

Marijuana: Past, Present, and Future

Aaron Weiner, PhD

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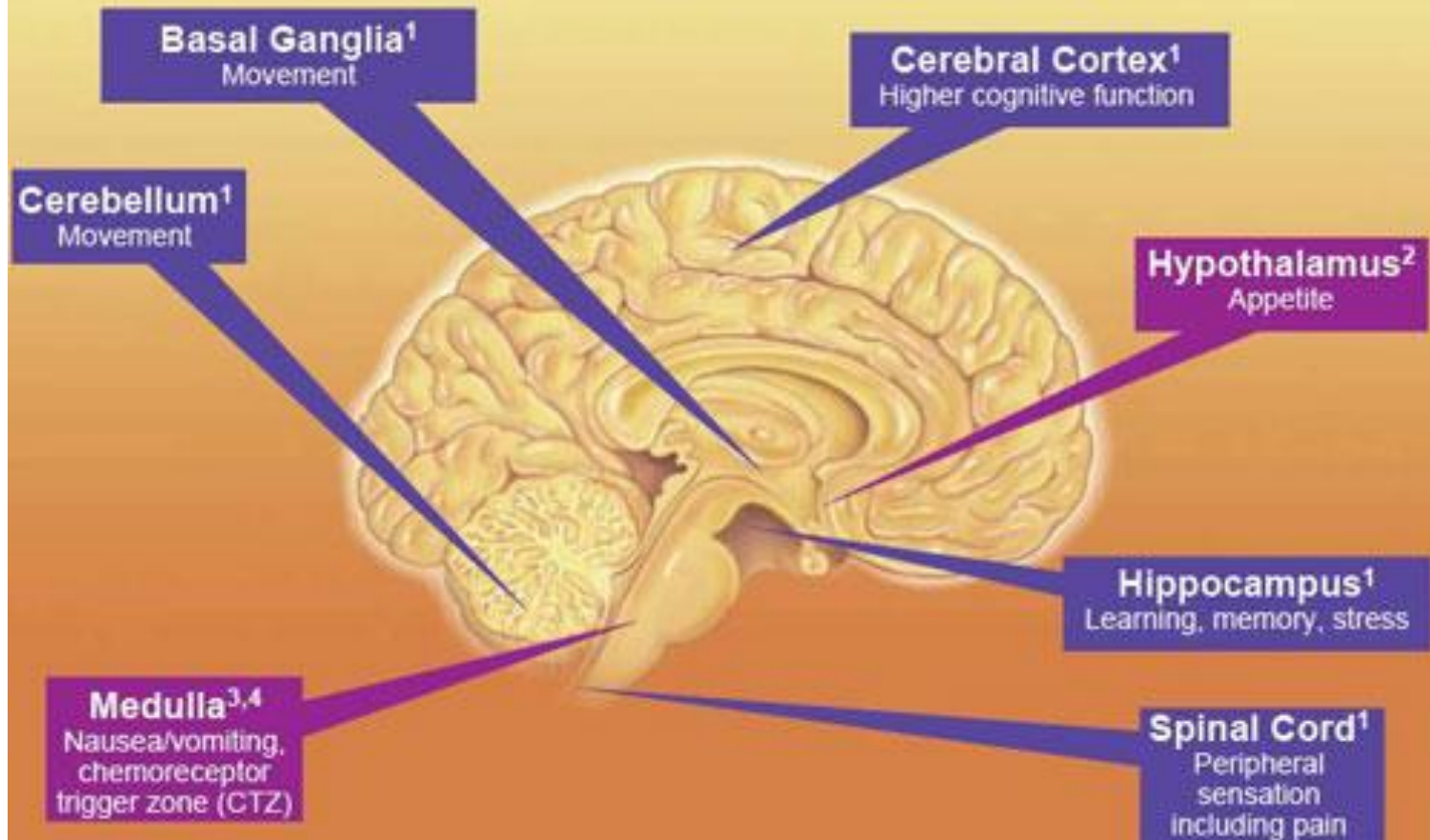
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What is marijuana?

- Plant with 500 chemical compounds, and 100 cannabinoids
- THC & CBD
- THC binds to CB1 receptors

Concentrations of CB₁ receptors



1. Joy JE, et al, eds. *Marijuana and Medicine: Assessing the Science Base*. Washington, DC: National Academy Press; 1999:33-81. 2. Marin BR, et al. *J Support Oncol*. 2004;2(4):305-316. 3. Grotenhemen F. *Curr Drug Targets CNS Neurol Disord*. 2005;4(5):507-530. 4. Navari RM, et al. *Expert Opin Emerg Drugs*. 2006;11(1):137-151.

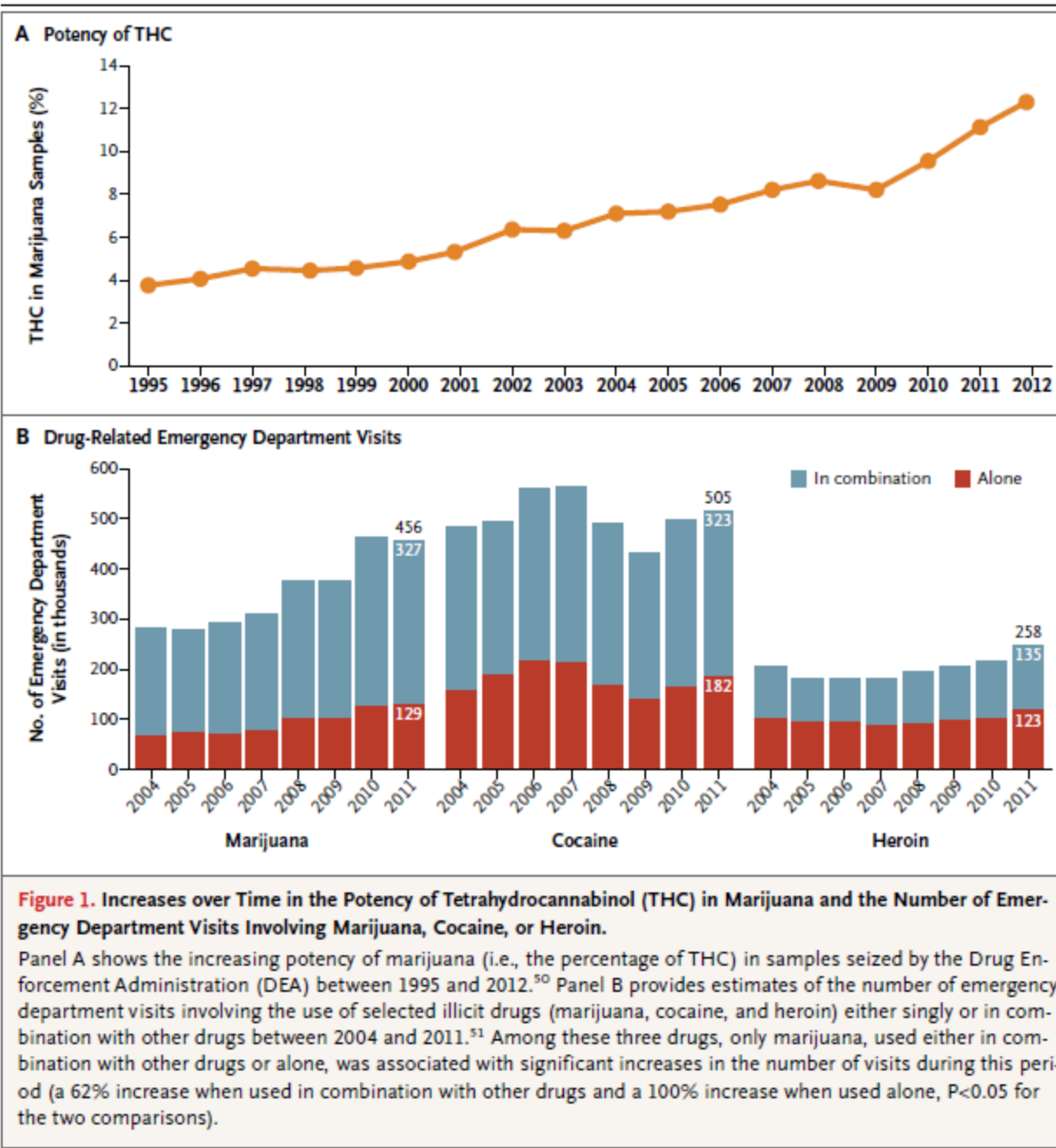
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- THC binds to CB1 receptors
- Most-used substance behind alcohol & tobacco
- Number of routes of administration
- High variability of concentration
- Addictive substance
 - Up to 30% of active users have a SUD
 - 1:10 adults, 1:6 adolescents

What is “medical” marijuana?

- In Illinois since 2013
- Not approved by the FDA, nor prescribed/dispensed like medicine
 - **Medicine:** Marinol, Sativex, and Epidiolex



What is “medical” marijuana?

- In Illinois since 2013
- Not approved by the FDA, nor prescribed/dispensed like medicine
 - **Medicine:** Marinol, Sativex, and Epidiolex
 - **Not medicine:** Buying whatever you like from a dispensary, using it however and whenever you want
- Have you ever looked at what product is actually being sold?
 - [Local Example](#) / [Another Local Example](#)

“Medical” Marijuana

- What does research show it is good for?

*The National
Academies of* | SCIENCES
ENGINEERING
MEDICINE

HEALTH AND MEDICINE DIVISION

CONCLUSIONS FOR: THERAPEUTIC EFFECTS

There is **conclusive or substantial evidence that cannabis or cannabinoids are effective:**

- For the treatment for chronic pain in adults (cannabis) (4-1)
- Antiemetics in the treatment of chemotherapy-induced nausea and vomiting (oral cannabinoids) (4-3)
- For improving patient-reported multiple sclerosis spasticity symptoms (oral cannabinoids) (4-7a)

There is **moderate evidence that cannabis or cannabinoids are effective for:**

- Improving short-term sleep outcomes in individuals with sleep disturbance associated with obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis (cannabinoids, primarily nabiximols) (4-19)

- In Illinois, it is approved (by the legislature) for **39** conditions...starting at age 18

- Agitation of Alzheimer's disease
- HIV/AIDS
- Amyotrophic lateral sclerosis (ALS)
- Arnold-Chiari malformation
- Cancer
- Causalgia
- Chronic inflammatory demyelinating polyneuropathy
- Crohn's disease
- CRPS (complex regional pain syndrome Type II)
- Dystonia
- Fibrous Dysplasia
- Glaucoma
- Hepatitis C
- Hydrocephalus
- Hydromyelia
- Interstitial cystitis
- Lupus
- Multiple Sclerosis
- Muscular Dystrophy
- Myasthenia Gravis
- Myoclonus
- Nail-patella syndrome
- Neurofibromatosis
- Parkinson's disease
- Post-Concussion Syndrome
- Post-Traumatic Stress Disorder (PTSD)
- Reflex sympathetic dystrophy
- Residual limb pain
- Rheumatoid arthritis
- Seizures (including those characteristic of Epilepsy)
- Severe fibromyalgia
- Sjogren's syndrome
- Spinal cord disease (including but not limited to arachnoiditis)
- Spinal cord injury is damage to the nervous tissue of the spinal cord with objective neurological indication of intractable spasticity
- Spinocerebellar ataxia
- Syringomyelia
- Tarlov cysts
- Tourette syndrome
- Traumatic brain injury
- Cachexia/wasting syndrome

“Medical” Marijuana

- Where is the medical evidence for this?

Narrative review of the safety and efficacy of marijuana for the treatment of commonly state-approved medical and psychiatric disorders

Katherine A Belendiuk¹, Lisa L Baldini² and Marcel O Bonn-Miller^{3,4,5*}

Abstract

The present investigation aimed to provide an objective narrative review of the existing literature pertaining to the benefits and harms of marijuana use for the treatment of the most common medical and psychological conditions for which it has been allowed at the state level. Common medical conditions for which marijuana is allowed (i.e., those conditions shared by at least 80 percent of medical marijuana states) were identified as: Alzheimer's disease, amyotrophic lateral sclerosis, cachexia/wasting syndrome, cancer, Crohn's disease, epilepsy and seizures, glaucoma, hepatitis C virus, human immunodeficiency virus/acquired immunodeficiency syndrome, multiple sclerosis and muscle spasticity, severe and chronic pain, and severe nausea. Post-traumatic stress disorder was also included in the review, as it is the sole psychological disorder for which medical marijuana has been allowed. Studies for this narrative review were included based on a literature search in PsycINFO, MEDLINE, and Google Scholar. Findings indicate that, for the majority of these conditions, there is insufficient evidence to support the recommendation of medical marijuana at this time. A significant amount of rigorous research is needed to definitively ascertain the potential implications of marijuana for these conditions. It is important for such work to not only examine the effects of smoked marijuana preparations, but also to compare its safety, tolerability, and efficacy in relation to existing pharmacological treatments.

Keywords: Cannabis, Medical marijuana, Marijuana, Medicine, Treatment, Alzheimer's disease, ALS, Cachexia, Cancer, Crohn's disease, Epilepsy, Seizures, Glaucoma, Hepatitis C virus, HCV, HIV, AIDS, Multiple sclerosis, MS, Pain, Nausea, Vomiting, Post-traumatic stress disorder, PTSD

“Medical” Marijuana

There is no or *insufficient evidence* to support or refute the conclusion that cannabis or cannabinoids are an effective treatment for:

- Cancers, including glioma (cannabinoids) (4-2)
 - Cancer-associated anorexia cachexia syndrome and anorexia nervosa (cannabinoids) (4-4b)
 - Symptoms of irritable bowel syndrome (dronabinol) (4-5)
- Epilepsy (cannabinoids) (4-6)
- Spasticity in patients with paralysis due to spinal cord injury (cannabinoids) (4-7b)
- Symptoms associated with amyotrophic lateral sclerosis (cannabinoids) (4-9)
 - Chorea and certain neuropsychiatric symptoms associated with Huntington’s disease (oral cannabinoids) (4-10)
- Motor system symptoms associated with Parkinson’s disease or the levodopa-induced dyskinesia (cannabinoids) (4-11)
- Dystonia (nabilone and dronabinol) (4-12)
 - Achieving abstinence in the use of addictive substances (cannabinoids) (4-16)
 - Mental health outcomes in individuals with schizophrenia or schizophreniform psychosis (cannabidiol) (4-21)

■ What about glaucoma?



Summary: Although marijuana can lower the intraocular pressure (IOP), its side effects and short duration of action, coupled with a lack of evidence that it use alters the course of glaucoma, preclude recommending this drug in any form for the treatment of glaucoma at the present time.

■ PTSD



“Medical” Marijuana

- Where is the medical evidence for this?
- Who created this list?

Adverse Impact

- What about negative health effects?

Table 1. Adverse Effects of Short-Term Use and Long-Term or Heavy Use of Marijuana.

Effects of short-term use

Impaired short-term memory, making it difficult to learn and to retain information

Impaired motor coordination, interfering with driving skills and increasing the risk of injuries

Altered judgment, increasing the risk of sexual behaviors that facilitate the transmission of sexually transmitted diseases|

In high doses, paranoia and psychosis

Effects of long-term or heavy use

Addiction (in about 9% of users overall, 17% of those who begin use in adolescence, and 25 to 50% of those who are daily users)*

Altered brain development*

Poor educational outcome, with increased likelihood of dropping out of school*

Cognitive impairment, with lower IQ among those who were frequent users during adolescence*

Diminished life satisfaction and achievement (determined on the basis of subjective and objective measures as compared with such ratings in the general population)*

Symptoms of chronic bronchitis

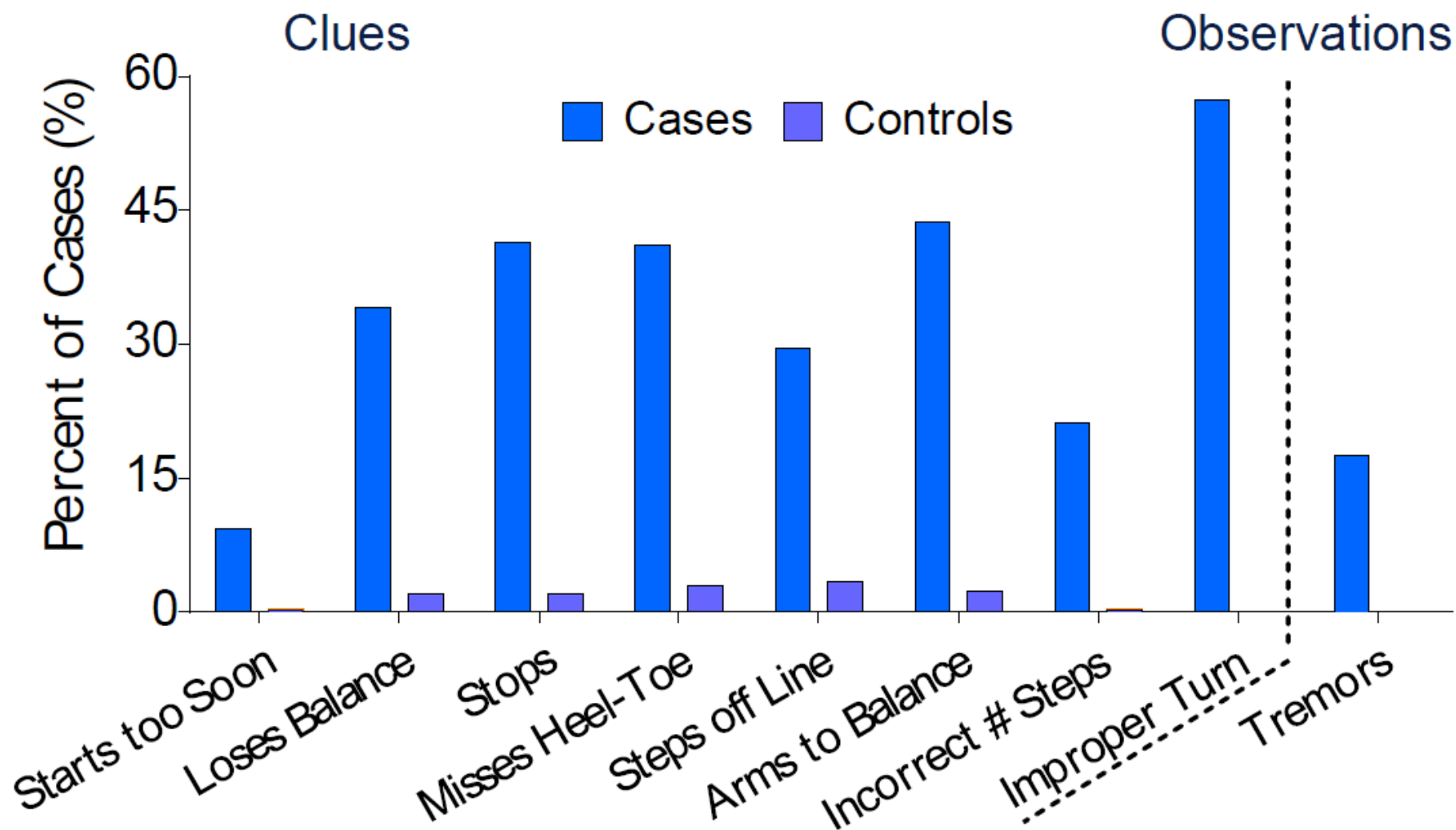
Increased risk of chronic psychosis disorders (including schizophrenia) in persons with a predisposition to such disorders

* The effect is strongly associated with initial marijuana use early in adolescence.

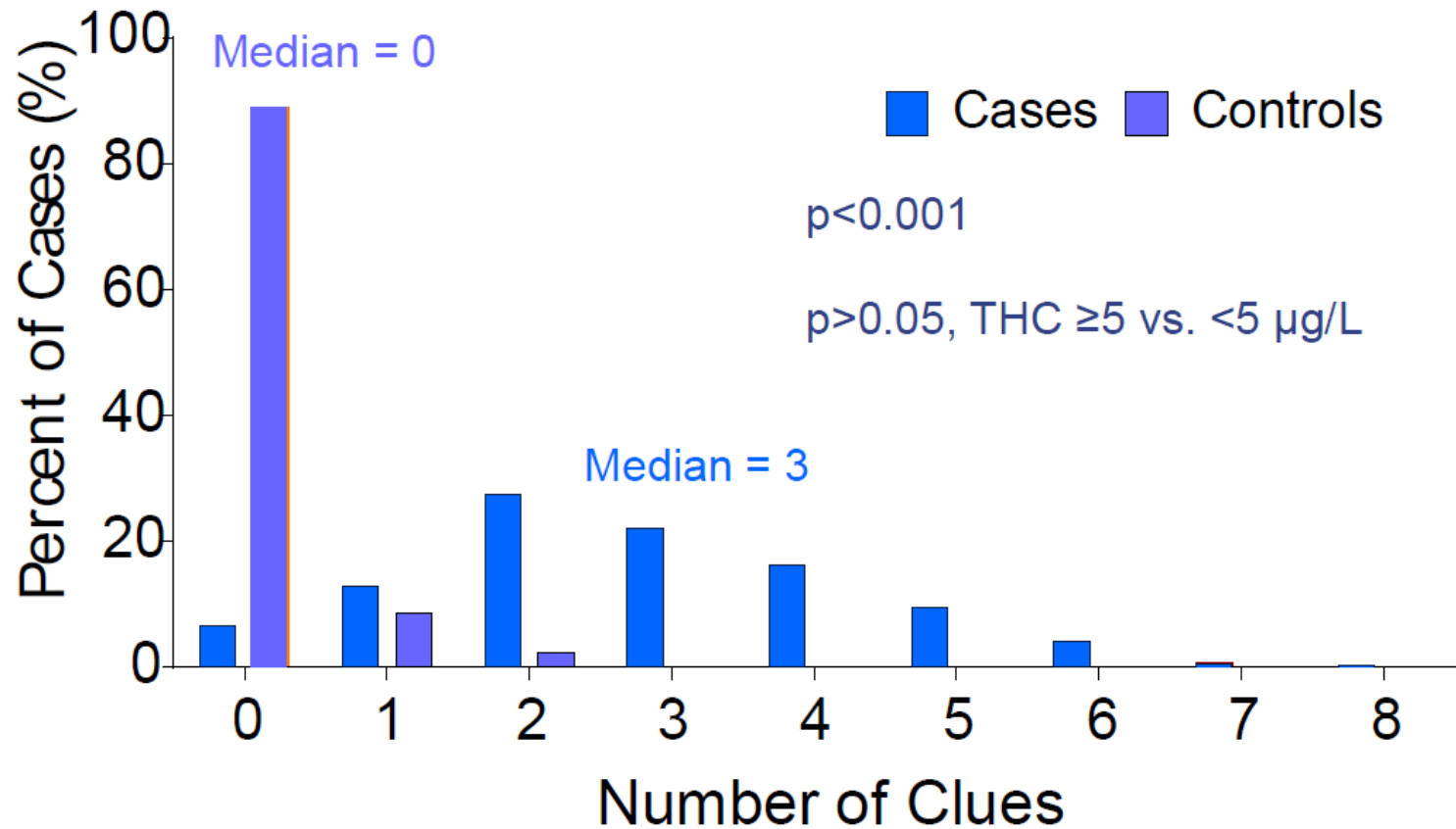
Adverse Impact

- What about negative health effects?
- Do THC concentration levels matter?
- Why aren't physicians asking for this?
 - Risk/benefit ratios, lack of evidence
- Drugged driving – how impaired are you, really?

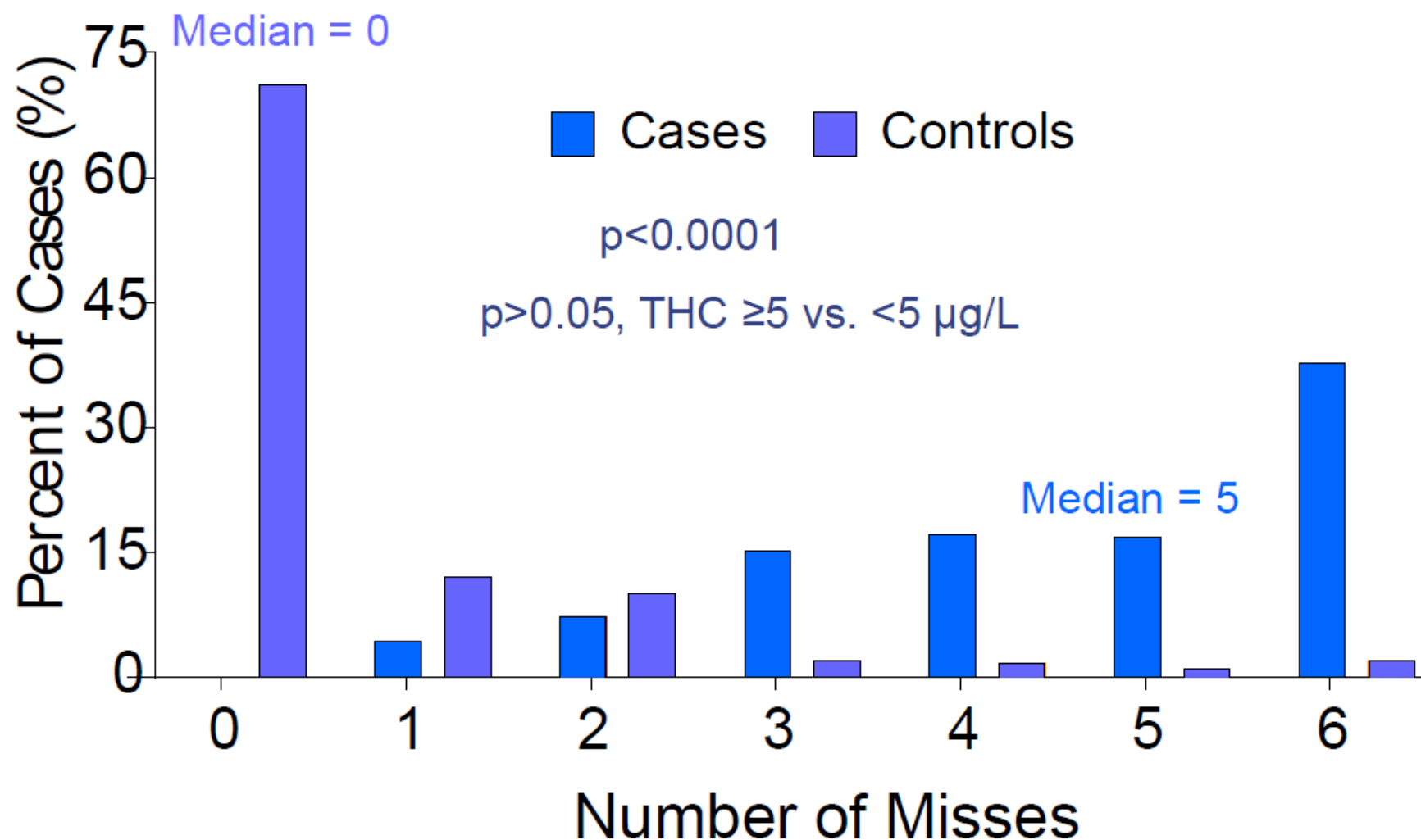
Walk And Turn Clues & Observations



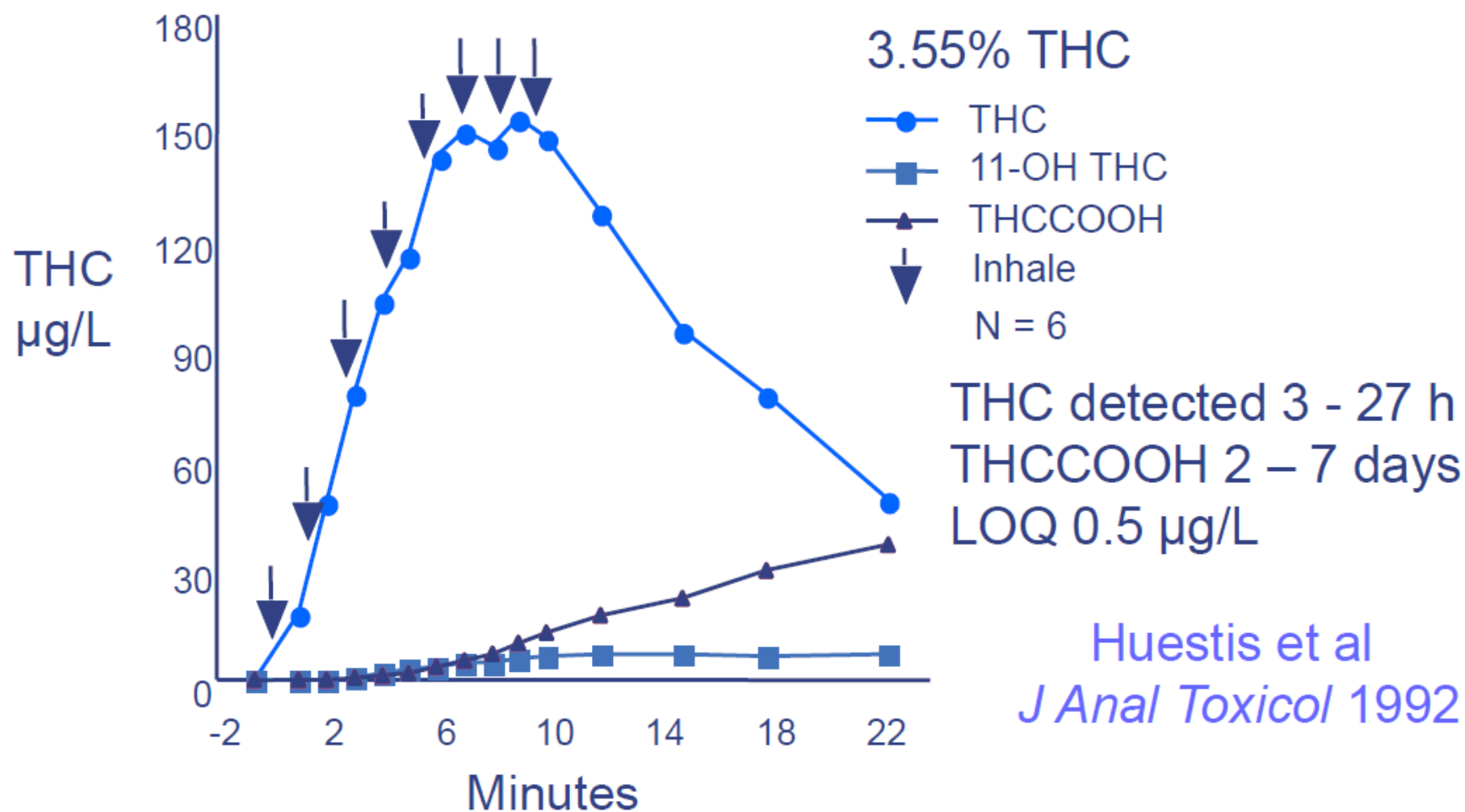
Number of WAT Clues ≥ 2 considered “Impaired”



Number of Finger To Nose Misses



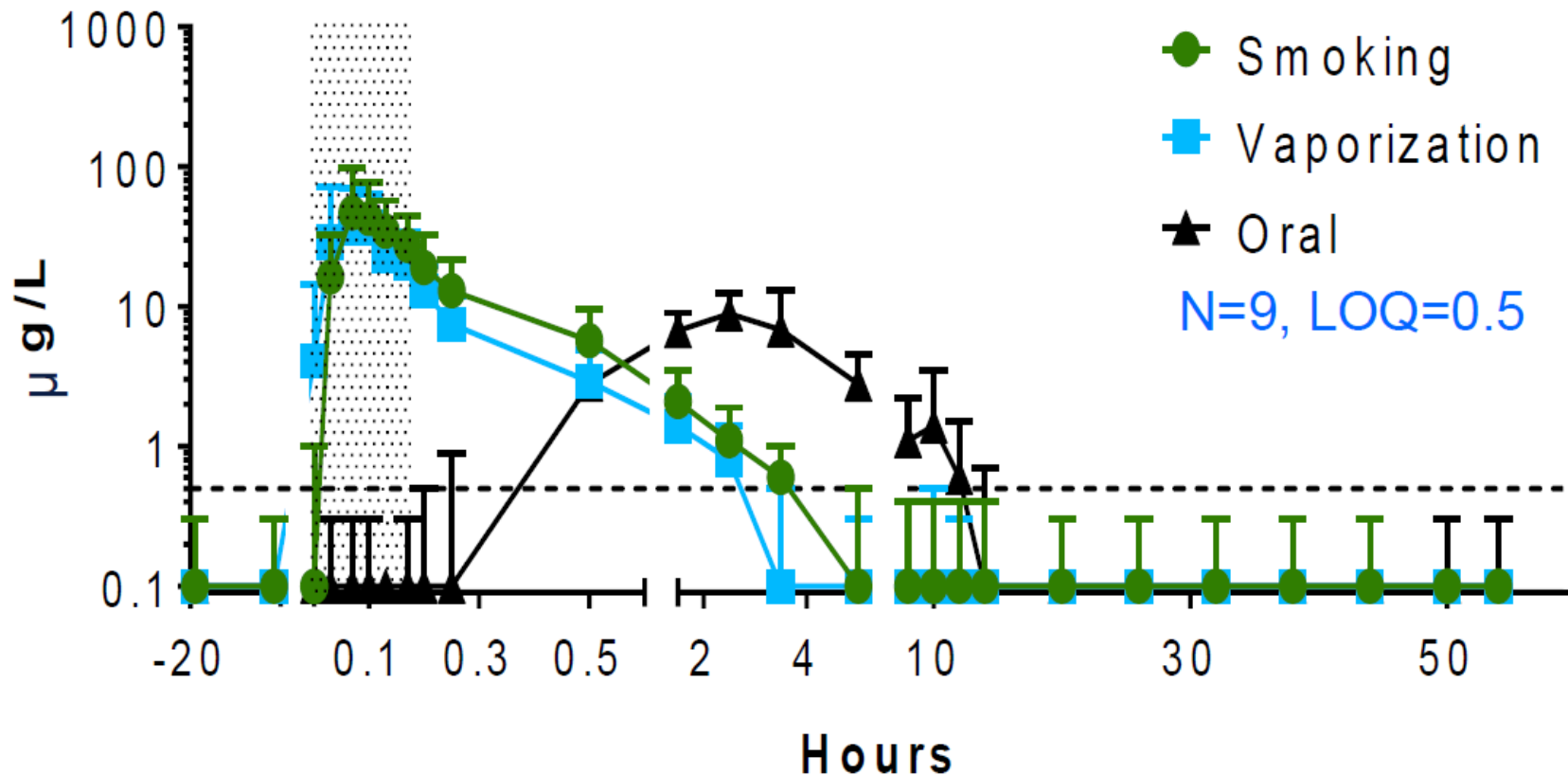
THC, 11-OH-THC & THCCOOH Plasma Concentrations After Smoking Cannabis



Adverse Impact

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 - How do edibles factor into this?

Mean Blood THC Concentrations in Occasional Smokers After 50.6 mg THC by 3 Administration Routes



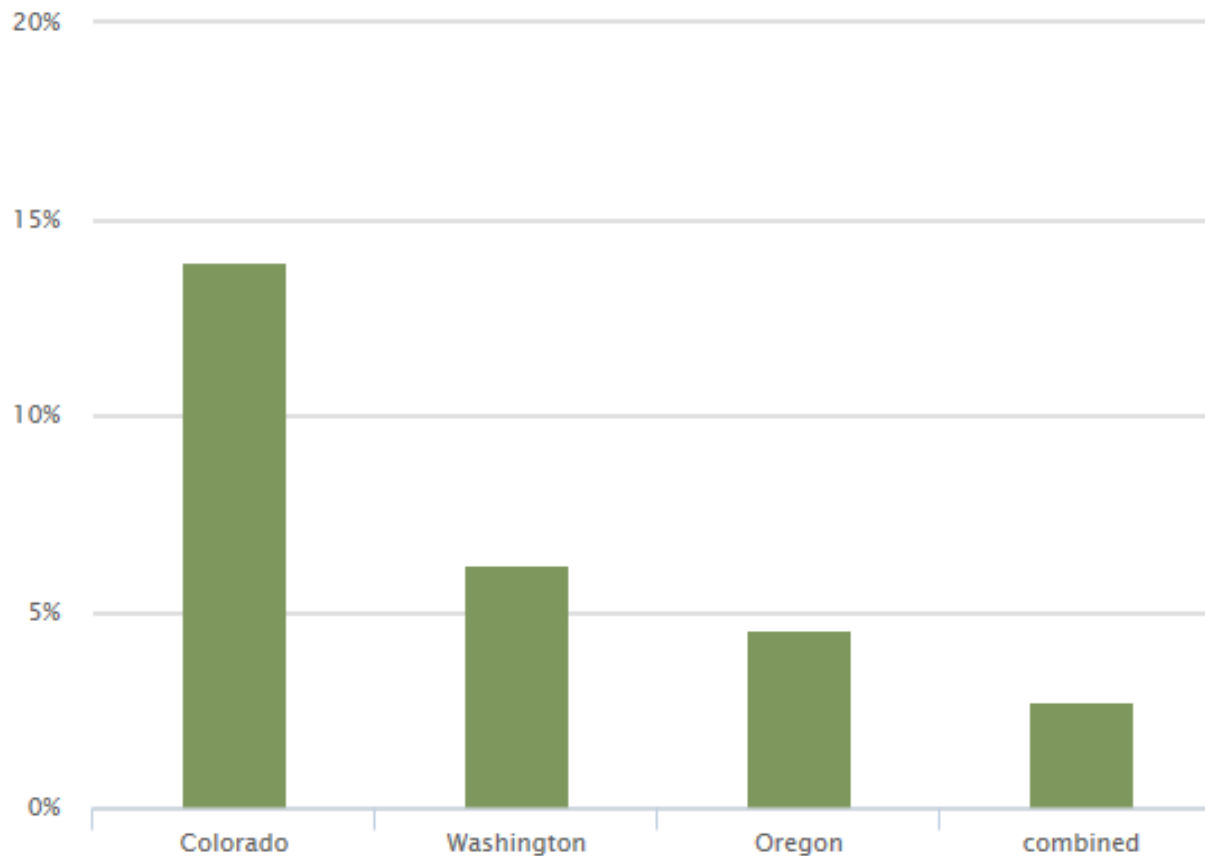
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 - How do edibles factor into this?
- Does it have a real-world impact?

Increase in MVA Claims

Estimated effects of recreational marijuana sales in 3 states

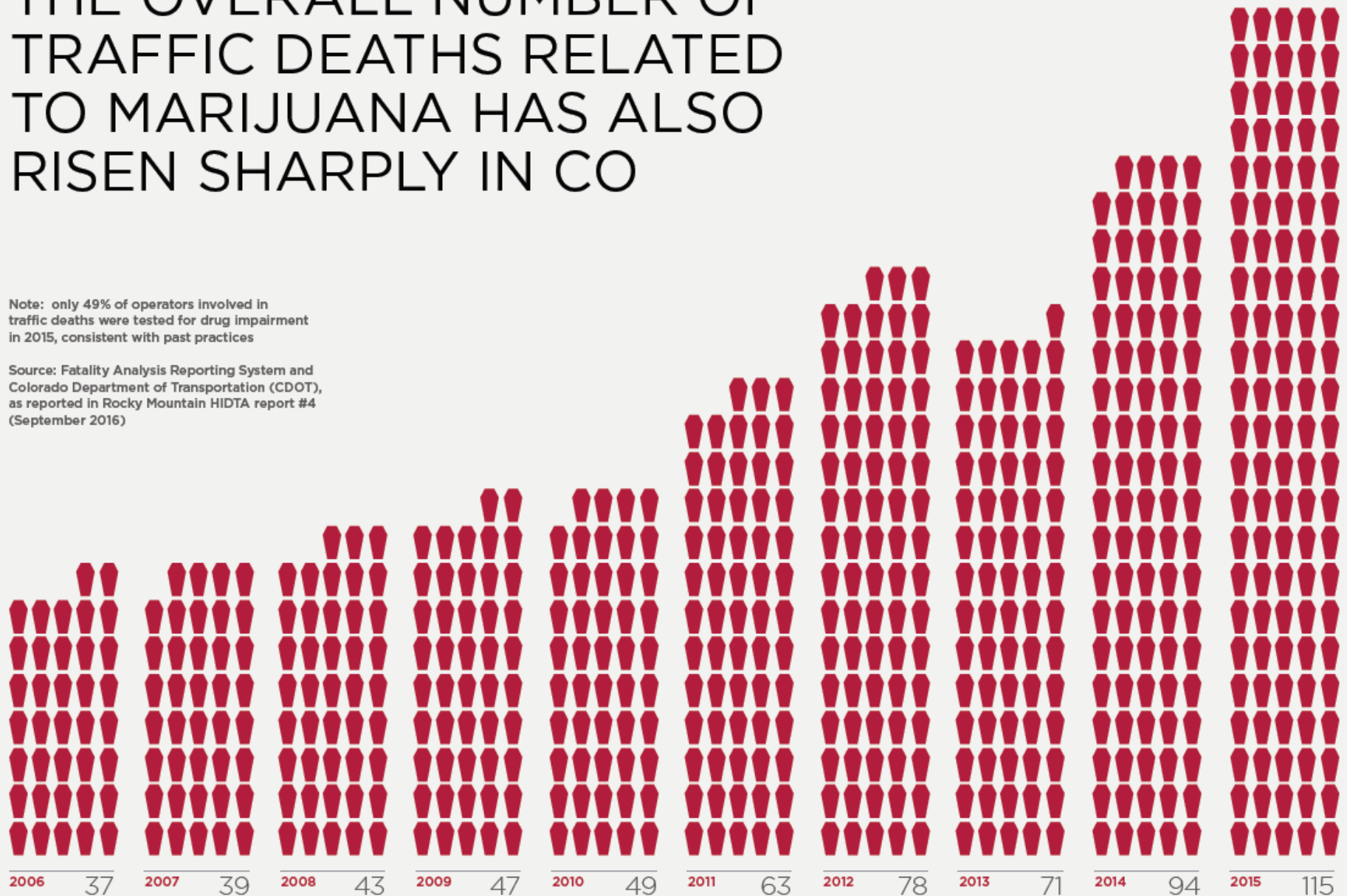
Change in claim frequency for vehicles up to 33 years old, 2012-16



THE OVERALL NUMBER OF TRAFFIC DEATHS RELATED TO MARIJUANA HAS ALSO RISEN SHARPLY IN CO

Note: only 49% of operators involved in traffic deaths were tested for drug impairment in 2015, consistent with past practices

Source: Fatality Analysis Reporting System and Colorado Department of Transportation (CDOT), as reported in Rocky Mountain HIDTA report #4 (September 2016)

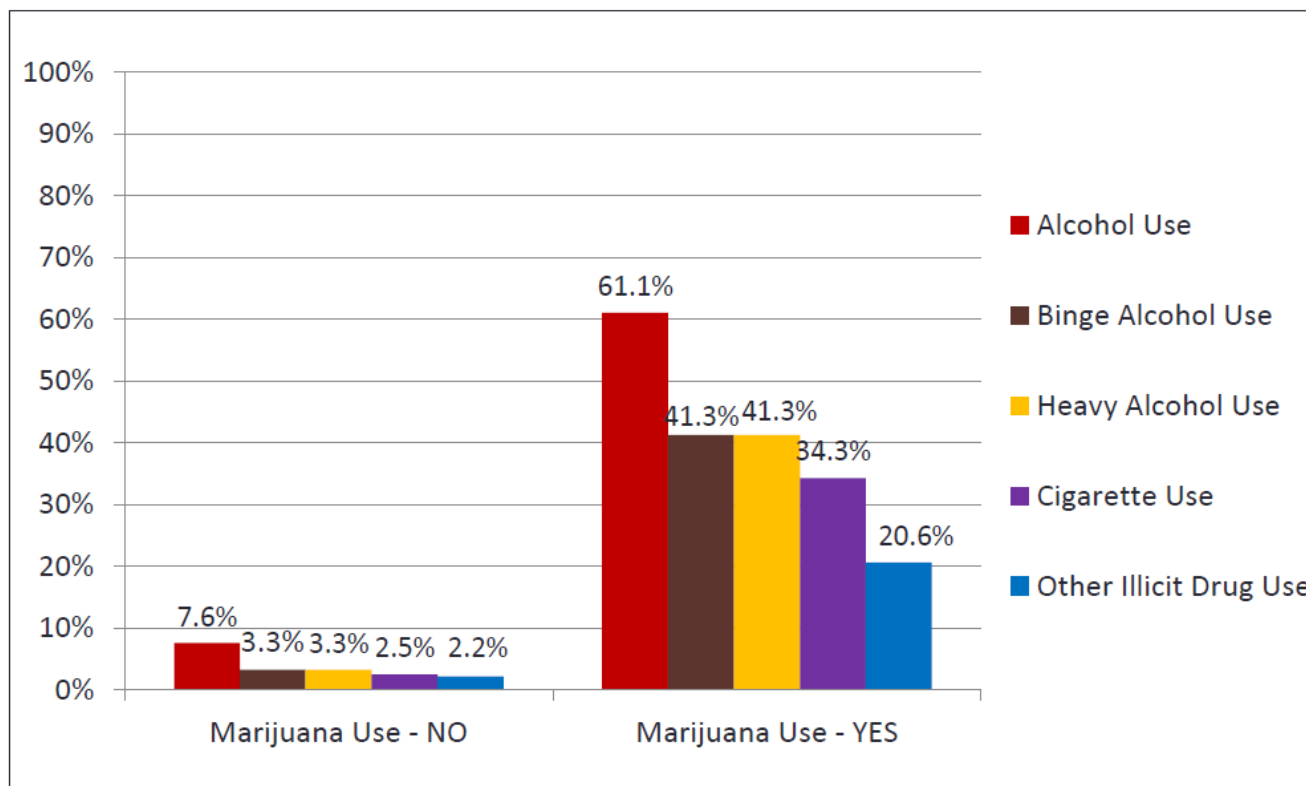


Adverse Impact

- What about negative health effects?
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 - How do edibles factor into this?
- Does it have a real-world impact?
- Is it a “gateway drug?”

Gateway Drug?

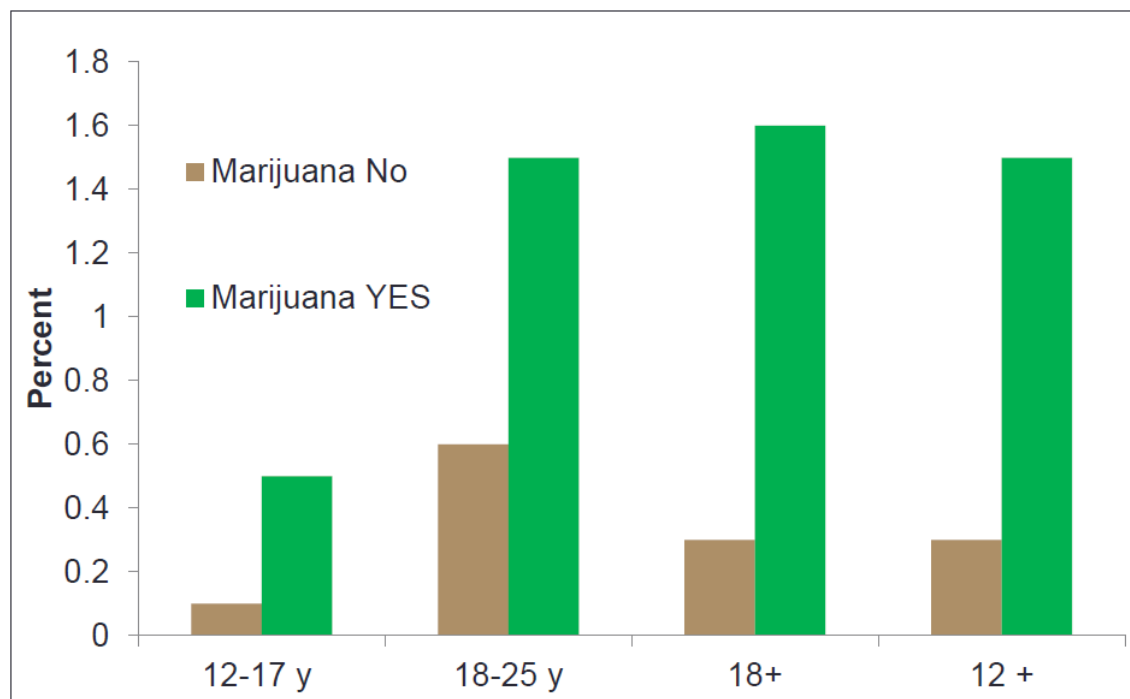
Past Month Prevalence of Cigarette, Alcohol and Other Illicit Use Among Youth Aged 12-17 by Past Month Marijuana Use, 2014



SAMHSA's Center for Behavioral Health Statistics and Quality: NSDUH 2014

Gateway Drug?

Prevalence Of Heroin Use Among Marijuana Users in the US



SAMHSA's Center for Behavioral Health Statistics and Quality: NSDUH 2015

Delivery System – Is this Medicine?

- How is medicine approved for the public?
 - Replicated science, multi-phase FDA trials
- How is medicine prescribed?
 - Dose, frequency, type, concentration
- How is medicine produced?
 - Uniform, standardized
- Do we smoke any medicine you're aware of?
 - Or use bongs, dab kits, etc.
- How many of those 39 conditions do you have at age 18?
- What demographic do the products appear to be marketed at?

So what's this all about then?

- To review...
 - Lack of evidence to support most medical claims
 - Dispensing system that is unspecific and promotes self-medication
 - Selling concentrates that have up to 93% THC
 - Low age for entry, products aimed to appeal to kids and young adults
- Do these ads look familiar?



Every doctor in private practice was asked:

*—family physicians, surgeons, specialists...
doctors in every branch of medicine—*

“What cigarette do you smoke?”



According to a recent Nationwide survey:

More Doctors Smoke Camels *than any other cigarette!*

THE
“E-ZONE” TEST
WILL
TELL YOU



The “E-Zone” is the zone of the throat—your throat. It’s the zone where your throat is growing around, for any reason, for any other reason, and your throat will show which cigarette is best for you...and here it is! Here your throat, the throat of the important of doctors, many millions of doctors, the throat of doctors will tell you “E-Zone” as a “E.”



Not a guess, not just a trend...but an actual fact based on the statements of doctors themselves to nationally known independent research organization

Yes, your doctor was asked...along with thousands of thousands of other doctors from Maine to California

And they’ve named their choice—the brand that more doctors named as their smoke is Camel! These nationally known independent research organizations found this to be a fact

Nothing unusual about it. Doctors smoke for pleasure just like the rest of us. They appreciate, just as you, a mild taste that’s cool and easy on the throat. They can enjoy a full, rich flavor of expertly blended golden tobaccos. As they named Camels...more of them named Camels than any other brand. Next time you buy cigarettes, try Camels.

20,679* Physicians

say "LUCKIES are
less irritating"

"It's toasted"
Your Throat Protection
against irritation against cough

LUCKY STRIKE
IT'S TOASTED
CIGARETTES

The figures quoted have been checked and certified to by LYBRAND, ROSE, BEOS, AND MONTGOMERY, Accountants

THE SHOCK OF FACING *what your figure may become*



AVOID FUTURE

by refraining
indulgence,
maintain the
are of

We do not represent that
smoking Lucky Strike
cigarettes will keep
or cause the
We do not
ed to do this
you will "Reach
instead, you
over-indulgence
cause throat
irritation and
cough.

When Tempted
**Reach
for a
LUCKY**
instead

"It's toasted"

Your Throat Protection—against irritation—against cough.



THE SPIRIT OF YOUTH *carry on—avoid that future shadow*



"LIVING EVENTS CAST
THEIR SHADOWS BEFORE"
—Thomas Campbell, 1817-1896

AVOID THAT FUTURE SHADOW

by refraining from
over-indulgence

We do not represent that
smoking Lucky Strike Ciga-
rettes will cause the reduction
of flesh. We do declare that when
compared to do yourself no harm,
if you will "Reach for a Lucky"
instead, you will thus avoid
over-indulgence in things that
cause excess weight and, by
avoiding over-indulgence, main-
tain a trim figure.

When Tempted
**Reach
for a
LUCKY**
instead

"It's toasted"

Your Throat Protection—against irritation—against cough.



© 1935, The American
Tobacco Co., Manufacturers

How an addiction-profiteering industry is born

■ Phase 1

- Associate an addictive substance with broad medical benefit, despite lack of evidence
- Promote public misinformation and confusion
- Market to teenagers and young adults
 - What the kids are saying? [Not an accident.](#)
 - [And who are these people](#), exactly?

■ Phase 2

- Commercialization
 - Bills to commercialize cannabis introduced in both house and senate
- Take a guess: in Illinois, who has exclusive cannabis sale rights for the first 12 months after commercialization?

Summary

- Actual science-based medical applications for cannabinoids are extremely limited
- Our current delivery system is not consistent with medicine and promotes self-medication and youth use
- Associating smoking marijuana (the plant) with medicine is a public health concern
- Big Cannabis is knocking at the door



Thank You!

