Designer Drugs – (Spice/K2, Bath Salts, & Beyond - 2013 Update)

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March 1, 2011 DEA “Banned” Five Synthetic Cannabinoids

- synthetic cannabinoids covered under the DEA’s new rule includes the following:
  - JWH-018 *
  - JWH-073 *
  - JWH-200
  - CP-47,497
  - CP-47,497 (C-8 homologue)
Bath Salts

On October 21, 2011, the Drug Enforcement Administration (DEA) “banned” three synthetic cathinones by placing them into Schedule I of the Controlled Substances Act (CSA)

- mephedrone
- 3,4 methylenedioxyxypyrovalerone (MDPV)
- methylone
DEA Actions:

- DEA took action - imminent hazard to the public safety
- imposes criminal sanctions and regulatory controls of Schedule I substances under the CSA
- covers the manufacture, distribution, possession, importation, and exportation
- RAMIFICATIONS?
The Story of Designer Drugs
Designer Drugs:

drugs, which are created (or reformulated, if the drug already existed) to get around existing drug laws (CSA), usually by modifying the molecular structures of existing drugs to varying degrees.
An agonist is a chemical that binds to a receptor and triggers a response – often mimicking the action of a naturally occurring substance.
Why Change the Key?

• prolong the effect of the drug
• increase the potency of the drug
• “select” the desired effect
• make the drug more difficult to detect
• avoid patent infringement
• make an illegal drug “legal”
Spice/K2 and Synthetic Cannabinoids
Preparation of the “incense”:

- botanicals are sprayed with liquid preparations of:
  - HU-210
  - HU-211
  - CP 47,497
  - JWH-018
  - JWH-073
Origins of Synthetic Cannabinoids

- HU-210 & HU-211 - synthesized at Hebrew University, Israel in 1988. HU-210 is an anti-inflammatory; HU-211 as an anesthetic
- CP 47,497 - developed by Pfizer in 1980 as an analgesic
- JWH-018 & JWH-073 - synthesize by a researcher at Clemson (1995) for use in THC receptor research - John W. Huffman
- more than 100 different synthetic cannabinoids have been created
Smoking Cannabinoids

What does CB₁ receptor control?

■ BG: motor control, learning
■ Hippo: memory, spatial navigation
■ CB: cognitive functions - attention, language, emotions
Pharmacological Effects of Synthetic Cannabinoids are Similar to THC

- increase heart rate & blood pressure
- altered state of consciousness
- mild euphoria and relaxation
- perceptual alterations (time distortion)
- intensification of sensory experiences
- pronounced cognitive effects
- impaired short-term memory
- reduction in motor skill acuity
- increase in reaction times
Synthetic Cannabinoids: Physical & Social Effects

- increasing reports of adverse effects
  - ER admissions, assaults, homicides, DUID
- effects similar to THC, BUT . . . .
  - increased anxiety, paranoia, panic
  - increased restlessness & aggressive behavior
- leads to untoward consequences
  - contact with law enforcement
  - loss of life (violence & unexplained)
Current state of drug testing for synthetic cannabinoids
Evolutionary Landscape

- appearing & disappearing
- what’s popular today cycles out to be replaced by new synthetic THC analogs
- labs testing for common compounds a few months ago may not be testing for same chemicals now
- on-site, POC devices cannot keep pace
Lab-Based Drug Testing (2010):

JWH-018
JWH-019
JWH-073
CP 47, 497 (C7)
CP 47,497 (C8)
WIN 48,098
HU-210
HU-211
## Lab-Based Drug Testing (2012):

<table>
<thead>
<tr>
<th>Substance 1</th>
<th>Substance 2</th>
<th>Substance 3</th>
<th>Substance 4</th>
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<tr>
<td>AM-694</td>
<td>JWH-018 Chloropentyl analog</td>
<td>JWH-251</td>
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<td>AM-1220</td>
<td>JWH-018 6-Methoxyindole analog</td>
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<td>JWH-018 1-Methylhexyl homolog</td>
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<td>JWH-073 3-Methylbutyl homolog</td>
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<td>CP47,497 (C7 analog)</td>
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<td>JWH-018</td>
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Acknowledgment:

Dr. Barry Logan
National Medical Services
Willow Grove, PA
Prevalence – 2010

July – December 2010

- JWH-018: 61%
- JWH073: 28%
- JWH250: 11%
Evolutionary Landscape
Evolutionary Landscape

- JWH-018/073 arrived early and have largely come and gone.
- JWH-250 arrived a little later and as also cycling out.
- JWH-081 was part of a second wave that has already completed its cycle.
- JWH-122 was part of the same wave but has persisted in popularity and is part of the current scene.
- AM-2201 was part of the same second wave and has gained in popularity, probably currently the most prevalent.
- JWH-022 and JWH-210 are showing signs of increasing popularity.
Ingenuity of Designer Chemists:

JWH-018

AM-2201
Drug Testing for Synthetic Cannabinoids
Drug Testing – On-Site:

- rapid, instant, POC tests
- testing for JWH-018/JWH-073
- cutoff 50-75 ng/mL
- lab testing - cutoff 0.5 ng/mL
- false negatives
Drug Testing – Laboratory:

- rapidly changing landscape
- constantly updating menus
- lack of standards
- some labs developing screening tests
- not all lab-based testing is equal
Unresolved Issues of Concern:

- what synthetic compounds (or metabolites) are being tested by these laboratories?
- no standardized urine cutoff levels
- no standardized methods (LC/MS/MS)
- tests detect metabolites
- no independent quality control materials
- no proficiency testing
- detection window unknown
Designer Stimulants
(Novelty Powders)
Designer Stimulants:

- bath salts/bath bubbles
- plant foods/plant vitamins
- glass cleaners/pond cleaners
- soft drink additive
- “novelty collectors item”
MDPV:

- Methylenedioxypyrovalerone (MDPV) - a psychoactive drug with stimulant properties which acts as both a norepinephrine-dopamine reuptake inhibitor (NDRI).
- Often snorted - similar to cocaine
- Considered extremely addictive
- Adverse medical/psychiatric ramifications
Methylemethcathinone (Mephedrone)

- designer drug chemically similar to cathinone
- first synthesized in 1929
- amphetamine-like properties
- powerful synthetic stimulant
- adverse medical/psychiatric ramifications
Bath Salts

33% Positivity Rate—DMAA is the Culprit

- DMAA: 31.1%
- Methylone: 11.1%
- Phenazepam: 8.9%
- MDPV: 6.7%
- Pencyline: 6.7%
- mCPP: 4.4%
- Butylone: 4.4%
- Mitragynine: 4.4%
- 4-MEC: 4.4%
DMAA

Methylhexanamine
(1,3-dimethylamylamine)
July, 2013 - Bath Salt Data

38% Positivity Rate — Alpha-PVP, Methyline and DMAA are the biggest culprits*

- Alpha PVP: 22.2%
- Methyline: 18.5%
- DMAA: 18.5%
- 4-MEC: 7.4%
- Mitragynine: 7.4%
- 7-Hydroxymitragynine: 7.4%
- MDMA: 7.4%
- 2C-B: 3.7%
- Ethylene: 3.7%
- MDPV: 3.7%
Growth of Designer Drugs

What’s different today then in the 1970’s when the drug Ecstasy (MDMA) was popularized?

What has changed to fuel the rapid development and distribution of designer drugs?
Internet has OVER 3 billion users
What does the Internet offer?

- improved accessibility
- increased affordability
- enhanced anonymity
Unfortunate Truisms:

- Legal controls that prohibit designer drugs will always lag behind their production.
- Drug detection methods for the identification of designer drugs may also not be available when these compounds become popular.
Legal Status of Control Strategies
Federal & State Law:

- Scheduled Drugs
- Federal Analog Statutes

- substantially chemically similar
- equivalent pharmacological activity
- intended for human consumption
Federal Controls:

Scheduling as of April 2013

- AKB48
- AM694
- AM2201
- CP47,497 (C7)
- CP47,497 (C8)
- JWH-018
- JWH-019
- JWH-073
- JWH-081
- JWH-122
- JWH-200
- JWH-203
- JWH-250
- JWH-398
- RCS-4
- RCS-8
- UR-144
- XLR-11

Plus any members of seven named classes
New Laws, New Controls:

Federal Register
Vol. 78, No. 71 / Friday, April 12, 2013 / Proposed Rules

21858

(9) 1-pentyl-1H-indol-3-yl)(2,2,3,3-tetramethylcyclopropyl)methanone, its optical, positional, and geometric isomers, salts and salts of isomers—7144 (Other names: UR-144, 1-pentyl-3-(2,2,3,3-tetramethylcyclopropyl)indole)

(10) 1-(5-fluoro-pentyl)-1H-indol-3-yl][2,2,3,3-tetramethylcyclopropyl)methanone, its optical, positional, and geometric isomers, salts and salts of isomers—7011 (Other names: 5-fluoro-UR-144, 5-F-UR-144, XLR11, 1-(5-fluoro-pentyl)-3-(2,2,3,3-tetramethylcyclopropyl)indole)

(11) N-(1-adamantyl)-1-pentyl-1H-indazole-3-carboxamide, its optical, positional, and geometric isomers, salts and salts of isomers—7048 (Other names: APINACA, AKB48)
Two Web Sites You Need to Know
Emerging Drug Spotlight, Synthetic Cannabinoid XLR-11

US Federal Actions

On July 9, 2012, the federal Synthetic Drug Abuse Prevention Act of 2012 was signed into law. Visit the S. 995 Synthetic Drug Act or continue to see the work being done by the National Institute on Drug Abuse.

Learn More

US State-by-State

Designer Drug Legislative Tracking

At least 43 states and Puerto Rico have legislatively banned synthetic cannabinoids. Information on state statutes and specific drug schedules is available by clicking on the map above. Additional information on classification of these substances can be found on the NICD Synthetic Cannabis & Cathinones Classes page.

Drug Schedule Search

This tool allows you to search for drug in the published schedules of all 50 states!

National Quick-GLance

New Action: NC T2, NC T3, NY A 6517, NY A 6608

Excluded: IL H 503, MD H 189, MD H 412, MD H 419, MD H 831, MD H 920, MD H 924, MD H 926, VA H 1145, VA A 1568

On the left hand column of this page we have launched the revolutionary new "Drug Schedule Search". This is the first comprehensive go state search of drug schedules and regulations in a fast and easily readable format.
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