

Is this medicine?

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▶ Medicine via politics, not physicians

- ▶ Should lawmakers really be deciding what society calls “medicine?”
 - ▶ Public health implications? Perceived risk?
 - ▶ Could you imagine a pharma company doing this?
- ▶ Why are we doing an end-around the FDA?
 - ▶ And what are the consequences?

Healthcare before science: Why do clinical trials matter?

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THE THALIDOMIDE TRAGEDY: LESSONS FOR DRUG SAFETY AND REGULATION

By: Bara Fintel, Athena T. Samaras, Edson Carias

Jul 28, 2009



Many children in the 1960's, like the kindergartner pictured above, were born with phocomelia as a side effect of the drug thalidomide, resulting in the shortening or absence of limbs. (Photo by Leonard McCombe//Time Life Pictures/Getty Images)

Opioid Substitute?

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

Gabrielle Campbell, Wayne D Hall, Amy Peacock, Nicholas Lintzeris, Raimondo Bruna, Briony Laranca, Suzanne Nielsen, Milton Cohen, Gary Chan, Richard P Mattick, Fiona Blyth, Marian Shanahan, Timothy Dobbins, Michael Farrell, Louisa Degenhardt

*Lancet Public Health 2018;
3: e341-50*

Interpretation Cannabis use was common in people with chronic non-cancer pain who had been prescribed opioids, but we found no evidence that cannabis use improved patient outcomes. People who used cannabis had greater pain and lower self-efficacy in managing pain, and there was no evidence that cannabis use reduced pain severity or interference or exerted an opioid-sparing effect. As cannabis use for medicinal purposes increases globally, it is important that large well designed clinical trials, which include people with complex comorbidities, are conducted to determine the efficacy of cannabis for chronic non-cancer pain.

Medical Marijuana Users are More Likely to Use Prescription Drugs Medically and Nonmedically

Theodore L. Caputi, BS and Keith Humphreys, PhD

J Addict Med • Volume 12, Number 4, July/August 2018

Association between medical cannabis laws and opioid overdose mortality has reversed over time



Chelsea L. Shover, Corey S. Davis, Sanford C. Gordon, and Keith Humphreys

PNAS June 25, 2019 116 (26) 12624-12626; first published June 10, 2019 <https://doi.org/10.1073/pnas.1903434116>

et al.'s analysis through 2017. Not only did findings from the original analysis not hold over the longer period, but the association between state medical cannabis laws and opioid overdose mortality reversed direction from -21% to $+23\%$ and remained positive after accounting for recreational cannabis laws. We also uncovered no evidence that either broader (recreational) or more restrictive (low-tetrahydrocannabinol) cannabis laws were associated with changes in opioid overdose mortality. We find it unlikely that medical

Medical Cannabis Patients Driving While High

24

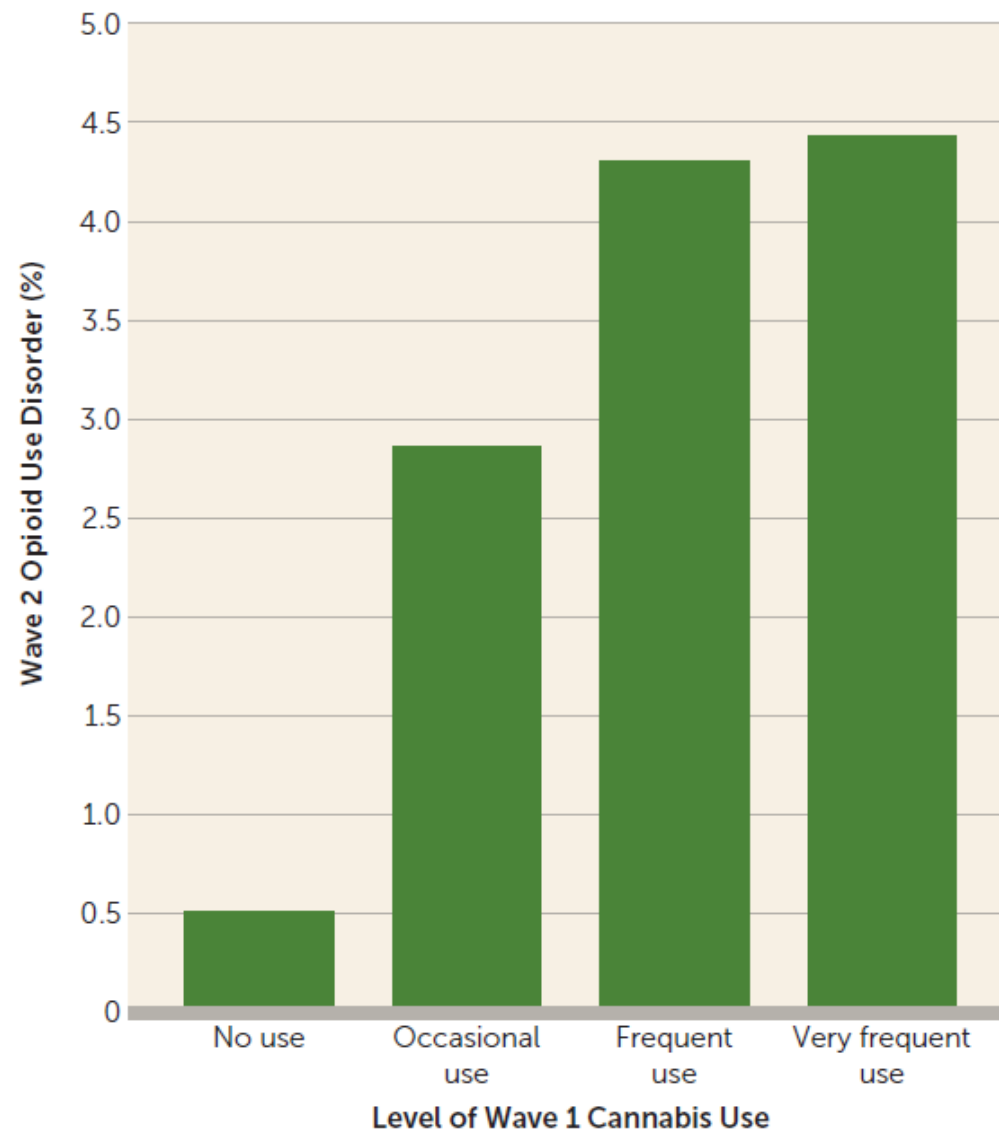
Driving under the influence of cannabis among medical cannabis patients with chronic pain

Erin E. Bonar^{a,b,*}, James A. Cranford^a, Brooke J. Arterberry^{a,c}, Maureen A. Walton^{a,b}, Kipling M. Bohnert^{a,d}, Mark A. Ilgen^{a,d}

In the past 6 months...

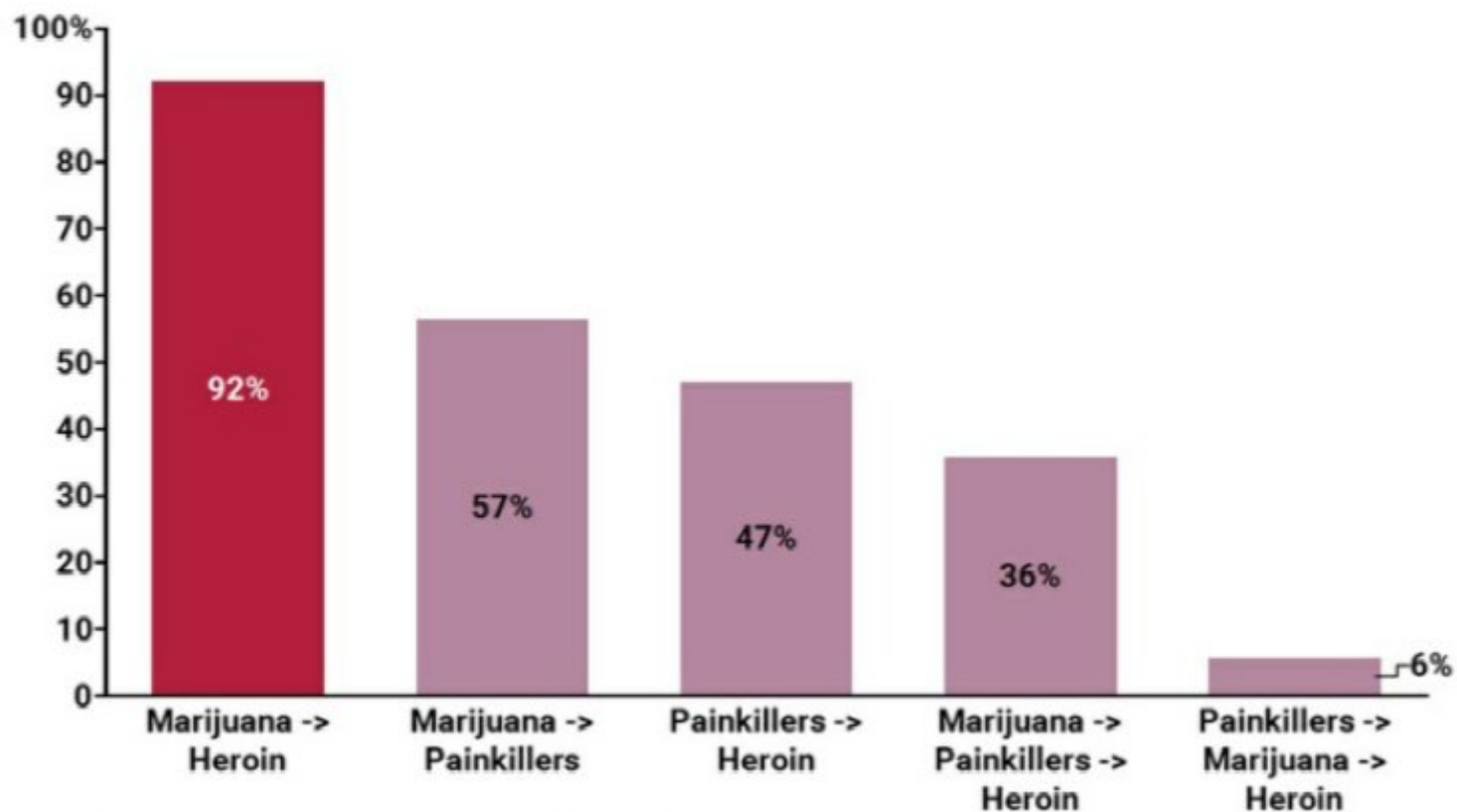
- ▶ 56.4% endorsed driving within 2h of use
- ▶ 50.5% endorsed driving while “a little high”
- ▶ 21.5% endorsed driving while “very high”
- ▶ US base rate 16+ for driving high in the past year: 4.3%

FIGURE 1. Level of Wave 1 Cannabis Use and Incident Wave 2 Prescription Opioid Use Disorder in the NESARC^a



^a NESARC=National Epidemiological Survey on Alcohol and Related Conditions; wave 1 was conducted in 2001 and 2002, and wave 2 in 2004 and 2005.

Percentage of heroin/prescription painkiller users who first used another addictive drug in previous years



Source: National Survey on Drug Use and Health (NSDUH, 2013 & 2014)

Smoking strong marijuana daily increases risk of psychosis, study finds

MARCH 20, 2019 / 11:44 AM / CBS/AP



Psychotic Disorders as Function of THC dose, Frequency of Use 11 Sites, 6 Nations in Europe, Brazil: 3 of the cities

The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): A multicentre case control study

Di Forti et al

www.thelancet.com/psychiatry
Published online March 19, 2019

If high-potency cannabis were no longer available:

- 12.2% of cases of first-episode psychosis could be prevented across 11 cities
- 30.3% prevented London
- 50.3% prevented Amsterdam

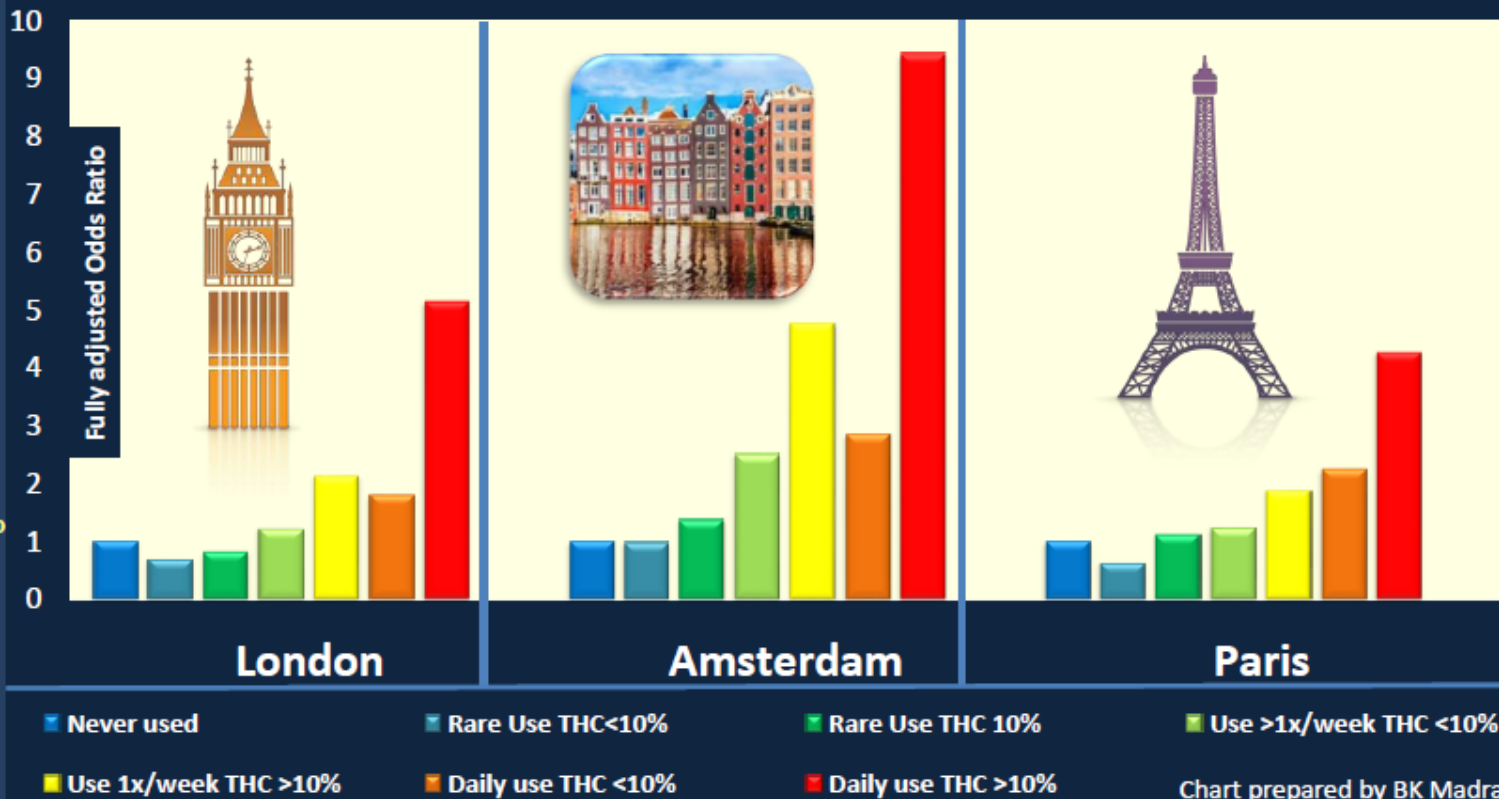


Chart prepared by BK Madras

ER visits linked to marijuana rose at Colorado hospital after legalization, study finds

People who consume marijuana edibles may be ingesting unsafe levels because they don't feel the immediate high, researcher says.

March 25, 2019, 4:30 PM CDT

By Shamard Charles, M.D.

 **NEWS**



He loved weed. Then the vomiting began. Months later, he died

[Shari Rudavsky](#), Indianapolis Star | Published 2:48 p.m. ET Sept. 20, 2019 | Updated 4:00 p.m. ET Sept. 20, 2019

What messages are customers receiving?

29

Marijuana shops recommend products to pregnant women, against doctors' warnings

By Michael Nedelman, CNN

🕒 Updated 6:05 AM ET, Thu May 10, 2018

Obstetrics: *Original Research*

Recommendations From Cannabis Dispensaries About First-Trimester Cannabis Use



Betsy Dickson, MD, Chanel Mansfield, MPH, Maryam Guiahi, MD, MS, Amanda A. Allhouse, MS, Laura M. Borgelt, PharmD, Jeanelle Sheeder, PhD, Robert M. Silver, MD, and Torri D. Metz, MD, MS

Is cannabis safe to take during pregnancy?

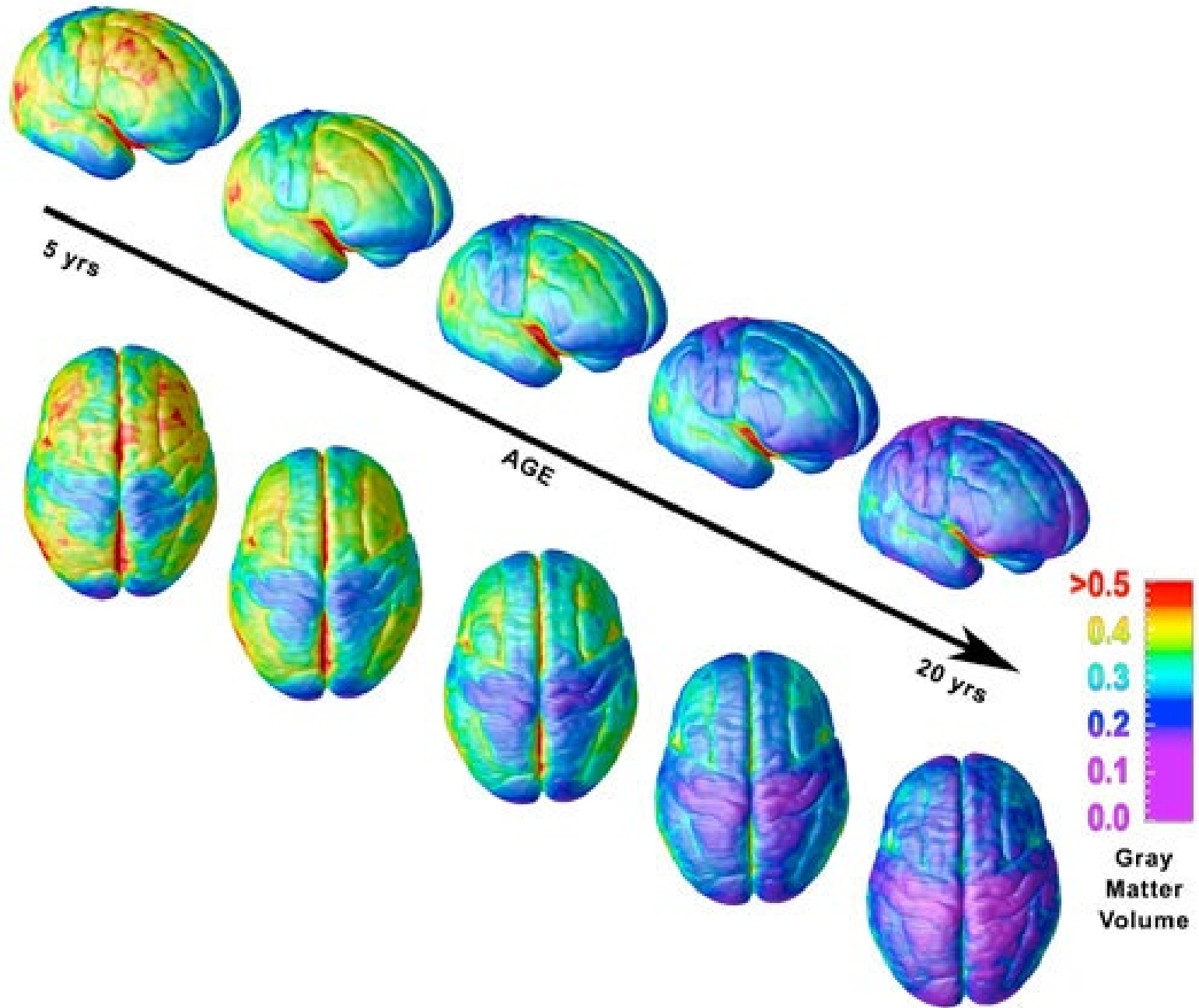
- “Different people opinions, kind of like alcohol; I used to be a bartender and it is legal to serve someone who is pregnant because it is up to them so you know. I am not here to tell you you should or should not use, does that make sense. I do know a lot of people that do use cannabis during their pregnancy though and for what they have found, there has not been side effects that they can see,”
- “I know a lot of doctors are recommending marijuana nowadays.”
- “We have a girl that comes in and she is probably 6 months pregnant and she smokes bud but she does not smoke it as much as she did but she still does...she said her doctor said it was ok...she said the doctor said that but I am not a doctor...I know aspirin is ok for babies and that is pretty much what you are getting is an aspirin that is probably better.”

Cannabis – A Particularly

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Bad Idea for Kids

▶ increased risk for addiction



Cannabis – A Particularly Bad Idea for Kids

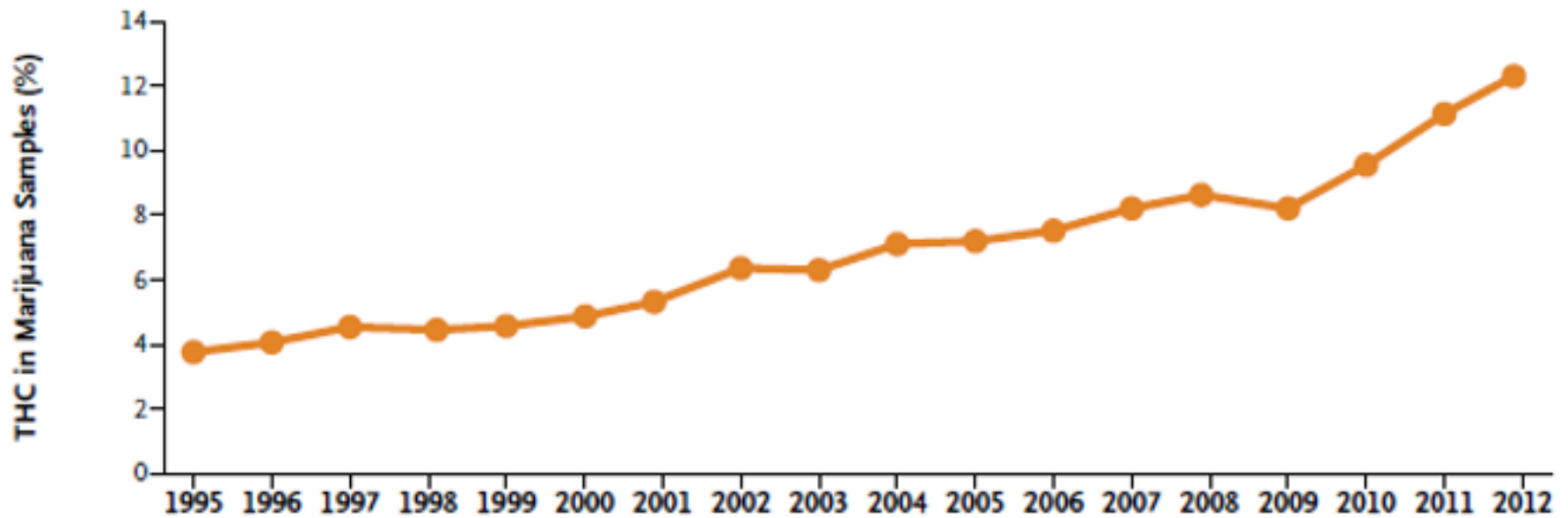
32

- ▶ increased risk for addiction
- ▶ This isn't Woodstock pot anymore – much stronger

Marijuana Potency

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A Potency of THC



Cannabis – A Particularly Bad Idea for Kids

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- ▶ increased risk for addiction
- ▶ This isn't Woodstock pot anymore – much stronger
- ▶ Negative academic and vocational outcomes

Academic and Vocational Outcomes

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▶ High School

- ▶ Lower grades, higher dropout rates, increased school disciplinary problems
 - ▶ May be social/functional, may be cognitive, may be both
 - ▶ Earlier use = worse outcomes
 - ▶ Greater frequency = worse outcome

▶ College

- ▶ Increased chance to skip class
 - ▶ Lower GPA
 - ▶ Potentially longer time to graduate
- ▶ Decreased lifetime earning potential



Cannabis – A Particularly

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Bad Idea for Kids

- ▶ Increased risk for addiction
- ▶ This isn't Woodstock pot anymore – much stronger
- ▶ Negative academic and vocational outcomes
- ▶ Brain morphology changes
 - ▶ Residual impairment in memory, processing speed, and decision-making

The Role of Cannabinoids in Neuroanatomic Alterations in Cannabis Users

Valentina Lorenzetti, Nadia Solowij, and Murat Yücel

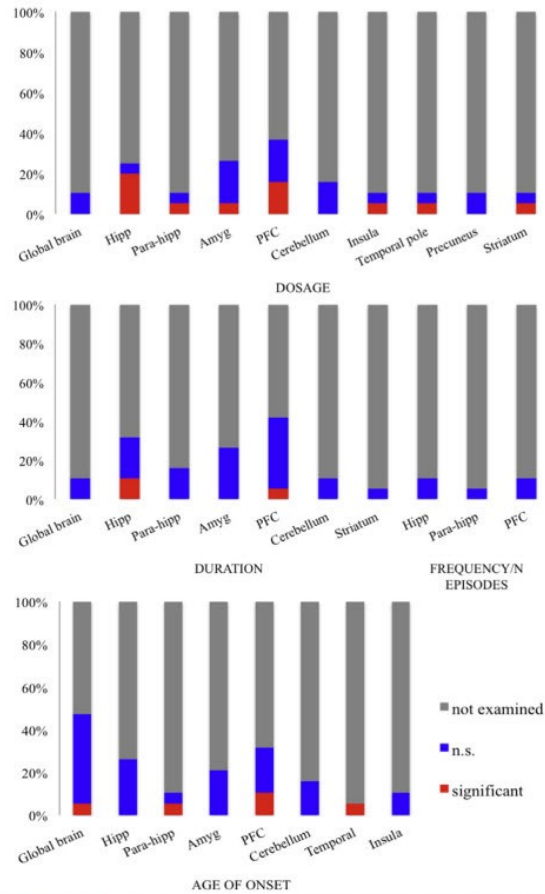


Figure 4. Percentage of studies reporting associations between regional neuroanatomy and cannabis use measures. Significant associations (red), nonsignificant associations (n.s.; blue), and associations unexamined (gray). Amyg, amygdala; Hipp, hippocampus; Para-hipp, parahippocampal gyrus; PFC, prefrontal cortex.

Drivers of Brain Aging

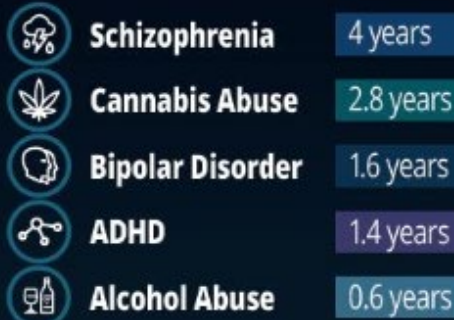
In the largest known brain imaging study, scientists from Amen Clinics, Google, John's Hopkins, UCLA, and UC San Francisco evaluated **62,454 brain SPECT scans** of individuals from nine months old to 105 years of age to investigate factors that accelerate brain aging.



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brain
regions

studied to predict
the chronological
age of a patient

Accelerated Aging Prediction



Aging SPECT scans



“We can now link clinical diagnoses and addictions to premature aging of the brain. Better treatment of these disorders can slow or even halt brain aging.”

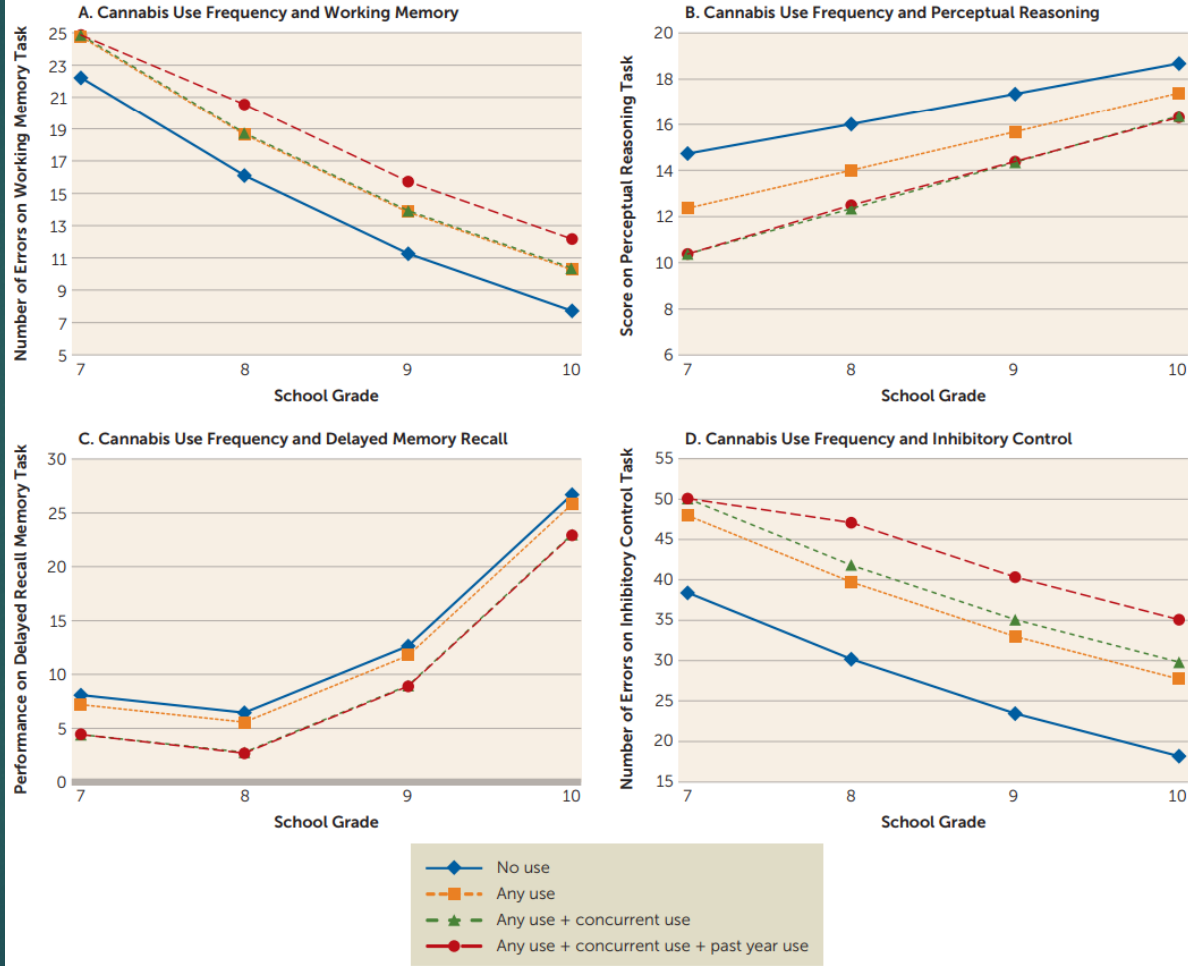
The cannabis abuse result was especially important, as our culture is starting to view marijuana as a harmless substance. These findings invite us to rethink its effects on the brain.”

~ Daniel G. Amen, MD, founder of Amen Clinics

A Population-Based Analysis of the Relationship Between Substance Use and Adolescent Cognitive Development

Jean-François G. Morin, B.A., Mohammad H. Afzali, Ph.D., Josiane Bourque, M.Sc., Sherry H. Stewart, Ph.D., Jean R. Séguin, Ph.D., Maeve O'Leary-Barrett, Ph.D., Patricia J. Conrod, Ph.D.

FIGURE 2. Between-Subject and Within-Subject (Concurrent and Lagged) Relationships Between Cannabis Use Frequency and Working Memory Errors, Perceptual Reasoning Performance, Delayed Memory Recall Performance, and Inhibitory Control Errors^a



Cannabis – A Particularly Bad Idea for Kids

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- ▶ Impaired judgement
 - ▶ Increased risky sexual behavior
- ▶ Psychotic breaks
 - ▶ Increases with higher % THC

Cannabis – A Particularly Bad Idea for Kids

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 - ▶ Increases with higher % THC
- ▶ Drugged driving

Youth – Target Demographic

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- ▶ 90% of addictions start in adolescence
- ▶ Current practices





Youth – Target Demographic

- ▶ 90% of addictions start in adolescence
- ▶ Current practices



- ▶ Local Example / Another Local Example
 - ▶ For comparison: Colorado
 - ▶ Flowers Edibles

Summary

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- ▶ Actual science-based therapeutic applications for cannabinoids are limited, but present
- ▶ The delivery system is not consistent with current models for medication, promoting speculative treatment, poor product choices, self-medication, and resale to youth
- ▶ Marijuana is far from a benign substance, and is particularly harmful for youth
- ▶ Industries based on addiction tend to market young – be aware

Thank You!