

Vaping Marijuana and Synthetic Marijuana

Background:

Marijuana used in newer methods such as dabbing, vaping, and/or consuming edibles have higher rates of THC. The health impact of these higher concentrations of THC are not fully understood.^{1,2,3,4}

Synthetic “marijuana” often referred to as K2, spice, and spike are not actually cannabis, but are plant material that is sprayed with laboratory produced chemicals or can be produced in a liquid for vaping.^{5,6}

Health Effects of Marijuana:

- Since marijuana contains many of the same compounds as tobacco, it has the same adverse effects on the respiratory system as tobacco.
 - These include chronic cough, respiratory infections, and bronchitis.⁷
 - Long term emphysema and lung cancer are among its effects.⁸
- In fact, smoking marijuana is more harmful than tobacco for two reasons:
 - Marijuana contains more tar and carcinogens than tobacco
 - Marijuana smokers tend to inhale more deeply and for a longer period of time as compared to tobacco smokers.
- Marijuana use also has adverse short and long-term effects on the cardiopulmonary system.
 - Marijuana raises the heart rate by 20-100 percent shortly after smoking; this effect can last up to three hours.
 - In one study, it was estimated that marijuana users had a 4.8-fold increase in the risk of heart attack in the first hour after smoking the drug.
 - This elevated risk may be due to increased heart rate as well as the effects of marijuana on heart rhythms, causing palpitations and arrhythmias. This risk may be greater in older individuals or in those with cardiac vulnerabilities.
 - Marijuana use has been found to increase blood pressure and heart rate and to decrease the oxygen-carrying capacity of the blood.⁹

Youth Rates of Vaping Marijuana:

- In a 2016 survey of youth from around the nation including 20,675 6th through 12th graders, the CDC analyzed youth rates of vaping marijuana.¹⁰
 - Key Findings:
 - 9 in 100 students vaped marijuana
 - 30 in 100 students who used electronic cigarettes in the past vaped marijuana
 - 1 in 3 US High Schoolers who use electronic cigarettes vaped marijuana or 1.7 million teens
 - 1 in 4 US Middle Schoolers have vaped marijuana or 425,000 kids.
- As the perceived risk of harm associated with marijuana is decreasing, a growing number of youth report vaping liquid hash oil, waxy forms of THC, or dried cannabis buds and leaves.¹¹

Findings from Use of Cannabis and Cannabinoids:

Synthetic Cannabinoids^{12,13}

- Synthetic cannabinoids can affect your brain more powerfully than cannabis.
- Symptoms can include nausea, anxiety, paranoia, brain swelling, seizures, hallucinations, aggression, heart palpitations or chest pains.

High concentrations of THC can^{1,2,3,4}

- Impair judgement and coordination
- Lead to poisonings
- Increase risk of acute psychosis
- Increase risk of addiction
- Increase risk of car crashes and other injuries

Vaping and Concentrates

- Vaping marijuana can be more appealing to adults and youth for several reasons:^{10,14,15}
 - Vaping produces less odor
 - It may be easier to access in States with legal retail marijuana
 - Perception and social norming that vaping marijuana is safe and leads to fewer lung and cardiac problems than smoking
 - Celebrities and professional athletes have endorsed use of cannabis in vape pens which further normalizes and reduces perception of harm.
- Due to inhalation, drug concentrations move to the brain faster and at higher levels. This can result in an increase in compulsive and addictive behaviors.¹⁵
- THC concentrations of vaporized hash oil and waxes can exceed that of dried cannabis by four to thirty times.¹⁶
- Vaping can circumvent laws that restrict public smoking.¹⁵
- The vaping tools and high temperatures required to vaporize cannabis can expose you to toxic substances.¹⁴
- Vaping cannabis at higher levels and with increased speed of impact can result in increased rates of addiction.¹⁵

Second Hand Marijuana Smoke:

Marijuana smokers risk exposing others to secondhand smoke, which can be a health hazard:

- Marijuana smoke contains significantly higher levels of toxic compounds including ammonia and hydrogen cyanide than tobacco smoke.¹⁷
- Ammonia levels were 20 times higher in marijuana smoke than in tobacco smoke
- Nitrogen oxides, hydrogen cyanide, and aromatic amines were present at levels 3 to 5 times higher in marijuana smoke than in mainstream tobacco smoke.¹⁷

While research in the health impacts of cannabis vapor is not fully understood there are factors to consider.^{14,15}

- Vaping cannabis may circumvent existing laws around smoking in public
- Vaping cannabis produces less odor and smoke
- Vaping cannabis may expose persons to toxic substances

- ¹ Peggy van der Pol, Nienke Liebrechts, Tibor Brunt, Jan van Amsterdam, Ron de Graaf, Dirk J. Korf, Wim van den Brink, and Margriet van Laar. 2014. "Cross-sectional and prospective relation of cannabis potency, dosing and smoking behavior with cannabis dependence: an ecological study." *Addiction*. 109(7):1101-1109.
- ² Rebecca L. Hartman, and Marilyn A. Huestis. 2013. "Cannabis effects on driving skills." *Clin Chem*. 59(3):478-492. doi:10.1373/clinchem.2012.194381. (Reviewed in: National Academies of Sciences, Engineering and Medicine. 2017. *The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research*. Washington, DC: The National Academies Press. P. 227-230).
- ³ Centers for Disease Control and Prevention (CDC). (2017). Frequently Asked Questions: What determines how marijuana affects an individual? Retrieved from <https://www.cdc.gov/marijuana/faqs.htm>
- ⁴ Di Forti, M., A. Marconi, E. Carra, S. Fraietta, A. Trotta, M. Bonomo, F. Bianconi, P. Gardner-Sood, J. O'Connor, M. Russo, S. A. Stilo, T. R. Marques, V. Mondelli, P. Dazzan, C., Pariante, A. S. David, F. Gaughran, Z. Atakan, C. Iyegbe, J. Powell, C. Morgan, M., Lynskey, and R. M. Murray. 2015. Proportion of patients in South London with first episode psychosis attributable to use of high potency cannabis: A case-control study. *The Lancet Psychiatry* 2(3):233–238. (Reviewed in: National Academies of Sciences, Engineering and Medicine. 2017. *The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research*. Washington, DC: The National Academies Press. P.294).
- ⁵ National Academies of Sciences, Engineering, and Medicine. 2017. *The health effects of cannabis and cannabinoids: Current state of evidence and recommendations for research*. Washington, DC: The National Academies Press.
- ⁶ Centers for Disease Control and Prevention. (2017). Synthetic marijuana: a dangerous drug at a cheap price. Retrieved from https://www.cdc.gov/nceh/hsb/synthetic_marijuana.htm
- ⁷ Want to know more? Some FAQs about marijuana. National Institute on Drug Abuse. <http://www.drugabuse.gov/publications/marijuana-facts-parents-need-to-know/want-to-know-more-some-faqs-about-marijuana>. Updated March 2014. Accessed July 10, 2012.
- ⁸ How Does Marijuana Affect Your Brain and Body? National Institute on Drug Abuse. <http://www.drugabuse.gov/publications/research-reports/marijuana/how-does-marijuana-use-affect-your-brain-body>. Accessed September 23, 2014. *Brain*. 2012 Jul;135(7):2245-55. Accessed June 4, 2012. <http://www.ncbi.nlm.nih.gov/pubmed?term=effect> of long-term cannabis use and zalesky.
- ⁹ 39. Mittleman MA, Lewis RA, Maclure M. Triggering myocardial infarction by marijuana. *Circ*. 2001;103(23): 2805-9.
- ¹⁰ **Journal:** K.F. Trivers et al. *Prevalence of cannabis use in electronic cigarettes among US youth*. *JAMA Pediatrics*. Published online September 17, 2018. doi:10.1001/jamapediatrics.2018.1920.
- ¹¹ See generally Lloyd D. Johnson et al., *Monitoring the Future: National Results on Adolescent Drug Use* 12, Nat'l Inst. Health (2018), <http://monitoringthefuture.org/pubs/monographs/mtf-overview2017.pdf>.
- ¹² Centers for Disease Control and Prevention (CDC). 2017. "Frequently Asked Questions: How harmful is K2/Spice (synthetic marijuana or synthetic cannabinoids)?" cdc.gov Accessed August 14, 2017. <https://www.cdc.gov/marijuana/faqs.htm>
- ¹³ Robert J. Tait, David Caldicott, David Mountain, Simon L. Hill, and Simon Lenton. 2016. "A systematic review of adverse events rising from the use of synthetic cannabinoids and their associated treatment." *Clinical Toxicology* 54(1):1-13.
- ¹⁴ California Cannabis Health Information Initiative, Safe and Responsible Use of Cannabis. https://www.cdph.ca.gov/Programs/DO/letstalkcannabis/CDPH%20Document%20Library/CDPH-Safe-Responsible_0901.pdf#search=vaping%20marijuana. Accessed on January 9, 2019.
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- ¹⁶ Meghan E. Morean et al., *High School Students' Use of Electronic Cigarettes to Vaporize Cannabis*, 136 *Pediatrics* 611 (2015), <http://pediatrics.aappublications.org/content/136/4/611.long>.
- ¹⁷ *Marijuana Smoke Contains Higher Levels of Certain Toxins Than Tobacco Smoke*, Science Daily (Dec. 18, 2007), <http://sciencedaily.com/releases/2007/12/071217110328.htm>; David Moir et al., *A Comparison of Mainstream and Sidestream Marijuana and Tobacco Smoke Produced Under Two Machine Smoking Conditions*, *Chemical Research In Toxicology* (2008), <http://www.ukcia.org/research/ComparisonOfSmoke.pdf>.