

Testimony before the United States Sentencing Commission

A hearing on

Synthetic Cannabinoids

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Statement of

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Introduction

I would like to express my appreciation to Kathleen C. Grilli and Charles S. Ray for this opportunity to speak on behalf of medical first responders regarding the impact synthetic cannabinoids have on our communities and medical resources.

As self-introduction: I am a Licensed Paramedic with the state of Texas, a certified Texas EMS Instructor, and a certified Flight Paramedic. For the last 21 years, I have been employed with University Medical Center's Emergency Medical Service (UMC EMS) in Lubbock, Texas. Initially, I started as a Field Paramedic and over time advanced into my current position as the service's Training Chief.

UMC EMS is the sole 9-1-1 emergency medical service for the city of Lubbock, serving a population of 252,000 within the city alone. This service responds to over 63,000 calls per year and provides care at the MICU level (Mobile Intensive Care Unit, staffed with at least one paramedic per ambulance). I work closely with our field staff of about 150 fulltime paramedics and emergency medical technicians (EMTs), oversee the Quality Assurance/Improvement process, and offer education to not only our own staff, but across Texas through our outreach programs.

As part of our statewide UMC EMS outreach education program, my training staff and I have been educating other healthcare providers, public school employees, and the general public on current topics that impact life and limb. These topics include bleeding control for the injured, cardiopulmonary resuscitation (CPR), stroke recognition, and just as importantly, the effects of "legal weed" (synthetic cannabinoids) and other drugs on the individual and community.

My testimony is as an expert in the field of emergency medical services. My testimony does not reflect the official position of the University Medical Center in Lubbock, Texas or other organizations I am affiliated with through my current profession. However, I believe my comments are consistent with the values and positions held by those organizations due to the significant impact synthetic cannabinoids have on both our patients and communities as a whole.

Synthetic Cannabinoids: Perceptions and Confusion

Across most of the nation, a prevailing notion suggests that drug problems do not occur within our own home communities. Instead, they happen elsewhere... in the dark alleys of bigger cities or poverty-stricken ghettos hundreds of miles away. Reality is: Drug problems are everywhere, and not limited to just a small subset of illegal drug abusers. Synthetic cannabinoids and other forms of mind-altering substances slip through the cracks of legislation and continue to infiltrate the daily lives of our community, friends, and even family. Many feel powerless to control this growing problem that indiscriminately steals the health and lives of both children and adults.

To add to the dilemma, confusion exists about specific terminology and its implication on what is or is not legal. There is a stark difference between “legal weed” (synthetic cannabinoids) and cannabinoids produced by the *Cannabis sativa* plant, commonly known as marijuana. In addition, every person naturally produces endocannabinoids. These are substances that target cannabinoid receptors located throughout the central nervous system and specific areas of the body as part of a normal regulatory response. Both externally and internally-produced sources of cannabinoids target the same receptors.

Through high-performance liquid chromatography and gas chromatography, approximately 500 natural components have been discovered in the *Cannabis sativa* plant.¹ Of the over 100 identified cannabinoid compounds, only a few have a notable effect on cannabinoid receptors within the human brain and central nervous system that cause the well-known euphoric affect associated with marijuana use. Synthetic cannabinoids, on the other hand, appear to have a greater affinity for cannabinoid receptors.^{2,3} Yet, synthetic cannabinoids do not offer a protective mechanism against psychosis, which is derived from compounds found in the marijuana plant (example: cannabidiol).⁴ In essence, synthetic cannabinoids are more harmful to the body

The term “synthetic cannabinoids” encompasses a wide range of non-Cannabis plant materials soaked or sprayed with solvents and synthetic chemical additives. Unlike other consumed or medicinal products, there is no general recipe for synthetic cannabinoids. The colorful foil packages are clearly labeled with a “not for human consumption” warning and usually state that the contents are to be used only as potpourri, incense, or even plant food. However, the consumer is well aware of the intended purpose and knows these warnings are only in place to skirt laws against certain unapproved consumable products.

The Marketplace and the Consumer

Attractive packaging and the perception of being a “safe” drug draws in children and young adults. Most synthetic cannabinoids are sold under unique names such as “Scooby Snaxs”, “Bombay Blue”, “Spice”, “24K Monkey”, “AK-47”, and “Mojo”, just to name a few. While new legislation and law enforcement are working towards halting the sale of these products, they can still be found in smoke or head shops, sold on the street, and as expected, can be purchased on the internet.

A package of synthetic cannabinoids is less expensive than marijuana and is advertised as offering the same effects without “tripping” a standard urine drug screen test.⁵ However, the product usually

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- 1 Aizpurua-Olaizola O, Soydaner U, Öztürk E, *et al.* Evolution of the cannabinoid and terpene content during the growth of cannabis sativa plants from different chemotypes. *J Nat Prod.* 2016 Feb 26;79(2):324-31. doi:10.1021/acs.jnatprod.5b00949.
 - 2 Castaneto MS, Gorelick DA, Desrosiers NA, *et al.* Synthetic cannabinoids: Epidemiology, pharmacodynamics, and clinical implications. *Drug Alcohol Depend.* 2014 Nov 1;144:12-41. doi: 10.1016/j.drugalcdep.2014.08.005.
 - 3 Ford BM, Tai S, Fantegrossi WE, *et al.* Synthetic pot: Not your grandfather's marijuana. *Trends Pharmacol Sci.* 2017 Mar;38(3):257-276. doi:10.1016/j.tips.2016.12.003.
 - 4 Weinstein AM, Rosca P, Fattore L, *et al.* Synthetic cathinone and cannabinoid designer drugs pose a major risk for public health. *Front Psychiatry.* 2017 Aug 23;8:156. doi:10.3389/fpsy.2017.00156.
 - 5 Fattore L and Fratta W. Beyond THC: The new Generation of cannabinoid designer drugs. *Front Behav Neurosci* 2011;5:60.

contains a mixture of unknown chopped, dried plant material sprayed or soaked with a chemical that may not be approved for human consumption or inhalation.⁶ There is no set recipe, and the point of manufacture ranges from small backyard labs to large unregulated factories in other countries. The extensive variety of plant materials and chemicals used in their manufacture is one reason why effective enforcement of current legislation is so difficult: The chemical composition can be changed rapidly to avoid immediate classification as a controlled substance.⁷

Many manufacturers are based in Asia and China^{6,8} and continually work towards designing new chemical compounds that achieve the same results as naturally-occurring cannabinoids. In turn, both Federal and state governments are continually updating their controlled substance schedules to include newly-developed synthetic cannabinoids. The most recent Texas legislation was enacted on September 1, 2011 (Texas Senate Bill 331), which defined a list of synthetic cannabinoids and their derivatives as controlled substances under the Texas Controlled Substances Act.⁹

Synthetic Cannabinoid's Impact on the Community

As a medical first responder, I see firsthand the impact synthetic cannabinoids have on our patients and community. Since the plant material species and chemicals are usually unknown, there is the potential for a wide variety of signs and symptoms. They can range from euphoria and sedation to the opposite end of the spectrum, mimicking methamphetamine, cocaine, or synthetic cathinones (“bath salts”). The more common presentations include severe agitation, psychosis with hallucinations, seizures, vomiting, tachycardia (rapid heart rate), severely elevated blood pressure, chest pain, hyperthermia (elevated body temperature), and/or even death. This is also reported in the literature.^{2-4,10,11} Through my observations, the signs and symptoms are very different compared to the typical presentation of a person who smoked or consumed naturally-occurring cannabinoids found in the *Cannabis sativa* plant.

But how much of a threat is a small amount of dried plant matter? At UMC EMS, we have found that synthetic cannabinoid products are continually placing our first responders and the general public at greater risk for harm. Our treatment protocols allow us to use ketamine hydrochloride for severe cases of patient violence or excited delirium, a physiological state where even the patient may be unaware of their own extreme actions. Excited delirium can kill the patient from complications such as severe hyperthermia, tachycardia, and dangerously elevated blood pressure, not to mention the potential

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- 6 Vardakou I, Pistos C, Spiliopoulou C. Spice drugs as a new trend: mode of action, identification and legislation. *Toxicol Lett.* 2010 Sep 1;197(3):157-162. doi: 10.1016/j.toxlet.2010.06.002.
 - 7 Uchiyama N, Kikura-Hanajiri R, Goda Y. Identification of a novel cannabimimetic phenylacetylindole, cannabipiperidiethanone, as a designer drug in a herbal product and its affinity for cannabinoid CB(1) and CB(2) receptors. *Chem Pharm Bull (Tokyo)* 2011;59:1203–1205.
 - 8 United Nations Office on Drugs and Crime, 2011. Synthetic Cannabinoids in Herbal Products. *Web document:* http://www.unodc.org/documents/scientific/Synthetic_Cannabinoids.pdf. Accessed November 22, 2017.
 - 9 Texas Senate Bill 331. *FTP access available at:* ftp://ftp.legis.state.tx.us/bills/82R/billtext/html/senate_bills/SB00300_SB00399/SB00331S.htm. Accessed November 22, 2017.
 - 10 Mills B, Yepes A, Nugent K. Synthetic cannabinoids. *Am J Med Sci.* 2015 Jul;350(1):59-62. doi:10.1097/MAJ.0000000000000466.
 - 11 Schep L, Slaughter R, Hudson S, et al. Delayed seizure-like activity following analytically confirmed use of previously unreported synthetic cannabinoid analogues. *Hum Exp Toxicol* 2015; 34:557–560. doi:10.1177/0960327114550886.

injuries from their overly-aggressive behaviors. None of our other sedative, benzodiazepine-based medications appear to work for many of these patients. Physical restraint alone requires several responders, and the patient is unaware that their own actions are causing self-harm. However, protecting ourselves, other responders, and the public from the delusional patient is our priority.

Ketamine hydrochloride is commonly referred to as a “horse tranquilizer”, and the UMC EMS training department tracks its use very closely to avoid inappropriate administration. In 2016, UMC EMS used ketamine 197 times to protect other responders and the public from the effects of violent reactions with suspected synthetic cannabinoid use. The initial dose should be enough to establish dissociative or subdissociative anesthesia at 4 mg/kg (body weight, maximum of 500 mg per dose) intramuscularly. This was not always the case though, and several patients required additional full doses. The opinion of some of our hospital’s medical personnel suggests that the synthetic cannabinoid’s composition in itself may play a role in this phenomenon.

Like other cities, Lubbock has been experiencing an increase in suspected synthetic cannabinoid use. While ketamine was used 197 times in the entire 2016 calendar year, 125 doses were administered for the same violent reasons in just the first six months of 2017.

Just recently, the Lubbock Police Department and Lubbock District Attorney’s Office employed a new set of strategies to effectively reduce the availability of synthetic cannabinoids by targeting known point of sale locations before the products ended up in the hands of users. While we’re seeing an increase in smaller “street dealing” of synthetic cannabinoids packaged in less obvious zip top plastic bags, law enforcement’s efforts have made a noticeable impact on our community. From July to November 2017, increased efforts to address the synthetic cannabinoid problem has reduced the number of patients who received ketamine for chemical restraint by approximately 50%.

The problem has not gone away though. We are still risking half a dozen first responders to physically restrain a delirious patient long enough for ketamine to take effect. Because of the powerful nature of this medication, the patient requires full cardiac and respiratory monitoring and cannot be simply “dropped off” at the hospital waiting room. Oftentimes, this patient will require a limited emergency department resource, such as a trauma room or specially-equipped observation room near the nurses’ station. This takes valuable resources away from other patients whose condition was accidental or incidental, not intentional like consumers of synthetic cannabinoids.

EMS itself had to take a new approach with patients who used synthetic cannabinoids. Responder safety has to come first, otherwise, the first responder becomes a patient. When it takes six to nine adults to hold down a patient affected by synthetic cannabinoids or other drugs, EMS cannot act immediately until other responders arrive on scene. Sometimes, family members of the patient are injured, not realizing that their words and pleas are falling on the patient’s deaf ears. They mean well, but quickly become patients themselves. EMS cannot help them until enough people arrive to stage a coordinated effort to subdue the initial patient. And with more than one patient on scene, even more EMS resources must be diverted from other geographical areas to assume care of the additional injured.

On the hospital side, the patients who consumed or smoked synthetic cannabinoids may require MICU-level care, another high-level, in-demand resource. Sometimes, the patient may be so violent that he or she cannot be controlled with sedatives alone, but requires complete skeletal muscle paralysis with medication and then intubation (a breathing tube inserted into the trachea) to maintain respirations afterwards. The effects of synthetic cannabinoids can be long term, ranging anywhere from hours to days. The patient's final outcome can be devastating. If he or she survives the physical effects from the synthetic cannabinoids, there still remains the concern about prevailing psychosis and cognitive impairments that could last a lifetime.

Financially, a patient, family, and community can be strapped with a massive burden from synthetic cannabinoids. Data from a large systematic review of the literature found that most synthetic cannabinoid smokers were men ranging from 13 to 59 years old.² These are supposed to be productive years in otherwise healthy people. But, instead of completing an education and entering the workforce, these individuals may experience permanent physical disabilities or impaired cognitive function from the complications that developed due to synthetic cannabinoid use. With substantial medical and daily care expenses, these individuals and their immediate families may need to rely on an already strained public assistance program and continued medical resources.

Of course, not every person who smokes synthetic cannabinoids will find themselves in a vegetative state and living in a long-term nursing facility. But with the lack of quality control by synthetic cannabinoid manufacturers, unpredictable effects of the drug, and a constantly-changing ingredient list, smoking or ingesting these products is no different than gambling on your life.

In closing, I have offered several concerns regarding synthetic cannabinoid use through the eyes of a medical first responder. While the individual is ultimately responsible for his or her own decision to use or decline the drug, the wrong decision will impact not only the patient, but family and community as well. If this growing problem is not controlled, we will continue to strain our first responder resources, public safety, and burden our hospitals with these high-acuity patients during a time when hospital overcrowding is already a concern. This will impact an entire community, not just a few individuals chasing a cheap euphoric "high".