

## Street Drugs: What's out there and just how bad is it?

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California Poison Control System

### Conflict of Interest Disclosure

- None

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### Objectives

- Examine the current drug problem
- Understand novel drugs of abuse: what are they, their mechanisms of action, where can you find them, & how they are regulated
- Briefly discuss the opioid epidemic
- What are providers in SF doing about it?

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### Out with the old...?



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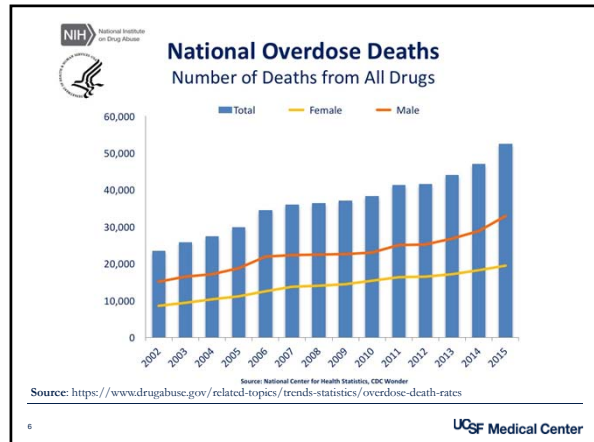
## They're still out there!

- In 2013, ~24.6 million Americans aged 12+ used an illicit drug in the past month
  - 9.4% of the population
  - Up from 8.3% in 2002
- \$600 billion annually in costs related to crime, health care, and lost work productivity

Source: <https://www.drugabuse.gov/publications/drugfacts/nationwide-trends>

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## Some good news

- Use of most drugs has **stabilized or declined** in the past decade
- Exceptions:
  - Marijuana
  - Methamphetamines

Source: <https://www.drugabuse.gov/publications/drugfacts/nationwide-trends>

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## & in with the new...



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## Novel drugs of abuse

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## What are novel drugs of abuse?

- Also known as “designer drugs,” “research chemicals,” “legal highs”
- Structural or functional analog of a controlled substance
- Designed to mimic the pharmacologic effects of the original drug

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## Why the shift from old to new?

- Academic chemists & pharmaceutical scientists studying ligands/effects on receptors
- [General] ease of access
- Users want alternatives to older and better-characterized drugs of abuse
- Avoid detection in standard drug screens

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## What's the problem?



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## What's the problem?

- Yields drugs that may differ significantly in effects from their “parent” drug
- Difficult to track

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## Synthetic cannabinoids


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N.Y. / REGION Drug 85 Times as Potent as Marijuana Caused a 'Zombielike' State in Brooklyn

### Drug 85 Times as Potent as Marijuana Caused a 'Zombielike' State in Brooklyn

By MARC SANTORA DEC. 14, 2016



RELATED COVERAGE

- New York City Council Initiates Steps to Ban the Manufacture of K2 10/11/16
- K2, a Potent Drug, Casts a Shadow Over an East Harlem Block 10/11/16
- 33 Suspected of Overdosing on Synthetic Marijuana in Brooklyn 10/11/16

Emergency workers treated a woman in Brooklyn in July in an area where people overdosed on a synthetic cannabinoid more potent than marijuana. Copyrighted for The New York Times

Source: [https://www.nytimes.com/2016/12/14/nyregion/zombielike-state-was-caused-by-synthetic-marijuana.html?\\_r=0](https://www.nytimes.com/2016/12/14/nyregion/zombielike-state-was-caused-by-synthetic-marijuana.html?_r=0)

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Source: Adams AJ, Banister SD, Izazary I, et al. "Zombie" outbreak caused by the synthetic cannabinoid AMB-FUBINACA in New York. *N Engl J Med*. 2017;376(3):235-242.

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## The culprit?

AMB-FUBINACA

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## Synthetic cannabinoids

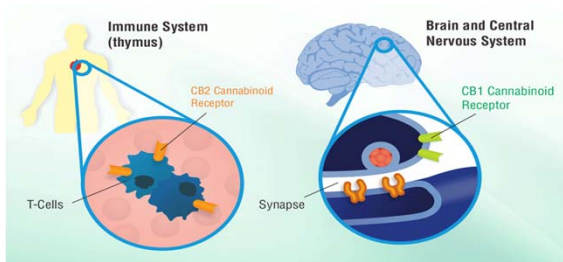
- Known as “synthetic marijuana,” “spice,” or “herbal incense”
- Inert herbs with the chemical added
- Many available varieties and forms



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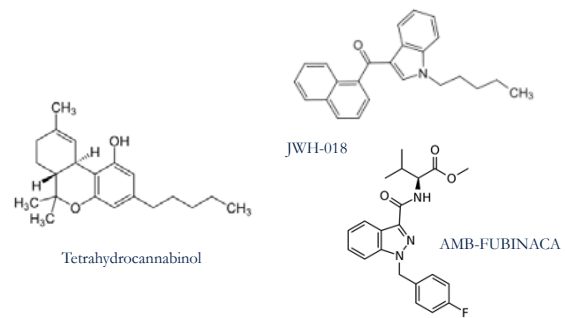
## Synthetic marijuana?



Source: <http://www.alpha-cat.org/introduction-to-cannabinoids/>

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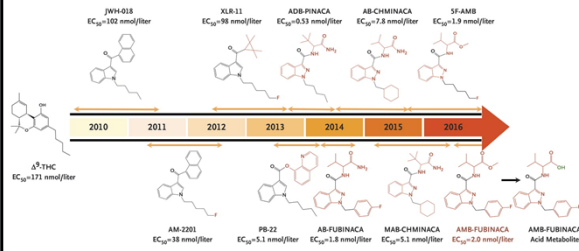
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## Synthetic cannabinoids



Source: Adams AJ, Banister SD, Irizarry L et al. "Zombie" outbreak caused by the synthetic cannabinoid AMB-FUBINACA in New York. *N Engl J Med*. 2017;376(5):235-242.

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## It's NOT marijuana

- 2011-2013: commonly available synthetic cannabinoids were **several times** as potent as THC
- 2014-2015: up to **700 times** more potent

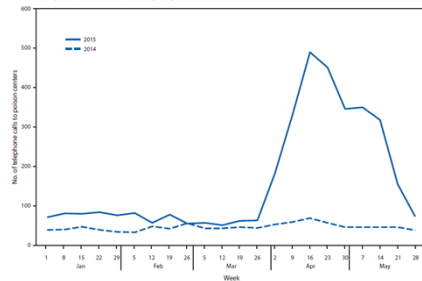
Source: Banister SD et al. Effects of bioisosteric fluorine in synthetic cannabinoid designer drugs. *ACS Chem Neurosci*. 2013;19(6(8)):1445-58.

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## It's NOT marijuana

FIGURE. Number of telephone calls to poison centers reporting adverse health effects related to synthetic cannabinoid use, by week – National Poison Data System, United States, January–May 2014 and 2015



Source: Law R et al. Note from the field: increase in reported adverse health effects related to synthetic cannabinoid use – United States, January – May 2015. *MMWR Morb Mortal Wkly Rep*. 2015;64(22):618-619.

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## Unexpected effects

- Seizures
- Chronic lung injury
- Ischemic stroke

Acute Kidney Injury Associated with Synthetic Cannabinoid Use – Multiple States, 2012

*Weekly*  
February 15, 2013 / 62(06):93-98

- 16 patients in 6 different states
- Onset 1-6 days after reported use
- 5 required hemodialysis

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## We can't keep up!



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## We can't keep up!

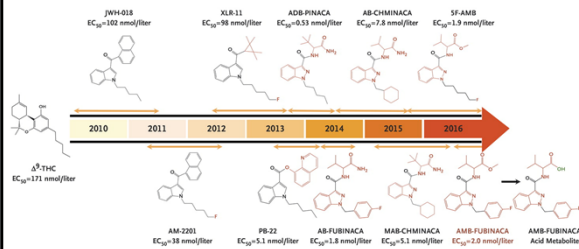
- 2012: Synthetic Drug Abuse Prevention Act to place “cannabimimetic agents” into Schedule I (15)
- Time lags & temporary bans
- But >150 new synthetic cannabinoids were reported by the UNODC in 2013

Source: <http://theconversation.com/labs-make-new-dangerous-synthetic-cannabinoid-drugs-faster-than-we-can-ban-them-47896>

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## We can't keep up!

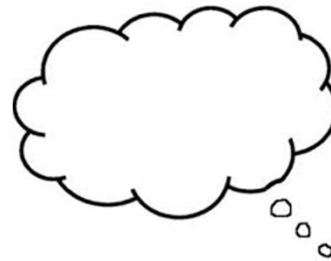


Source: <http://theconversation.com/labs-make-new-dangerous-synthetic-cannabinoid-drugs-faster-than-we-can-ban-them-47896>

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## What do we do about it?



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### Miami Police Shoot, Kill Man Eating Another Man's Face

Surveillance Video Shows Apparent Shooting, Nude Men On The Ground

May 26, 2012 11:30 PM



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### Synthetic cathinones

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### Cathinones

- “Khat”
- *Catha edulis* native to East Africa
- Leaves & twigs chewed for euphoric and amphetamine-like effects



Source: <https://www.justice.gov/archive/ndic/pubs3/3920/index.htm>

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## Synthetic cathinones

- Developed in the 1920s for therapeutic purposes
- Widespread use in Europe in early 1990s, then spread to the US
- Currently, at least 30 chemical compounds in existence and many street names

Table 2. Common Street Names and Active Compounds of New Drugs of Abuse

Drug of abuse	Street names	Active compounds
Synthetic cathinones <sup>9, 11</sup>	Khat, Bath salts, Meow meow, MCAT, Ivory wave Bubbles, Vanilla sky, Cloud 9, Explosion, White lightning	Methcathinone Ethylone, Mephedrone, Methedrone Methylenedioxypropylvalerone (MDPV) Naphyrondarylone-4-Fluoromethcathinone Brepheдрone Pyrovalerone

Source: Rech MA et al. New drugs of abuse. *Pharmacotherapy*. 2013;35(2):189-97.

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## Cathinones

- In 1993, cathinone was classified as a Schedule I by the DEA
- SDAPA of 2012 made several cathinones controlled substances
- Sold in smoke shops, head shops, gas stations as bath salts, plant food, jewelry cleaner, research chemicals, etc.

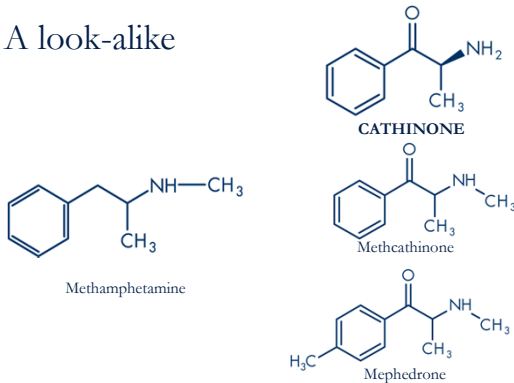


Source: <https://www.justice.gov/archives/ndic/pubs3/3920/index.htm>

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## A look-alike



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## Emergency Department Visits After Use of a Drug Sold as "Bath Salts" --- Michigan, November 13, 2010--March 31, 2011

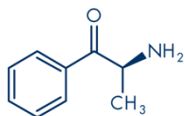
Weekly  
May 26, 2011 / 60(10):624-627

Signs and symptoms		
Agitation	23	(66)
Tachycardia	22	(63)
Delusions/hallucinations	14	(40)
Seizure/tremor	10	(29)
Hypertension	8	(23)
Drowsiness	8	(23)
Paranoia	7	(20)
Mydriasis	7	(20)
Disposition		
Treated in ED and released	15	(43)
Admitted	17	(49)
Dead upon arrival	1	(3)

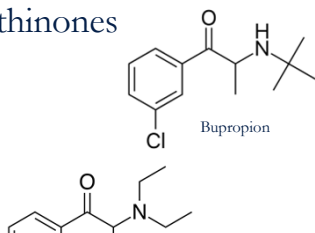
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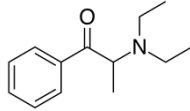
## Therapeutic cathinones



CATHINONE



Bupropion



Diethylpropion



Source: <https://www.justice.gov/archive/ndic/pubs3/3920/index.htm>

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## What's being done about it?



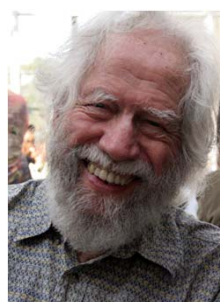
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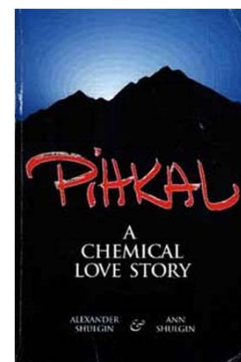
## Hallucinogens & psychedelics

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Alexander "Sasha" Shulgin  
June 17, 1925 - June 2, 2014



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## Love story of a drug

“How long will this last, this delicious feeling of being alive, of having penetrated the veil which hides beauty and the wonders of celestial vistas? It doesn't matter, as there can be nothing but gratitude for even a glimpse of what exists for those who can become open to it.”



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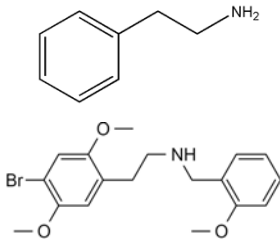
Source: <http://d.britain.co.uk/en/full/1396281/burning-man.jpg>

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## NBOMe

- Designer phenethylamines



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## NBOMe

- May be marketed as “legal LSD” & is often sold on blotter papers
- Potent serotonin receptor agonists with increased affinity compared with amphetamine
- Effects and duration of action depends on compound and route

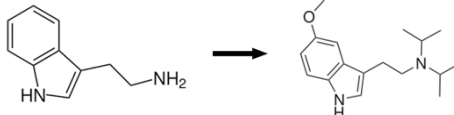
Source: Armenian P, Gerona RR. The electric Kool-Aid NBOMe test: LC-TOF/MS confirmed 2C-C-NBOMe (25C) intoxication at Burning Man. *Am J Emerg Med.* 2014;32(11): 1444.

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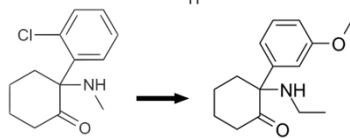
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## The list goes on...

- 5-methoxy-diisopropyltryptamine (5-MeO-DiPT)



- Methoxetamine



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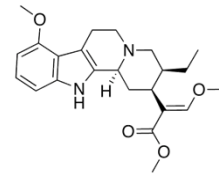
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## Kratom: all natural?

- Derived from the *Mitragyna speciosa* tree
- Opioid receptor activation



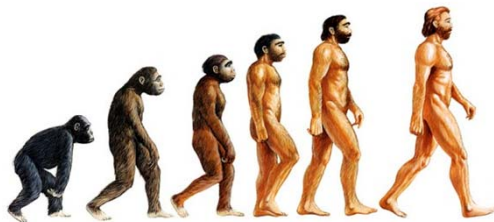
- Lower doses: stimulant-like effect
- Higher doses: opiate-like effects



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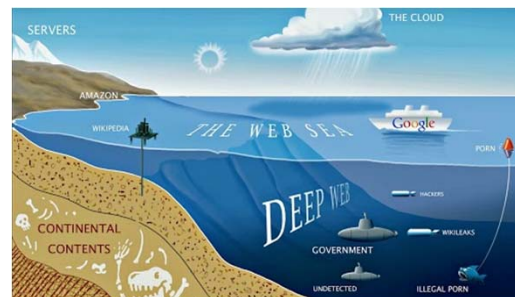
## The big picture



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## The Darknet



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## Common themes



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## The opioid epidemic

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## Fake Xanax can be a killer



Source: SF Public Health

San Francisco public health officials released a photo of a fake Xanax pill last fall that looks a lot like the real thing.

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Top: Pharmaceutical Tablet  
Bottom: Counterfeit Tablet

**Fatal Fentanyl: One Pill Can Kill**

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DRUGS

## Heroin Laced With Elephant Tranquilizer Linked to 8 Overdose Deaths in Ohio

Mahita Gajanan  
Sep 07, 2016



Heroin laced with carfentanil, a sedative used on large animals, has caused at least eight overdose deaths in Ohio, officials said.

September 22, 2016  
Contact: DEA Public Affairs  
(202) 307-7977

**DEA Issues Carfentanil Warning to Police and Public**  
*Dangerous opioid 10,000 times more potent than morphine and 100 times more potent than fentanyl*

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## What are opioids?

- Heroin
- Morphine
- Hydrocodone
- OxyContin
- Oxycodone
- Methadone



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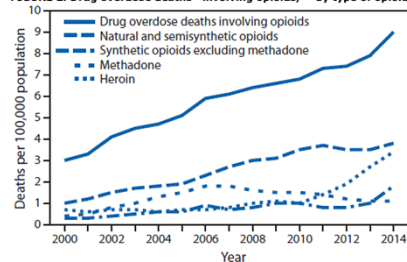
## The opioid epidemic

- Opioid use expanded on an unprecedented scale beginning in the 1990s
- **Causes:**
  - # of prescriptions written and dispensed
  - Greater social acceptability for using medications for different purposes
  - Aggressive marketing by pharmaceutical companies

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FIGURE 2. Drug overdose deaths\* involving opioids,<sup>7,8</sup> by type of opioid<sup>1</sup> — United States, 2000–2014

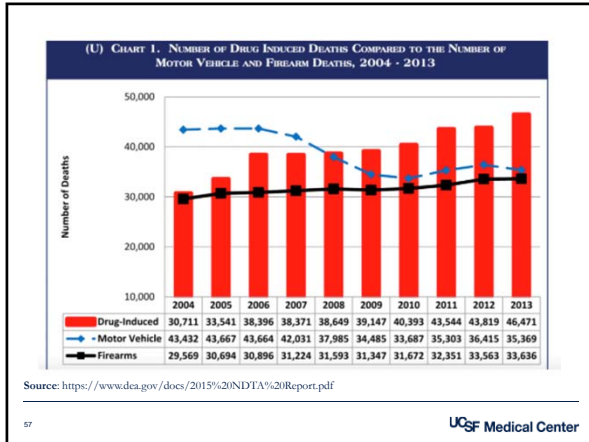


Source: National Vital Statistics System, Mortality file.

Source: Rudd RA, Aleshire N, Zibbell JE, Gladden RM. Increases in drug and opioid-involved overdose deaths — United States, 2000–2014. MMWR Morb Mortal Wkly Rep. 2016;64:1378–82.

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What are we doing about it?

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Problem: the “treatment gap”

- In 2013, an estimated 22.7 million Americans (8.6%) needed treatment for a problem related to drugs or alcohol
- Only 2.5 million people (0.9%) received treatment at a specialty facility

Source: <https://www.drugabuse.gov/publications/drugfacts/nationwide-trends>

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