

# **Up in Smoke.....and Vapor**

**Texas-Wide Underwriting Conference (TWUC)**

**October 2-4, 2019**

**Fredericksburg, Texas**

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# A millennium (or two?) of smoking

What impact will the legalization of marijuana and the rising usage of e-cigarettes have on the life insurance industry?

This session discusses the latest medical research and trends in these areas as well as possible mortality implications

Reproduction of a carving from the temple at Palenque, Mexico, depicting a Maya deity using a smoking tube

Ca. 700 AD

Image Open Source: Smoke: a global history of smoking (2004) edited by Sander L. Gilman and Zhou Xun ISBN 1-86189-200-4, p. 10, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=2380252>



# The Case of the E-Cigarette Conundrum

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- Male, 48 years old, commercial contractor. Simplified Issue, face amount \$500,000.
- No admitted health history and Rx check “green” – Issued Preferred
- Case was flagged for random holdout; total line exceeded \$2,000,000
  - Vitals: 6.0 190, BP 141/90, pulse 82
  - BCP: Chol 302, HDL 74, Ratio 4.08, trigs 200. Otherwise WNL.
  - HOS: Cotinine positive
- Question on application: Have you in the last 12 months used tobacco or any other nicotine products such as cigarettes, cigar, pipe, chewing tobacco, snuff, nicotine gum or nicotine patch? If Yes, provide details: Product type(s), Date Last Used, Frequency of Use.
  - Question on application answered NO.

# E-Cigarette Case (cont.)

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When further questioned based on positive cotinine:

Proposed insured states he answered the question correctly and that perhaps his urine was positive because he occasionally vapes - at times they don't contain any nicotine products and just flavors, and at times they will include some nicotine.

# How would you handle this case?

1. Question was answered correctly and thus obliged to assess as NS
2. Question was answered correctly but there is additional risk, and thus keep NS but amend offer to low substd rate
3. Question was not answered correctly since was using a nicotine product, but risk is minimal, especially since use infrequent and often without nicotine – maintain offer
4. Question was not answered correctly – an APS should be ordered and then assess as Smoker vs NS based on APS info on tobacco use
5. Question was not answered correctly since was cotinine positive and most likely smokes tobacco – policy should be amended as smoker



# It's just vapor, right?



- Electronic cigarettes – so named because, like tobacco cigarettes, they are primarily nicotine delivery devices
  - Also called ENDS - Electronic Nicotine Delivery Systems
- First developed by Chinese scientists in 2003 with penetration into the US in 2006
- Battery-powered system to heat liquid that produces the inhalable aerosol
- Estimated 466 brands and 7,764 unique flavors
- Regulated since 2016

# Patterns of use

	<u>Use in the U.S. (%)</u> <u>2017 data</u>
All adults	4.5
Men	5.9
Women	3.7
Ages 18-24	9.2
Middle-schoolers	3.3
High-schoolers	11.7

- Recent data in adults showed increasing use in young adults but decreasing use in older people
- Never tobacco smokers mostly seen in younger age groups – and is increasing
  - Among e-cigarette users aged 45 and up in 2015, only 1.3% had never been cigarette smokers
  - However, this was the case for 40% of 18–24 year olds
- Marketing of products to younger age group with attractive packages and exotic flavors
- The e-cigarette brand Juul has ~80% of the youth market

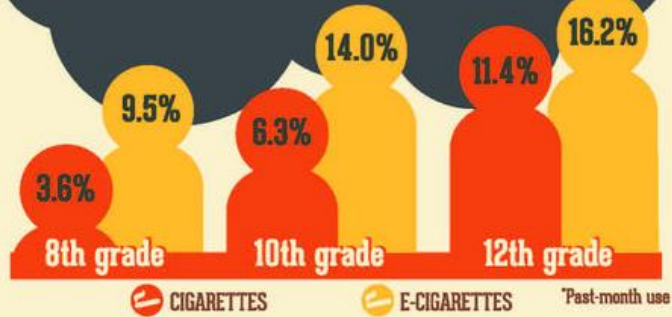
Tobacco Product Use Among Middle and High School Students - United States, 2011-2017.  
Wang TW, et al. MMWR Morb Mortal Wkly Rep. 2018;67(22):629.

# Next generation nicotine – and more?

## Teens and E-cigarettes

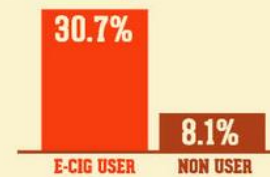


TEENS ARE MORE LIKELY TO USE E-CIGARETTES THAN CIGARETTES.<sup>1</sup>



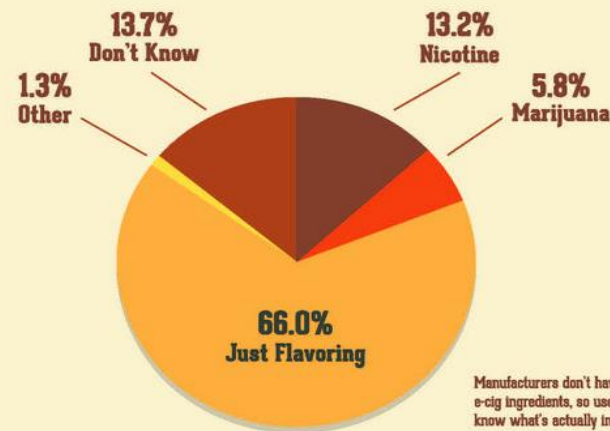
### TEEN E-CIG USERS ARE MORE LIKELY TO START SMOKING.<sup>2</sup>

Start Smoking Within 6 Months



Includes combustible tobacco products (cigarettes, cigars, and hookahs)

### WHAT DO TEENS SAY IS IN THEIR E-CIG?<sup>3</sup>



Manufacturers don't have to report e-cig ingredients, so users don't know what's actually in them.



**NIH** National Institute on Drug Abuse

1. MTF, 2015; 2. Leventhal, 2015; 3. Singh, 2016



# Are some of the trends changing?



E-liquid



Food product



E-liquid



Food product

- Government data shows e-cigarette use up 78% among high schoolers (to 20.8%) from 2017 to 2018.
- Similar use up 50% in middle schoolers since 2017 (to 4.9% in 2018).
- Frequent (~daily) use also increased by nearly 40%.
- Moreover, the declining trend in tobacco use may have stopped.
  - Recent review showed tobacco cigarette use in about 8% of high schoolers – the same as in 2016.

Cullen KA, Ambrose BK, Gentzke AS, et al. Notes from the field: Use of electronic cigarettes and any tobacco product among middle and high school students - United States, 2011-2018. MMWR Morb Mortal Wkly Rep 2018; 67:1276.

(Photo: Federal Dept. of Agriculture)

Which of the following is NOT an e-cigarette flavor available in the U.S.?

1. Gummiberry
2. Jack Daniels e-juice
3. Unicorn Puke
4. Stoned Smurf
5. Insane Candy Cane

# But better than tobacco?

- Risks with use of combustible tobacco are well known – and substantial
- **Short-term** risks for e-cigarettes appear to be lower than for smoking tobacco
- Some studies have shown that e-cigarettes can lead to successful smoking cessation
  - Recent randomized trial of e-cigs vs other nicotine replacement found 18% using no tobacco at one year compared to 10% with nicotine patch or gum
  - But 80% of them were still using the e-cigs compared to 9% of the others still using a nicotine replacement
- What's the risk of long term use, and how likely is one to go back to using combustible cigarettes?

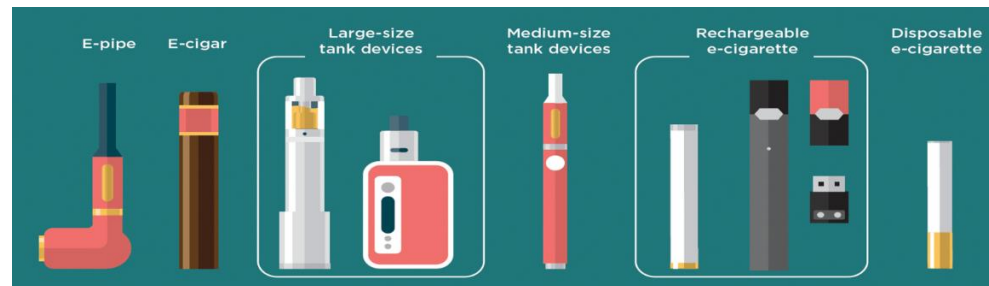


Image source CDC: <https://www.drugabuse.gov/publications/drugfacts/electronic-cigarettes-e-cigarettes>

# Long-term concerns for e-cigarette use

- Lead to nicotine addiction and increase in tobacco use
  - Teen users often move on to tobacco, even when they report using non-nicotine products only
- Evidence of increased MI risk with daily e-cigarette use
- Reports of acute pulmonary failure and of seizures associated with e-cigarette use\*
- Manufacturers don't have to report e-cigarette ingredients – and when they do they don't have to be accurate!

*So just what is being inhaled?*





# Making headlines

Sept 6, 2019

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Pulmonary Illness Related to E-Cigarette Use in Illinois and Wisconsin — Preliminary Report



Sept 7, 2019

Sept 27, 2019

# What exactly is being inhaled?

Basic ingredients are **propylene glycol** and **vegetable glycerin**

- Safe (GRAS) in usual liquid form but have potential for toxicity when inhaled
  - Hyperosmolality
  - Lactic acidosis
  - CNS depression

Heating coil can release **toxic metals** such as lead, chromium and manganese into the aerosol

**Formaldehyde** is a by-product of vapor – known to be carcinogenic

- Deposited deeper into the lungs than with tobacco smoking
- However, e-cigarette levels of formaldehyde and acrolein are found at much lower concentrations than seen with smoking

Biopsies from chronic vapors show marked **changes to the lining of the bronchioles**

# But what about nicotine?

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- Nicotine concentrations are usually listed in a range from 0 to 36 mg/mL
  - How much nicotine is inhaled varies substantially by delivery method
- Actual amounts vary widely by brand, and even within the same label
- Many products misrepresent the true concentration
  - 91% of samples labeled as 0 mg/mL of nicotine were found to contain nicotine
- Significant effects of early nicotine exposure on the developing prefrontal cortex
  - Adversely affects concentration and memory
  - Increases susceptibility to nicotine and, possibly, other drug addiction
- Nicotine may contribute to CV and cancer risk but the data are not convincing

# Impact to underwriting



- Mortality and morbidity data on long-term consequences of use is lacking
- Use will generally lead to positive levels of cotinine
- How can we distinguish e-cig use from tobacco smoking?
  - Can we count on the app answers?
  - Carbon monoxide not useful in insurance setting
  - Thiocyanate – present in smoke and not in vapor, but somewhat limited accuracy
  - Potential to use epigenetic testing?



## Assessment? Less risk? Have you considered...

...specialized rates for the vaper?  
*Reviti Life, Giggle Insurance*

...what your app questions ask?

...if your applicants know (or reveal) what is in their e-cigarette?

...how likely an e-cigarette only user is to begin (or resume) tobacco use? Does age matter?

...if anti-selection will increase once word is out of an e-cigarette class?



Image courtesy of Giggleinsurance.com

# Some conclusions

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- There is **strong** evidence that e-cigarettes are addictive
- E-cigarette use **increases** the likelihood of smoking tobacco – and marijuana
- E-cigarettes *may* aid in smoking cessation with a possible **reduction** in health risk but *to what degree is not clear*
- The lungs are not designed to handle anything other than air very well – exposure to e-cigarette aerosols could **increase** the risk of lung disease, cardiovascular disease, cancer, and adverse reproductive outcomes, though *to what extent remains uncertain*



Anastasia Jaegerman, FLMI, ACS, AALU  
VP Underwriting & Chief Underwriter  
Optimum Re Insurance Company



# Cannabis case #1

- Female age 56 executive/investor from CA; face amount 25MM (inforce 35MM replacing 25MM POI capital gains/estate)
  - MIB code suggestive of Marijuana use 11/16;
  - 5.6. 131 lbs, BP 123/80, pulse 70
  - BCP - Chol 140, HDL 32, ratio 4.3; HOS - cotinine negative; EKG - WNL
  - Para - In the last 10 years has the Proposed Insured:
    - Used cocaine, barbiturates, amphetamines, heroin, narcotics, stimulants, hallucinogens or other controlled substances not prescribed by a physician. Answered No
    - Medical hx of LBP, knee replacement, situational anxiety, HRT and migraine headaches.



# Cannabis case #1

## ➤ APS:

- 4-16 anxiety related to sister's breast cancer, headaches-migraines Rx Alprazolam 0.5mg, Zomig 2.5mg.
- 6-16 anxiety better managed, knee pain worsening, scheduled PT and to ortho-surgeon referral. Rx hydrocodone
- 12-16 sister doing better, taking Cannabis oil, PT inquired about how to get medical cannabis card wants to try it for treating her pain, headaches, anxiety. Referred PT to Cannabis clinician for further answers to her questions. In the meantime all Rx should be continued.
- 8-17 f-u post surgery for knee replacement, obtained Cannabis medical card which helps with her anxiety, at times will do edibles and that also helps with her musculoskeletal pain. Has also added CBD oil daily to her regimen 4:1 (CBD-THC ratio).
- 11-17 Migraine headache ran out of Zomig, renew Rx
- 2-18 Sister struggling, helping her financially will be moving in with her, trying to organize, stress ++ Rx Alprazolam
- 6-18 Sisters in remission, feeling better, no longer uses Alprazolam. Will vape-smoke cannabis once a day + edibles 1-2 x/week.

# Cannabis case #1 (cont.)

- Script check: Alprazolam 0.5mg- 2-3 x per day-prn- 4 fills (last filled 2-2018)  
Zomig 2.5mg -10 fills (last filled 12-2017)  
Naproxen 500mg -3 fills (last filled 5-2016)  
Hydrocodone-Norco 10-325mg- 5 fills (last filled 11-2017)

➤ Poll Question

Your assessment of the risk:

- a. Rate as Non-Smoker – and additional debits for anxiety/chronic pain
- b. Standard Smoker – and additional debits for Cannabis use
- c. Standard Non-Smoker
- d. Preferred (2<sup>nd</sup> best class)

# Cannabis case #2

- 37 year old male, Rancher from CO; face amount 2MM (POI to cover new loan, has 3MM inforce personal coverage)
- MIB; nil sign IAI hits in 2016
- Application and exam question are “similar” - Has the Proposed Insured(s) ever used marijuana, narcotic or hallucinogenic drugs other than as prescribed by a licensed physician or received treatment for a drug habit?
  - **Answered No**
- Medical hx: celiac disease 2012 diet controlled. 2017 torn rotator cuff Rx cortisone injection 7/17 and arthroscopic repair 11/17 no complications. Uses CBD tincture, has medical cannabis card.
- Script check: nil
- BCP/HOS: WNL. Re-tested for Cannabinoids results + ( 17ng/mL)

# Cannabis case #2 (cont.)

- Drug Q:
- In the past 10 years, has the Proposed Insured named above used:
  - Barbiturates, sedatives or tranquilizers habitually?  Yes  No
  - LSD, marijuana or any amphetamine?  Yes  No
  - Heroin, morphine or other narcotic drug?  Yes  No
  - List below the drug, dosage, frequency, reason taken and length of time:

Drug:	Dosage/Frequency:	Why Taken:	How long:
Marijuana CBD	Daily/ depends, one joint, a few bowls, or vaping Daily / 100 mg	helps to relax helps with joint pains	4 years



# Cannabis case #2 (cont.)

## ➤ Poll Question

Which one of the following statements is incorrect:

- a) Cannabidiol (CBD) can actually lessen the psychoactive effects of THC
- b) High doses of CBD can be sleep-promoting, if the cannabis flower confers a myrcene-rich terpene profile
- c) Cannabinoids results + (17ng/mL) indicates high concentrations of THC
- d) Cannabidiol and THC are the power couple of cannabis therapeutics; they work best together.



# Let's weed out some of the issues . . .

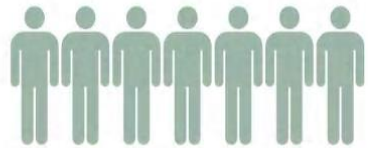
- Marijuana

- Update on the Marijuana Industry and our friends from North eh?
- New Medical indications and disease modifying effects
- New industry data on *potential* mortality increase
- Relationship to tobacco smoking
- Review and critique common underwriting approaches

# Scenario – 1a, 1b

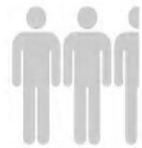
## Non-users perspectives

### 3. People who have tried marijuana are much more approving of it than those who haven't



**70%**

of people who've tried marijuana support recreational legalization



**26%**

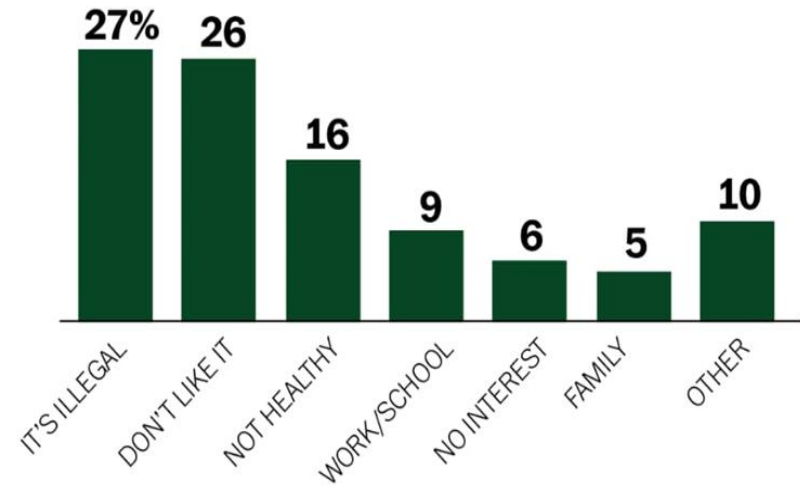
of people who **haven't** tried marijuana support recreational legalization

WAPO.ST/WONKBLOG

Source: Yahoo News/Marist survey

### 6. Marijuana's legal status isn't a huge barrier to use

*why non-users don't use marijuana...*



WAPO.ST/WONKBLOG

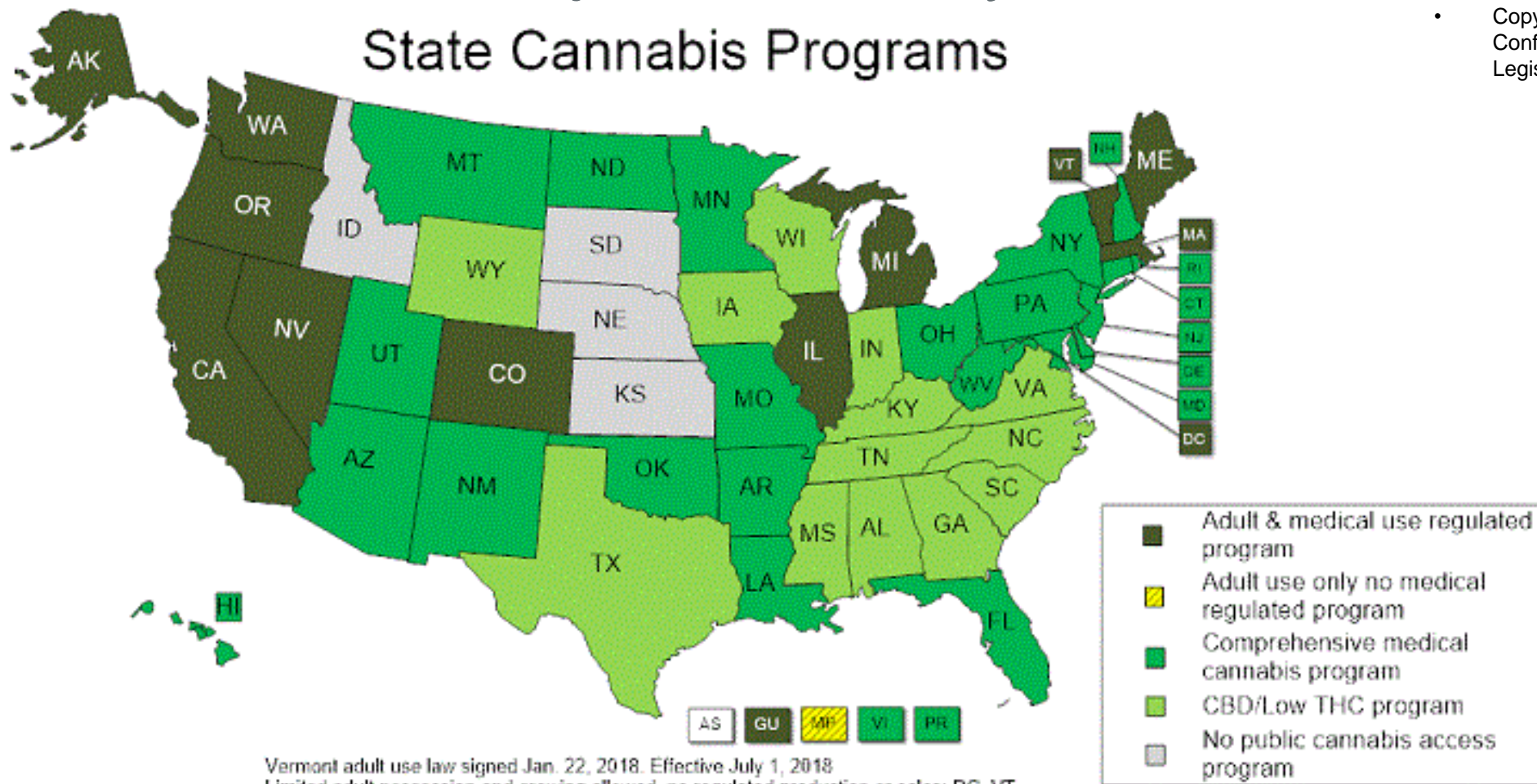
Source: Yahoo News/Marist survey

- 1996: California – Proposition 215 – The Compassionate Use Act of 1996

# Marijuana Laws by State

## State Cannabis Programs

- Copyright 2019 by National Conference of State Legislatures



Vermont adult use law signed Jan. 22, 2018. Effective July 1, 2018  
 Limited adult possession and growing allowed, no regulated production or sales: DC, VT

August 1, 2019



ON THE  
THERAPEUTICAL USES AND TOXIC EFFECTS  
OF CANNABIS INDICA.

BY J. RUSSELL REYNOLDS, M.D., F.R.S., &c.,  
PHYSICIAN IN ORDINARY TO HER MAJESTY'S HOUSEHOLD.

1. *Mental.*—In senile insomnia, with wandering; where an elderly person, probably with brain-softening, in the

2. *Sensorial.*—In almost all painful maladies I have found Indian hemp by far the most useful of drugs; and it is especially so in those cases which are, to the present time, relegated to the “functional” order. Neuralgia, periodic

3. *Muscular.*—In clonic spasms, whether of epileptoid or choreoid type, I have found hemp very useful. For example, in the eclampsia of children, or of adults, whether from worms, teething—first or second dentition, or the cutting of the wisdom teeth—in a very large number of cases I have relied, and successfully, upon it alone. In true, chronic epilepsy I have found it absolutely useless, and this as the result of very extensive experience. There are

# August 11th . . . another DEA denial





## Description listed in Patent # 6630507:

Cannabinoids have been found to have antioxidant properties, unrelated to NMDA receptor antagonism. This new found property makes cannabinoids useful in the treatment and prophylaxis of wide variety of oxidation associated diseases, such as ischemic, age-related, inflammatory and autoimmune diseases. The cannabinoids are found to have particular application as neuroprotectants, for example in limiting neurological damage following ischemic insults, such as stroke and trauma, or in the treatment of neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease and HIV dementia

*Who owns this patent?*

United States Dept. of Health  
and Human Services







**Your right to purchase CBD and other hemp products is in jeopardy.**

According to U.S. Hemp Roundtable, the long-awaited first meeting of the US House/Senate Conference Committee on the 2018 Farm Bill will take place tomorrow morning (September 5). Nine Senators and 47 Congressmen will sit down for the first time to try to reconcile the differences between the two versions of the bill, with the hopes of final passage by September 30, when the 2014 Farm Bill expires.

As summarized [here](#), prospects are bright that the House will agree to the Senate's hemp provisions, which would permanently establish hemp as an agricultural commodity and **remove it from the purview of the Controlled Substances Act.**

[We can't take anything for granted.](#)  
[Contact your Congressman TODAY.](#)

[Read More](#)

SHARE these images with your social circles. How? Right click on image and "save image as" to save to your computer. Open your social media account and upload the photo. #freehemp #speakup

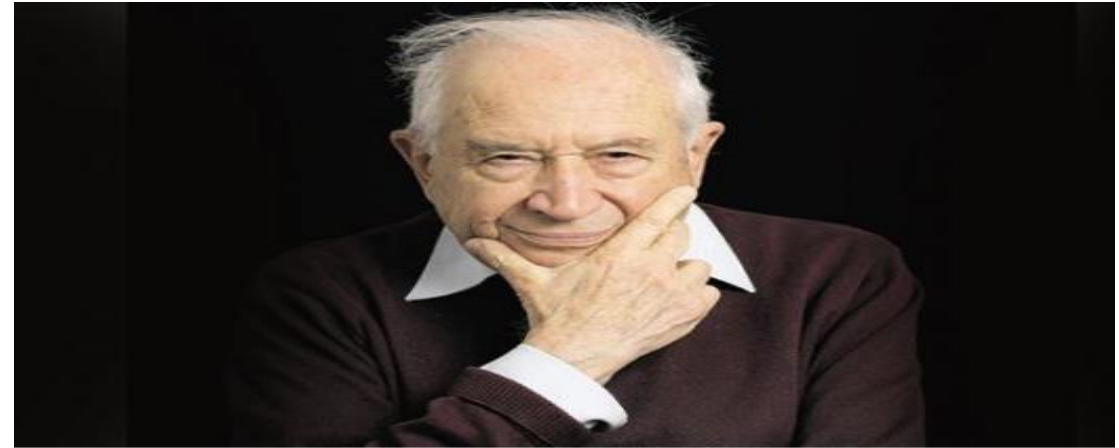
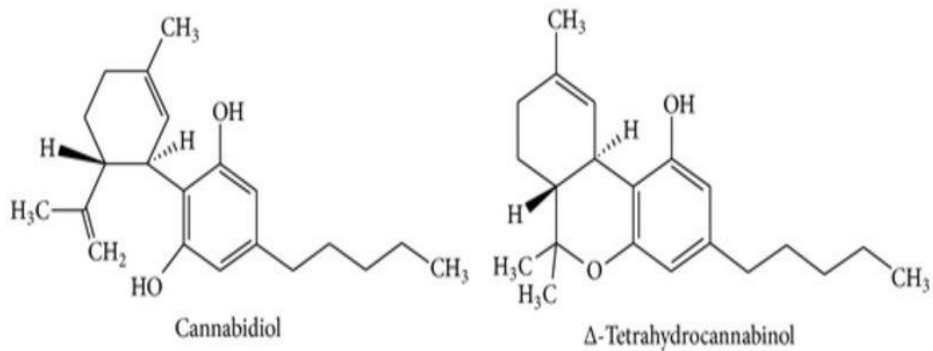
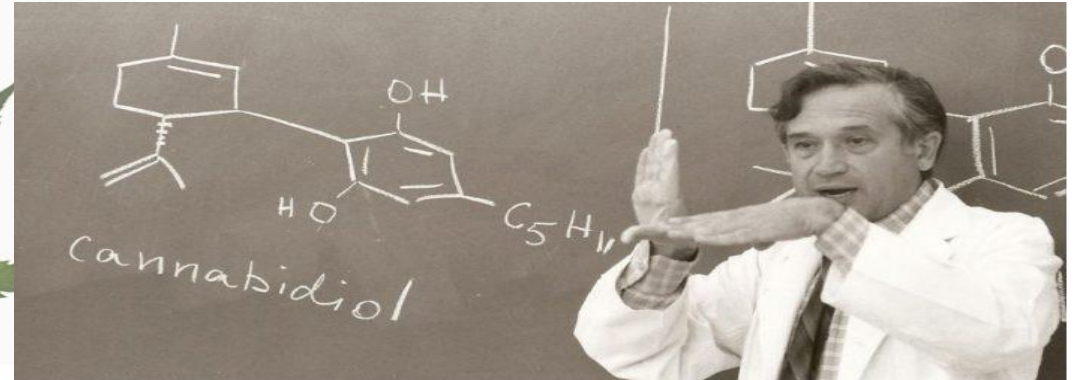


**INTRODUCING THE U.S. HEMP ROUNDTABLE'S  
STATE ACTION  
CENTER**

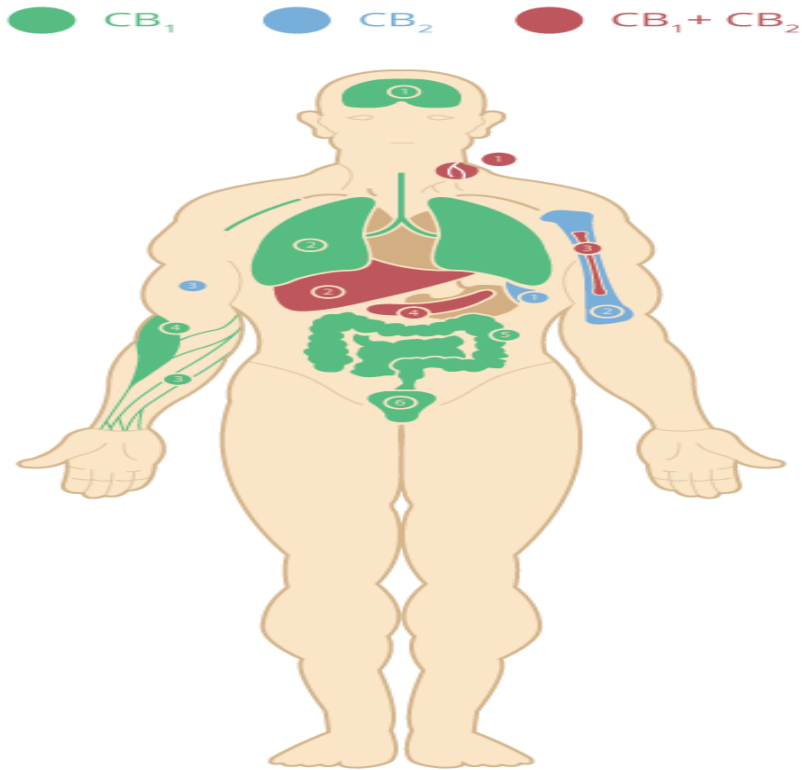
U.S. Hemp Roundtable



## The founder of the Endocannabinoid System

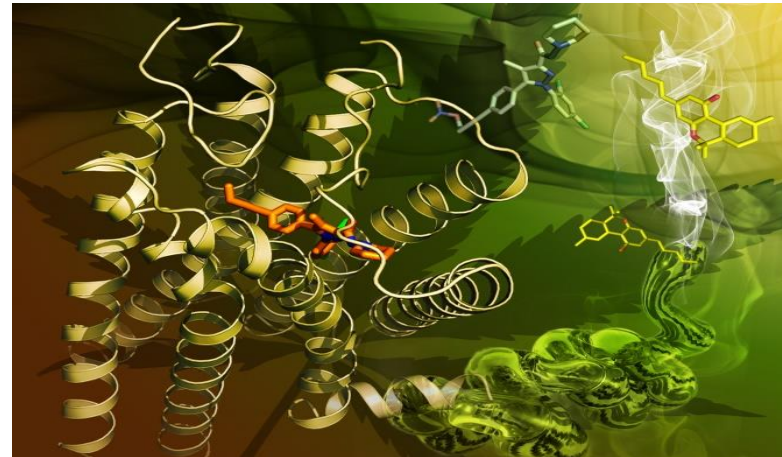


# The Endocannabinoid System (EC)



CB1 receptors are primarily found in the brain and central nervous system and to a lesser extent in other tissues.

CB2 receptors are primarily found in the peripheral organs, especially cells associated with the immune system.



Structure of primary cannabinoid receptor  
Yekaterina Kadyshevskaya, The Stevens Laboratory, USC

# Receptor Location → Clinical Manifestation

- Hippocampus – memory formation & learning
- Hypothalamus – appetite
- Orbitofrontal Cortex – attention, tracking
- Cerebellum & Basal Ganglia – motor skills, reaction time
- Subcortex & midbrain – reward system
- Spinal dorsal root ganglia – analgesia, spasticity
- Brain Cannabinoid receptors

[Effect of cannabis use in people with chronic non-cancer pain prescribed opioids: findings from a 4-year prospective cohort study](#)

*Conclusion: no evidence that cannabis use improved patient outcomes.*

THE LANCET

### **The Endocannabinoid System, Cannabinoids, and Pain (Oct 29, 2013)**

- Efficacy as a therapeutic adjunct in treating peripheral and central neuropathic pain and inflammation-mediated chronic pain
- Barrier to oral bioavailability

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3820295/>

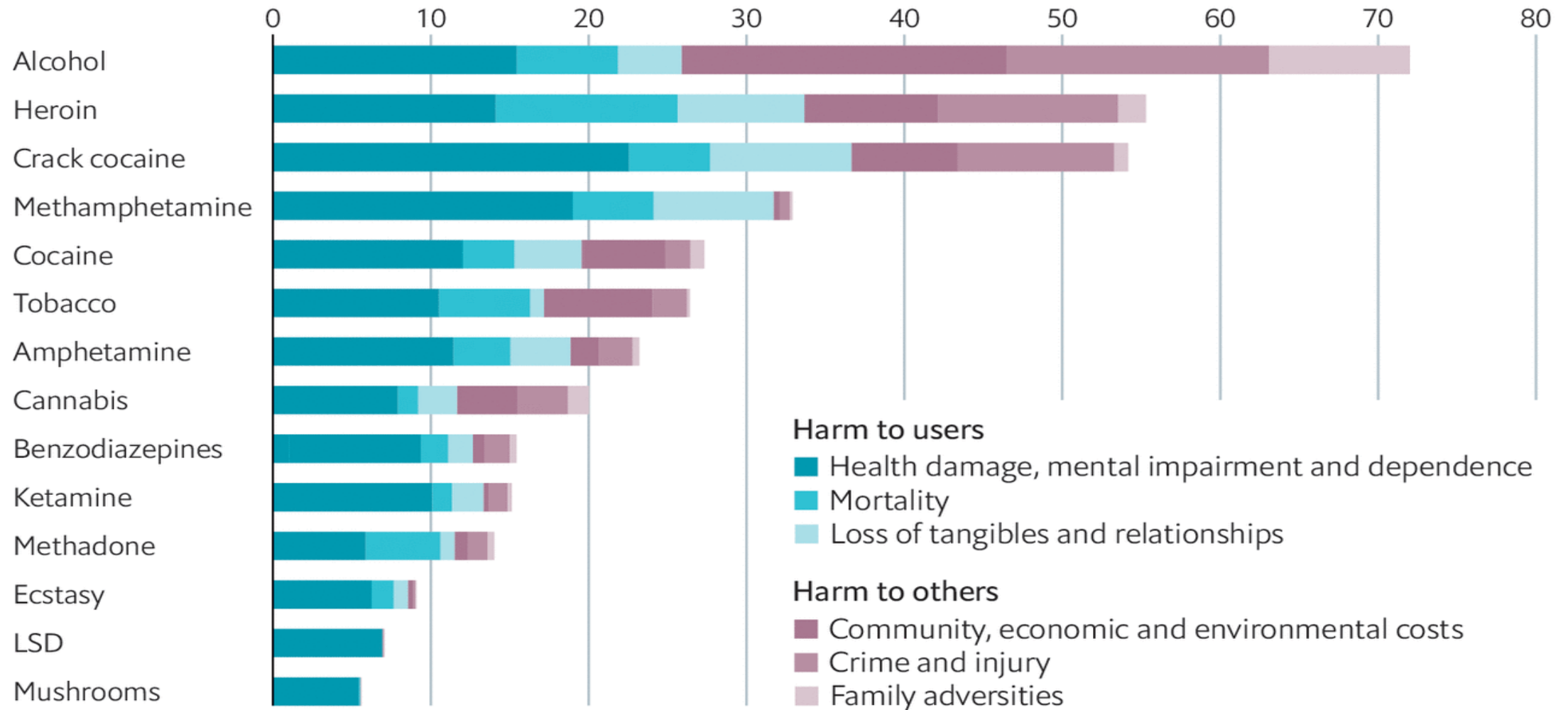
### **CATO Institute MARCH 1, 2018**

#### **Yet Another Study Points to The Potential of Cannabis for Reducing Opioid Use**

- MN Department of Health 42% (2,000+ first time Medical MJ users obtained significant pain relief
- 63% were able to reduce or eliminate their opioid use after 6 months
- JAMA study 2014 looked at all 50 states from 1999-2010 and found opioid overdose rates approximately 25% lower in states with legalized medicinal marijuana during that time period. A RAND study published in the March 2018 Journal of Health Economics reveals similar findings.

## Paying through the nose

Britain, drug harm score (out of 100), selected drugs, 2010

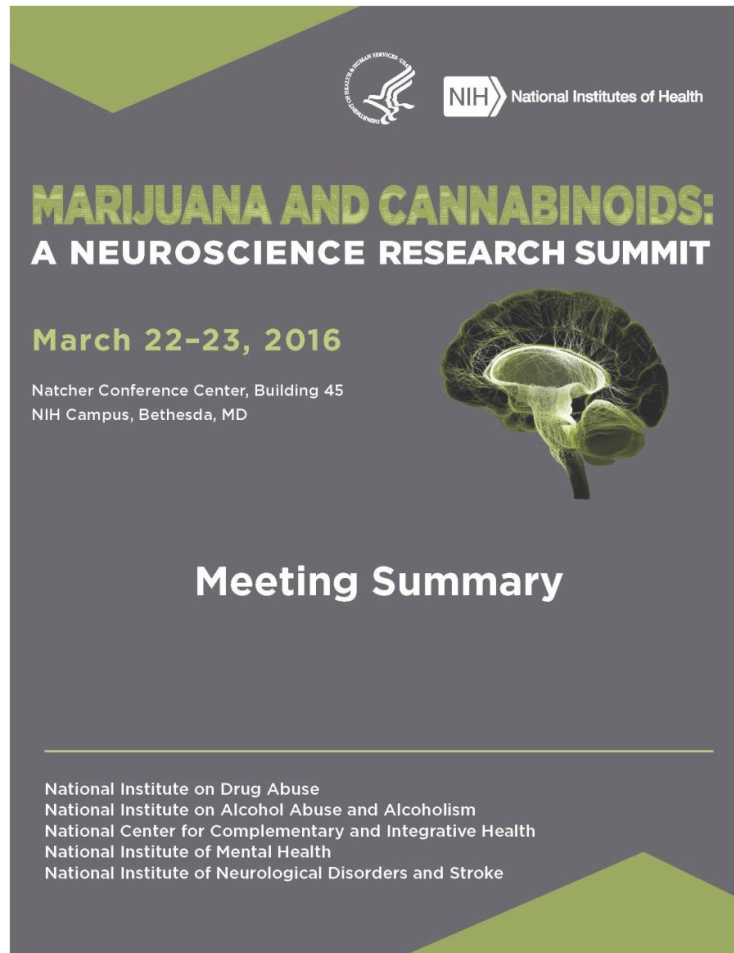


Source: "Drug harms in the UK: a multicriteria decision analysis", by D. Nutt et al., *The Lancet*

The Economist



# NIH (National Institute on Drug Abuse)



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# Recreational vs. Pharmaceutical Marijuana

- Ratio THC:CBD defines the psychoactive potential
- Breeders-Growers for the recreational & medical market seek to tip the ratio of THC
  - THC content  $\alpha$  potency (“street pot”)
    - 1990s avg 4%
    - 2014 avg 6%
    - MJ extract (hash oil) 50-80%
- Pharmaceutical preparations/”therapeutic pot” THC:CBD
  - 2.5:1.0
  - 0.0:1.0 (pure CBD)
  - 500mg THC-1000mg a day 500 mg CBD

# Hybrid strain specific $\uparrow$ CBD $\downarrow$ THC



+ Effects	Relaxed	Uplifted	Focused	CBD 16 / 19
- Effects	Dry Eyes	Dry Mouth	Paranoid	THC 0.42 / 1.2
Symptoms	Stress	Pain	Muscle Spasm	CBN 0.01 / 0.02







ACDC  
**ACD**  
HYBRID







ACDC marijuana strain induces clear headed high with strong analgesic effect without psychoactive influence. Relieves stress and anxiety. Controls pain and nausea, helps with

**ACDC**  
Anxiety | Depression | Arthritis

Good to Very Good  
○○○○○

CannaSOS 






# What about the terps?

TERPENE BENEFITS				
NAME	FOUND IN	EFFECTS	AROMA	STRAINS
<b>MYRCENE</b>		anti-inflammatory sedative muscle relaxant pain relief	musky herbal somewhat citrusy	Chemdawg Grape Stomper Fire Alien Kush Agent Orange
<b>A-PINENE</b>		boosts energy improves focus bronchodilator improves memory	pine fresh mountain air slightly woody	Vanilla Kush Cookie Cross 9lb Hammer Lavender
<b>CARYOPHYLLENE</b>		pain relief anti-depressant anti-inflammatory anti-anxiety	spicy woody pepper	Gorilla Glue #4 Tangerine Dream Sage N Sour Pineapple Express
<b>LIMONENE</b>		improves mood anti-anxiety anti-depressant relieves nausea	citrus lemon orange	GSC (Cookies) Pre-98 Bubba Kush Tangerine Dream Cush / Green Crack
<b>HUMULENE</b>		anti-inflammatory appetite suppressant pain relief anti-tumor	woody earthy herbal spicy	Liberty Haze Gorilla Glue #4 Cush / Green Crack Sage N Sour
<b>LINALOOL</b>		anti-anxiety sedative pain relief anti-bacterial	floral sugar citrus	Bubble Gum 9lb Hammer Sour Diesel Locomotion

Trust & Verify™ what you put into your mind and body CDX LIVE PURE

## Terpenes to Remember

MyDx

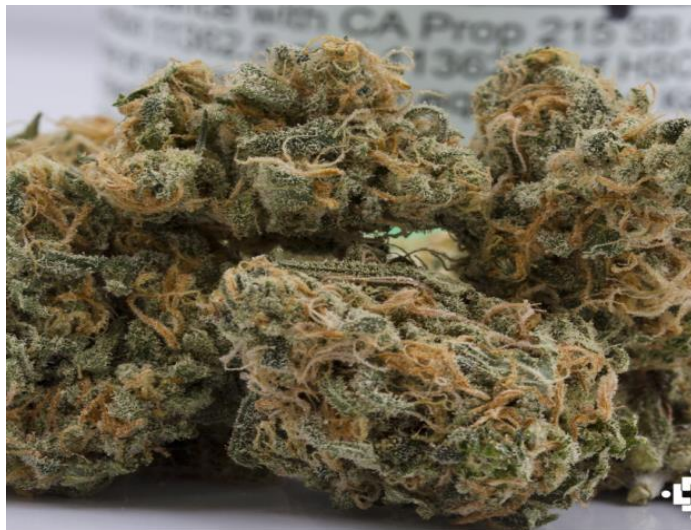
alpha-pinene	linalool	myrcene	beta caryophyllene	limonene
				
<b>FOCUSED</b>	<b>RELAXED</b>	<b>BODY BUZZ</b>	<b>HAPPY</b>	<b>ENERGETIC</b>
<ul style="list-style-type: none"> <li>memory aid</li> <li>bronchodilator</li> <li>anti-inflammatory</li> <li>anti-microbial</li> </ul>	<ul style="list-style-type: none"> <li>sedative</li> <li>anti-epileptic</li> <li>analgesic</li> <li>anti-anxiety</li> </ul>	<ul style="list-style-type: none"> <li>analgesic</li> <li>muscle relaxant</li> <li>antibiotic</li> <li>"couch-lock"</li> </ul>	<ul style="list-style-type: none"> <li>anti-anxiety</li> <li>antidepressant</li> <li>antioxidant</li> <li>antimicrobial</li> </ul>	<ul style="list-style-type: none"> <li>improves mood</li> <li>anti-anxiety</li> <li>antidepressant</li> <li>immune booster</li> </ul>
<ul style="list-style-type: none"> <li>Jack Herer</li> <li>Chemdawg</li> <li>Blue Dream</li> <li>Trainwreck</li> </ul>	<ul style="list-style-type: none"> <li>G-13</li> <li>Amnesia Haze</li> <li>Lavender</li> <li>LA Confidential</li> </ul>	<ul style="list-style-type: none"> <li>Pure Kush</li> <li>Skunk #1</li> <li>White Widow</li> <li>Granddaddy Purple</li> </ul>	<ul style="list-style-type: none"> <li>Hash Plant</li> <li>OG Kush</li> <li>Bubba Kush</li> <li>Girl Scout Cookies</li> </ul>	<ul style="list-style-type: none"> <li>OG Kush</li> <li>Lemon Haze</li> <li>Sour Diesel</li> <li>Lemon Skunk</li> </ul>
<p>Pinene smells like pines, it makes you breathe easier, and it helps you focus. Strains high in pinene are shown to help memory retention and recall as well as overall alertness; ideal for studying or working.</p>	<p>This "comfort" aroma promotes relaxation and feelings of well-being. Linalool is also found in cotton and linen; this explains why the smell of warm towels and sheets can be so soothing.</p>	<p>Myrcene is found in mangoes and hops; it smells earthy, tropical, and fruity. This terpene is a cornerstone of the Kush family, known for inducing a "couch-lock" stone.</p>	<p>This terpene smells spicy like peppers and is bound to make you feel very happy. Beta-caryophyllene will elevate your mood and alleviate your depression. A few puffs and your worries will float away.</p>	<p>Smells like fresh lemons. This terpene promotes stress relief and mood elevation. Strains with high limonene content will make you talkative, happy, and social. Perfect for a session with your friends.</p>

CDXLife.com



# Sativa-Indica-Hybrids (^CBD)

- You can get them on the Recreational or MMJ side
- Hybrids can be broken down into three basic categories:
- Sativa-dominant Hybrids
- Indica-dominant Hybrids



## Indica



**Morphology:** Short and bushy; suitable for indoor gardens

**Geographical Origins:** Areas between 30 to 50 degrees latitude.

**Effects:** Tend to be sedating and relaxing with full-body effects

**Symptom Relief:** Anxiety, insomnia, pain, muscle spasms

Indica

**Ga**

Grape Ape

Indica

**Gdp**

Granddaddy Purple

Indica

**Nl**

Northern Lights

## Sativa



**Morphology:** Tall and thin; suitable for outdoor gardens

**Geographical Origins:** Areas between 0 and 30 degrees latitude

**Effects:** Tend to be uplifting and creative with cerebrally-focused effects

**Symptom Relief:** Depression, ADD, fatigue, mood disorders

Sativa

**Sd**

Sour Diesel

Sativa

**Jh**

Jack Herer

Sativa

**Lh**

Lemon Haze



# Bridging the gap between the patient, the caregiver, and cannabis



Canna-Val is a turnkey software solution giving doctors and dispensaries instant access to patient and product data, matching patients with an individualized cannabinoid treatment profile.



Canna-Val will give dispensaries and doctors the ability to provide their patients with a professional and consistent standard of care.



The Canna-Val Assessment (**CVA**) will generate a LeafPrint™ that will identify the combination of cannabinoids that offer the best relief for each individual symptom.



Canna-Val will move the cannabis industry beyond the current 3 tier classification (Sativa, Indica, and Hybrid) for all cannabis related products and create a well-defined and accurate measure for how cannabis should be viewed and used. It will pave the way to the creation of better methods of production and consumption, adding value for the MMJ industry as well as patients.

Category	Ailment/Symptom	THC	THCv	THCa	CBD	CBDa	CBG	CBGa	CBN	CBC	CBCa	Patient 1	Total
Neurological	Tourettes	10	5		8		8		2			Tourettes	25
Neurological	Epilepsy											Epilepsy	0
Neurological	Seizures											Seizures	0
Neurological	Mutiple Sclerosis											Mutiple Sclerosis	0
Neurological	Alzheimers											Alzheimers	0
Neurological	Parkinsons											Parkinsons	0
Neurological	Spasticity											Spasticity	0
Neurological	Osteoporosis											Osteoporosis	0
Neurological	ALS											ALS	0
Mood/Behavior	Anxiety	10			10		10					Anxiety	30
Mood/Behavior	ADD ADHD											ADD ADHD	0

Mood/Behavior  
Mood/Behavior  
Mood/Behavior  
Mood/Behavior  
Mood/Behavior  
Gastro-Intestir  
Gastro-Intestir

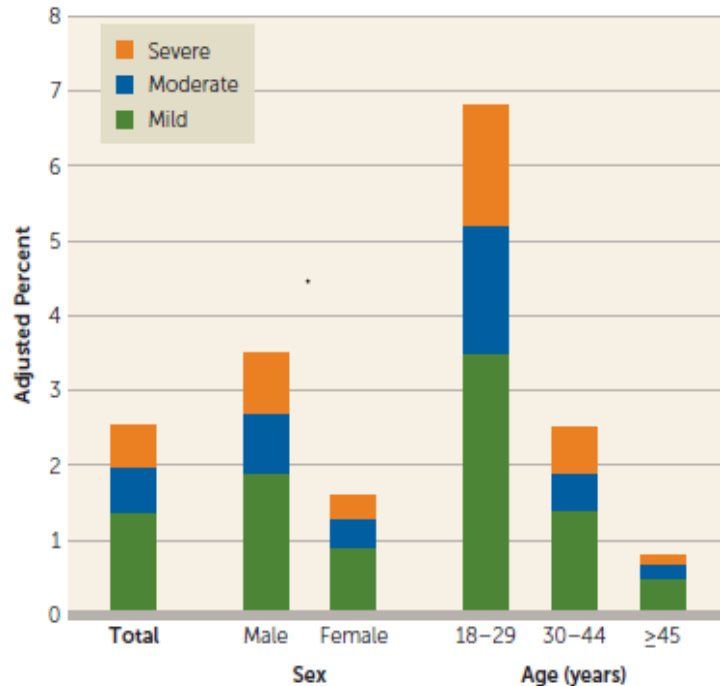


# Pros and Cons of Medical Cannabis use by People with Chronic Brain Disorders

- This review provides an overview of the perceived benefits and adverse mental health effects of cannabis use in people with ALS, MS, AD, PD, bipolar disorder, and schizophrenia.
- Results: Cannabis use diminishes some symptoms associated with these disorders.
- Decreases pain and spasticity in people with MS, decreases tremor, rigidity, and pain in people with PD, and improves the quality of life of ALS patients by improving appetite, and decreasing pain and spasticity.
- Cannabis use is more common among people with schizophrenia than healthy controls.
- It's a risk factor for schizophrenia which increases positive symptoms in schizophrenia patients and diminishes negative symptoms.
- Cannabis use worsens bipolar disorder and there is no evidence that bipolar patients derive any benefit from cannabis. In late stage Alzheimer's patients, cannabis products may improve food intake, sleep quality, and diminish agitation.
- Conclusion: Cannabis use diminishes some of the adverse effects of neurological and psychiatric disorders. However, chronic cannabis use may lead to cognitive impairments and dependence.
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5652027/>

# Cannabis use disorder (CUD)

**FIGURE 1. Prevalence of 12-Month DSM-5 Cannabis Use Disorder in the United States, by Severity<sup>a</sup>**



<sup>a</sup> Prevalences reflect numbers adjusted for nonresponse and weighted to represent the U.S. population based on the 2012 American Community Survey. Total, N=36,309; males, N=15,862; females, N=20,447; age 18-29, N=8,126; age 30-44, N=10,135; age ≥45, N=5,806.

DSM-5: MJ dependence and abuse = *cannabis use disorder*

- Associated with other substance use, psychiatric disorders, and cannabis-induced psychotic disorder
- Per 2013 NESARC III: One-year prevalence in U.S. of 2.5% (but <1% at age >26 or income >\$70,000)

Conflicting data whether cannabis use, and use disorder, is increasing (NESARC III) or stable (NSDUH)

Approximately 9% of all users become dependent at some time in their life; 17% if started in teens

- Compared to 67.5% for nicotine

# Can marijuana cause schizophrenia?



Photo by Camila Quintero Franco on Unsplash

## Likely yes

- Early use (ages 15 to 18) is associated with the risk of psychotic disorders, even after controlling for many other factors
- Not likely to be 'reverse causation' or self-medication

## Overall roughly doubles risk

## Risk associated with multiple factors

- Early use ( $\leq 18$ yo) – effect on the developing brain
- Amount used and higher potency cannabis
- Pre-existing vulnerability (genetic, child abuse, psychiatric illness)



**GWAS of lifetime cannabis use reveals new risk loci, genetic overlap with psychiatric traits, and a causal influence of schizophrenia**

Di Forti M, et al. *Lancet Psychiatry* (2019)

*Eur Arch Psychiatry Clin Neurosci*. 2009 October; 259(7): 413–431



## Risk of depression, anxiety, and suicidality in young adulthood

Systematic review and meta-analysis:

- 11 studies comprising 23,317 individuals were included in the quantitative analysis

The pooled odds ratio was 1.37 for depression and 3.46 for suicidal attempt

Biologic plausibility – known neuroanatomic alterations seen in early cannabis users



But remember – association does not mean causation!

# Cannabis & MVA Risk: Meta-analysis

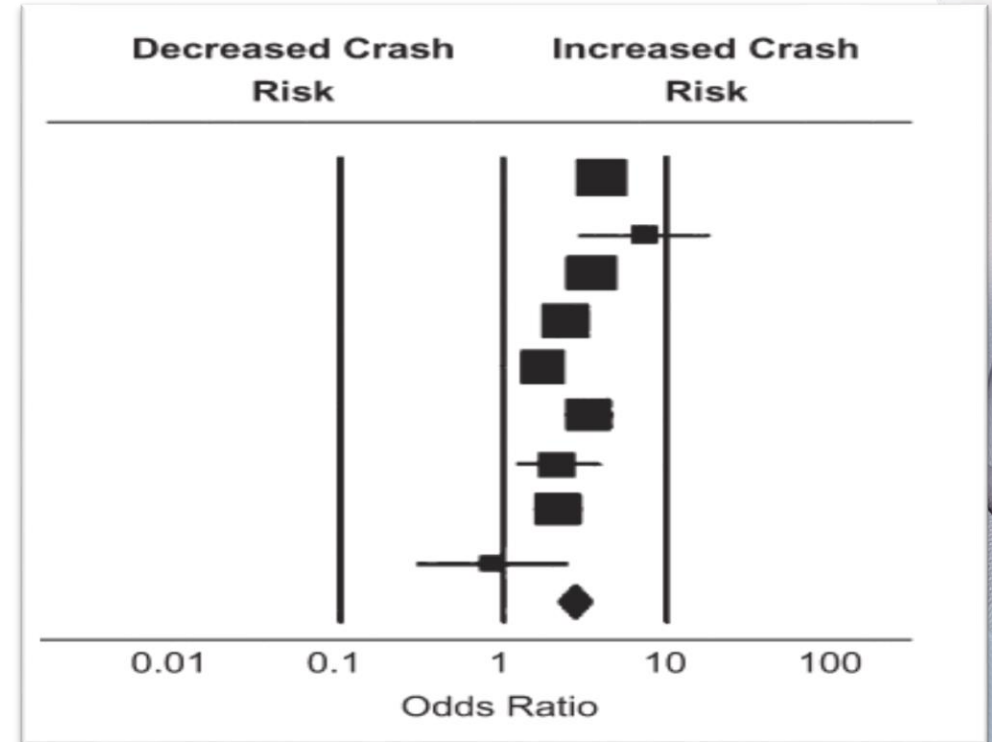
Pooled risk OR of 2.66

other analyses with OR 1.5-2.0 range, including increasing risk with increasing THC levels

Psychomotor impairment lasts for 12 to 24 hours due to accumulation of marijuana in adipose tissue and awareness of this decreases in a few hours

Risk appears to be less than that seen with alcohol

5.2% higher rate in CO, WA, and OR compared with neighboring states that did not legalize retail sales



Asbridge M, et al. BMJ 2012;344:e536 doi: 10.1136  
Hartmann RL, Huestis MA. Clin Chem. 2013 March ; 59(3)  
Rogeberg O, Elvik R. Addiction. 2016 Aug;111(8):1348-59  
HLDI Bulletin. Recreational marijuana and collision claim frequencies. 2018;35(8):1-14.

# Mortality risk of cannabis use

Clinical literature has found little to indicate an independent mortality risk except for the increased MVA risk and possibly a small increase in lung cancer risk.

- Risk appears to be primarily in the company it keeps

Kaiser and NHANES population studies:

- Small, but not significant increased risk in someone who admits to using marijuana in the last month, controlled for other aspects of their medical history



kimzy-nanney-b2haCjfk\_cM-unsplash\_Cannabis



## Insurance population results

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Insurance lab studies of applicants testing positive for THC found that much of the mortality of marijuana is mediated by the concomitant use of cigarettes.

When controlled for smoking status, plus age and sex (but not other effects of underwriting), the hazard ratios were:

- CRL\*
  - 1.21
- ExamOne\*\*
  - ~1.0 for women
  - 1.97 for men THC(+) only, 3.06 cotinine (+) only, and 3.97 if both (+)

- Risk higher in younger ages
- THC(+) also correlated some with most other drugs of abuse

Courtesy of: \*Dr Steven Rigatti, Rigatti Risk Analytics, LLC; \*\*Brian Lanzrath, Director of Analytics, ExamOne

# Common Approaches for Positive MJ

- Rate as tobacco?
  - Not very well justified by these data
  - Perhaps in those under age 30
- Restrict Preferred classes?
  - Better justification
  - Up to about age 50-60
- Ignore it completely?
  - Beware of those who self-medicate, the very young and heavy users
  - Consider the positive side – beneficial medicinal effect in those with responsive disorders



# What's the market doing?



- Distinguish Recreational versus Medical (75% yes)
- Rate for underlying condition
- Testing vs not testing for THC (80% No)
- Legal Use vs. Illicit (70% No)
- Assess the quantity (80% yes) vs. frequency
- > 16x /month Recreational = RNA (50% yes) vs. MMJ

# Why Marijuana Users Get Specialized Rates



Marijuana is now legal in 29 states Medically and 8 states Recreationally



Marijuana Users Can Be Rated Non-Smoker



Millions of Marijuana users were afraid to pee in a cup



Partnered with Top Insurers

# Case: E-Cigarettes and more

- Male 39 years old, Owner and bene (gaming co)
  - BP 138/89, pulse 88; lab OK, HOS - **cotinine negative**
  - APS:
    - 10/15 – BP 140/92 pulse 90. CMP WNL, **discuss d/c nicotine product/smoking/vaping**
    - 2/16 – stress, concentration issues, ? ADHD, **GAD: Rx Clonazepam 0.5mg**
    - 11/16 – fracture left tibia snowboarding accident
    - 5/17, 11/17 – stress, late hours, unable to sleep, GAD: Rx Zoloft 50 mg, Rx Clonazepam 0.5mg
    - 1/18 – **started JUUL pods to try to quit smoking when drinking**
    - 8/18 - ER visit for palpitations, dx anxiety, **vaping ++ on and off**. Advised to d/c nicotine products.
    - 11/18 - anxiety, poor sleep habits, stress: **Rx Alprazolam 0.5mg up to t.i.d. (d/c Clonazepam)**
- Question on application: Have you ever used tobacco or any other nicotine products such as cigarettes, cigar, pipe, chewing tobacco, snuff, nicotine gum or nicotine patch? **Answered NO**

# Poll Question

What would you guess is his most likely pattern of nicotine and tobacco use?

1. No current or recent tobacco or nicotine use [noting the negative cotinine and app question]
2. Tobacco use in the past but only occasional e-cig use in the past year
3. Both tobacco use and e-cigarette use intermittently up to present
4. Smoker, but cut back some in past year with e-cigarette replacement

# Cannabis case #1 revisited

- Script check:
  - **Alprazolam 0.5mg (last filled 2-2018), Zomig (12-2017), Naproxen (5-2016), Hydrocodone-Norco (11-2017)**
  
- Poll question
  
- Your assessment of the risk:
  - a. Rate as Non-Smoker – and additional debits for anxiety
  - b. Standard Smoker – and additional debits for Cannabis use
  - c. Standard Non-Smoker
  - d. Preferred (2<sup>nd</sup> best class)



# Cannabis case #2 revisited

## ➤ Poll Question

Which one of the following statements is incorrect:

- a) Cannabidiol (CBD) can actually lessen the psychoactive effects of THC
- b) High doses of CBD can be sleep-promoting, if the cannabis flower confers a myrcene-rich terpene profile
- c) Cannabinoids results + (17ng/mL) indicates high concentrations of THC
- d) Cannabidiol and THC are the power couple of cannabis therapeutics; they work best together.



# QUESTIONS???





# Thank you!

