-care or the scene of the investigation.

For more information, visit NMS Labs Center for Innovation at [www.nmslabs.com/c4i](http://www.nmslabs.com/c4i)

# Forensic Science Research

## ① Database of Deaths

To highlight the severity of the use of synthetic cannabinoids, NMS Labs is compiling a database of deaths related to their use. These include homicides, suicides, accidents and toxic deaths. Over 60 cases have been identified to date.

Contact Dr. Barry Logan at [Barry.Logan@nmslabs.com](mailto:Barry.Logan@nmslabs.com) to be included in the study.

## ② New Publication Highlights the Human Health Risks and Impairing Effects of Synthetic Cannabinoid Drugs

### **Pharmacology, Toxicology, and Adverse Effects of Synthetic Cannabinoid Drugs**

S. M. R. Gurney, K. S. Scott, S. L. Kacinko, B. C. Presley, B. K. Logan  
Forensic Science Review 26:53; 2014

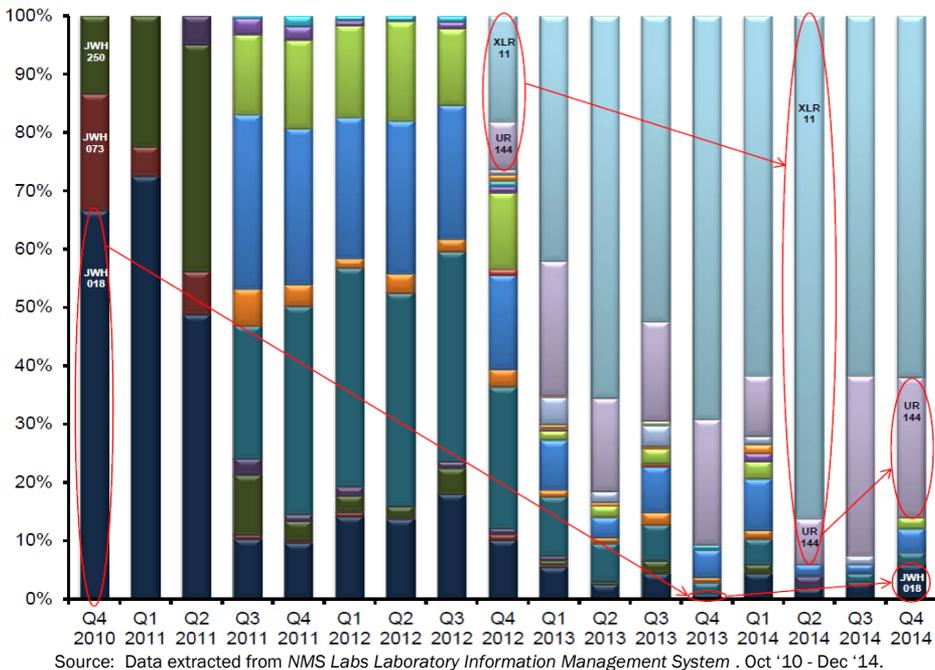
**Abstract:** Synthetic cannabinoid drugs have become an established part of the recreational drug landscape in the United States and internationally. These drugs are manufactured in clandestine laboratories internationally and distributed in the United States in smoking mixtures, use of which produces effects very similar to use of marijuana. The adverse-effect profile of the drugs has not been studied in humans and infrequently in animal models, so much of the information about their toxicity comes from emergency department and treatment reports and forensic case studies. This review considers the discovery and characterization of the endocannabinoid system, approaches to receptor-binding studies of various synthetic cannabinoids from the first wave of naphthoylindoles (e.g., JWH-018) to the emerging adamantoylindole drugs (e.g., AKB-48), and their analogs, to evaluate the potential activity of drugs in this class. Currently employed approaches to assessing functional activity of the drugs using in vitro and in vivo models is also described, and comparisons made to the effects of THC. The physiological effects of activation of the endocannabinoid system in humans are reviewed, and the physiological effects of cannabinoid use are described. Case reports of adverse events including emergency department admissions, mental health admissions, and clinical and forensic case reports are presented in detail and discussed to summarize the current state of knowledge of adverse effects, both clinical and forensic in humans, including effects on driving ability, and tissue injury and death. The greatest weight is accorded to those reports that include toxicological confirmation of use. Finally, we discuss the current status of attempts to schedule and control the distribution of synthetic cannabinoids and the relevance of receptor binding and functional activity in this context. There is growing toxicological and pharmacological evidence of impairment, psychosis, tissue injury, and isolated deaths attributable to this emerging class of drugs.

To request an electronic copy of this article, please visit [www.nmslabs.com/publications](http://www.nmslabs.com/publications).

# Synthetic Cannabinoids

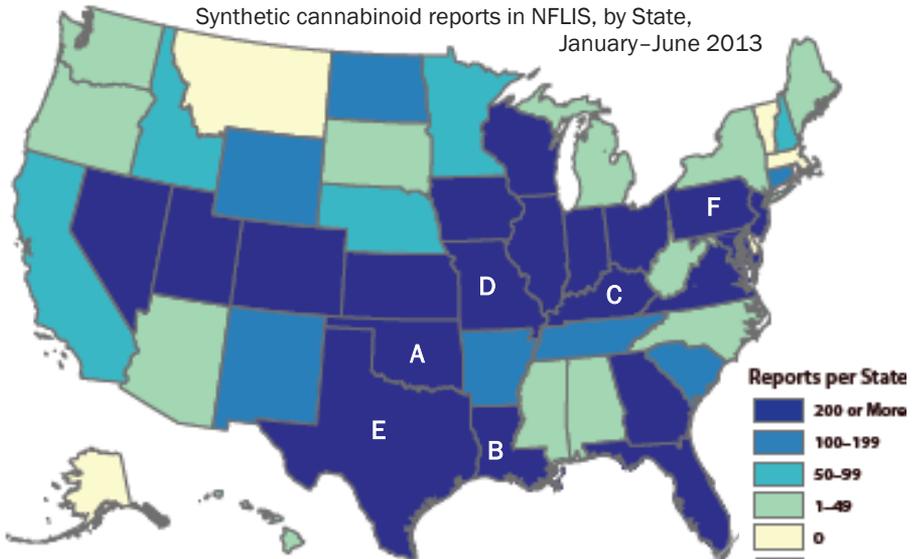
*JWH-018 alone is not enough; Next generation compounds still dominate*

- XLR-11 and UR-144 are chemically different than 1st generation synthetic compounds and are invisible to outdated drug screens.
- XLR-11 & UR-144 account for the majority of confirmed positive findings in synthetic cannabinoids. In 2010, JWH-018 was found in nearly 70% of positive samples.



Simple Selection of Key Synthetic Cannabinoids Tests			CPT Code
9562U	Synthetic Cannabinoid Metabolites Screen—Expanded, urine (Forensic)	XLR-11, UR-144, AM-2201, JWH-018, JWH-019, JWH-073, JWH-250, JWH-019, JWH-122, JWH-081, JWH-2, RCS-4, BB-22, PB-22, F-PB-22, MAM-2201	80304 80302
9560B	Synthetic Cannabinoids Screen, blood (Forensic)	5F-AB-001, 5F-ADBICA, 5F-ADB-PINACA, 5F-APICA, 5F-APINACA (5F-AKB-48), 5F-MN-18, 5F-PB-22, AB-CHMINACA, AB-FUBINACA, AB-PINACA, ADB-FUBINACA, ADBICA, ADB-PINACA, AM-2201, APICA, APINACA (AKB-48), BB-22, FUB-AKB-48, FUBIMINA, FUB-PB-22, JWH-018, JWH-081, JWH-122, JWH-210, MDMB-CHMINACA, MN-18, MN-25, PB-22, THJ-018, THJ-2201, UR-144, XLR-11	80304

## Media Stories: Designer Drugs Are In Your Backyard



Source: U.S. DEA, Office of Diversion Control. *National Forensic Laboratory Information System 2014 Special Report: Synthetic Cannabinoids and Synthetic Cathinones Reported in NFLIS, 2010–2013, June 2014*

**A:** Jan 2015: Oklahoma. **Court records: Driver smoked "Frankenstein" before deadly Oct. 27 wreck.** The driver of a van who collided with a vehicle carrying two school teachers who were fatally wounded, admits to smoking synthetic cannabinoids prior to the crash. *Stillwater News Press* January 17, 2015.

**B:** Jan 2015: Louisiana. **Man Charged with Attacking EMS, ER Nurse After Synthetic Marijuana Use.** A 21 yr old male was taken to the hospital after admitting he had used two kinds of synthetic marijuana. *Red Stick Now Baton Rouge Crime News* January 19, 2015.

**C:** Jan 2015: Kentucky. **Boyle County Man Dead After Smoking Synthetic Marijuana.** A man has died after smoking the synthetic cannabinoid brand called "Serenity". When he was found unconscious in his home, he had a suitcase with 15 lbs. of the drug. *LEX18* January 10, 2015.

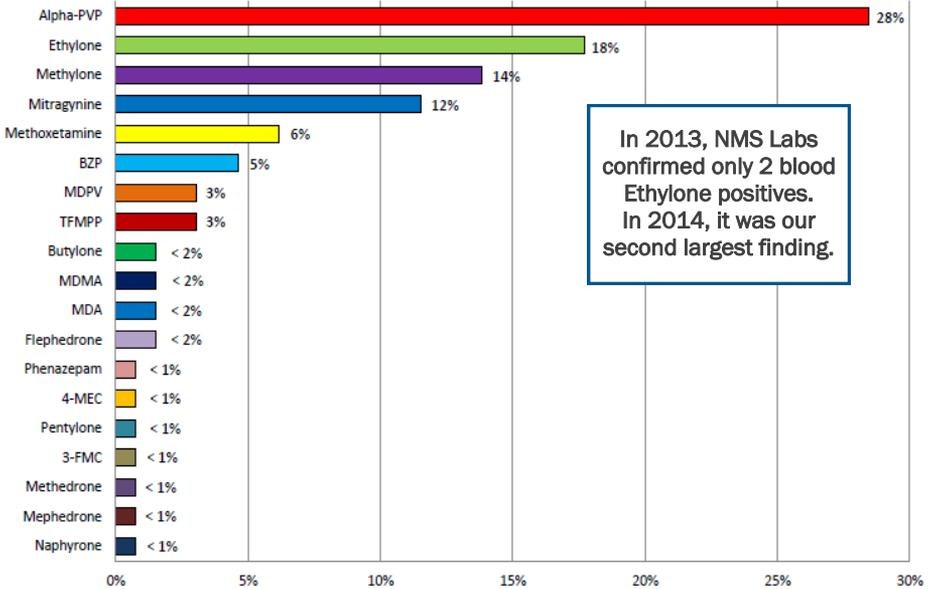
**D:** Jan 2015: Missouri. **Family believes synthetic marijuana led to teen's death.** A 15 yr old male died of cardiac arrest after smoking synthetic marijuana. When EMS services were called, he was sitting on a couch not breathing. *News* January 2, 2015.

**E:** Dec 2014: Texas. **Tokemon: 11-year-old boy sickened by synthetic marijuana.** An 11 yr old boy smoked synthetic cannabinoids with a family friend. *Victoria Advocate* December 20, 2014.

**F:** Nov 2014: Pennsylvania. **Bradford County Man Smoked Synthetic Marijuana With Children.** A 51 yr old man was arrested for smoking synthetic marijuana with a 14 yr old male and 17 yr old female. *PA Homepage* November 25, 2014.

# Bath Salts & More

## 28.3% Positivity Rate—Alpha PVP and Ethylone are the Culprits

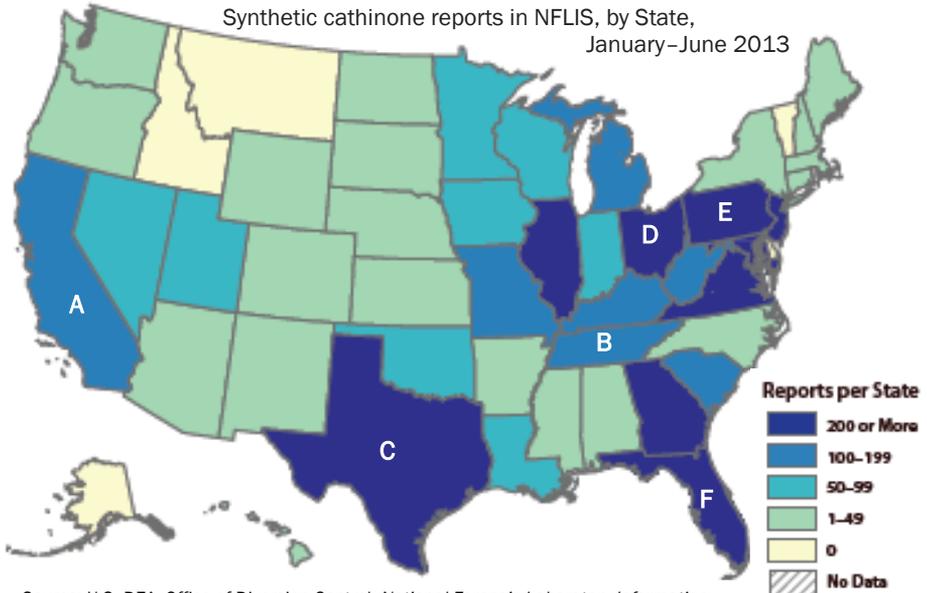


In 2013, NMS Labs confirmed only 2 blood Ethylone positives. In 2014, it was our second largest finding.

Source: Of the 459 blood samples submitted to NMS Labs in 2014, 28.3% samples were positive for 1 or more analytes in the Expanded Bath Salts & Stimulants Panel (8756B). Confirmed positive cases (n=130) included methamphetamine and amphetamine; of the 198 positive analytes, methamphetamine and amphetamine were 30.8% of the positives.

Simple Selection of Key Bath Salts Tests			CPT Code
2626	Bath Salts Panel <i>blood, urine, serum/plasma</i>	MDPV, Mephedrone, Methoxetamine, Methylone, Pentedrone, alpha-PVP	80371
8756	Bath Salts & Stimulants—Expanded (includes confirmation) <i>blood, urine, serum/plasma</i>	Bath salts, cathinones, piperazines, stimulants, designer stimulants	80304
8755	Hallucinogens Screen—Expanded (includes confirmation) <i>blood, urine, serum/plasma</i>	Please refer to our website	80304
0245	Alpha PVP <i>blood, urine, serum/plasma</i>	Alpha PVP	80371
3143	NBOME <i>blood, urine, serum/plasma</i>	25I-NBOMe, 25B-NBOMe, 25H-NBOMe, 25C-NBOMe	80371

## Media Stories: Bath Salts Usage is Growing Across the Nation



Source: U.S. DEA, Office of Diversion Control. *National Forensic Laboratory Information System 2014 Special Report: Synthetic Cannabinoids and Synthetic Cathinones Reported in NFLIS, 2010–2013, June 2014*

**A:** Feb 2015: California. ***Trial begins in Orange County Jail death from bath salts.*** A man, while in custody, died from a fatal dose of bath salts, even though a toxicology report showed no signs of the drugs *Beaumont Enterprise* February 3, 2015.

**B:** Jan 2015: Tennessee. ***Greeneville Police Assist With Investigation Of Gravel Dealer.*** Hollander, Zaz. "Alaska case first federal prosecution involving a methyloone death" *Anchorage Daily News* November 27, 2013.

**C:** Jan 2015: Texas. ***Trio sentenced to prison for role in Frisco teen's overdose death.*** Federal judge sentenced man to five years in prison for distributing the designer drug that killed teen *The Dallas Morning News Leader* January 13, 2015.

**D:** Jan 2015: Ohio. ***Brothers arrested by Ironton police: Accused of selling synthetic stimulant.*** After a four-month investigation into drug trafficking, the Ironton Police Department arrested two brothers accused of selling synthetic stimulants *Ironton Tribune* January 30, 2015.

**E:** Jan 2015: Pennsylvania. ***Pittston Township woman pleads guilty to bath salts distribution.*** Woman pleads guilty to participating in a conspiracy to distribute alpha-pvp *Times Leader* January 16, 2015.

**F:** Dec 2014: Florida. ***Deadly new synthetic drug NBOME found in Sarasota.*** Sheriff's office was first alerted to this new drug last week when teenager was rushed to the hospital *10 News Tampa Bay Sarasota* December 8, 2014.

# Mislabeled Molly & More

If you think it's...	It may actually be...
MOLLY	METHYLONE
LSD	NBOMes

## Have You Seen Molly?



She's popular, the face on many t-shirts, and very dangerous; although her name sounds innocent, she's far from it. You find her in clubs, music, and very likely, right in your backyard.

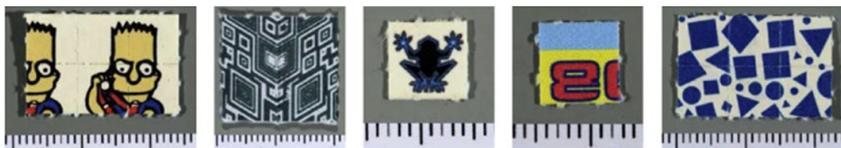
Hospitals are facing a difficult problem whenever someone comes in to be treated for a Molly overdose. The patient may believe they've taken a form of ecstasy, but do they know what they actually swallowed?

Molly is the street name for the synthetic drug MDMA. It's called Molly because of the powder or capsule form that it comes in, as opposed to tabs, and the presumption that the "molecular," or Molly for short, form is more pure.

The problem is that drug users don't know the person who designed their Molly. Experts are often finding **METHYLONE** in the pills, which is a key component in deadly bath salts. Although Methylone seems to be predominate right now, it is not uncommon to find other compounds in "Molly" as well.

Nevertheless, rappers and rock stars continue to sing about the "beauties" of Molly and young people continue to swallow whatever they are being told by their idols.

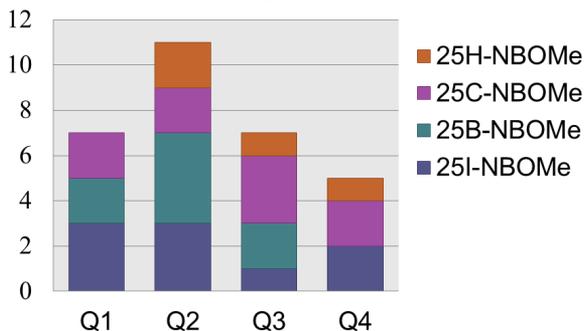
## The NBOMe Series



The NBOMe series of drugs, a group of psychedelic substituted phenethylamines, are being seen with increasing frequency as designer hallucinogens. These compounds are commonly impregnated onto blotter papers or administered in powder and liquid formulations. Members of the NBOMe series have been linked to fatal intoxications, characterized by violent behavior, psychosis, and sympathetic stimulation. Case reports of NBOMe use have included both hospitalizations and death.

Although the DEA federally scheduled 25I-NBOMe, 25B-NBOMe, and 25C-NBOMe in November of 2013, these substances continue to be found in toxicology casework. These compounds are commonly sold as an alternative to LSD or even falsely as LSD, occasionally being marketed as “acid”.

### Distribution of NBOMe Type Compounds Detected in Toxicology Casework



The first NBOMe substance to hit the market was 25I-NBOMe in 2012. Other NBOMes started to hit the scene in 2013. In 2014, NMS Labs reported 22 cases positive for 1 or more NBOMe type NPS (novel psychoactive substance).

Only NMS Labs offers comprehensive tests for the next generation of synthetic cannabinoids & bath salts.

Designer drugs have infiltrated our rural communities and metropolitan areas. These synthetic drugs are often a blind spot for regional labs, law enforcement and medical examiners. The rapid turnover of the compounds found in designer drugs challenges the analytical capabilities of most labs, frustrating attempts at deterrence and detection, while encouraging the growth of the market. Designer drugs may be the key piece of evidence that allows the reliable certification of a death, or explains a subject's behavior in a medical or criminal case. As a result, consider testing for the newest designer drug compounds as standard practice.

A growing volume of data from emergency rooms, law enforcement and medical examiners suggests that the smallest dose of synthetic drugs may result in emergency room visits, fatal collisions, and unintended suicides. Detection may be stymied, as many of these compounds lack toxicological confirmation. That, coupled with the inability of most labs to offer updated and comprehensive testing for synthetic drugs, means that only a fraction of the problems that these new drugs are causing are recognized.

Reliable, timely and current toxicological screens are critical to the effective enforcement of new laws passed by Congress and the states to protect the public from these untested and demonstrably dangerous drugs.

NMS Labs continues to be a thought leader in designer drug toxicology and have documented cases with new compounds previously not seen on the street. NMS Labs is proud to be one of very few accredited labs to have committed the necessary resources, analytical and toxicological expertise to keep up with this divergent and rapidly growing list of drugs. We offer these tests to death investigation, law enforcement and healthcare providers.

# Supporting DEA Control

**From the U.S. Drug Enforcement Agency, November 15, 2013:**

*"Effective today, the United States Drug Enforcement Administration (DEA) made the synthetic phenethylamines 25I-NBOMe, 25C-NBOMe, and 25B-NBOMe Schedule I, illegal drugs under the Controlled Substances Act (CSA) for the next two years..."*

**From the U.S. Drug Enforcement Agency, January 28, 2014:**

*"The Deputy Administrator of the Drug Enforcement Administration (DEA) is issuing this notice of intent to temporarily schedule 10 synthetic cathinones into schedule I pursuant to the temporary scheduling provisions of the Controlled Substances Act (CSA)..."* These substances include alpha PVP.

**From the U.S. Drug Enforcement Agency, February 10, 2014:**

*"The Deputy Administrator of the Drug Enforcement Administration (DEA) is issuing this final order to temporarily schedule four synthetic cannabinoids into schedule I pursuant to the temporary scheduling provisions of the Controlled Substances Act (CSA)..."* The substances are: PB-22, 5F-PB-22, AB-FUBINACA and ADB-PINACA.

## NMS LABS HAS THE SOLUTION

NMS Labs continues to dedicate resources to remain one step ahead of unreliable drug manufacturers and drug dealers. What drug users think they are taking are too often not what they are actually swallowing.

NMS Labs is here to help confirm the presence of the latest generation in designer drugs. We're following the trends, we know that's out there and what to look for. Most importantly, we're answering questions that nobody else can.

# Questions to ask about designer drugs

1. Why are you testing, detection or deterrence?
2. Are you depending on blood or urine positivity rates to guide deterrence test decisions?
3. Are you familiar with the current and popular bath salts and spice compounds?
4. Are you worried that your current synthetic cannabinoid test isn't picking up the latest drugs?
5. Does your synthetic cannabinoid test include XLR-11 and UR-144? The "NACA's" such as AB-FUBINACA?
6. Does your bath salts test include alpha-PVP? Ethylone? Methylone? Alpha PPP? MePPP?
7. Are you aware of an emerging, highly addictive synthetic stimulant referred to as Gravel?

Visit [DesignerDrugTrends.org](http://DesignerDrugTrends.org)

*to find the most current information about:*

Local laws  
National drug scheduling laws  
Drug sightings  
Scientific changes  
Emerging designer drugs  
Testing trends  
And more

Sign-up to receive regularly published reports on emerging trends in this dynamic market.

No matter how designer drugs evolve, we'll be ready.

## Contact Us

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