CESAR FAX

A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

CESAR FAX
Synthetic Cannabinoid Series

May 9, 2011 to October 12, 2015

(updated October 13, 2015)

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CESAR FAX Synthetic Cannabinoid Series

(updated 10/13/15)

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CESAR FAX

May 9, 2011
Vol. 20, Issue 17

A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

DEA Temporarily Classifies Synthetic Marijuana as a Schedule I Drug

Synthetic marijuana packaged as incense or potpourri has spurred more than 4,500 "fake pot" calls to U.S. poison centers since 2010, prompting the Drug Enforcement Administration to recently temporarily classify it as a Schedule I drug.

What is synthetic marijuana? Synthetic marijuana is a blend of herbs and plant material sprayed with one or more synthetic cannabinoids, synthesized chemical compounds that bind to the same cannabinoid receptors as THC. Synthetic cannabinoids were originally created in a lab as potential pharmaceutical agents.

What are other names for synthetic marijuana? The most recognizable brand names are Spice and K2. More than 100 other brand names of have been identified, including Blaze, Fire 'n' Ice, G-Force, Solar Flare, and Yucatan Fire.

Where is synthetic marijuana sold? Synthetic marijuana is packaged in small pouches or packets and sold as herbal incense or potpourri that is labeled "Not for Human Consumption." Until the recent DEA ban, it was legally sold in head shops, smoke shops, liquor stores, convenience stores, gas stations, and over the internet.

Who uses synthetic marijuana? Qualitative evidence suggests that the primary users are teenagers and young adults as well as cannabis users. According to the DEA, a major private toxicology laboratory reported that 30% to 35% of specimens submitted by juvenile probation departments were positive for synthetic marijuana.

What are the effects of synthetic marijuana use? Research as to the potency and side effects is new and limited. However, it appears that the psychoactive effects of synthetic marijuana are similar to marijuana, and there is some evidence that synthetic marijuana may even be more potent depending on the specific synthetic cannabinoid. Adverse effects include increased heart rate and blood pressure, extreme anxiety, agitation, disorientation, paranoia, hallucinations, vomiting, and tremors. There were 2,874 calls received by U.S. poison centers about synthetic marijuana products in 2010. As of April 20, 2011, 1,639 calls had been received in 2011.

Can you become dependent on synthetic marijuana? The limited research available to date indicates that synthetic marijuana may have the potential for dependence. There has been one documented case of dependency based on both DSM-IV and ICD-10 criteria, including tolerance and physical withdrawal symptoms. The European Monitoring Centre for Drugs and Drug Addiction suggests that "it seems tolerance to these synthetic cannabinoids may develop fairly fast, and arguably this might be associated with relatively high potential to cause dependence" (p. 12).

Can it be detected by drug tests? While synthetic marijuana will not be detected by standard drug tests that screen for marijuana, several national laboratories offer tests for synthetic cannabinoids.

What are the current laws regarding synthetic marijuana in the U.S.? As of May 4, 2011, 24 states have enacted legislation and 24 states have legislation pending banning one or more synthetic cannabinoids. In March 2011, the DEA temporarily classified five of the synthetic cannabinoids used in synthetic marijuana as Schedule I drugs, which is reserved for those substances with high potential for abuse, no accepted medical use for treatment in the U.S., and a lack of accepted safety use of the drug under medical supervision. This classification can last up to one year, with a 6-month extension, allowing the DEA and the U.S. Department of Health and Human Services time to determine whether these chemicals should be permanently controlled. Based on Europe's experience with regulating synthetic marijuana, it is possible that current laws will be circumvented by the production and use of new synthetic cannabinoids not covered by current legislation.

SOURCE: A complete list of sources is available by accessing the PDF version of this issue online at www.cesar.umd.edu.

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Source List

"Schedules of Controlled Substances: Temporary Placement of Five Synthetic Cannabinoids into Schedule I," *Federal Register* 76(40): 11075-11078, March 1, 2011.

American Association of Poison Control Centers, "Fake Marijuana Spurs More Than 4,500 Calls to U.S. Poison Centers," *Press Release*, April 20, 2011. Available online at http://www.aapcc.org/dnn/Portals/0/prrel/revisedk2releaseapril20.pdf.

Atwood, B.K., Huffman, J., Straiker, A., Mackie, K., "JWH018, a Common Constituent of 'Spice' Herbal Blends, Is a Potent and Efficacious Cannabinoid CB Receptor Agonist," *British Journal of Pharmacology*, 160(3):585-593, 2010.

Dargan, P.I., Hudson, S., Ramsey, J., Wood, D.M. "The Impact of Changes in UK Classification of the Synthetic Cannabinoid Receptor Agonists in 'Spice'," *International Journal of Drug Policy*, April 7, 2011, doi:10.1016/j.drugo.2011.02.006.

Dresen, S., Kneisel, S., Weinimann, W., Zimmermann, R., Aüwarter, V. "Development and Validation of a Liquid Chromatography-Tandem Mass Spectrometry Method for the Quantitation of Synthetic Cannabinoids of the Aminoalkylindole Type and Methanandamide in Serum and Its Application to Forensic Samples," *Journal of Mass Spectrometry*, 46:163-171, 2010.

Drug Enforcement Administration, "Chemicals Used in 'Spice' and 'K2' Type Products Now Under Federal Control and Regulation," *Press Release*, 3/1/2011. Available online at http://www.justice.gov/dea/pubs/pressrel/pr030111.html.

Drug Enforcement Administration, Office of Diversion Control, *National Forensic Laboratory Information System (NFLIS) Year 2009 Annual Report*, 2010.

Drug Enforcement Administration, Office of Diversion Control, *National Forensic Laboratory Information System (NFLIS) Year 2008 Annual Report*, 2009.

European Monitoring Centre for Drugs and Drug Addiction, "Understanding the 'Spice' Phenomenon," *Thematic Papers*, 2009.

European Monitoring Centre for Drugs and Drug Addiction, *Annual Report 2010: The State of the Drugs Problem in Europe*, 2010.

Müller, H., Sperling, W., Köhrmann, M., Huttner, H., Kornhuber, J., Maler, J-M. "The Synthetic Cannabinoid Spice as a Trigger for an Acute Exacerbation of Cannabis Induced Recurrent Psychotic Episodes," *Schizophrenia Research*, 118(1-3): 309-310, 2010.

National Conference of State Legislatures, *Legislation on Synthetic Cannabinoids as of May 4, 2011*, online at http://www.ncsl.org/?TabId=22431, accessed 5/6/2011.

National Drug Court Institute, "Spice, K2, and the Problem of Synthetic Cannabinoids," *Drug Court Practitioner Fact Sheet*, 6(1), 2010.

National Drug Intelligence Center, U.S. Department of Justice, "Use of Synthetic Cannabinoid Products by Teens and Young Adults Increasing," *Drug Alert Watch*, 2010.

Redwood Toxicology Laboratory, "Redwood Toxicology Laboratory Announces Oral Fluid Test for Synthetic Cannabinoids: JWH-018, JWH-073 and JWH-250," *Press Release,* November 15, 2010.

Redwood Toxicology Laboratory, "Redwood Toxicology Laboratory Announces Urine Test for Marijuana Mimics: Synthetic Cannabinoids JWH-018 and JWH-073 Metabolites," *Press Release,* July 12, 2010.

Schneir, A.B., Cullen, J., Ly, B.T., "'Spice' Girls: Synthetic Cannabinoid Intoxication," *The Journal of Emergency Medicine*, 40(3):296-299, 2011.

U.S. Naval Criminal Investigative Service, Norfolk Field Office, *Introduction to Spice*, 2010.

United States Drug Testing Laboratories, "USDTL Synthetic Cannabinoid Urine Test Stems from Increasing Illicit Use," *Press Release*, April 18, 2011.

Vardakou, I., Pistos, C., Spiliopoulu, Ch. "Spice Drugs as a New Trend: Mode of Action, Identification and Legislation," *Toxicology Letters*, 197(3):157-16, 2010.

Zimmerman, U. S., Winkelmann, M. P., Nees, J. A., Spanagel, R., Schulz, K., "Withdrawal phenomena and dependence syndrome after the consumption of 'spice gold'," *Deutsches Arzteblatt International*, 106(27):464-467, 2009.

CESAR FAX

November 28, 2011
Vol. 20, Issue 45

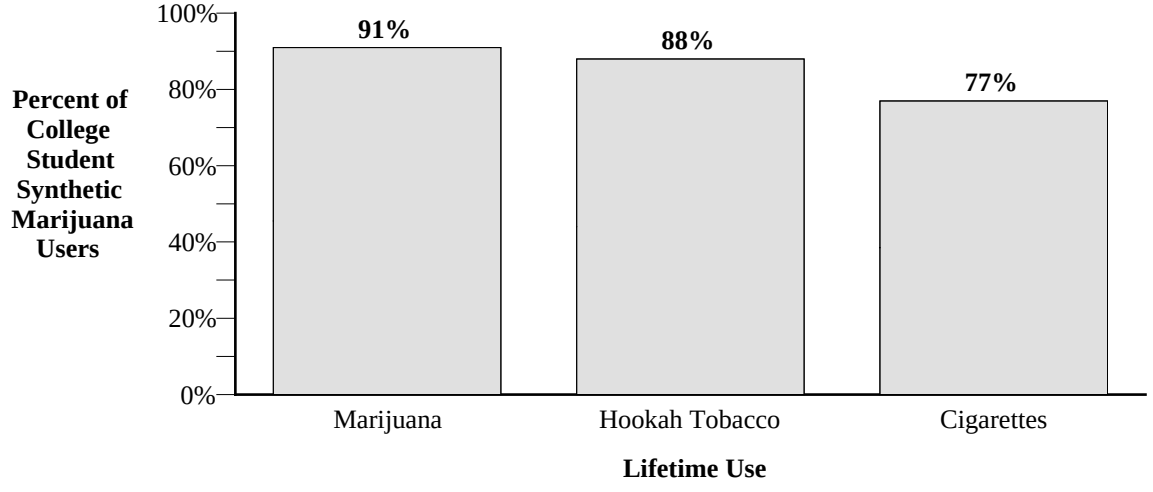
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Nearly One in Ten College Students Have Ever Used Synthetic Marijuana; Nearly All Also Report Using Marijuana, Cigarettes, and Hookah

Nearly one in ten University of Florida college students (8%) reported ever using synthetic marijuana, according to the first study of lifetime prevalence of synthetic marijuana in college students. Synthetic marijuana, also known as K2 or spice, is an herbal blend sprayed with one or more synthetic cannabinoids with effects similar to marijuana when smoked (see *CESAR FAX*, Volume 20, Issue 17 to learn more about synthetic marijuana). Among these synthetic marijuana users, 77% reported smoking cigarettes, 91% reported smoking marijuana, and 88% reported smoking hookah tobacco. In addition, this study found that males and early college students (1st or 2nd year) were more likely to have ever used synthetic marijuana (data not shown). Unfortunately, "the latest national ban of five synthetic cannabinoids does not necessarily indicate the end of K2 or 'spice'. For example, K2 manufacturers have already started to produce and sell a new generation of K2 products that are claimed to be 'completely legal everywhere' (using a similar product with another, not yet illegal, synthetic cannabinoid)" (p. 3).

Percentage of College Students Who Have Ever Used Synthetic Marijuana Who Also Reported Smoking Cigarettes, Marijuana, or Hookah Tobacco in Their Lifetime, 2010 (N=69)



NOTE: Data was collected from 852 University of Florida students who responded to an email survey conducted in September 2010.

SOURCE: Adapted by CESAR from Hu, X., Primack, B.A., Barnett, T.E., and Cook, R.L., "College Students and Use of K2: An Emerging Drug of Abuse in Young Persons," *Substance Abuse Treatment, Prevention, and Policy* 6(16), 2011. Available online at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3142218. For more information, contact Xingdi Hu at qmshjwhx@phhp.ufl.edu.

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CESAR FAX

February 6, 2012
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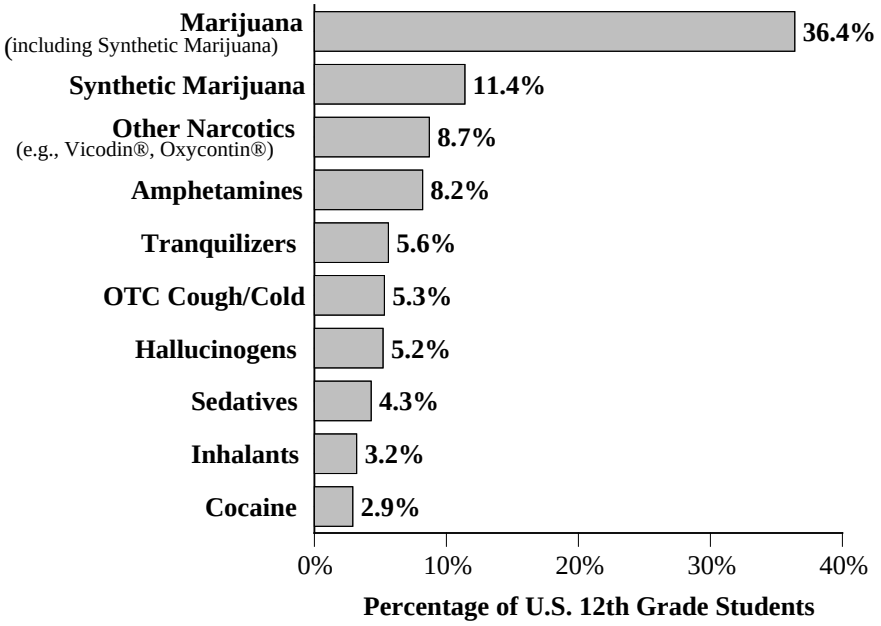
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

One in Nine U.S. High School Seniors Report Using Synthetic Marijuana in the Past Year

Marijuana and synthetic marijuana are the most prevalent illicit drugs used by 12th graders, according to recent data from the 2011 Monitoring the Future (MTF) survey. Slightly more than one-third (36.4%) of high school seniors reported using marijuana in the past year, including 11.4% who reported using synthetic marijuana, compared with less than 10% for all other illicit drugs (see figure below). Synthetic marijuana, an herbal drug mixture that usually contains synthetic cannabinoids, was readily available on the internet and in smaller retail establishments until it was scheduled by the Drug Enforcement Administration (DEA) in March 2011 (see *CESAR FAX*, Volume 20, Issue 17, for more information about synthetic marijuana). Questions about synthetic marijuana use were included for the first time in the Spring 2011 MTF survey, and therefore measured use over a considerable period of time prior to the drug's scheduling. The authors note that "next year's survey results should reflect any effects of the scheduling by the DEA" (p. 5).

Percentage of U.S. 12th Grade Students Reporting Past Year Use of Drugs*
Other Than Alcohol and Tobacco, 2011
(N=approximately 14,900)



*Amphetamines include Adderall® (6.5%), Ritalin® (2.6%), Provigil (1.5%), methamphetamine (1.4%), and crystal methamphetamine (1.2%). Hallucinogens include salvia (5.9%), ecstasy (5.3%), LSD (2.7%), and PCP (1.3%). Other narcotic drugs used nonmedically include Vicodin® (8.1%) and Oxycontin® (4.9%). OTC Cough/Cold refers to use for the explicit purpose of getting high. Drugs with less than 2% prevalence were ketamine (1.7%), GHB (1.4%), Rohypnol® (1.3%), steroids (1.2%), and heroin (0.8%).

SOURCE: Adapted by CESAR from National Institute of Drug Abuse, *Monitoring the Future: National Results on Adolescent Drug Use*, 2011. Available online at http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2011.pdf.

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CESAR FAX

February 18, 2013
Vol. 22, Issue 7

A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

CDC Alert: Acute Kidney Injury Associated with Synthetic Marijuana Use in Six States

Acute kidney injury following exposure to synthetic cannabinoids has been identified in six states from March to December 2012, according to a recent report from the Centers for Disease Control and Prevention (CDC). Synthetic cannabinoids, also known as synthetic marijuana, K2, and Spice, are psychoactive substances chemically similar to the active ingredient in marijuana that are applied to plant material and smoked (see *CESAR FAX*, Volume 20, Issue 17). Prompted by hospitalizations in Wyoming for unexplained acute kidney injury after recent use of synthetic marijuana, a collaboration among several state public health officials, poison center toxicologists, forensic laboratory scientists, individual clinicians, and the Arkansas K2 Research Consortium identified 16 cases of synthetic marijuana-associated acute kidney injury in 6 states (Kansas, Oklahoma, Oregon, New York, Rhode Island, and Wyoming (see table below). All of the patients were admitted to the hospital, and five required hemodialysis, a treatment for kidney failure. None of the patients reported preexisting renal dysfunction or use of medication that might have caused renal problems. Earlier this month, doctors in Alabama reported four cases of acute kidney injury after ingestion of synthetic marijuana among previously health young men.* The CDC report suggests that "physicians caring for otherwise healthy adolescents and young adults with unexplained [acute kidney injury] should inquire about [synthetic marijuana] use, and cases of suspected [synthetic marijuana] poisoning should be reported to both the regional poison center and the appropriate state health department" (p. 97).

Sixteen Acute Kidney Injury Cases Associated with Synthetic Marijuana Use, March 16-December 7, 2012

State	Number of Cases	Ages (median 18.5 yrs)	Peak Creatinine (normal=0.6-1.2 mg/dL)	Implicated Product(s)
Kansas	1	26	7.7	Mr. Happy
Oklahoma	2	15	6.2-11.5	Flame 2.0
Oregon	6	15-27	4.7-10.6	synthetic cannabinoid; Mad Monkey or Clown Loyal; Lava
New York	2	30-33	3.3-9.0	Phantom Wicked Dreams; Spice Gold
Rhode Island	1	25	21.0	synthetic cannabinoid
Wyoming	4	15-21	4.1-6.8	synthetic cannabinoid; blueberry flavored; bubble gum flavored

*Bhanushali, G.K., Jain, G., Fatima, H., Leisch, L., Thornley-Brown, D., "AKI Associated with Synthetic Cannabinoids: A Case Series," *Clinical Journal of the American Society of Nephrology*, published online before print December 2012. Online at http://www.ncbi.nlm.nih.gov/pubmed/23243266. Also see press release at http://www.uab.edu/news/latest/item/3133-uab-doctors-synthetic-marijuana-dangerous-for-kidneys

SOURCE: Adapted by CESAR from Centers for Disease Control and Prevention, "Acute Kidney Injury Associated with Synthetic Cannabinoid Use—Multiple States, 2012," *Morbidity and Mortality Weekly Report* (MMWR), 62(6): 93-98, 2012. Available online at http://www.cdc.gov/mmwr/pdf/wk/mm6206.pdf. For more information, contact Michael D. Schwartz at mschwartz@cdc.gov or 770-488-7282.

CESAR FAX

March 11, 2013
Vol. 22, Issue 10

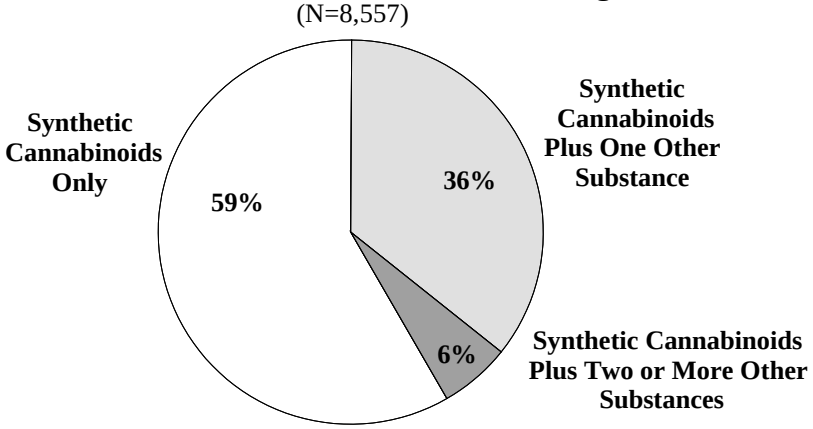
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Majority of U.S. Emergency Department Visits Involving Synthetic Cannabinoids Involve No Other Substances

An estimated 11,406 U.S. emergency department (ED) visits in 2010 involved a synthetic cannabinoid product[1], and three-fourths of these visits were made by patients ages 12 to 29, according to the most recent data available from the Drug Abuse Warning Network (DAWN). Synthetic cannabinoids, also referred to as synthetic marijuana, Spice, or K2, are substances designed to produce physical effects similar to marijuana (see *CESAR FAX*, Volume 20, Issue 17). In the majority (59%) of ED visits made by patients ages 12 to 29 that involved synthetic cannabinoids, no other substances were involved. Synthetic cannabinoid were used in combination with one other substance in 36% of the visits, and were used in combination with two or more substances in only 6% of visits[2] (see figure below). This is unusual in that the majority of ED visits involving other illicit drugs or the nonmedical use of pharmaceuticals also involve multiple drugs. For example, only 31% of ED visits involving marijuana were for marijuana alone; 69% involved other drugs (data not shown). The authors suggest that "educators can help prevent use of synthetic cannabinoids by addressing use of these substances in programs designed to prevent use of illicit drugs. Parents can also discuss the dangers of these drugs with their children and use parental controls for online purchases" (p. 3-4).

Estimated Percentage of U.S. Emergency Department Visits Involving Synthetic Cannabinoids Only or in Combination with Other Substances, Patients Ages 12 to 29, 2010



NOTE: Percentages add to more than 100 percent due to rounding

[1]The 11,406 ED visits involving synthetic cannabinoids represent less than 1% of all ED visits. However, the authors note that "because of limited availability of tests for synthetic cannabinoids, data collection efforts in the ED may have missed visits in which they were involved" (p. 4).

[2]When other drugs were used with synthetic marijuana, they were most commonly marijuana (17%), pharmaceuticals (17%), and alcohol (13%).

SOURCE: Adapted by CESAR from data from Substance Abuse and Mental Health Services Administration (SAMHSA), "Drug-Related Emergency Department Visits Involving Synthetic Cannabinoids," *The DAWN Report*, December 4, 2012. Available online at http://www.samhsa.gov/data/2k12/DAWN105/SR105-synthetic-marijuana.pdf.

CDC Reports Acute Kidney Injury Associated with Synthetic Marijuana Use in Six States

The Centers for Disease Control and Prevention (CDC) reports that acute kidney injury following exposure to synthetic cannabinoids has been identified in six states from March to December 2012. See *CESAR FAX*, Volume 22, Issue 7 for more information (available online at http://www.cesar.umd.edu/cesar/cesarfax/vol22/22-07.pdf).

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CESAR FAX

April 29, 2013
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A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

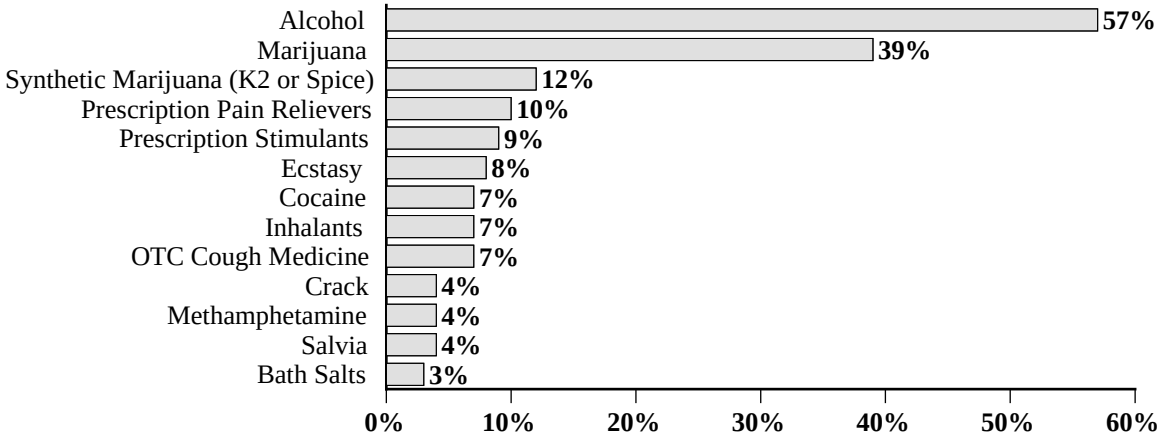
Synthetic Marijuana Third Most Reported Substance Used by U.S. High School Students

More high school students report using synthetic marijuana than any other substance besides alcohol and marijuana, according to data from a recently released survey of 9th to 12th graders. Alcohol and marijuana were the most prevalent drug used, with 57% reporting alcohol use and 39% reporting marijuana use in the past year in 2012. The third most prevalent substance used was synthetic marijuana (12%), often referred to as K2 or Spice. Use of all other substances was reported by 10% or less of high school students. Similar results have been found by other surveys of high school students (see *CESAR FAX*, Volume 21, Issue 5).

Editor's Note: Synthetic marijuana products typically consist of plant material treated with synthetic cannabinoids, psychoactive substances designed to bind to and stimulate the same receptors in the brain as THC. Synthetic marijuana use in general has been linked with adverse effects such as increased heart rate and blood pressure, anxiety, agitation, and acute kidney injury (see CESAR FAX, Volume 20, Issue 17 and Volume 22, Issue 7). However, there are more than 140 different types[1] of synthetic cannabinoids, each with potentially different potency as well as adverse effects[2]. The exact synthetic cannabinoids contained in synthetic marijuana products is impossible to determine without specific testing—studies have shown that the types and amounts of synthetic cannabinoids can vary greatly between products, lots, and even within the same package[3]. In reality, youth who report using synthetic marijuana likely have no idea what specific synthetic cannabinoid they are using or what the effects will be.

Percentage of U.S. Students (Grades 9 to 12) Reporting Past Year Alcohol and Other Drug Use, 2012

(N=3,884)



[1]Hudson S, Ramsey J, "The Emergency and Analysis of Synthetic Cannabinoids," *Drug Testing and Analysis* 3(7-8):466-478, 2011. [2]United Nations Office on Drugs and Crime, *Synthetic Cannabinoids in Herbal Products*, 2011. [3]Hillebrand, J, et al., "Legal Highs on the Internet," *Substance Use and Misuse*, 45(3): 330-340, 2010.

NOTES: Abuse of inhalants and OTC cough medicine is defined as use to get high. Abuse of prescription drugs is defined as use without a doctor's prescription. Surveys were conducted in schools by GfK Roper Public Affairs & Corporate Communications with 3,884 9th to 12th grade students from February to June 2012.. The margin of error is +/- 2.1 percentage points.

SOURCE: Adapted by CESAR from The Partnership for a Drug-Free America and the MetLife Foundation, *The Partnership Attitude Tracking Study (PATS): Teens and Parents*, 2013. Available online at http://www.drugfree.org/newsroom/research-publication/full-report-and-key-findings-the-2012-partnership-attitude-tracking-study-sponsored-by-metlife-foundation .

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CESAR FAX

May 20, 2013
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A Weekly FAX from the Center for Substance Abuse Research

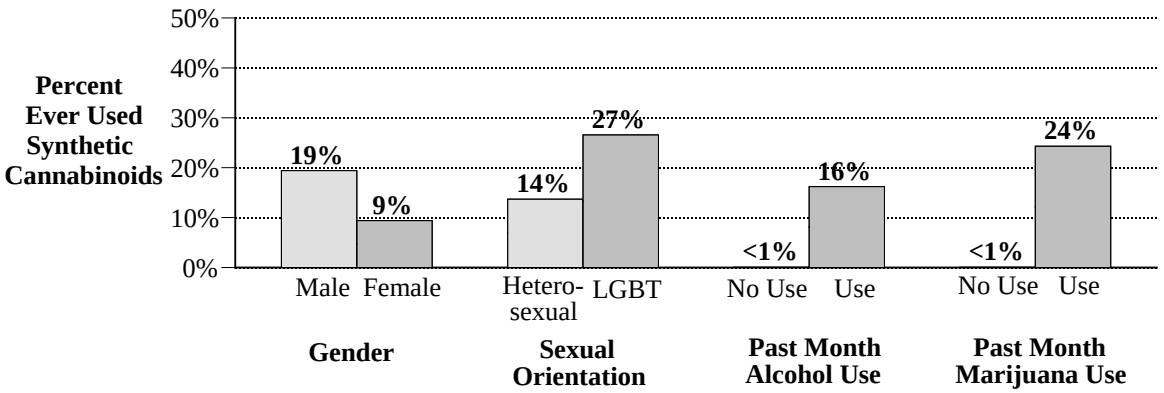
University of Maryland, College Park

Study Finds That 14% of Undergraduate Students at a Southeastern University Report Synthetic Cannabinoid Use; Users More Likely to Be Male and Identify as LGBT

Synthetic cannabinoid use among college students at a Southeastern university is concentrated in males and in the lesbian, gay, bisexual, or transgender (LGBT) community, according to the first known study to obtain a detailed profile of users of any type of synthetic cannabinoid.* Overall, 14% of undergraduate students reported lifetime use of synthetic cannabinoids, with an average initiation age of 18. Males were twice as likely as females (19% vs. 9%) to report synthetic cannabinoid use. Sexual orientation was also found to be related to synthetic cannabinoid use. Students who self-identified themselves as LGBT were nearly twice as likely as heterosexual students (27% vs. 14%) to report lifetime use (see figure below), and reported use was equally high among both male and female LGBT students (data not shown). The study also found that lifetime use of synthetic cannabinoids was virtually non-existent among those who did not report past month alcohol (0.3%) or marijuana (0.4%) use, compared to 16% and 24%, respectively, of past month users of these substances. According to the authors, "future research should investigate the higher use among [LGBT individuals], and prevention efforts may be most effective when reaching out to the LGBT community" (p. 6).

Editor's Note: It is impossible to determine the types of synthetic cannabinoids contained in synthetic marijuana products without specific testing—studies have shown that the types and amounts of synthetic cannabinoids can vary greatly between products, lots, and even within the same package[1]. In reality, youth who report using synthetic marijuana likely have no idea what specific synthetic cannabinoid they are using or what the effects will be.

Percentage of Undergraduate College Students Reporting Lifetime Synthetic Cannabinoid Use, by Gender, Sexual Orientation, and Past Month Alcohol or Marijuana Use, 2011-2012
(n=2,349 students at a large Southeastern University)



*According to the authors, their study "provides the first detailed profile of synthetic cannabinoid users from a random sample of young adults" that was "not limited to one of a few forms of synthetic cannabinoids, but instead asked about any of the compounds in that category" (p. 4). Respondents were asked if they had "used any synthetic marijuana (K2, Spice, Mr. Miyagi, Pot-Pourri, etc.) ever or in the last year" (p. 2). The survey "utilized the term 'synthetic marijuana' rather than the more scientific 'synthetic cannabinoid' since that language would be better understood by respondents" (p. 6).

[1]e.g., Hillebrand, J, et al., "Legal Highs on the Internet," *Substance Use and Misuse*, 45(3): 330-340, 2010.

NOTES: Data were collected from a self-report survey administered to 2,349 undergraduate students in 40 classes at a large public university in the State of Georgia between November 2011 and March 2012.

SOURCE: Adapted by CESAR from Stogner, J.M. and Miller, B.L., "A Spicy Kind of High: A Profile of Synthetic Cannabinoid Users," *Journal of Substance Use*, Advance online publication (doi:10.3109/14659891.2013.770571), 2013. For more information, contact Dr. Stogner at stogner@email.unc.edu.

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CESAR FAX

July 8, 2013
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A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Synthetic Cannabinoid Users Report Using the Drug to Avoid Positive Drug Tests; Return to Marijuana Use When Not Being Tested

Synthetic cannabinoids, also known as K2 or Spice, are not included in most routine drug test panels because they require specialized, more expensive testing. Furthermore, studies have shown that the types and amounts of synthetic cannabinoid (SC) metabolites can vary greatly between products, lots, and even within the same package[1], making it difficult to decide which specific SC metabolite should be included in drug testing programs. Some SC users use the drug as a substitute for marijuana to avoid positive drug tests, according a qualitative study of SC users in Southern California. The study found that:

- The majority of synthetic cannabinoid users reported that they used the drug to avoid positive drug tests, either because they were under community correctional supervisions, seeking employment, residing in a sober living facility, or joining the military. According to one user, "Spice would give you a weed like effect without the positive test" (p. 220).
- "Most of the users of Spice-type products in this study consumed these products as a substitute for marijuana during drug-testing periods, and returned to marijuana use once that period ended" (p. 223). According to one user, "I was trying to get a job where they were going to drug test . . . so I got that stuff [Spice], and I liked it enough. I enjoyed it. I did it for a while . . . Then, my job search ended 'cause I wasn't going to do any of them. So I went back to the regular stuff" (p. 222).
- Nearly all the SC users learned of the drug from someone who was using SC to avoid detection on drug tests. For example, one user reported that he "was talking to some kids that went to a Christian school, and they get drug tested. So, all the kids there would smoke Spice instead of weed" (p. 222).
- All the SC users also used marijuana, and half had a history of drug problems, such as sobriety attempts, drug-related offending, and negative drug experiences.
- Some of the SC users expressed concern over the health effects of the drug. "I don't know what they're putting in it. It kind of scares me, so I try not to do it that often" (p. 222). Others experienced negative side-effects. "It [Spice] just doesn't feel right. Way more of a stressor on your body, like your body is trying to deal with whatever cannabinoid that is in there, and it's just like you experience it in a different way. It feels worse." (p. 222).

The authors note that while synthetic cannabinoid products are labeled as not being for human consumption and thus cannot be regulated by the Food and Drug Administration (FDA), "this tactic for circumventing the law does not appear to detract potential users form purchasing and consuming these untested, unknown and potentially harmful substances" (p. 223).

NOTE: Findings are from in-depth, semi-structured interviews with 25 Southern California adults who had used K2, mephedrone, bath salts, or *Salvia divinorum* at least once. Participants were recruited using flyers distributed to head shops, cafes and other businesses; advertisements posted in free weekly newspapers; and snowball sampling. The "findings are neither intended to reflect the patterns of all users throughout the US nor users around the globe. Rather, they are intended to contribute to the need for accurate information about the growing use of these substances" (p. 223).

[1]e.g., Hillebrand, J, et al., "Legal Highs on the Internet," *Substance Use and Misuse*, 45(3): 330-340, 2010.

SOURCE: Adapted by CESAR from Perrone, D., Helgesen, R.D., and Fischer, R.G., "United States Drug Prohibition and Legal Highs: How Drug Testing May Lead Cannabis Users to Spice," *Drugs: Education, Prevention and Policy* 20(3):216-224, 2013. For more information, contact Dina Perrone at dina.perrone@csulb.edu.

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CESAR FAX

July 15, 2013
Vol. 22, Issue 28

A Weekly FAX from the Center for Substance Abuse Research

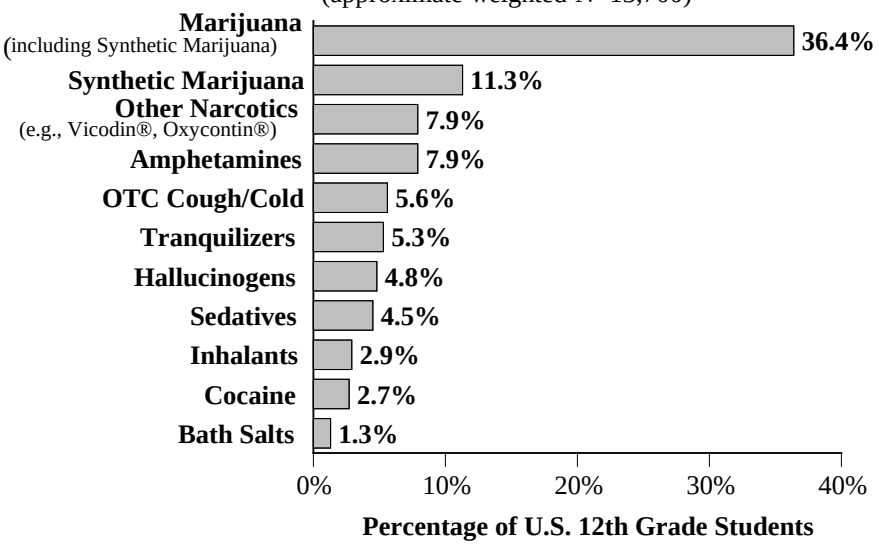
University of Maryland, College Park

One in Nine U.S. High School Seniors Report Using Synthetic Marijuana in the Past Year

Marijuana and synthetic marijuana are the most prevalent illicit drugs used by 12th graders, according to data from the most recent national Monitoring the Future (MTF) survey. Slightly more than one-third (36.4%) of high school seniors reported using marijuana in the past year, including 11.3% who reported using synthetic marijuana, compared with less than 8% for all other illicit drugs (see figure below). These estimates of synthetic marijuana use among U.S. high school students are nearly identical to those found by another 2012 survey of high school students (see *CESAR FAX*, Volume 22, Issue 17). The MTF survey also found that approximately one-fourth (24%) of 12th graders perceive a great risk for harm in trying synthetic marijuana once or twice, and one-third (33%) think there is a great risk for harm in using the drug occasionally, compared to 15% and 21%, respectively, for marijuana. Previous research on high school students has shown that students' perceived risk is related to their likelihood of using a drug (see *CESAR FAX*, Volume 20, Issue 3).

Percentage of U.S. 12th Grade Students Reporting Past Year Use of Drugs* Other Than Alcohol and Tobacco, 2012

(approximate weighted N=13,700)



*Amphetamines include Adderall® (7.6%), Ritalin® (2.6%), methamphetamine (1.1%), and crystal methamphetamine (0.8%). Hallucinogens include salvia (4.4%), ecstasy (3.8%), LSD (2.4%), and PCP (0.9%). Other narcotic drugs used nonmedically include Vicodin® (7.5%) and Oxycontin® (4.3%). Drugs with less than 2% prevalence were ketamine (1.5%), GHB (1.4%), Rohypnol® (1.5%), steroids (1.3%), and heroin (0.8%). Amphetamines, sedatives, tranquilizers, and other narcotics include only use ". . . on your own—that is, without a doctor telling you to take them." OTC Cough/Cold refers to use for the explicit purpose of getting high.

NOTE: Youth who report using synthetic marijuana likely have no idea what specific synthetic cannabinoid they are using or what the effects will be, especially since the types and amounts of synthetic cannabinoids can vary greatly between products, lots, and even within the same package.

SOURCE: Adapted by CESAR from National Institute of Drug Abuse, *Monitoring the Future: National Results on Adolescent Drug Use, 1975-2012, Volume I: Secondary School Students*, 2013. Available online at http://www.monitoringthefuture.org//pubs/monographs/mtf-vol1_2012.pdf.

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CESAR FAX

August 12, 2013
Vol. 22, Issue 32

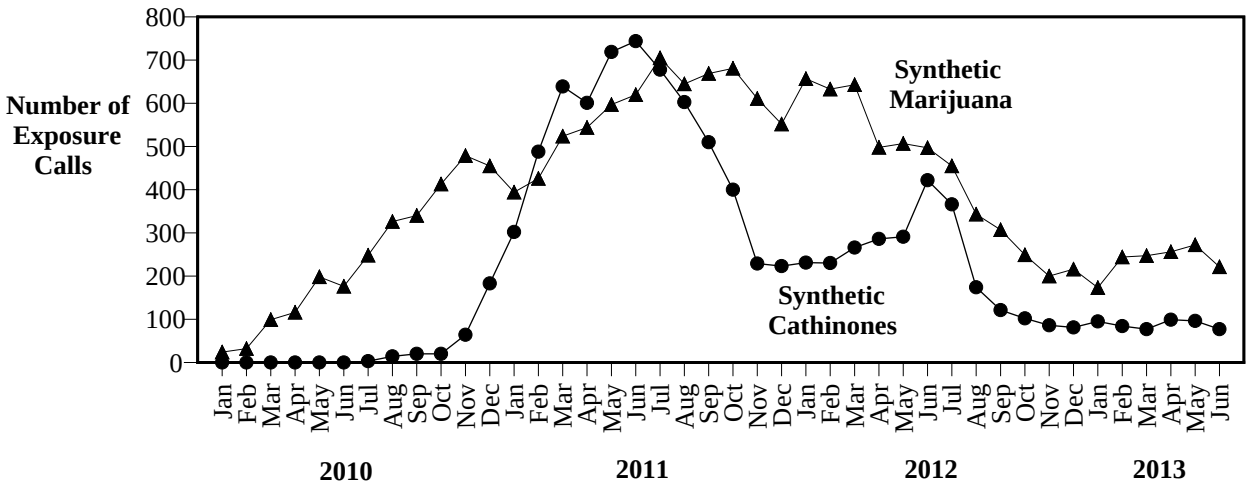
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Number of Calls to U.S. Poison Control Centers About Exposure to Synthetic Marijuana and Synthetic Cathinones Stable at Lower Levels Than Recent Years

The number of calls to U.S. poison control centers about exposure to synthetic marijuana and synthetic cathinones remained relatively stable in the first six months of 2013, according to data from the American Association of Poison Control Centers (AAPCC). After peaking in July 2011 at 705 calls, the number of calls for synthetic marijuana, also known as spice or K2, began to decline in 2012, reaching 173 in January 2013. Since then the number of calls for exposure to synthetic marijuana have remained relatively stable at around 250 calls per month, with a slight decrease from May to June 2013 (from 272 calls to 221 calls). A similar pattern emerged for synthetic cathinones, also known as bath salts. After peaking in June 2011 at 744 calls, the number of poison center calls for synthetic cathinone exposure declined sharply during the rest of 2011, stabilized for the first part of 2012, then declined again after a brief rise. The number of calls for exposure to synthetic cathinones has remained around 90 calls per month since September 2012. The decreases in exposure calls for synthetic marijuana and bath salts since 2011 may be related to the heightened media exposure about the negative effects of these drugs as well as recent federal and state legal bans on the substances.

Number of Calls to U.S. Poison Control Centers About Exposure* to Synthetic Cathinones and Synthetic Marijuana, January 2010- June 2013†



*The term exposure means someone has had contact with the substance in some way; for example, ingested, inhaled, absorbed by the skin or eyes, etc. Not all exposures are poisonings or overdoses.

†AAPCC data for 2012 and 2013 are considered preliminary because it is possible that a poison center may update a case anytime during the year if new information is obtained. In the fall of each year, the data for the previous year is locked, and no additional changes are made.

SOURCES: Adapted by CESAR from the American Association of Poison Control Centers (AAPCC), *Synthetic Marijuana Data June 30,2013*, 2013. Online at https://aapcc.s3.amazonaws.com/files/library/Synthetic_Marijuana_Data_for_Website_6.30.2013.pdf; and AAPCC, *Bath Salts Data June 30, 2013*, 2013. Online at https://aapcc.s3.amazonaws.com/files/library/Bath_Salts_Data_for_Website_5.31.2013.pdf.

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CESAR FAX

August 19, 2013
Vol. 22, Issue 33

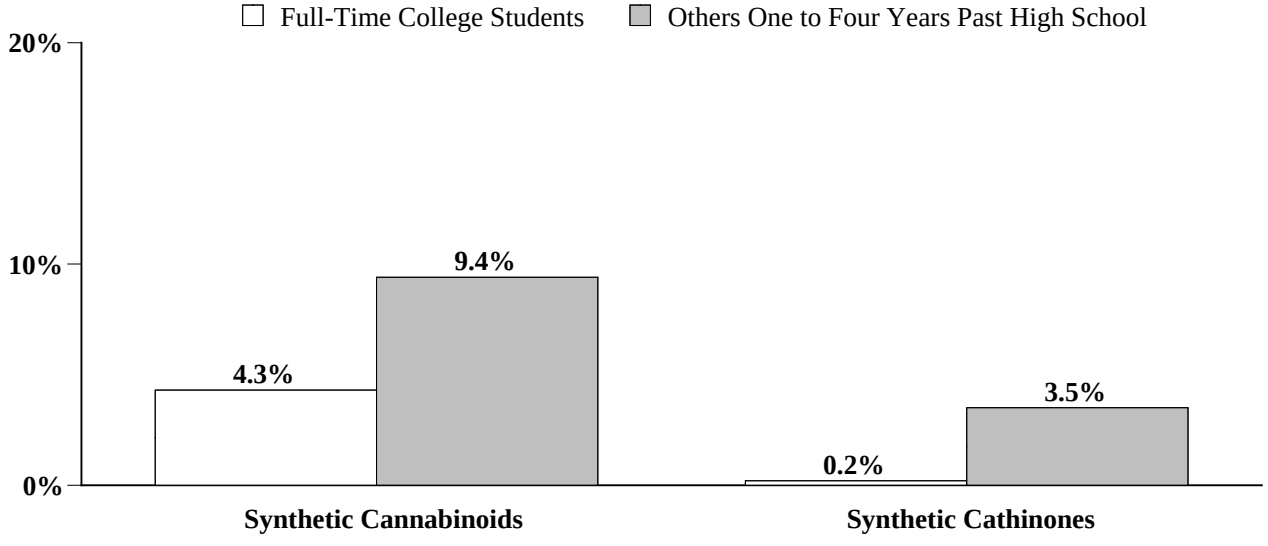
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Full-Time College Students Less Likely to Use Synthetic Cannabinoids or Cathinones Than Other Young Adults

Young adults not in college are more than twice as likely to report using synthetic cannabinoids or synthetic cathinones than those attending college full time, according to the most recent data from the national Monitoring the Future survey. Nearly one in ten high school graduates who were one to four years out of high school reported using synthetic cannabinoids, also known as spice or K2, in the past year, compared to 4.3% of full-time college students. Similarly, 3.5% of young adults not attending college reported using synthetic cathinones, also known as bath salts, compared to 0.2% of full-time college students. While there are currently 18 synthetic cannabinoids and 3 synthetic cathinones illegal at the federal level, these laws are often circumvented by the production, sale, and use of new synthetic cannabinoid and cathinone metabolites not covered by current legislation.

Young Adults Not in College More Than Twice As Likely to Report Past Year Synthetic Cannabinoid or Synthetic Cathinone Use As Full-Time College Students*, 2012



*Full-time college students were defined as persons one to four years past high school who said they were taking courses as full-time students in a two- or four-year undergraduate college at the beginning of March 2012.

SOURCE: Adapted by CESAR from Johnston, L.D., O'Malley, P.M., Bachman, J.G., and Schulenberg, J.E., *Monitoring the Future National Survey Results on Drug Use, 1975-2012, Volume 2: College Students and Adults Ages 19-50*, 2013. Available online at http://www.monitoringthefuture.org//pubs/monographs/mtf-vol2_2012.pdf.

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CESAR FAX

August 26, 2013
Vol. 22, Issue 34

A Weekly FAX from the Center for Substance Abuse Research

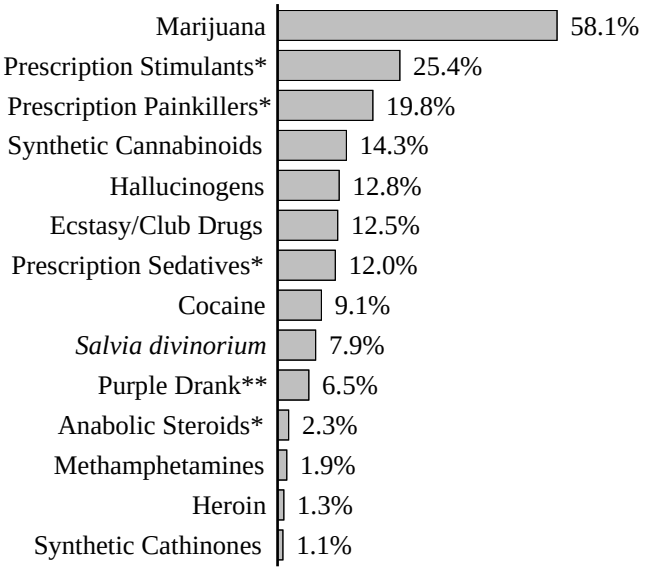
University of Maryland, College Park

Despite Intense Media Attention, Study Finds Bath Salts Rarely Used by College Students at a Large Southeastern University

"Despite extensive media coverage and the products continuing to be sold in local stores, use of synthetic cathinones was extremely rare in a random sample of young adults and was dwarfed by other novel drugs," according to data from a survey of college students at a large southeastern university. Less than 1% of the students reported ever using synthetic cathinones, also known as bath salts—substantially less than those reporting lifetime use of other novel drugs, such as synthetic cannabinoids (14.3%), *Salvia divinorium* (7.9%), or purple drank (6.5%). The drugs most commonly used by college students were marijuana and prescription stimulants and painkillers used nonmedically (see figure below). In light of their findings, the authors suggest that "the media attention focusing on synthetic cathinone use as a growing epidemic may be largely misplaced." Other national surveys of drug use in the past year† have found similarly low rates of bath salt use among high school students, college students, and young adults not in college.

Percentage of College Students At a Large Southeastern University Reporting Lifetime Use of Substances Other Than Alcohol and Tobacco, 2012

(N=2,349)



†See *CESAR FAX*, Volume 22, Issues 17, 28, and 33.

*Questions specified recreational use and excluded use for legitimate medical issues.

**Purple Drank typically refers to a mixture of codeine cough syrup, soda, and candy, with or without alcohol. Respondents were asked if they had "ever used 'purple drank' or mixed cough syrup with alcohol".

NOTE: With the exception of heroin, lifetime use of each drug was reported by a significantly larger portion of the sample than was synthetic cathinones ($P<0.01$).

SOURCE: Adapted by CESAR from Stogner, J.M. and Miller, B.L., "Investigating the 'Bath Salt' Panic: The Rarity of Synthetic Cathinone Use Among Students in the United States," *Drug and Alcohol Review*, Early View, May 29, 2013. For more information, contact Dr. John Stogner at stogner@email.unc.edu.

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CESAR FAX

September 23, 2013
Vol. 22, Issue 38

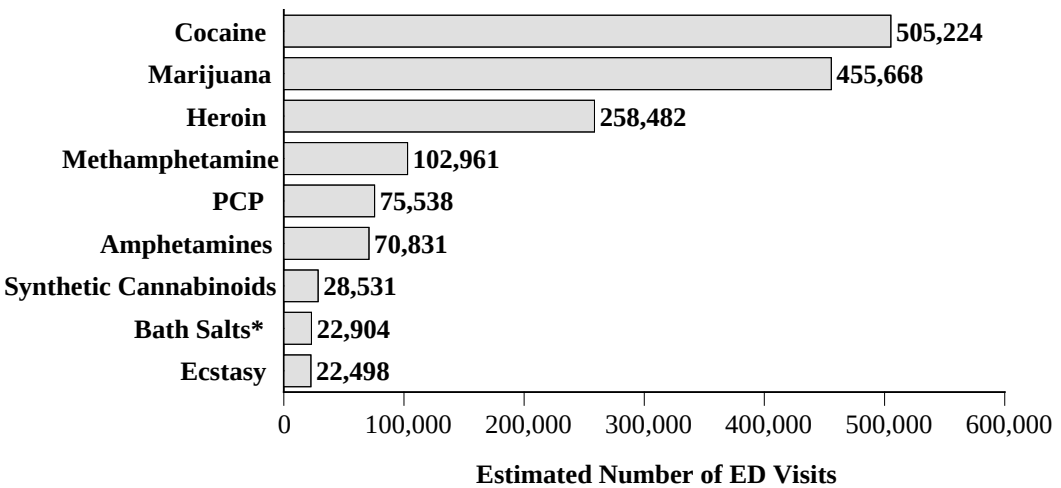
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Cocaine, Marijuana, and Heroin Have Highest Rates of U.S. Emergency Department Illicit Drug-Related Visits

Of the estimated 2.5 million emergency department (ED) visits for drug misuse or abuse, one-half—nearly 1.3 million—involved illicit drugs, according to the most recent data from the national Drug Abuse Warning Network (DAWN). The majority of these visits involved cocaine (505,224) and marijuana (455,668), followed by heroin (258,482). The estimated number of visits related to methamphetamine, PCP, and amphetamine use ranged from approximately 71,000 to 103,000, while those related to the use of synthetic cannabinoids, bath salts, and ecstasy ranged from around 22,500 to 28,500 (see figure below). All other illicit drugs had less than 11,000 visits per year.

Estimated Rate (per 100,000 population) of U.S. Emergency Department (ED) Visits Involving Illicit Drugs, 2011



*The category Amphetamines also includes Bath Salts.

NOTES: Estimates of ED visits are based on a "nationally representative sample of general, non-Federal hospitals operating 24-hour EDs, with oversampling of hospitals in selected metropolitan areas" (p. 7). "Drugs that DAWN considers to be illicit yet have legitimate medicinal uses include amphetamines; ketamine; and anesthetic gases, such as nitrous oxide ('laughing gas'). DAWN Field Reporters are careful to distinguish abuse from adverse reactions when classifying visits involving these drugs" (p. 25). Bath salts include substances that were specifically documented as 'bath salts' in the ED records. "Heroin-related ED visits may be slightly underestimated. When drugs related to an ED visit are determined through toxicology tests, heroin metabolites are indistinguishable from other opiates unless a test specifically for the heroin metabolite is conducted. In the absence of this test, or if there is no evidence in the written record that heroin, specifically, was involved, the visit will be grouped with pharmaceuticals labeled "unspecified opiates" and not classified as heroin, an illicit drug" (p. 25).

Editor's Note: Synthetic cannabinoid-related ED visits may also be underestimated for the same reason as heroin. As noted in a 2012 DAWN Report, "Because of limited availability of tests for synthetic cannabinoids, data collection efforts in the ED may have missed visits in which they were involved." (p. 4).

SOURCE: Adapted by CESAR from Substance Abuse and Mental Health Services Administration (SAMHSA), *Drug Abuse Warning Network, 2011: National Estimates of Drug-Related Emergency Department Visits*, 2013. Available online at http://www.samhsa.gov/data/DAWN.aspx.

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CESAR FAX

September 30, 2013
Vol. 22, Issue 39

A Weekly FAX from the Center for Substance Abuse Research

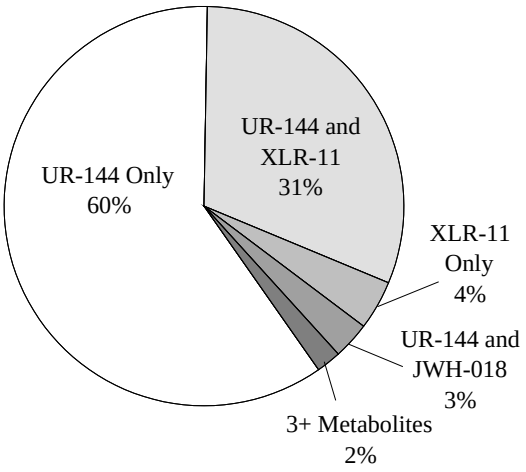
University of Maryland, College Park

CESAR Pilots New Community Drug Early Warning System in Criminal Justice System; Finds Synthetic Cannabinoids in All Populations Studied

Emerging drugs of abuse in communities can be rapidly identified by an innovative urine testing system, according to the results of a recently released ONDCP-funded pilot study of the Community Drug Early Warning System (CDEWS). CDEWS is designed to detect emerging drugs by re-testing urine specimens collected by traditional criminal justice system (CJS) drug testing programs, and examining them for emerging drugs of abuse, such as synthetic cannabinoids (SC). The CDEWS model is based on the premise that emerging drugs of abuse often show up in high-risk CJS populations before other persons in the community. In the pilot study, 1,064 anonymous urine specimens from five CJS populations in Washington, DC; Prince George's County, Maryland; and Chesterfield, Virginia were sent to an independent laboratory for testing for an expanded CDEWS panel of more than 30 prescription and illicit drugs. In addition, approximately one-half (56%) of these specimens were sent to a second independent laboratory for testing for 12 SC metabolites.

- SCs were detected in the specimens from all participating sites in the District of Columbia, Maryland, and Virginia. Furthermore, all of the SC positive specimens contained one or two of the metabolites (UR-144 and XLR-11) recently identified and added to the federal schedule of prohibited SC metabolites after this study began (see figure).
- SCs were most likely to be detected in younger men. What was not expected was the level of use that was found. For example, one-quarter to one-third of young men in the three populations studied in DC tested positive for SC.
- Unlike other prescription and illicit drugs, SCs were as likely to be found in persons who had failed the limited CJS screen as in persons who had passed. In other words, current drug testing screens which do not test for SCs are likely missing significant drug use (and users) in the populations they monitor. One possibility is that persons who know they will be tested use SC products because they know that the drug is not included in most test panels.

Metabolites Found in All Synthetic Cannabinoid Positive Specimens from Five CJS Populations, 2013
(N=118)



The results demonstrate that CDEWS could be successfully implemented in diverse criminal justice populations, including arrestees, probationers and parolees, and drug court participants and proved its unique ability to uncover emerging drug trends. The findings from this pilot study suggest that CJS drug testing programs should weigh the value of adding SC metabolites to their testing protocols and adopting an annual CDEWS type of process for reviewing and updating the drugs included in their testing protocols. Hospital, physician, military, and workplace testing programs should also consider expanded testing of urine specimens to accurately identify drugs recently used. Finally, the high level of SC use detected suggests that local public health systems should implement targeted prevention campaigns to educate the public, especially youth and young adults, about the rapidly changing ingredients in products sold as synthetic cannabinoids and the potential harm that can result from their use. Plans are currently being developed to expand CDEWS to additional sites.

SOURCE: Adapted by CESAR from Wish, E.D., Artigiani, E.E. and Billing, A. S, *Community Drug Early Warning System: The CDEWS Pilot Project*, Office of National Drug Control Policy (ONDCP), 2013. Available online at http://www.whitehouse.gov/sites/default/files/finalreport_with_cover_09172013.pdf. For more information, contact Dr. Eric D. Wish at ewish@umd.edu. Also see the *CESAR FAX Synthetic Cannabinoid Series* at http://www.cesar.umd.edu/cesar/pubs/SyntheticCannabinoidCESARFAX.pdf.

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CESAR FAX

October 7, 2013
Vol. 22, Issue 40

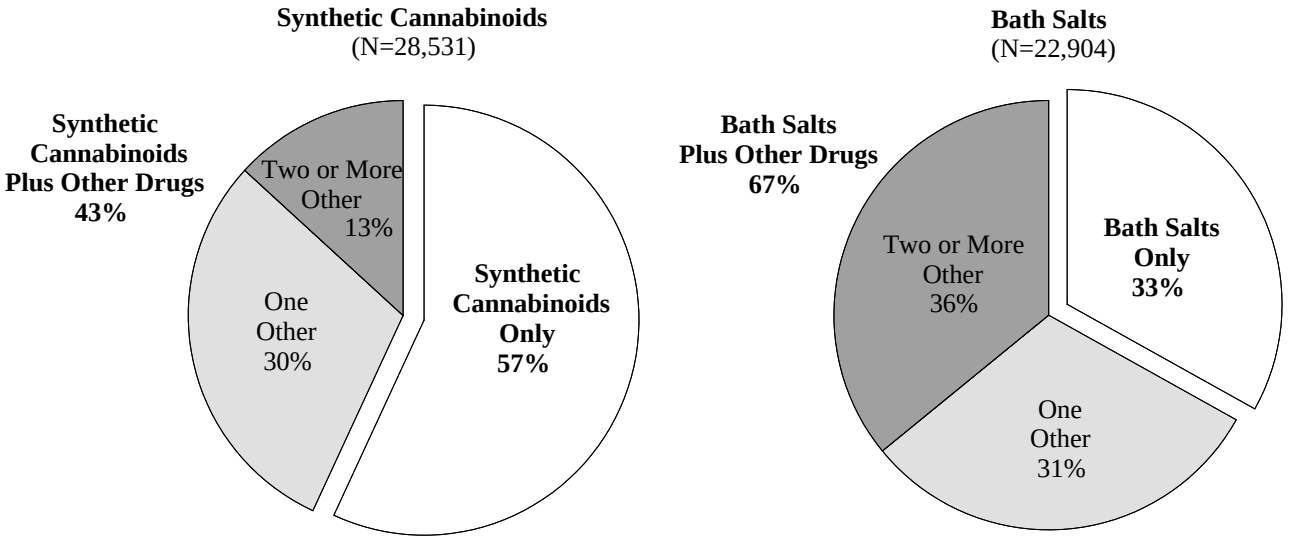
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

More Than Half of Synthetic Cannabinoid-Related Emergency Department Visits Involve No Other Drugs; Bath Salt-Related Visits More Likely to Involve Multiple Substances

The majority of synthetic cannabinoid-related emergency department visits in 2011 involved no other drugs, according to recently released data from the national Drug Abuse Warning Network (DAWN). Of the estimated 28,531 ED visits involving a synthetic cannabinoid product[1], 57% were for synthetic cannabinoids alone, and only 13% involved two or more substances in addition to the synthetic cannabinoids. In contrast, only one-third (33%) of the estimated 22,904 bath salt-related ED visits involved bath salts[2] alone, while more than one-third (36%) involved two or more substances combined with bath salts—nearly three times the rate for synthetic cannabinoid-related ED visits involving two or more other substances.

Estimated Percentage of U.S. Emergency Department Visits Involving Synthetic Cannabinoids and Bath Salts Alone and With Other Drugs, 2011



[1]The synthetic cannabinoid drug category was introduced in 2010. In the 2010 DAWN report, the authors note that "because of limited availability of tests for synthetic cannabinoids, data collection efforts in the ED may have missed visits in which they were involved" (p. 4).

[2]The bath salt drug category was introduced in 2011 and includes only substances that were specifically documented as 'bath salts' in the ED records.

SOURCE: Adapted by CESAR from data from the Substance Abuse and Mental Health Data Archive, online analysis of the 2011 Drug Abuse Warning Network (DAWN) data set, conducted 9/18/2013. The SAMHDA is available online at http://www.icpsr.umich.edu/SAMHDA.

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CESAR FAX

October 14, 2013
Vol. 22, Issue 41

A Weekly FAX from the Center for Substance Abuse Research

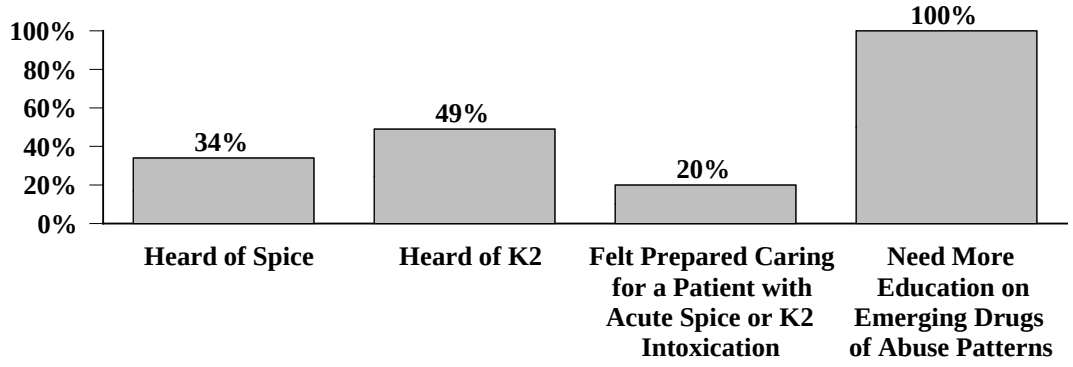
University of Maryland, College Park

Only One-Fifth of Physicians in an Urban Emergency Department Felt Prepared to Treat Patients with Synthetic Marijuana Intoxication in 2010

During a period of growth in the use of synthetic cannabinoids, emergency department physicians were unfamiliar and inexperienced with the nature and effects of the substances, according to a 2010 internet-based survey of emergency physicians at a large urban emergency department. Synthetic cannabinoid (SC) products, also known as Spice or K2, were first identified in the U.S. in December 2008 and there were an estimated 11,206 emergency department visits related to SC use in 2010. Despite the growing prevalence of SC use, less than half of the emergency physicians (EPs) surveyed in December 2010 had ever heard of Spice (34%) or K2 (49%), and only 20% felt they were prepared to take care of a patient with acute Spice or K2 intoxication (see figure below). Even those with some knowledge of SC had misconceptions about the nature of these drugs and their effects. For example, 25% were not aware that Spice or K2 were synthetic drugs and 47% said that they would not expect to see anxiety, sedation, or psychosis in a patient who had used SC—all potential symptoms of SC intoxication (data not shown). While EPs likely have more knowledge of SC now than they did at the time of the survey, the findings illustrate the difficulty physicians face when treating patients who are using any new drugs of abuse. The medical literature on the effects and complications of using novel drugs is typically limited, leaving physicians to rely on other sources of information, such as lay publications, the internet, patients, and colleagues. The authors suggest that "[w]ith the seemingly limitless designer drug compounds available for use and with no information on relative toxicity of each compound, [the] connection to toxicologists, poison centers, or other experts in emerging drugs of abuse will be crucial to EPs dealing with the constantly changing world of designer drugs" (p. 469).

Emergency Department Physicians (EPs) Knowledge of Synthetic Cannabinoids, 2010

(N=71 EPs at a large urban emergency department)



NOTES: Data are from a self-administered, anonymous, voluntary, internet-based survey in December 2010 of resident and attending EPs at a large academic urban emergency department with an annual volume of approximately 85,000 visits. The study is limited by having a small sample size and being performed in a single study center.

SOURCE: Adapted by CESAR from data from Lank, P.M., Pines, E., Mycyk, M.B., "Emergency Physicians' Knowledge of Cannabinoid Designer Drugs," *Western Journal of Emergency Medicine* 14(5):467-470, 2013. For more information, contact Dr. Patrick Lank at patrick.lank@gmail.com.

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CESAR FAX

January 13, 2014
Vol. 23, Issue 2

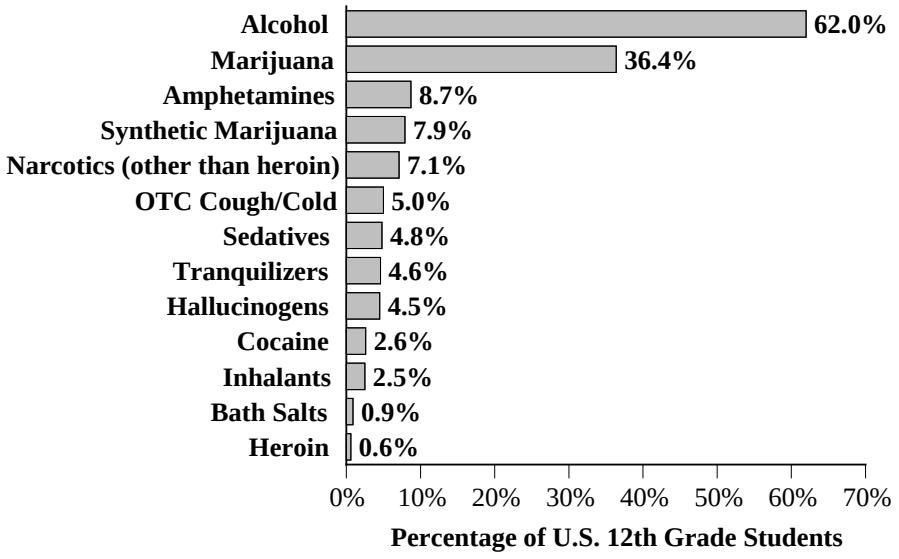
A Weekly FAX from the Center for Substance Abuse Research

University of Maryland, College Park

Alcohol and Marijuana Most Prevalent Drugs Used by U.S. 12th Graders; Use of Bath Salts and Heroin Extremely Rare

Alcohol and marijuana are the most prevalent drugs used by 12th graders in the past year, according to data from the 2013 national Monitoring the Future (MTF) survey. Nearly two-thirds (62.0%) of high school seniors reported using alcohol in the past year and slightly more than one-third (36.4%) reported using marijuana. Approximately one in twelve (8.7%) reported using amphetamines, 7.9% reported synthetic marijuana use, and 7.1% reported using narcotics other than heroin. All other drugs were used by 5% or less of 12th grade students, including bath salts (0.9%) and heroin (0.6%)—both of which have received recent media attention. Only three drugs had statistically significant changes from the previous year, and all were decreases—synthetic marijuana (from 11.3% in 2012 to 7.9% in 2013), Vicodin® (from 7.5% to 5.3%), and salvia (from 4.4% to 3.4%) (data not shown). While the decrease in synthetic marijuana use is encouraging, it remains the fourth most prevalent drug used by high school seniors in the past year. According to the study's principal investigator, "synthetic drugs are particularly dangerous because their ingredients are unknown, they have not been tested for safety, and their ever-changing ingredients can be unusually powerful. Users really don't know what they are getting . . ." (p. 7).

Percentage of U.S. 12th Grade Students Reporting Past Year Use of Alcohol and Other Drugs* (Excluding Tobacco), 2013



*Amphetamines, Sedatives, Tranquilizers, and Narcotics (other than heroin) include only use ". . . on your own—that is, without a doctor telling you to take them." OTC Cough/Cold refers to use for the explicit purpose of getting high. Amphetamines include Adderall® (7.4%), Ritalin® (2.3%), crystal methamphetamine (1.1%), and methamphetamine (0.9%). Narcotics (other than heroin) include Vicodin® (5.3%) and Oxycontin® (3.6%). Hallucinogens include ecstasy (4.0%), salvia (3.4%), LSD (2.2%), and PCP (0.7%). Drugs not listed above with less than 2% prevalence were steroids (1.5%), ketamine (1.4%), GHB (1.0%), and Rohypnol® (0.9%).

SOURCE: Adapted by CESAR from University of Michigan, "American Teens More Cautious About Using Synthetic Drugs," *Monitoring the Future Press Release*, December 18, 2013. Available online at www.monitoringthefuture.org.

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CESAR FAX

September 8, 2014
Vol. 23, Issue 13

A Publication from the Center for Substance Abuse Research

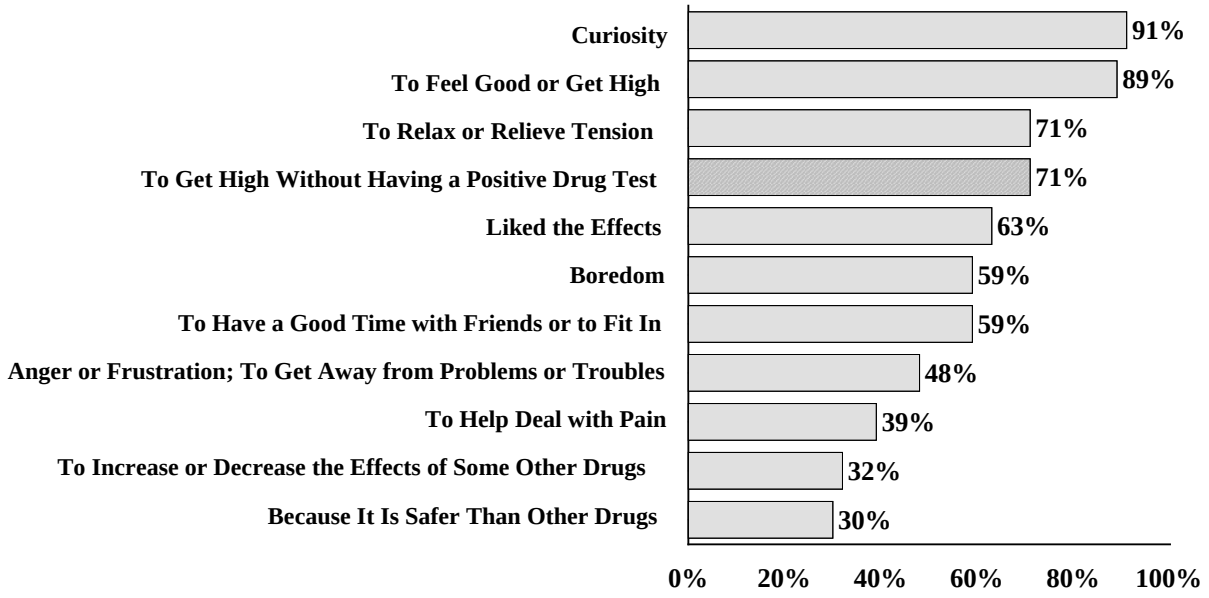
University of Maryland, College Park

Study of Patients in a Midwestern Residential Treatment Program Finds 71% of Those Reporting Synthetic Cannabinoid Use Report Using to Avoid Positive Drug Test

More than one-third (38%) of adult patients in a Midwestern substance use disorder residential treatment program reported ever using synthetic cannabinoids. Nearly all of these patients reported multiple reasons for use, with the most common being "curiosity" (91%) and "to feel good or get high" (89%). A substantial number also reported that they used synthetic cannabinoids "to relax or relieve tension" (71%) or "to get high without having a positive drug test" (71%; see figure below). Prior studies have also found that synthetic cannabinoids are used to avoid positive drug tests (see *CESAR FAX*, Volume 22, Issue 27). According to the authors, "consuming synthetic cannabinoids can complicate the treatment process, especially when urine tests do not identify all synthetic cannabinoids" (p. 2). The authors note that a limitation of their study is that it "lacked toxicology screening to verify recent substance uses or whether the substances patients reported were synthetic cannabinoids were actually synthetic cannabinoids and not another substance" (p. 3).

Self-Reported Reasons for Using Synthetic Cannabinoids

(N=150 Adult Residential Substance Use Disorder Treatment Patients Reporting Lifetime Synthetic Cannabinoid Use)



NOTE: Reasons were assessed with a checklist of 13 items developed by combining motives from Monitoring the Future's marijuana motives questions and prior research on synthetic cannabinoid use.

SOURCE: Adapted by CESAR from Bonar, E.E., Ashrafioun, L., and Ilgen, M.A, "Synthetic Cannabinoid Use Among Patients in Residential Substance Use Disorder Treatment: Prevalence, Motives, and Correlates," *Drug and Alcohol Dependence*, In Press, 2014. For more information, contact Erin Bonar at erinbona@med.umich.edu.

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CESAR FAX

March 4, 2015
Vol. 24, Issue 1 (Rev.)

A Weekly FAX from the Center for Substance Abuse Research

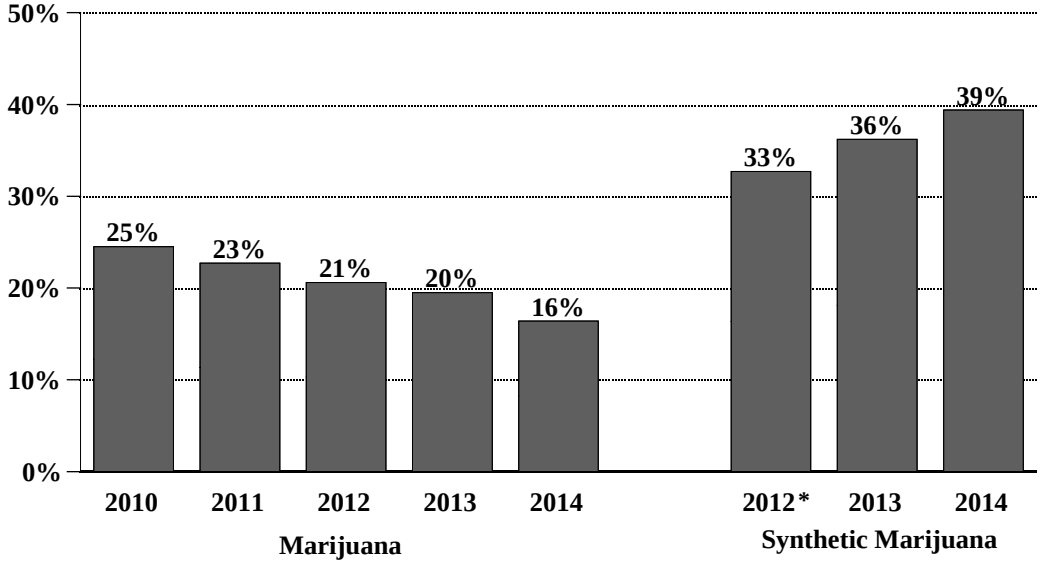
University of Maryland, College Park

U.S. 12th Graders' Perceptions of Risk from Occasional Use of Marijuana Declines, Even as Perceived Risk from Synthetic Marijuana Rises

An indicator of marijuana use, the perceived risk, is declining among U.S. 12th graders, even as the perceived risk of using synthetic marijuana increases. The percentage of high school seniors who perceived great risk from occasional use of synthetic marijuana increased from 33% in 2012 (the first year it was included) to 39% in 2014. A recent press release from the Monitoring the Future survey reported that the side effects of using synthetic marijuana are numerous, and may include acute psychosis and heart attack, in addition to other effects noted in two previous *CESAR FAX* issues (see Volume 20, Issue 17 and Volume 22, Issue 7). These findings are important because prior surveys have found marijuana use increases as perceived risk declines (see *CESAR FAX*, Volume 22, Issue 2).

Editor's Note: The original survey used the term "synthetic marijuana". CESAR uses the term synthetic cannabinoids instead because synthetic cannabinoid products typically consist of plant material treated with chemicals that may or may not have effects on the brain similar to those from marijuana.

Percentage of U.S. 12th Graders Reporting that Occasional Use of Marijuana or Synthetic Marijuana Results in a Great Risk of Harm (Physically or in Other Ways), 2010-2014



*The Monitoring the Future survey first included questions about synthetic marijuana in 2012.

SOURCE: Adapted by CESAR from Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E., "Use of Alcohol, Cigarettes, and a Number of Illicit Drugs Declines Among U.S. Teens," *Monitoring the Future Press Release*, December 16, 2014. Available online at http://www.monitoringthefuture.org//pressreleases/14drugpr_complete.pdf.

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CESAR FAX

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A Publication from the Center for Substance Abuse Research

University of Maryland, College Park

New CDEWS Study Finds Synthetic Cannabinoids (SC) in Adults and Juveniles in Washington, DC, Denver and Tampa

The Community Drug Early Warning System (CDEWS) provides information about emerging drug use in local communities by sampling anonymous urine specimens that were previously collected by a criminal justice agency and tested for a limited panel of drugs and are ready to be discarded. CDEWS re-tests the specimens for an expanded panel of more than 75 drugs. The second CDEWS study (CDEWS-2) again collected specimens from adult parolees/probationers in Washington, DC and for the first time also analyzed specimens from juveniles in the criminal justice system. Other criminal justice sites included Denver, Colorado (adults), and Tampa, Florida (juveniles). Key findings from the CDEWS-2 report, released May 13th by the Office of National Drug Control Policy and available on their website, include:

- **The types of SC metabolites detected vary considerably by site.** While SC-positive specimens for Tampa juveniles contained only one metabolite (UR-144), specimens from adults and juveniles in DC and adults in Denver contained as many as 10 different metabolites.
- **DC juveniles may be using different formulations of SC than DC adults.** SC was detected in specimens from DC juveniles of all ages from 13-17. However, SC-positive specimens from DC juveniles contained a larger variety of SC metabolites than those from DC adults, including AB-PINACA (13% of SC-positive specimens).
- **SC metabolites detected have changed in the one year since the first study.** Two newly discovered SC metabolites (PB-22 and 5F-PB-22) not available for testing in the first CDEWS study in Washington, DC, were identified in 41% and 13%, respectively, of the SC-positive specimens from adult DC parolees/probationers in CDEWS-2.
- **SC metabolites are often found in specimens that test negative for drugs in standard CJS drug screens.** For example, a substantial number of the 21-30 year old male probationers from DC who had passed the standard local CJS screen tested positive for SC.

The CDEWS-2 results attest to the value of expanded testing of specimens already collected by local CJS drug testing programs and the difficulties inherent in keeping up with the constantly evolving nature of new psychoactive substances (NPS) such as SC. The results suggest that many adults and juveniles in local CJS drug testing programs likely turn to SC to avoid detection. It is also likely that programs using similar protocols to test urine specimens in other contexts, such as schools, workplaces, accident investigations, hospitals, and treatment programs, are missing SC use in their populations, leading to lost opportunities for diagnosis and intervention.

SOURCE: Adapted by CESAR from Wish, E.D., Billing, A.S., and Artigiani, E.E., *Community Drug Early Warning System: The CDEWS-2 Replication Study*, Office of National Drug Control Policy (ONDCP), 2015. Available online at https://www.whitehouse.gov/sites/default/files/ondcp/policy-and-research/finalreport_4_8_15v3.pdf. For more information, contact Dr. Eric D. Wish at ewish@umd.edu. Also see the *CESAR FAX Synthetic Cannabinoid Series* at http://www.cesar.umd.edu/cesar/pubs/SyntheticCannabinoidCESARFAX.pdf.

Want a CDEWS Study in Your Area? If interested, please contact Dr. Eric D. Wish at ewish@umd.edu.

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CESAR FAX

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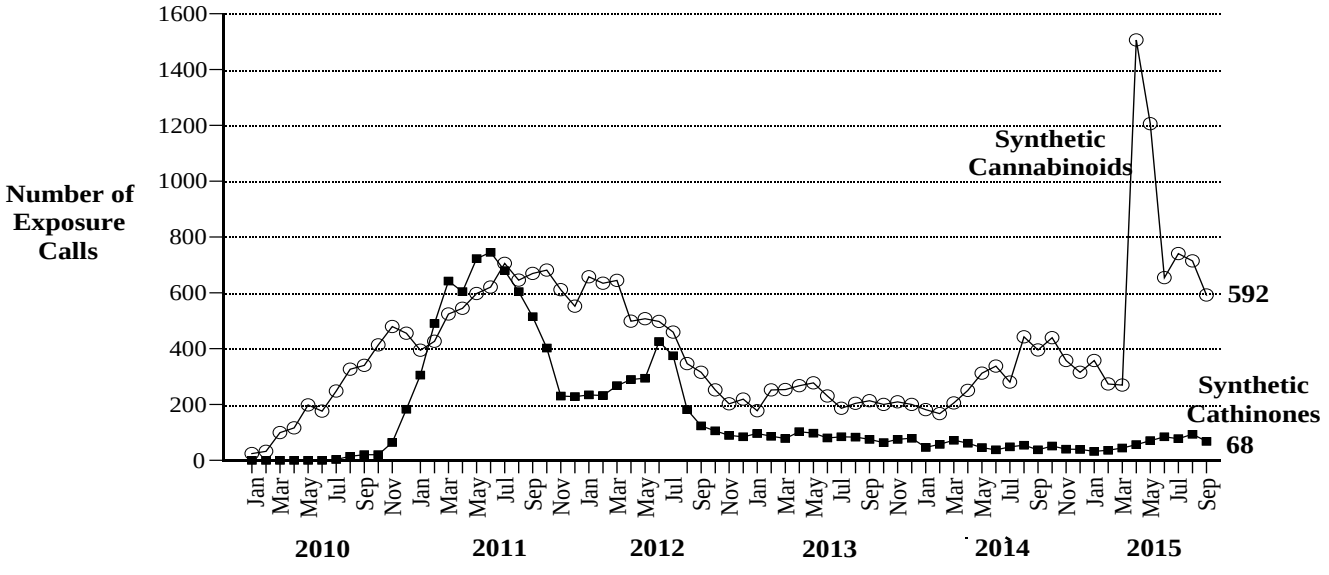
A Publication from the Center for Substance Abuse Research

University of Maryland, College Park

Number of Synthetic Cannabinoid Exposure Calls to U.S. Poison Control Centers Spike in 2015; Synthetic Cathinone Calls Remain at Low Levels Since 2011

The number of calls to U.S. poison control centers for human exposure to synthetic cannabinoids reached 1,506 during the month of April 2015, an increase of over 450 percent from the previous month, according to data from the National Poison Data System (NPDS) of the American Association of Poison Control Centers (AAPCC). After peaking at 705 in July 2011, the number of calls involving synthetic cannabinoids declined gradually during 2012, then remained relatively stable in 2013 at around 200 calls per month. Synthetic cannabinoid calls increased briefly in 2014, then declined to 269 in March 2015 before spiking to 1,506 in April. The number of synthetic cannabinoid calls have since declined to 592 in September of this year. In contrast, the number of calls for exposure to synthetic cathinones, also known as bath salts, have remained stable at lower levels for the last three years. Synthetic cathinone calls peaked in 2011 (at 745) and again in 2012 (at 425), and have averaged 55 cases per month since the beginning of 2014. Information about poison control center exposure calls, including regularly updated call data, is available at www.aapcc.org.

Number of Calls to U.S. Poison Control Centers Involving Human Exposure to Synthetic Cannabinoids or Synthetic Cathinones, January 2010-September 2015



NOTES: The term human exposure means someone has had contact with the substance in some way; for example, ingested, inhaled, absorbed by the skin or eyes, etc. Not all exposures are poisonings or overdoses.

AAPCC data for 2014 and 2015 are considered preliminary because it is possible that a poison center may update a case anytime during the year if new information is obtained. In the fall of each year, the data for the previous year are locked, and no additional changed are made.

SOURCE: Adapted by CESAR from the American Association of Poison Control Centers (AAPCC), S*ynthetic Cannabinoid Data: September 30, 2105*, 2015; and AAPCC, *Bath Salts Data: September 30, 2015*, 2015. For more information, contact Naya McMillan at mcmillan@aapcc.org.

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