

# NAMSDL



**National Alliance for Model State Drug Laws**

## **AN INTRODUCTION TO SYNTHETIC DRUGS**

This project was supported by Cooperative Agreement No. 2012-DC-BX-K002 awarded by the Bureau of Justice Assistance. The Bureau of Justice Assistance is a component of the Office of Justice Programs, which also includes the Bureau of Justice Statistics, the National Institute of Justice, the office of Juvenile Justice and Delinquency Prevention, the office for Victims of Crime, the Community Capacity Development Office, and the Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking. Points of view or opinions in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.

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## **How Controlled Substances Are Scheduled**

In general, there are five schedules of controlled substances (some states have six). Schedule V controlled substances are those drugs that 1) have a low potential for abuse relative to other drugs in Schedule IV, 2) the drug has a currently accepted medical use in treatment in the United States, and 3) abuse of the drug may lead to limited physical or psychological dependence relative to the drugs in Schedule IV.<sup>1</sup>

On the opposite end of the spectrum are Schedule I drugs. Schedule I drugs include those substances that 1) have a high potential for abuse, 2) currently have no accepted medical use in the United States, and 3) there is a lack of safety for use of the drug under medical supervision.<sup>2</sup> Examples of such drugs include heroin, marijuana, and LSD. Most states have included synthetic substances, including synthetic cannabinoids and what are known as cathinone derivatives or bath salts, as Schedule I substances.

## **History of Synthetic Substances**

Synthetic cannabinoids – often referred to as Spice or K2 – were originally created as research chemicals 40 years ago to test their use as pharmaceutical agents, typically for the treatment of pain. The idea was to separate the unwanted psychoactive effects from the treatment aspects of THC (the active ingredient in marijuana), but such a separation proved impossible.<sup>3</sup> Many of the currently abused synthetic cannabinoids stem from this and other legitimate research.<sup>4</sup> For example, JWH-018 and JWH-073 were developed by researchers at Clemson University in the 1990's for use in scientific research while HU-210 was developed in the 1980's at Hebrew University in Israel for experimental purposes.<sup>5</sup>

Synthetic cannabinoids were seen in Europe as early as 2004, although they took some time to gain in popularity.<sup>6</sup> They have a recent history of illicit use in the United States, being first detected in DEA forensic labs in 2008. Calls to Poison Control centers nationwide have increased dramatically in the past few years with calls related to synthetic cannabinoids increasing from 2,906 in 2010 to 6,959 in 2011 and calls related to cathinone derivatives (bath

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<sup>1</sup> 21 USCA § 812

<sup>2</sup> 21 USCA § 812

<sup>3</sup> "Consideration of the major cannabinoid agonists." Nutt, David, FMed Sci. Advisory Council on the Misuse of Drugs. London UK

<sup>4</sup> Legitimate research is ongoing (the Drug Enforcement Administration [DEA] has approved 41 research registrations for synthetic designer drugs for legitimate, scientific research purposes).

<sup>5</sup> "An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives." National Alliance for Drug Endangered Children. Webinar. William Benson, Trey King, Dr. Sullivan Smith, and Tennessee Attorney General Robert Cooper, presenters. Dec. 14, 2011.

<sup>6</sup> Psychonaut Web Mapping Research Group (2009). Spice report. Institute of Psychiatry, King's College London: London UK

salts) increasing from 304 in 2010 to 6,138 in 2011. There were between 11,000 – 12,000 emergency room admissions related to synthetic drugs in 2011.<sup>7</sup>

Methylone, a cathinone derivative, was created in 1996 and originally patented by Jacob Peyton and Alexander Shulgin as an antidepressant.<sup>8</sup> It began appearing in the Netherlands in late 2004 under the trade name “Explosion.”<sup>9</sup> MDPV (3,4-methylenedioxypropylvalerone) was created and patented in 1969 by Boehringer Ingelheim for use in the treatment of chronic fatigue.<sup>10</sup> It didn’t appear as a recreational drug until approximately 2005 in Europe, followed by the United States in 2008.<sup>11</sup> The synthesis of mephedrone was first described by Saem de Burnaga Sanchez in 1929; however, it did not start appearing as a recreational drug until the late 2000’s.<sup>12</sup> Other cathinone derivatives and synthetic substances also have their genesis in legitimate research channels.

### **Where Do Synthetics Come From and How Are They Made?**

The chemicals used to create synthetic drugs are typically shipped into the United States from overseas – generally east and south Asian countries – where these chemicals are not regulated. Law enforcement has identified four main countries where synthetic substances are synthesized – China, India, Korea, and Pakistan.<sup>13</sup> They are easy to obtain via the internet, and are typically shipped directly to the distributor or ordered by distributors or users via the internet.<sup>14</sup>

In the case of synthetic cannabinoids, the substance is shipped to the distributor in powder form. It is then mixed with acetone, typically 1 gram of powder to 2 ounces of acetone, which liquefies the powder. The mixture is then placed in a spray bottle and sprayed onto a dried plant material like oregano, parsley or damiana (a small shrub) or poured directly onto the plant material. It is then placed into a glass dish, coated with the mixture, and continuously flipped to recoat the plant material. It is then allowed to dry and is packaged.<sup>15</sup> Distributors will sometimes use horse troughs or cement mixers in which to coat the plant material before packaging.<sup>16</sup>

Cathinone derivatives are related to the khat plant and are generally manufactured and imported from Europe and Asia as capsules, powders, or tablets and are typically snorted, injected, or

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<sup>7</sup> “Federal Perspectives on Bath Salts and Other Synthetics.” National Alliance for Drug Endangered Children. Webinar. Benjamin Tucker, Richard Baum, Robert Bell, Deborah Spence, and Dr. Matthew Scheider, presenters. April 25, 2012.

<sup>8</sup> See, [http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&II=7&ND=3&adjacent=true&locale=en\\_EP&FT=D&date=19961212&CC=WO&NR=9639133A1&KC=A1](http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&II=7&ND=3&adjacent=true&locale=en_EP&FT=D&date=19961212&CC=WO&NR=9639133A1&KC=A1)

<sup>9</sup> [http://www.erowid.org/chemicals/methylone/methylone\\_info1.shtml](http://www.erowid.org/chemicals/methylone/methylone_info1.shtml)

<sup>10</sup> <http://www.hdap.org/mdpv.html>

<sup>11</sup> <http://www.hdap.org/mdpv.html>

<sup>12</sup> “Europol–EMCDDA Joint Report on a new psychoactive substance: 4-methylmethcathinone (mephedrone).” P. 17. European Monitoring Centre for Drugs and Drug Addiction. 27 May 2010.

<sup>13</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>14</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>15</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>16</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

swallowed. Cathinone derivatives can also be made in garages, trailers, and other residential areas. For example, to create a batch of mephedrone, one only needs, among other things, hardware store paint solvents, sulfuric drain opener, a car battery charger, lead sheet metal, and a food preservative called sodium metabisulfite.<sup>17</sup> Like with synthetic cannabinoids, cathinone derivatives are shipped to distributors in powder form typically, and the powder is then placed into capsules and packaged for sale.<sup>18</sup>

Most retailers sell these products in small doses in foil packets. Synthetic cannabinoids are typically leafy, while cathinone derivatives and other synthetics take many forms – pill, capsule, crystal, powder, tablet, and even liquid.

### **The Problem of Synthetic Drugs**

Synthetic drugs are cheap, easy to make, and return a high profit for manufacturers and distributors. One of the major issues with synthetic drugs is the ease with which they can be purchased. Synthetic cannabinoids, cathinone derivatives, and other synthetic substances are sold in convenience stores, gas stations, “head” shops, discount beer and tobacco shops, and on the internet. Typically, these substances are sold as “herbal incense,” “bath salts,” “plant food,” “jewelry cleaner,” and are labeled “not for human consumption.” COPS – Community Oriented Policing Services – recommends that people with an interest in keeping synthetic substances off the shelves of local stores develop partnerships with key stakeholders who can use leverage against these sellers to keep the products from being sold.<sup>19</sup> Suggested were contacting parents, schools, youth directly, the media, hospitals, and the retailers themselves, to use pressure to keep them from selling these substances and affect their profit-margin to make selling synthetic drugs unprofitable for them.<sup>20</sup>

These products are targeted at teens and young adults.<sup>21</sup> Some of the synthetic cannabinoids are packaged under brands like “Scooby Snax” and include a picture of Scooby Doo on the front of the packaging. Others include “Tutti frutti” which includes the same yellow packaging as the bubble gum and “Snoop” which includes a caricature of the rap artist Snoop Dogg on the label. The packages include bright colors to attract children. In the case of liquid cathinones, some of the packages resemble popular energy drink bottles and may be purchased unknowingly by children and adults looking for a legitimate energy boost.<sup>22</sup>

Distributors label these substances “not for human consumption” in an attempt to evade prosecution under controlled substance analogue statutes which, in most cases, require that a substance, in order to be considered an analogue of a controlled substance, must be for human

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<sup>17</sup> <http://www.vice.com/read/hamilton-s-pharmacopeia-455-v17n6>

<sup>18</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>19</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

<sup>20</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

<sup>21</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>22</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

consumption.<sup>23</sup> Therefore, the difficulty becomes prosecuting distributors, sellers, vendors, manufacturers, and others for crimes related to synthetic drugs for substances which are not specifically listed in the state or federal controlled substances schedules. Some states have attempted to address this issue by prosecuting distributors and vendors under their state consumer protection statutes for the mislabeling of the products. Some states have called upon their state Department of Agriculture to have the substances removed from the shelves on the basis that the substance is labeled “plant food” but has not been registered with the state Department of Agriculture as a fertilizer as required by law.<sup>24</sup> Other states have addressed the issue in legislation, modifying their controlled substance analogue statutes to remove the provision that the substance be intended for human consumption.<sup>25</sup>

Additionally, the effects of these drugs are wide-ranging and potentially fatal. Emergency room physicians have reported that they have seen patients with heart attacks, kidney failure, extreme aggression, hallucinations, paranoia, delusions, anxiety, high body temperatures (temperatures of 103 or 104 are not uncommon and temperatures of up to 108 have been reported in Europe), extremely high blood pressure and increased heart rate, organ failure, seizures, psychosis, and many other side effects, including death.<sup>26</sup> Because of the wide ranging symptoms, treatment of users who present to the emergency room often involves supportive treatment, including intravenous fluids, active cooling of the body, and blood pressure control methods as well as sedation. Dr. Sullivan Smith has said that sedation is the best treatment you can use for someone who is high on a synthetic substance as it will lower the blood pressure, heart rate, and body temperature and help prevent seizures in the patient, though doses of up to double or triple the normal sedation dose are sometimes required.<sup>27</sup>

One of the greatest concerns is that there is no consistency in purity or potency of the drugs, and variations in the contents of identical retail packages have been found. Additionally, there is no consistency in how the drugs are mixed or in how dosages are applied to the smokeable plant material.<sup>28</sup> This can be dangerous as it can lead to “hot spots” with some packages having far more potency than others. A man in South Carolina died of an overdose after smoking a synthetic cannabinoid that it was later discovered actually contained approximately five different synthetic cannabinoid compounds. His body temperature rose dramatically which led to organ failure and, ultimately, his death.<sup>29</sup>

Further, cathinone derivatives have been found to contain other drugs like Lidocaine, an anesthetic used to numb patients during dental procedures or when getting stitches. Lidocaine is toxic in humans at above 4.5mg per kilogram. A 1g package of cathinone derivatives was found to contain 730mg of Lidocaine in addition to methylone. Lidocaine toxicity can lead to seizures,

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<sup>23</sup> See, 21 USCA § 802(32).

<sup>24</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>25</sup> See, for example, Tennessee House Bill 3175, signed by the Governor on May 1, 2012, effective May 15, 2012.

<sup>26</sup> “Federal Perspectives on Bath Salts and Other Synthetics.” and “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>27</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>28</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

<sup>29</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

hallucinations, vomiting, paralysis, heart arrhythmia, and death.<sup>30</sup> Additionally, some of the synthetic cannabinoids are very similar structurally to known carcinogens.<sup>31</sup>

Another key issue is that of the ever-changing landscape of synthetic drugs. No sooner do legislators nationwide pass legislation banning specific substances than chemists change the chemical composition by one or two molecules creating a new “legal” substance that has the same or similar effect of the now outlawed substance. For example, if you add one oxygen molecule to the molecular structure of MDMA (Ecstasy) it becomes methylone.<sup>32</sup> If you add a carbon molecule to methylone, it then becomes butylone.<sup>33</sup> According to Dr. Smith, all of the cathinone derivatives are very similar structurally while the synthetic cannabinoids are very different from one another structurally which makes them more difficult to control.<sup>34</sup>

When NAMSDL began tracking synthetic drugs in 2011, we were focused on five synthetic cannabinoids (CP 47,497, cannabicyclohexanol, JWH-018, JWH-073, and JWH-200) and six cathinone derivatives (mephedrone, methedrone, 4-fluoromethcathinone, 3-fluoromethcathinone, methylone, and MDPV). Currently, NAMSDL is tracking over 120 synthetic substances and new substances frequently appear which we are not yet tracking. In order to combat the rising tide of synthetics, numerous states have adopted versions of the generic language first proposed by the DEA and the Advisory Council on the Misuse of Drugs (ACMD), a panel of experts tasked with advising the British government on the regulation and control of substances. This language will be discussed in more detail below.

### **Categories of Synthetic Substances**

According to the DEA, there are seven distinct classes of synthetic substances: cannabinoids, phenethylamines, phencyclidines, tryptamines, piperazines, N-ring systems, and ecgonine derivatives.<sup>35</sup>

Cannabinoids are synthetic versions of marijuana. They are classified as depressants/hallucinogens and are further broken down into various categories which will be discussed below. Phenethylamines are classified as either stimulants, hallucinogens, or both, and include the cathinone derivatives as well as amphetamines, methamphetamine, mescaline, and MDMA (Ecstasy). Phencyclidines are stimulants/hallucinogens and are derivatives of PCP. Tryptamines include psychedelic substances such as 5-MeO-DALT, 4-HO-DIPT, and 5-MeO-DIPT and are classified as hallucinogens primarily. Piperazines include BZP (1-benzylpiperazine) and TFMP and are also classified as stimulants/hallucinogens while N-ring system drugs are primarily stimulants. Finally, ecgonine derivatives include cocaine and cocaine-like drugs and are primarily stimulants.

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<sup>30</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>31</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>32</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>33</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

<sup>34</sup> “An Overview of Bath Salts and Other Synthetic Drugs from Law Enforcement and Medical Perspectives.”

<sup>35</sup> “Federal Perspectives on Bath Salts and Other Synthetics.”

As mentioned above, cannabinoids are broken down into several other categories of substances. At this time, we are aware of nine distinct categories of cannabinoids. They are: naphthoylindoles, naphthylmethylindoles, naphthoylpyrroles, naphthylmethylindenes, phenylacetylindoles, cyclohexyphenols, benzoylindoles, adamantoylindoles, and cyclopropanols.

The naphthoylindole group includes, but is not limited to, the following compounds: JWH-015, JWH-018, JWH-019, JWH-073, JWH-081, JWH-122, JWH-200, JWH-210, JWH-398, AM-2201, WIN 55-212, AM-2201 (C1 analog), AM-1220.

The naphthylmethylindole group includes (but is not limited to) JWH-175, JWH-184, JWH-185, JWH-192, JWH-194, JWH-195, JWH-196, JWH-197, and JWH-199.

The naphthoylpyrrole group includes, among others, JWH-307, JWH-370, and JWH-176.

The naphthylmethylindenes include, but are not limited to, JWH-171, JWH-172, JWH-173, and JWH-176.

Phenylacetylindoles include SR-18, RCS-8, JWH-203, JWH-250, and JWH-251 among others.

Cyclohexyphenols include, but are not limited to, CP 47,497 and its homologues (including cannabicyclohexanol) and CP 55,940.

The benzoylindoles include, but are not limited to, AM-694, Pravadoline (WIN 48,098), RCS-4, AM-630, AM-1241, AM-2233, and the adamantoylindole group includes AM-1248 among others.

Not much is known at this time about the cyclopropanols; however, previously unknown substances fitting into that class have been found in South Carolina and include UR-144.

The lists of substances above are not intended to be comprehensive, but only indicative of the types of substances that are found in the particular class of cannabinoid.

### **Generic Language**

The DEA and the ACMD have suggested the use of generic language in order to prevent the necessity of having to schedule each synthetic substance specifically. It allows legislators to criminalize specific categories of substances so that if a manufacturer changes the chemical composition of a substance currently scheduled, the resulting substance will still be classified as illegal under the generic language.

The DEA language as it relates to synthetic cannabinoids is as follows:

The term Cannabimimetic Agents means, collectively, the chemicals that meet the criteria of any one or more of paragraphs (a) through (e). Any substance within the structural classes identified below that is a cannabinoid receptor type 1 (CB1 receptor) agonist as demonstrated by binding studies and functional assays:

- (a) 2-(3-hydroxycyclohexyl)phenol with substitution at the 5-position of the phenolic ring by alkyl or alkenyl, whether or not substituted on the cyclohexyl ring to any extent.
- (b) 3-(1-naphthoyl)indole or 3-(1-naphthyl)indole by substitution at the nitrogen atom of the indole ring, whether or not further substituted on the indole ring to any extent, whether or not substituted on the naphthoyl or naphthyl ring to any extent.
- (c) 3-(1-naphthoyl)pyrrole by substitution at the nitrogen atom of the pyrrole ring, whether or not further substituted in the indole ring to any extent, whether or not substituted on the naphthoyl ring to any extent.
- (d) 1-(1-naphthylmethyl)indene by substitution of the 3-position of the indene ring, whether or not further substituted in the indene ring to any extent, whether or not substituted on the naphthyl ring to any extent.
- (e) 3-phenylacetylindole or 3-benzoylindole by substitution at the nitrogen atom of the indole ring, whether or not further substituted in the indole ring to any extent, whether or not substituted on the phenyl ring to any extent.

The ACMD language is similar, but includes the specific category names in the language.

Groups 1 and 2 (Naphthoylindoles and naphthylmethylindoles) (N = 74 and 9 respectively)

“Any compound structurally derived from 3-(1-naphthoyl)indole or 1H-indol-3-yl-(1-naphthyl)methane by substitution at the nitrogen atom of the indole ring by alkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl or 2-(4-morpholinyl)ethyl whether or not further substituted in the indole ring to any extent, whether or not substituted in the naphthyl ring to any extent.”

Group 3 (Naphthoylpyrroles) (N = 32)

“Any compound structurally derived from 3-(1-naphthoyl)pyrrole by substitution at the nitrogen atom of the pyrrole ring by alkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl or 2-(4-morpholinyl)ethyl, whether or not further substituted in the pyrrole ring to any extent, whether or not substituted in the naphthyl ring to any extent..”

Group 4 (Naphthylmethylindenenes) (N = 3)

“Any compound structurally derived from 1-(1-naphthylmethyl)indene by substitution at the 3-position of the indene ring by alkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl or 2-(4-morpholinyl)ethyl whether or not further substituted in the indene ring to any extent, whether or not substituted in the naphthyl ring to any extent.”



Group 5 (Phenylacetylindoles) (N = 28)

“Any compound structurally derived from 3-phenylacetylindole by substitution at the nitrogen atom of the indole ring with alkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl or 2-(4-morpholinyl)ethyl, whether or not further substituted in the indole ring to any extent, whether or not substituted in the phenyl ring to any extent.”

Group 6 (Cyclohexylphenols) (N = 16)

“Any compound structurally derived from 2-(3-hydroxycyclohexyl)phenol by substitution at the 5-position of the phenolic ring by alkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl or 2-(4-morpholinyl)ethyl, whether or not substituted in the cyclohexyl ring to any extent .”

Since this language was introduced, other categories of synthetic cannabinoids have appeared; namely adamantoylindoles, benzoylindoles, and cyclopropanols. Adamantoylindoles and benzoylindoles have been included in the generic language passed by several states while, as mentioned above, cyclopropanols are so new that, at this time, no state has included that language.

Since 2011, states have adapted the generic language to suit their needs. In many cases, states have included examples of the types of substances included in each category in the language of the legislation or regulation. For example, Minnesota passed legislation on April 27, 2012 (effective August 1, 2012) which included the following language:

(3) synthetic cannabinoids, including the following substances:

(i) Naphthoylindoles, which are any compounds containing a 3-(1-naphthoyl)indole structure with substitution at the nitrogen atom of the indole ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group, whether or not further substituted in the indole ring to any extent and whether or not substituted in the naphthyl ring to any extent. Examples of naphthoylindoles include, but are not limited to:

- (A) 1-Pentyl-3-(1-naphthoyl)indole (JWH-018 and AM-678);
- (B) 1-Butyl-3-(1-naphthoyl)indole (JWH-073);
- (C) 1-Pentyl-3-(4-methoxy-1-naphthoyl)indole (JWH-081);
- (D) 1-[2-(4-morpholinyl)ethyl]-3-(1-naphthoyl)indole (JWH-200);
- (E) 1-Propyl-2-methyl-3-(1-naphthoyl)indole (JWH-015);
- (F) 1-Hexyl-3-(1-naphthoyl)indole (JWH-019);
- (G) 1-Pentyl-3-(4-methyl-1-naphthoyl)indole (JWH-122);
- (H) 1-Pentyl-3-(4-ethyl-1-naphthoyl)indole (JWH-210);
- (I) 1-Pentyl-3-(4-chloro-1-naphthoyl)indole (JWH-398);
- (J) 1-(5-fluoropentyl)-3-(1-naphthoyl)indole (AM-2201).

(ii) Naphthylmethylindoles, which are any compounds containing a 1H-indol-3-yl-(1-naphthyl)methane structure with substitution at the nitrogen atom of the indole ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group, whether or not further substituted in

the indole ring to any extent and whether or not substituted in the naphthyl ring to any extent. Examples of naphthylmethylindoles include, but are not limited to:

- (A) 1-Pentyl-1H-indol-3-yl-(1-naphthyl)methane (JWH-175);
- (B) 1-Pentyl-1H-indol-3-yl-(4-methyl-1-naphthyl)methane (JWH-184).

(iii) Naphthoylpyrroles, which are any compounds containing a 3-(1-naphthoyl)pyrrole structure with substitution at the nitrogen atom of the pyrrole ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group whether or not further substituted in the pyrrole ring to any extent, whether or not substituted in the naphthyl ring to any extent. Examples of naphthoylpyrroles include, but are not limited to, (5-(2-fluorophenyl)-1-pentylpyrrol-3-yl)-naphthalen-1-ylmethanone (JWH-307).

(iv) Naphthylmethylindenes, which are any compounds containing a naphthylideneindene structure with substitution at the 3-position of the indene ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group whether or not further substituted in the indene ring to any extent, whether or not substituted in the naphthyl ring to any extent. Examples of naphthylmethylindenes include, but are not limited to, E-1-[1-(1-naphthalenylmethylene)-1H-inden-3-yl]pentane (JWH-176).

(v) Phenylacetylindoles, which are any compounds containing a 3-phenylacetylindole structure with substitution at the nitrogen atom of the indole ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group whether or not further substituted in the indole ring to any extent, whether or not substituted in the phenyl ring to any extent. Examples of phenylacetylindoles include, but are not limited to:

- (A) 1-(2-cyclohexylethyl)-3-(2-methoxyphenylacetyl)indole (RCS-8);
- (B) 1-pentyl-3-(2-methoxyphenylacetyl)indole (JWH-250);
- (C) 1-pentyl-3-(2-methylphenylacetyl)indole (JWH-251);
- (D) 1-pentyl-3-(2-chlorophenylacetyl)indole (JWH-203).

(vi) Cyclohexylphenols, which are compounds containing a 2-(3-hydroxycyclohexyl)phenol structure with substitution at the 5-position of the phenolic ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group whether or not substituted in the cyclohexyl ring to any extent. Examples of cyclohexylphenols include, but are not limited to:

- (A) 5-(1,1-dimethylheptyl)-2-[(1R,3S)-3-hydroxycyclohexyl]-phenol (CP 47,497);
- (B) 5-(1,1-dimethyloctyl)-2-[(1R,3S)-3-hydroxycyclohexyl]-phenol (Cannabicyclohexanol or CP 47,497 C8 homologue);
- (C) 5-(1,1-dimethylheptyl)-2-[(1R,2R)-5-hydroxy-2-(3-hydroxypropyl)cyclohexyl]-phenol (CP 55,940).

(vii) Benzoylindoles, which are any compounds containing a 3-(benzoyl)indole structure with substitution at the nitrogen atom of the indole ring by an alkyl, haloalkyl, alkenyl, cycloalkylmethyl, cycloalkylethyl, 1-(N-methyl-2-piperidinyl)methyl or 2-(4-morpholinyl)ethyl group whether or not further substituted in the indole ring to any extent and whether or not substituted in the phenyl ring to any extent. Examples of benzoylindoles include, but are not limited to:

- (A) 1-Pentyl-3-(4-methoxybenzoyl)indole (RCS-4);
- (B) 1-(5-fluoropentyl)-3-(2-iodobenzoyl)indole (AM-694);
- (C) (4-methoxyphenyl-[2-methyl-1-(2-(4-morpholinyl)ethyl)indol-3-yl]methanone (WIN 48,098 or Pravadoline).

However, by contrast, Georgia merely listed the categories of synthetic cannabinoids without the accompanying chemical composition language or examples of substances.

The ACMD also suggested generic language for use with cathinone derivatives. Unlike the synthetic cannabinoid generic language, the language for cathinone derivatives has remained relatively consistent, as follows:

Any compound (not being bupropion ... ) structurally derived from 2-amino-1-phenyl-1-propanone by modification in any of the following ways, that is to say,

- (i) by substitution in the phenyl ring to any extent with alkyl, alkoxy, alkylendioxy, haloalkyl or halide substituents, whether or not further substituted in the phenyl ring by one or more other univalent substituents;
- (ii) by substitution at the 3-position with an alkyl substituent;
- (iii) by substitution at the nitrogen atom with alkyl or dialkyl groups, or by inclusion of the nitrogen atom in a cyclic structure.

At this time, there is no equivalent language for the other categories of synthetic substances.

### **What Has Been Scheduled Where and Pending Legislation**

At this time, forty-six (46) states and the federal government have scheduled one or more synthetic cannabinoids by statute or regulation and twenty-nine (29) states have some form of the generic language. Of the four states that have not scheduled one or more of the synthetic cannabinoids, Louisiana and Nebraska include the generic language. The only two states that have not yet scheduled any of the synthetic cannabinoids or the generic language are Maryland and Rhode Island. Maryland had four bills pending this legislative session, but was unable to get legislation passed before the session adjourned. There is still a regulation pending in Maryland that would schedule certain cannabinoids. The District of Columbia also has legislation pending. Rhode Island, however, does not have anything pending at this time.

Of those states that have scheduled synthetic cannabinoids or the generic language, thirty-six (36) plus the federal government have classified them as Schedule I substances. Alaska schedules them as Schedule IIIA substances, while Arkansas and North Carolina have included

them in Schedule VI. Maine has added them to their Schedule Z, which is the equivalent of a Schedule IV or V drug in other states. New York banned the sale or distribution of certain synthetic cannabinoids by emergency rule, but has not yet scheduled them. New York currently has ten bills pending before its legislature to schedule one or more of the substances. California, Tennessee, Utah, and Virginia have separate statutes and penalty provisions for synthetic cannabinoids, so those substances aren't included in their scheduled controlled substances statutes. Finally, Colorado simply includes a definition for "synthetic cannabinoids" in its controlled substances act.

Forty-nine states (49) and the federal government have scheduled one or more of the cathinone derivatives, while twenty (20) states have some form of the generic language. The sole state that has not scheduled or otherwise provided for cathinone derivatives is Rhode Island. Rhode Island and the District of Columbia have bills pending this legislative session.

The majority of states (forty) have scheduled cathinone derivatives as Schedule I substances. Alaska added them to their Schedule IIA substances, and Arizona added them to Schedule IV. California and Tennessee have separate statutes and penalty provisions as with the synthetic cannabinoids. New York also banned the sale or distribution of certain cathinone derivatives, but they have also not been scheduled as controlled substances. Colorado and Maine include cathinone derivatives among their definitions in their respective controlled substances acts, but have not specifically added them to their schedules of controlled substances. Utah also has a separate statute addressing cathinone derivatives with the exception of BZP which it has included in Schedule I.

Finally, thirty-nine (39) states have scheduled one or more "other" synthetics, those drugs that do not fall into the category of cannabinoid or cathinone derivative. Of the states that do not currently schedule the other synthetics, only West Virginia had legislation pending that would have scheduled one or more of those substances. However, the legislative session adjourned before it was passed. The District of Columbia and Congress both have bills pending.

The overwhelming majority of states that have scheduled other synthetics have included them in Schedule I. Colorado included 5-MeO-DiPT in Schedule I, but only included MPHP in its controlled substances act definitions. Maine included its other synthetics in Schedule X, the equivalent of Schedule II drugs. Arizona includes other synthetics in its definitions of "dangerous drugs" but they are not otherwise scheduled.

For a more comprehensive look at what has been scheduled where and which states have legislation pending, please see the attached documents.