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Synthetic Drugs

Synthetic drugs, unlike drugs that naturally occur, are chemically produced in a laboratory. The purpose of such drugs is to slightly modify the molecular chemical structure in order to circumvent existing drug laws.¹ In states lacking prohibitive legislation, synthetic drugs may be purchased legally at retail outlets as “herbal incense” or “plant food,” labeled “not for human consumption.”² This masks the intended purpose and is meant to subvert organizations such as the Food and Drug Administration (FDA) from regulatory oversight.³

Recently, two categories of drugs, synthetic cannabinoids (hereinafter, “synthetic marijuana”) and substituted cathinones (hereinafter, “bath salts”), have been a topic of legislators throughout the country due to the recent emergence of the drugs.⁴ Beginning in spring 2010 states began outlawing synthetic marijuana and bath salts in response to a rapid increase in use.^{5,6} The federal government took action on July 9, 2012 when President Obama signed into law a bill that outlawed synthetic drugs at the federal level. Synthetic marijuana is chemically engineered to be similar to tetrahydrocannabinol (THC), the active ingredient in marijuana.⁷ The chemical is then sprayed on dry herbs, concealing its intended purpose and making it legal to purchase. It is typically marketed as “K2” or “Spice.” These synthetic substitutes may be used for the purpose of achieving a “marijuana-like-high,” but their actual long-term effects are not

¹ Lisa N. Sacco and Kristin M. Finklea, “Synthetic Drugs: Overview and Issues for Congress,” Congressional Research Service, last modified October 28, 2011, accessed October 9, 2012, <http://www.fas.org/sgp/crs/misc/R42066.pdf>, p. 1.

² Office of National Drug Control Policy, “Synthetic Drugs: (a.k.a. k2, Spice, Bath Salts, etc.) – Overview and History,” The White House Administration, last modified 2012, accessed October 9, 2012, <http://www.whitehouse.gov/ondcp/ondcp-fact-sheets/synthetic-drugs-k2-spice-bath-salts>.

³ Lisa N. Sacco and Kristin M. Finklea, “Synthetic Drugs: Overview and Issues for Congress,” p. 1.

⁴ National Council of State Legislators (NCSL), “Synthetic Drug Threats,” last modified August 23, 2012, accessed October 9, 2012, <http://www.ncsl.org/issues-research/justice/synthetic-drug-threats.aspx>.

⁵ NCSL, “Synthetic Cannabinoids (a.k.a. “K2”/ “Spice”) Enactments,” last modified September 17, 2012, November 28, 2012, <http://www.ncsl.org/issues-research/justice/synthetic-cannabinoids-enactments.aspx>.

⁶ NCSL, “Substituted Cathinones (a.k.a. “Bath Salts”) Enactments,” last modified September 17, 2012, November 28, 2012, <http://www.ncsl.org/issues-research/justice/substituted-cathinones-enactments.aspx>.

⁷ NCSL, “Synthetic Drug Threats.”

yet known. Use of such substances could have serious potentially harmful ramifications on the human body.⁸

Bath salts are a stimulant containing amphetamine-like chemicals, which produce effects similar to those of ecstasy and cocaine.^{9,10} The amphetamine-like properties that constitute these drugs can include chemicals such as 4-methyl-N-methylcathinone (mephedrone), 3,4-methylenedioxy-N-methylcathinone (methylone), and 3,4-methylenedioxypyrovalerone (MDPV). Even so, the content and chemical makeup of the drugs remains largely unknown. Since MDPV and other amphetamine-like chemicals may be included, these substances present a high risk of abuse and addiction. Bath salts are sold in powder form in retail stores marketed as “Ivory Wave,” “Red Dove,” “White Lightening,” “Zoom,” “Cloud Nine,” and a whole host of other names.¹¹

Synthetic Cannabinoids & Substituted Cathinones Effects on the Brain

Synthetic marijuana and bath salts pose serious health and safety problems to both the individuals who choose to use them and society as a whole.¹²

Synthetic Marijuana

Synthetic marijuana affects the brain similar to regular marijuana. However, due to the highly concentrated chemical make-up, the effects of the substance can be amplified above the regular effects of marijuana. Users report “positive” effects and “negative” effects. Positive effects include elevated mood, relaxation, and altered perception. While negative effects include anxiety, paranoia, and hallucinations. These effects closely parallel those felt by marijuana users. According to the National Institute of Health “there have been no scientific studies of Spice’s [a type of synthetic marijuana] effects on the human brain, but we do know that the cannabinoid compounds found in Spice products act on the same cell receptors as THC, the primary psychoactive component of marijuana. Some of the compounds found in Spice, however, bind more strongly to those receptors, which could lead to a much more powerful and unpredictable effect.”¹³

Regarding health effects, those who have been admitted to hospitals and poison control centers have reported vomiting, elevated heart rate, confusion, hallucinations, and agitation. Synthetic cannabinoids have also been known to lead to issues with the heart, some resulting in

⁸ Lisa N. Sacco and Kristin M. Finklea, “Synthetic Drugs: Overview and Issues for Congress,” p. 5.

⁹ Lisa N. Sacco and Kristin M. Finklea, “Synthetic Drugs: Overview and Issues for Congress,” p. 8.

¹⁰ NCSL, “Synthetic Drug Threats.”

¹¹ Lisa N. Sacco and Kristin M. Finklea, “Synthetic Drugs: Overview and Issues for Congress,” p. 8.

¹² Office of National Drug Control Policy, “Synthetic Drugs: (a.k.a. k2, Spice, Bath Salts, etc.) – Overview and History.”

¹³ National Institute of Health, “Drugs Facts: Spice (Synthetic Marijuana),” National Institute on Drug Abuse, last modified May 2012, accessed November 14, 2012, <http://www.drugabuse.gov/publications/drugfacts/spice-synthetic-marijuana>.

heart attacks. The chemical also dramatically raises blood pressure and heart rate, while lowering the blood supply to the heart—known as myocardial ischemia. Users may also experience withdrawal and addiction symptoms that are common with almost all Schedule I controlled substances.¹⁴ A Schedule I controlled substance is the classification given to the most addictive drugs with a high potential for abuse as stated under the Controlled Substances Act of 1970. To be considered a Schedule I controlled substance a drug must, “have no currently accepted medical use in the United States, a lack of accepted safety for use under medical supervision, and a high potential for abuse.”¹⁵

Bath Salts

Bath salts consist of many combinations of chemicals and different variations. Cathinones (chemicals within the human brain) are naturally occurring stimulants in the brain that interact with proteins called monoamine transporters and then connect with the transporters expressed on nerve cells. Bath salts are experimental, man-made substances that attempt to mimic the chemical structure of natural cathinones. Under normal conditions, monoamine transporters act as gates within the brain, making sure there is a low concentration of neurotransmitters such as dopamine and serotonin outside the cell. Bath salts interact with the monoamine transporters by either blocking them or reversing their normal direction of transport so that the neurotransmitters that were previously controlled now flood the extracellular space.¹⁶

Bath salt consumption (such as MDPV) has been shown to have numerous adverse effects on humans. Among these effects are agitation, combative behavior, increased heart rates and blood pressure, hypothermia, hallucinations, psychosis, inability to sense pain, a belief by the user that they have ‘superhuman strength’ and a host of other symptoms.¹⁷

Figure A, below, provides a graphical depiction of the substantial increase in the number of calls made to U.S. poison control centers for exposure to bath salts from 2010 to January 2012.¹⁸ This figure illustrates that throughout 2010, 304 calls were made. In 2011 that number skyrocketed to 6,138 calls, roughly 20 times the number of calls made the prior year. Figure 1 indicates that calls made to poison control centers across the U.S. for human exposure to bath salts climbed through June 2011 before gradually declining and leveling off in November 2011.¹⁹

¹⁴ National Institute of Health, “Drugs Facts: Spice (Synthetic Marijuana).”

¹⁵ Drug Enforcement Agency: Office of Diversion Control, “Controlled Substance Schedules,” last modified September 2012, accessed November 27, 2012, <http://www.deadiversion.usdoj.gov/schedules/index.html>.

¹⁶ Michael Baumann M.D., National Institute on Drug Abuse, undated Interview with Carina Wu available via podcast, accessed October 24, 2012, http://www.nature.com/multimedia/podcast/npp/npp_09212012.mp3.

¹⁷ Michael Baumann M.D., National Institute on Drug Abuse, undated Interview with Carina Wu available via podcast.

¹⁸ Office of National Drug Control Policy, “Synthetic Drugs: (a.k.a. k2, Spice, Bath Salts, etc.) – Overview and History.”

¹⁹ American Association of Poison Control Centers, “Bath Salts Data,” last modified February 8, 2012, accessed November 14, 2012.

Based on the data provided in Figure A, it appears that bath salt usage has increased.

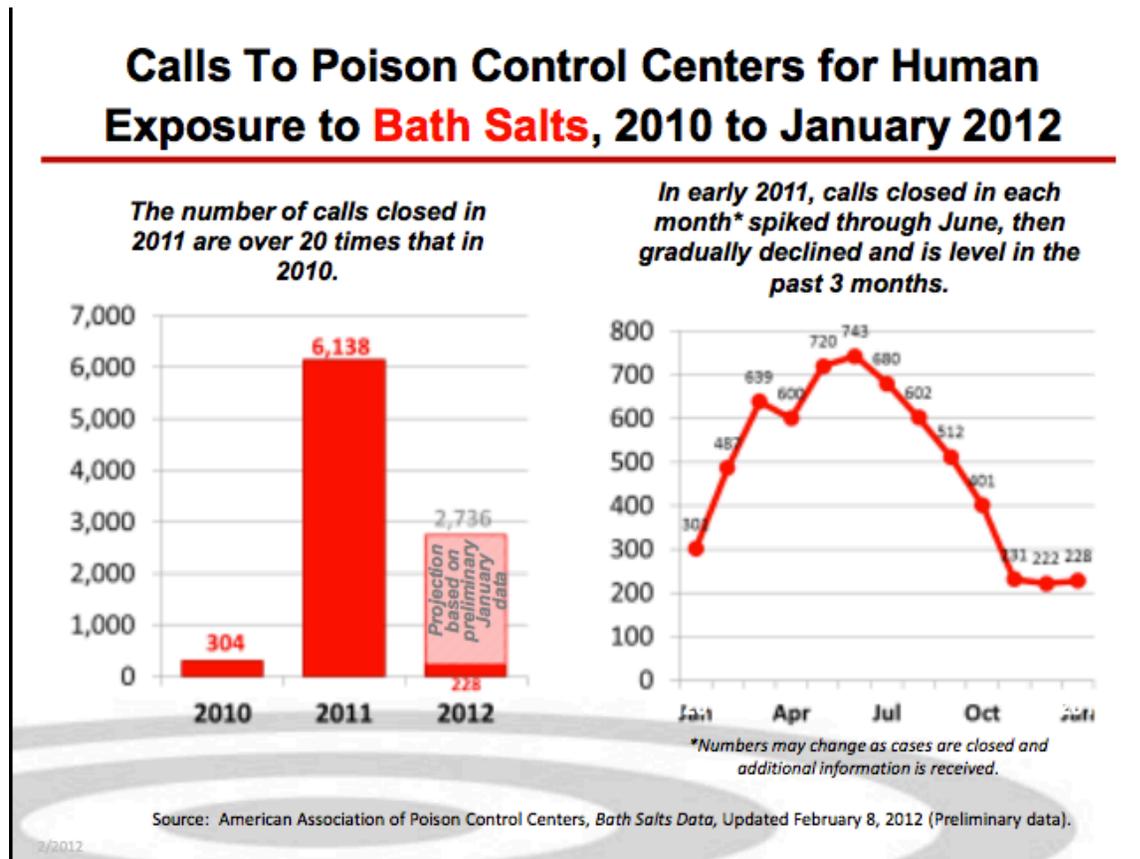


Figure 1: Calls to Poison Control Centers for Human Exposure to Bath Salts 2010 to January 2012

American Association of Poison Control Centers, “Bath Salts Data,” last modified February 8, 2012, accessed November 14, 2012.

Federal Government Response

“On July 9, 2012, the Federal Synthetic Drug Abuse Prevention Act of 2012 was signed into law. The law adds certain classes of synthetic cannabinoids and two substituted cathinones—mephedrone and MDPV—to the federal controlled substances act.”²⁰ The law also makes the possession and distribution of these synthetic drugs illegal on the federal level, as they have been added to the list of Schedule I Substances under the Controlled Substance Act. Although federal law has supremacy over state statutes it is difficult for federal drug enforcement agencies to regulate these drugs on a state-by-state basis. For example, although distribution of these drugs is technically illegal on a federal level, the federal government doesn’t have the

²⁰ NCSL, “Synthetic Drug Threats.”

resources to monitor each state. For this reason certain states have chosen to ban the drugs on a state level to grant the state drug enforcement authorities the proper power to more strictly enforce federal law.²¹

What Are States and Communities Doing to Deal with the Problem?

Synthetic marijuana has been banned by 41 state legislatures. The nine states that have not banned the substance include Massachusetts, Maryland, Nevada, New Hampshire, New Jersey, New York, Oregon, Washington, and Vermont. Bath salts have been banned by 42 state legislatures. The eight states that have not banned the substances are California, Massachusetts, Montana, Nebraska, New Hampshire, Oregon, Washington, and Vermont.²²

Maine

Maine, a New England state with a similar demographic to Vermont, has passed legislation to ban both synthetic marijuana and bath salts. In Maine, the penalty for the possession of synthetic marijuana or bath salts is a fine up to \$350. There is no jail time associated with this penalty, as it is a civil offense. The third offense of possession, or any offense related to the sale of these drugs, constitutes a criminal rather than a civil offense.²³

California

California's senate has passed legislation to outlaw synthetic marijuana; however, there has been no law passed regarding a ban of bath salts. The penalty for the sale, distribution, or the possession with the intent to sell synthetic marijuana is a misdemeanor, punishable by up to 6 months in jail and the possibility of a fine up to \$1000 dollars.²⁴

Connecticut

Connecticut has passed legislation to ban both synthetic marijuana and bath salts.²⁵ In July of 2011, Connecticut's legislature passed a bill that categorized synthetic marijuana as a controlled substance, specifically referring to "cannabis-type" substances and placing them in the same category as marijuana.²⁶ The penalty for a first offense possession of less than a half-ounce of a

²¹ R. Gil Kwelikowske, "Untitled Letter" The White House: Office of National Drug Control Policy, last modified July 10, 2012, accessed November 6, 2012, <http://www.psychiatry.emory.edu/PROGRAMS/GADrug/PDFdocs/Synthetic%20Drug%20Abuse%20Prevention%20Act%20of%202012.pdf>.

²² NCSL, "Synthetic Drug Threats."

²³ Maine State Legislature, "Public Law, Chapter 447," last modified July 6, 2011, accessed October 23, 2012, http://www.mainelegislature.org/legis/bills/bills_125th/chappdfs/PUBLIC447.pdf.

²⁴ Legislative Council of California, "Senate Bill 420," last modified October 2, 2011, accessed October 23, 2012, http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0401-0450/sb_420_bill_20111002_chaptered.pdf.

²⁵ NCSL, "Synthetic Drug Threats."

²⁶ State of Connecticut General Assembly, "Bill No. 1098," last modified July 1, 2011, accessed October 24, 2012, <http://www.cga.ct.gov/2011/TOB/s/pdf/2011SB-01098-R00-SB.pdf>.

“cannabis-type” substance is a \$150 fine. Individuals charged with the possession of a half-ounce or more of “cannabis-type” are subject to a maximum fine of \$1000 and the possibility of up to a one-year in prison.²⁷ In Connecticut, the penalties are far more severe for bath salts. Any individual possessing any amount of the substance is subject to a maximum penalty of a \$50,000 fine and up to 7 years in prison.²⁸

New York

New York has passed legislation to ban bath salts, but has not yet passed the legislation to ban synthetic marijuana. The criminal penalties for bath salt possession constitute 15 days jail time and the possibility of a fine up to \$500. However, civil penalties can result in violators facing up to a \$2000 fine per possession.²⁹

Conclusion

Synthetic drugs are synthetic compounds of naturally occurring chemicals. Over forty states have banned either one or both of the drugs, creating harsh penalties for those who use and distribute these substances. In response to the tremendous increase in the use of these drugs, states began to ban both synthetic marijuana and bath salts in 2010. The federal government followed suit and classified both drugs as Schedule I banned substances under the Controlled Substances Act in 2012. The short-term toxicity of these drugs has been shown to be problematic for individuals and could have life-long impacts; however, as these drugs have only recently infiltrated society not much is known about the long-term effects and further research is needed.

This report was completed on January 9, 2013 by Michael Gibson, Olivia Peterson, and Liam Walsh under the supervision of Associate Director Kate Fournier and Professor Anthony Gierzynski.

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Disclaimer: This report has been compiled by undergraduate students at the University of Vermont under the supervision of Professor Anthony Gierzynski. The material contained in the report does not reflect the official policy of the University of Vermont.

²⁷ James Orlando, OLR Research Report, “Marijuana Penalties,” last modified December 22, 2011, accessed October 24, 2012, <http://www.cga.ct.gov/2011/rpt/2011-R-0489.htm>.

²⁸ State of Connecticut General Assembly, “Bill No. 6554,” last modified October 1, 2011, accessed October 24, 2012. <http://www.cga.ct.gov/2011/TOB/h/pdf/2011HB-06554-R00-HB.pdf>.

²⁹ Andrew M. Cuomo, “Governor Cuomo Announces State Makes it Illegal to Sell or Possess Bath Salts or Synthetic Drugs,” last modified August 7, 2012, accessed October 23, 2012, <http://www.governor.ny.gov/press/08072012-bath-salts-illegal>.