

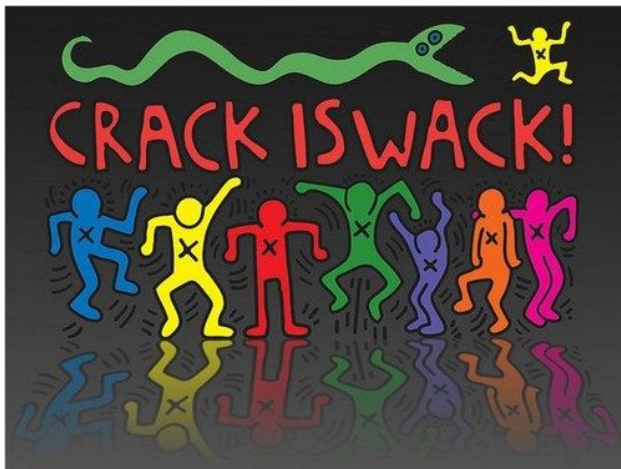
Changing Paradigms in Drug Policy

Commercialization of Marijuana

Aaron Weiner, PhD

aaron@weinerphd.com

Changing Landscape



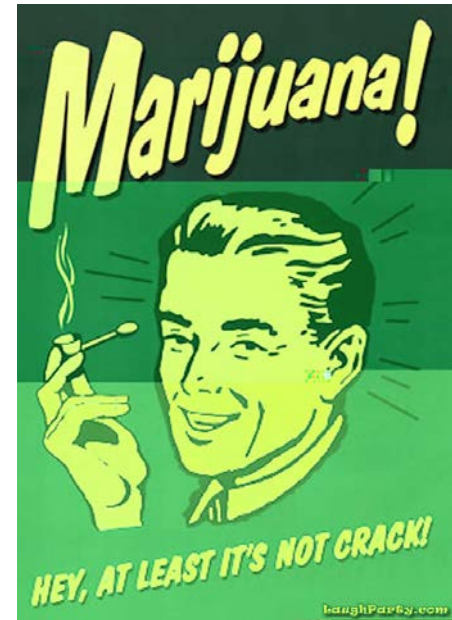
Changing Landscape



Changing Landscape



ALCOHOL	MARIJUANA
USE - LEGAL	USE - ILLEGAL
	
POSSIBLE SIDE EFFECT	POSSIBLE SIDE EFFECT
ADDICTIVE	NON-ADDICTIVE
DEPRESSANT	ANTI-DEPRESSANT
CAUSES CANCER	CURES CANCER
1 MILLION DEATHS PER ANNUM	ZERO DEATHS IN HISTORY
COST POLICE & NHS BILLIONS	SAVES POLICE & NHS BILLIONS
DEATH VIA OD	NO OD
DESTROYS BRAIN CELLS	GROWS BRAIN CELLS
LEGAL	ILLEGAL



ECSVAP
Premium E-liquid

FRUIT BLEND
5 PACK



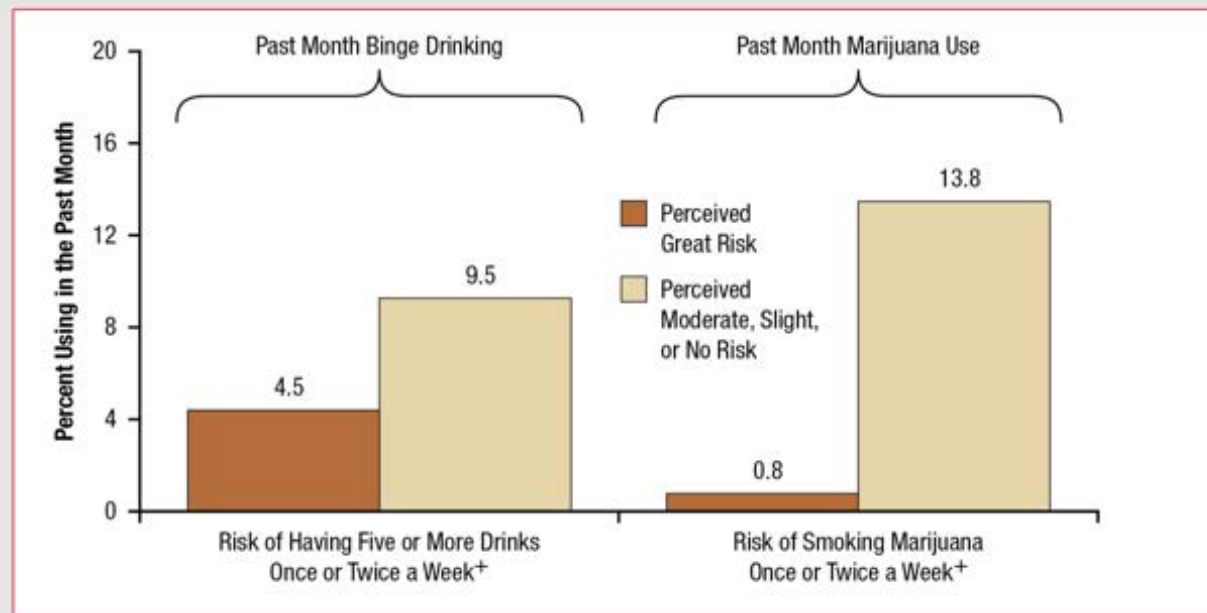
Where does your community
fit in?

Impact of Legalization on Marijuana Trends

- Does it matter?
 - State level, absolutely
 - Greater exposure and availability + lower perceived risk = increase in use

Perceived Risk vs. Use Rate

Figure 2. Past Month Binge Drinking and Marijuana Use among Adolescents Aged 12 to 17, by Perceptions of Risk: 2011



Difference between those perceiving great risk and those perceiving moderate, slight, or no risk is statistically significant at the .05 level.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Surveys on Drug Use and Health (NSDUHs), 2002 to 2011 (revised March 2012).

Progression Over Time

18+ Yrs

Past Year

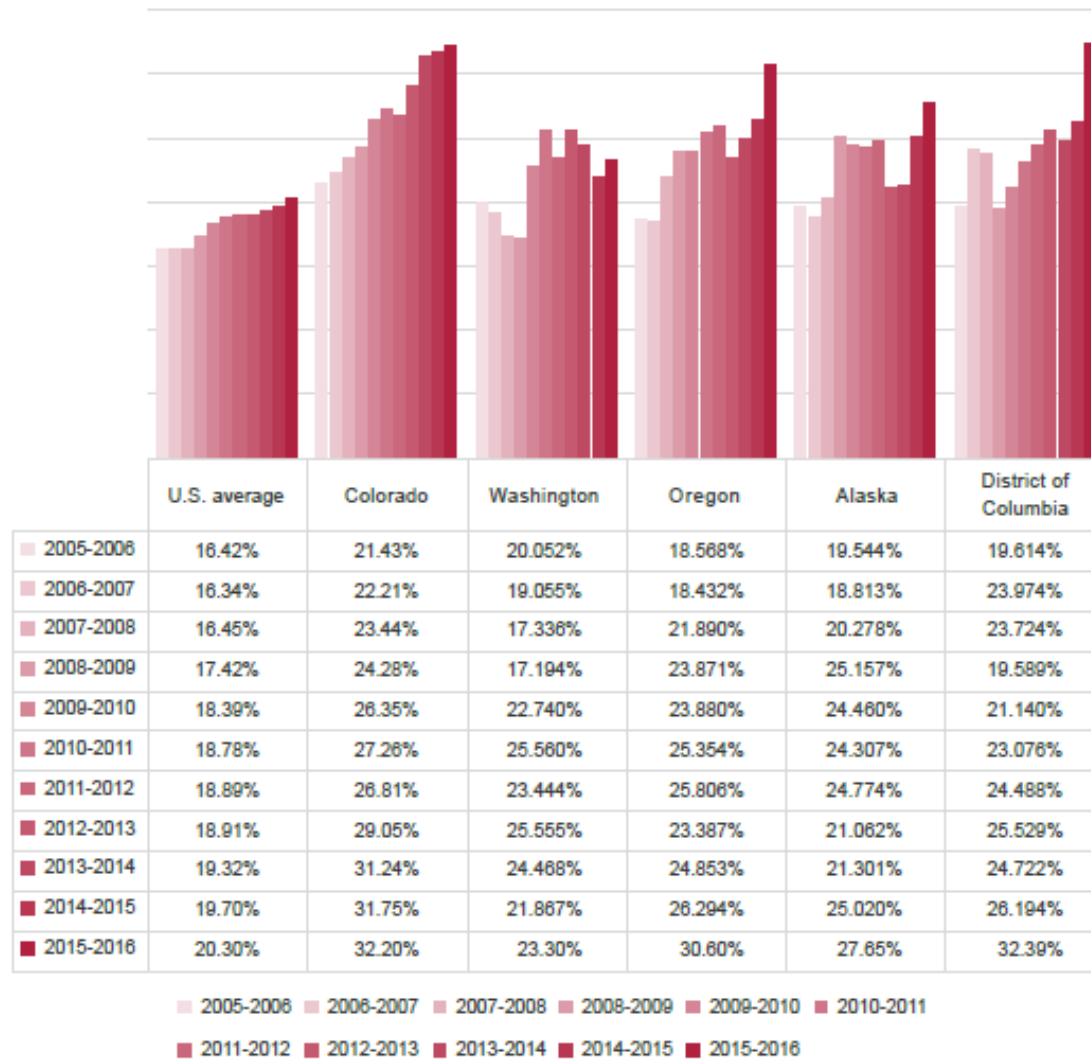
		2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
	Colorado	16.08	18.94	20.74	23.57	23.82	25.65
	Washington	15.29	17.58	19.06	17.68	19.45	23.21
Past Month	Colorado	10.4	12.86	15.17	17.12	16.62	17.18
	Washington	10.29	12.53	13.06	11.42	12.41	15.9

18+ Yrs

Past Year

		2013-14	2014-15	2015-16	2016-17
	Alaska	19.86	22.31	23.46	23.43
	D.C.	21.83	23.9	25.3	27.01
	Oregon	19.5	19.59	23.19	27.38
Past Month	Alaska	12.16	14.8	16.66	16.59
	D.C.	12.72	12.1	14.41	17.67
	Oregon	12.59	13.04	16.26	20.04

PAST MONTH MARIJUANA USE OF COLLEGE AGE 18-25 YEARS OLD

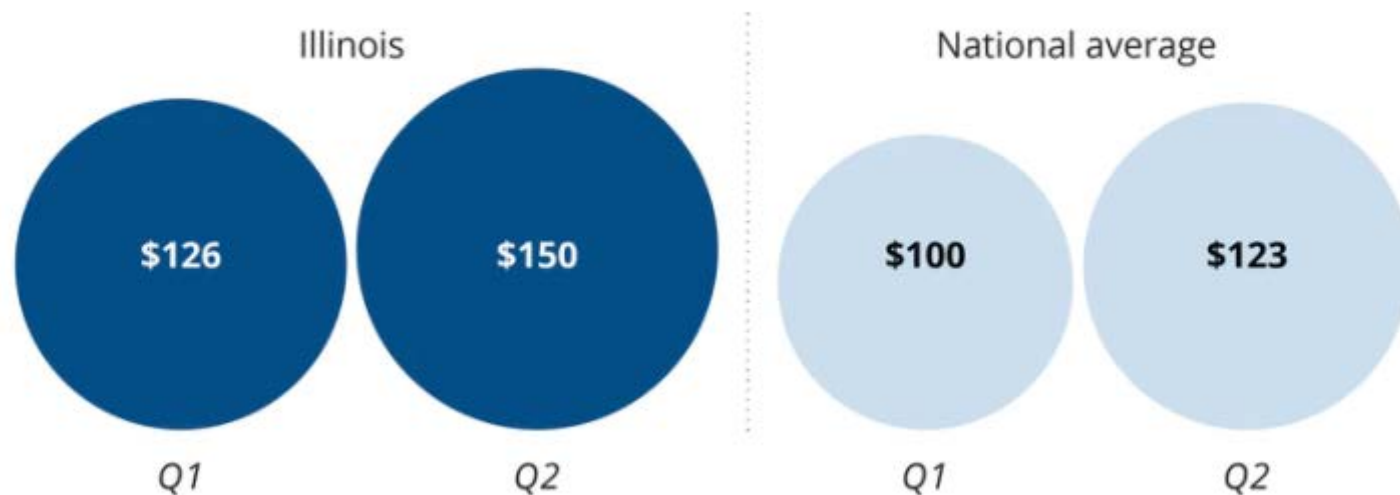


CANNABIS SALES IN ILLINOIS BY MONTH

Month	Total sales	Items sold
January	\$39.2M	972,045
February	\$34.8M	831,600
March	\$35.9M	812,203
April	\$37.3M	818,954
May	\$44.3M	989,179
June	\$47.6M	994,545
July	\$61.0M	1.3M

THE AMOUNT PEOPLE ARE BUYING IS ALSO GOING UP

Average transaction size

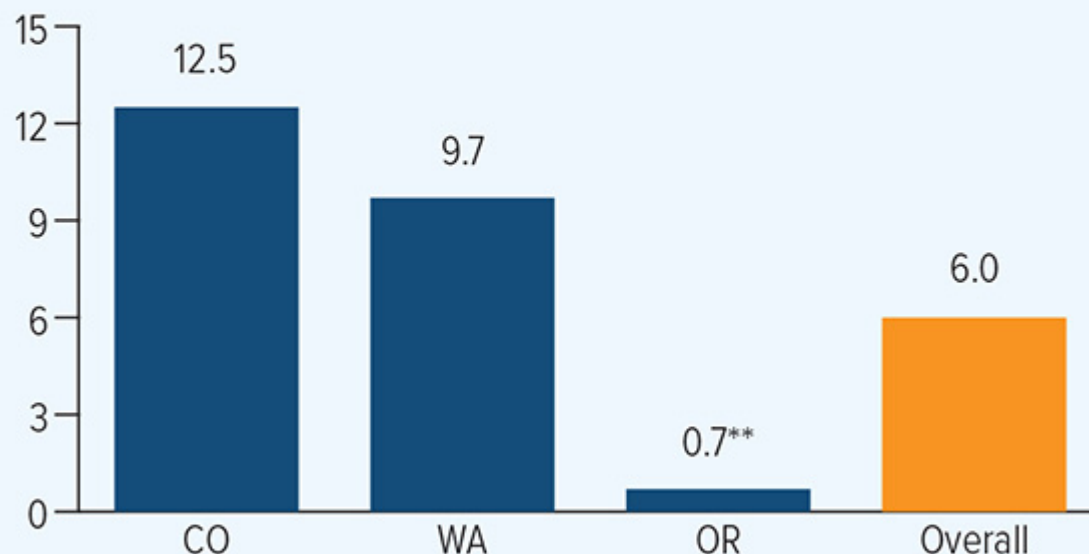


SOURCES: Illinois Department of Financial and Professional Regulation

Impact of Legalization on Marijuana Trends

- Does it matter?
 - State level, absolutely
 - Greater exposure and availability + lower perceived risk = increase in use
 - Increase in use/exposure → increase in consequences

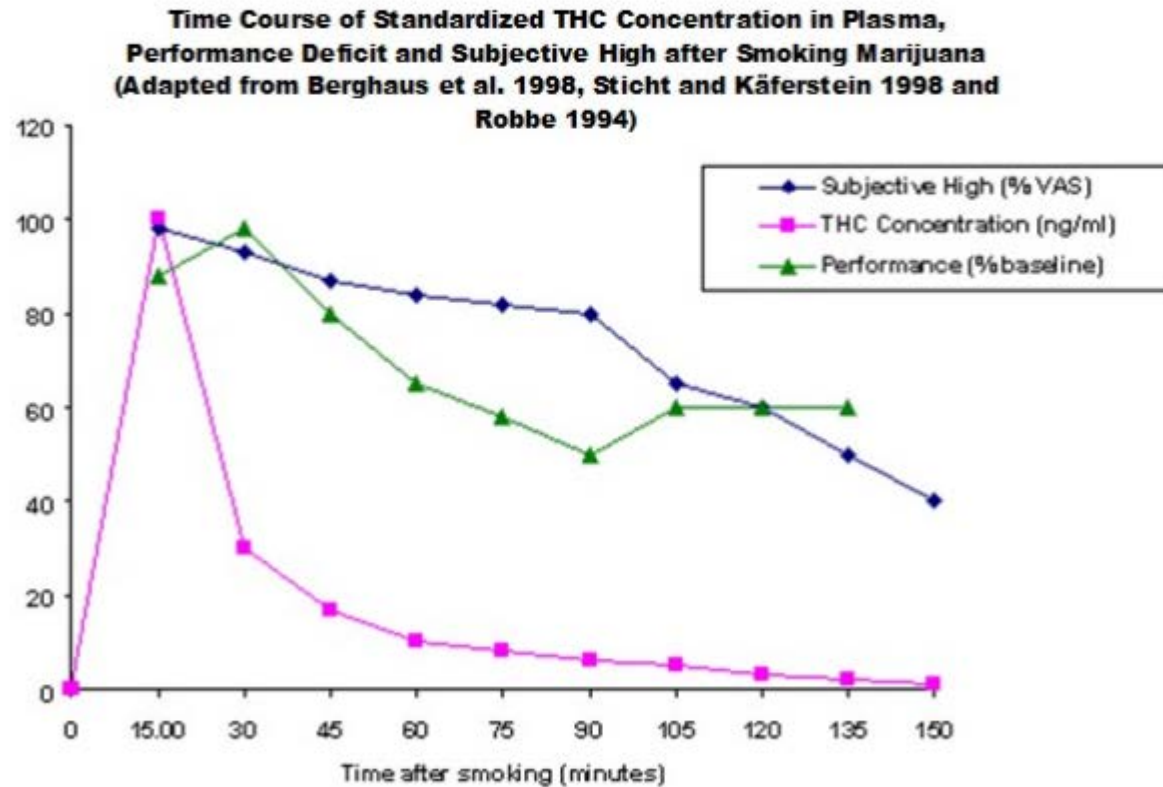
Percent change in collision claim frequency following recreational marijuana legalization*



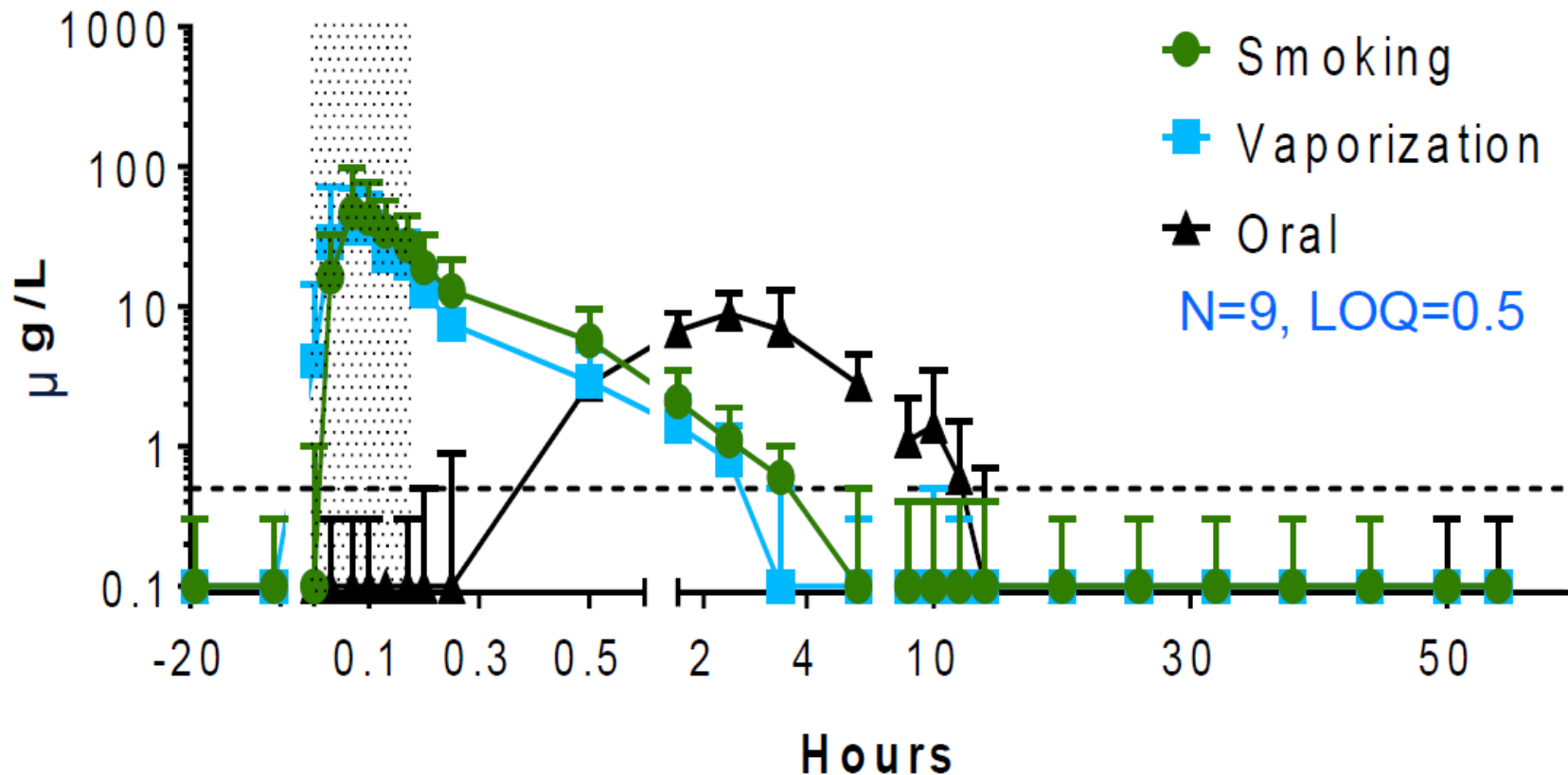
*vs. nearby states. **Not statistically significant.
Source: Highway Loss Data Institute, 2018.

Traffic Safety Concerns

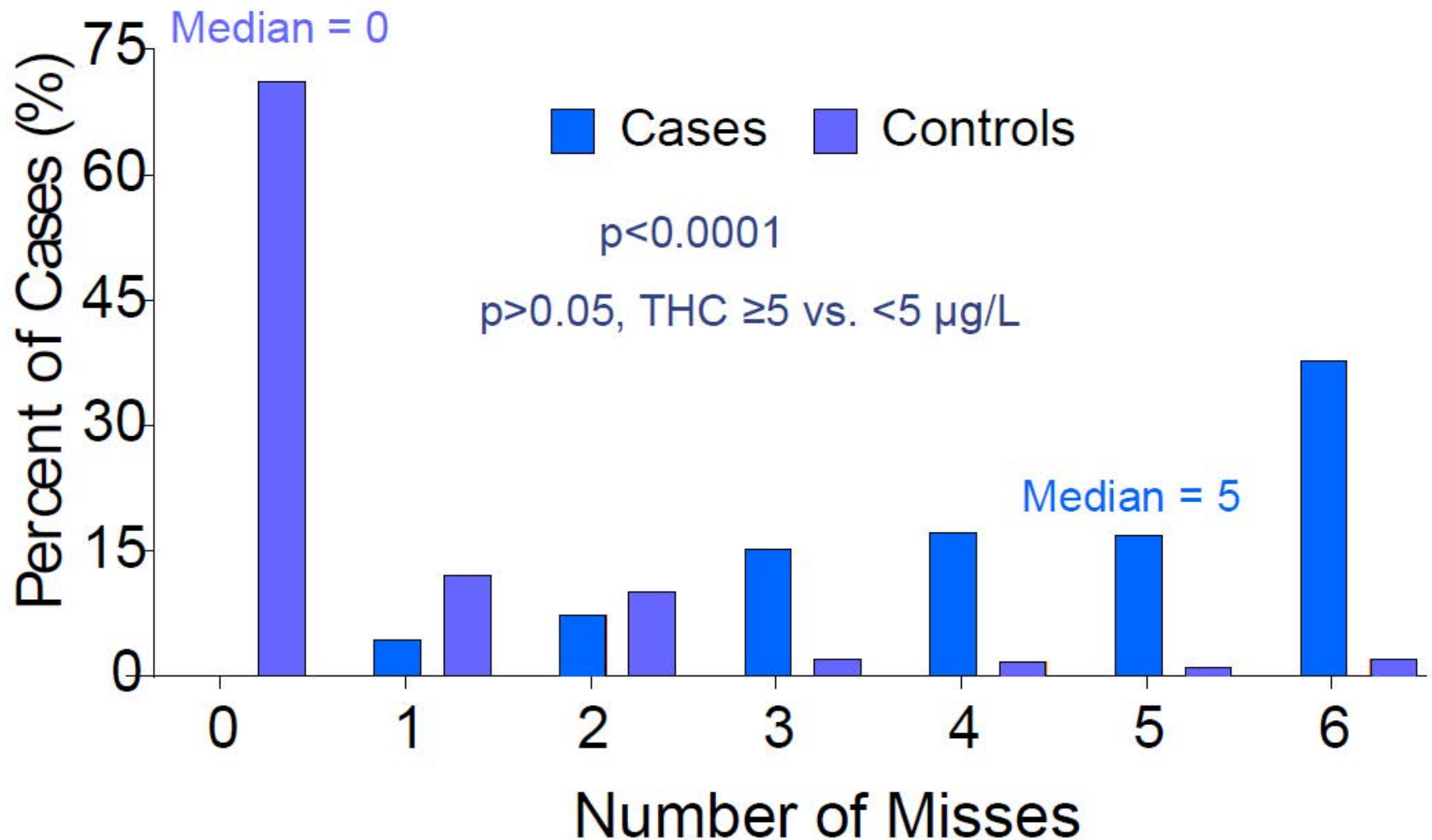
Figure 4



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



Number of Finger To Nose Misses



Medical Cannabis Patients Driving While High

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%

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.



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

Smoking strong marijuana daily increases risk of psychosis, study finds

CBS
NEWS

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

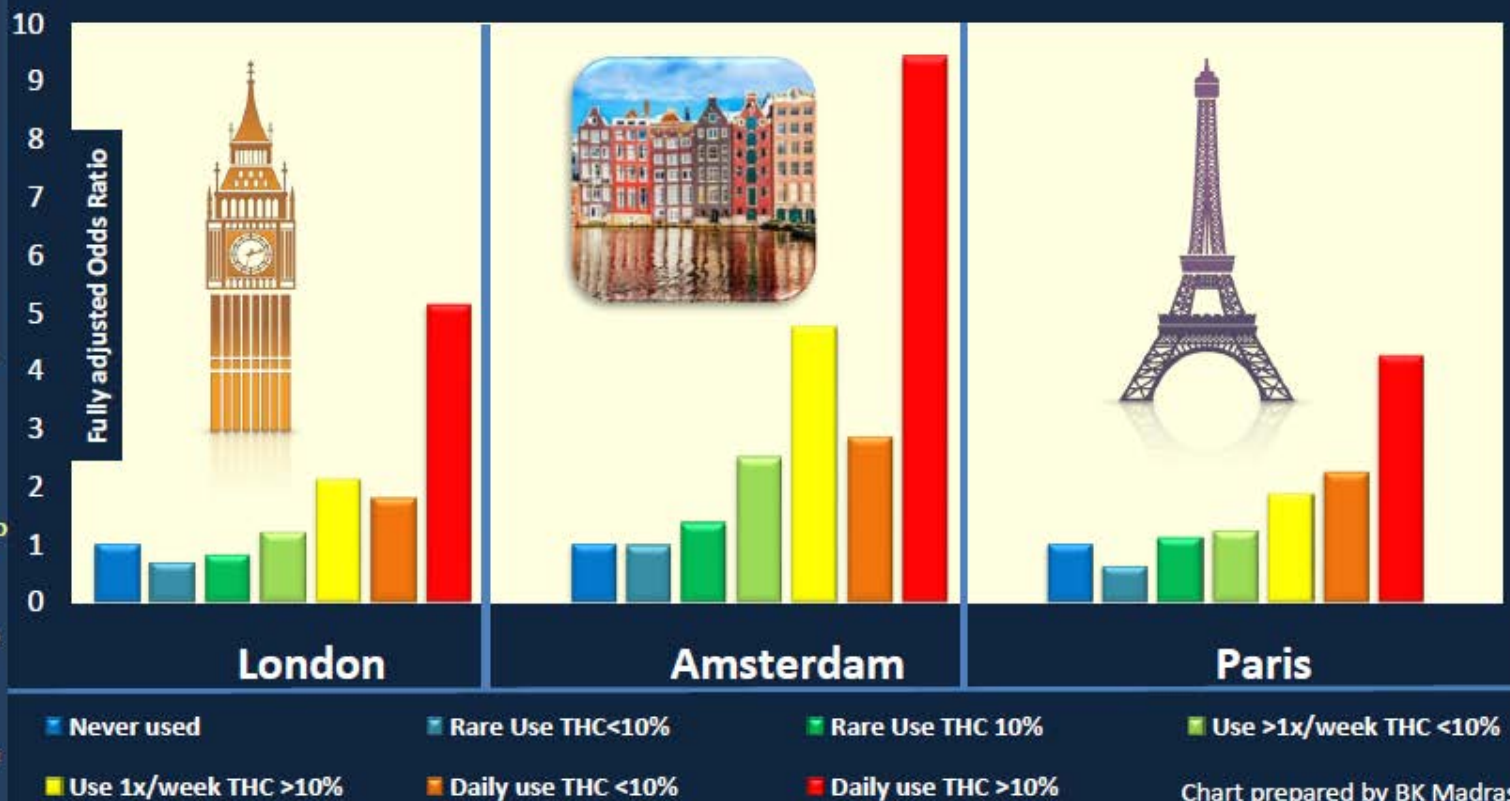
The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): A multicentre case control study

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



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

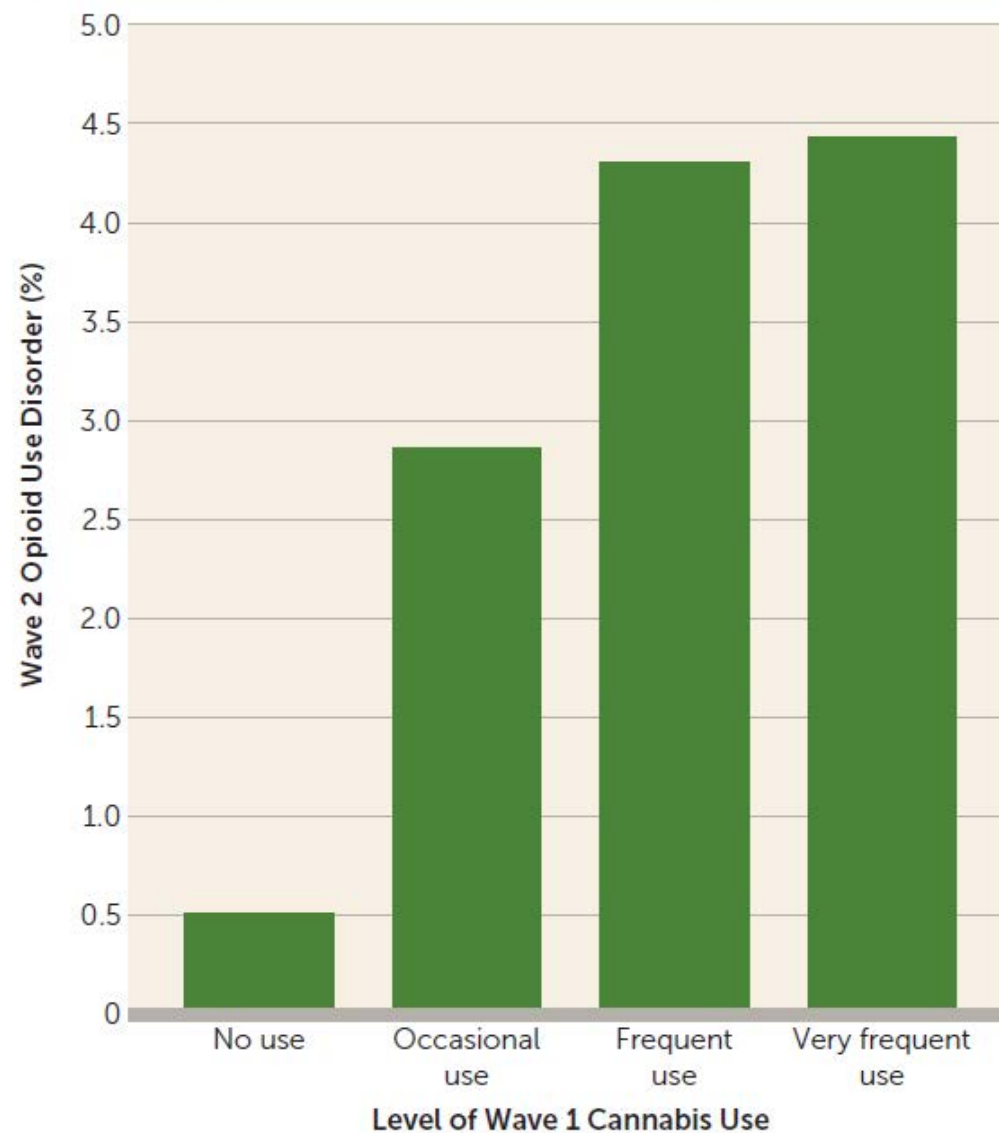


Chelsea L. Shover, Corey S. Davis, Sanford C. Gordon, and Keith Humphreys

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

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.

Trajectories of cannabis use and risk for opioid misuse in a young adult urban cohort

Beth A. Reboussin^{a,*}, Jill A. Rabinowitz^b, Johannes Thrul^b, Brion Maher^b, Kerry M. Green^c, Nicholas S. Ialongo^b

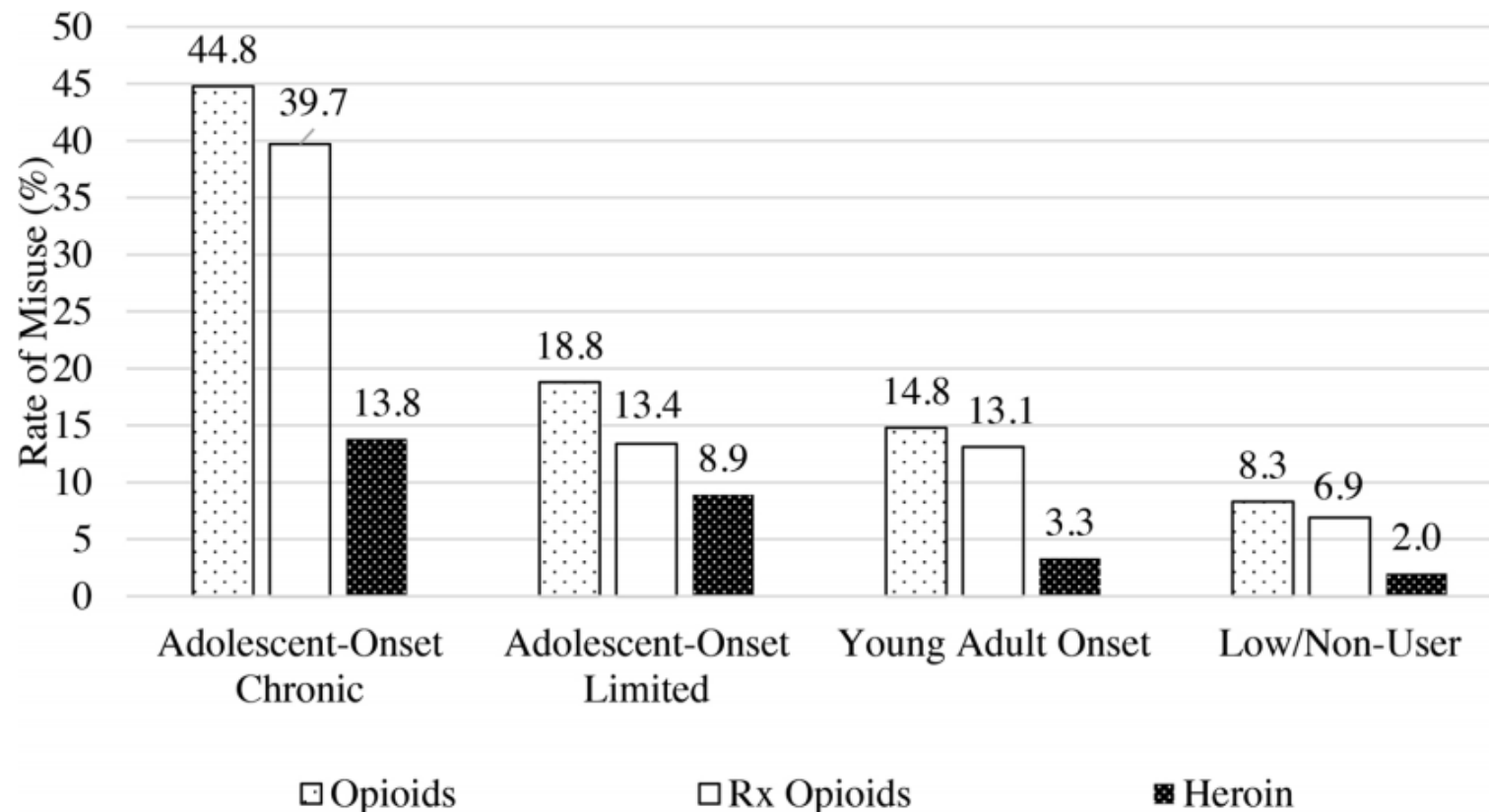


Fig. 2. Rates of Opioid Misuse Between Ages 19-26 by Cannabis Trajectory Group.

Impact of Legalization on Marijuana Trends

- Does it matter?
 - State level, absolutely
 - Greater exposure and availability + lower perceived risk = increase in use
 - Increase in use/exposure → increase in consequences
 - vs. community?

Associations between young adult marijuana outcomes and availability of medical marijuana dispensaries and storefront signage

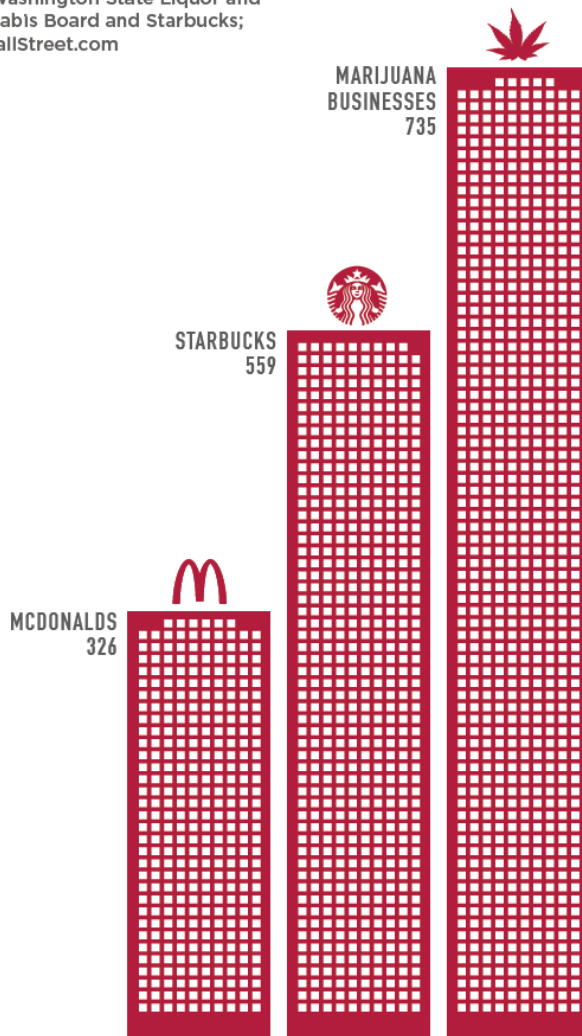
Regina A. Shih , Anthony Rodriguez, Layla Parast , Eric R. Pedersen , Joan S. Tucker ,
Wendy M. Troxel, Lisa Kraus, Jordan P. Davis & Elizabeth J. D'Amico

RAND Corporation, Santa Monica, CA, USA

($\beta = -0.005$; 95% CI = $-0.009, -0.001$; $P = 0.03$). **Conclusions** For young adults in Los Angeles County, living near more medical marijuana dispensaries (MMDs) is positively associated with more frequent use of marijuana within the past month and greater expectations of marijuana's positive benefits. MMDs with signage show stronger associations with number of times used each day and positive expectancies.

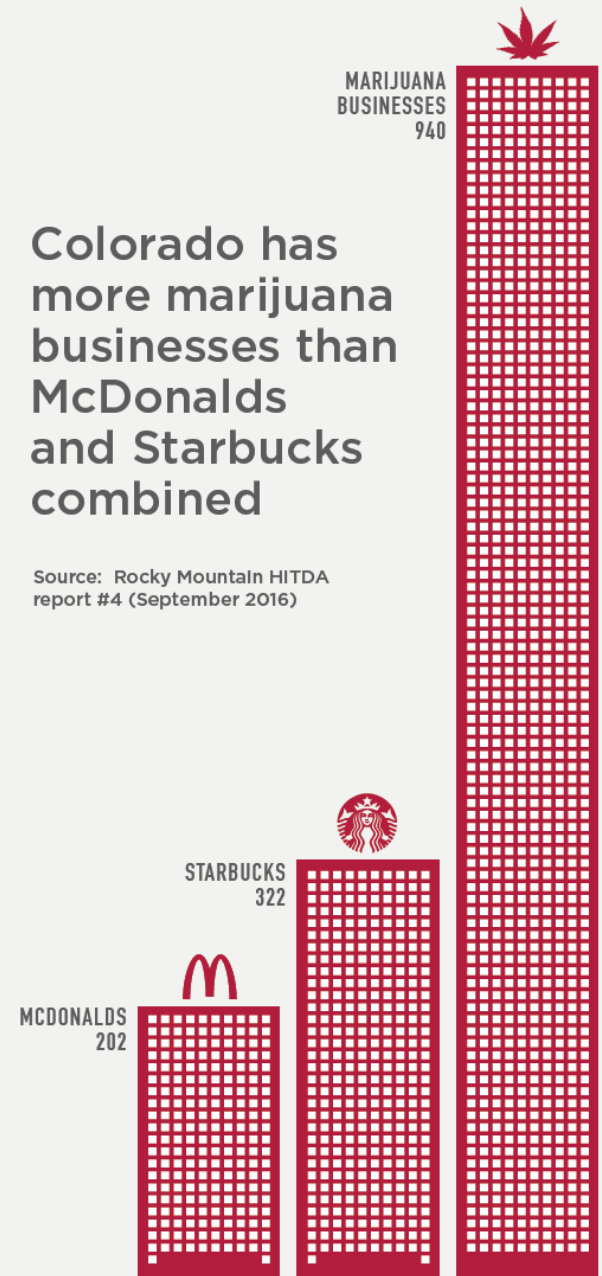
Washington State has more marijuana businesses than Starbucks or McDonalds

Source: NW HIDTA Report, citing the Washington State Liquor and Cannabis Board and Starbucks; 24WallStreet.com

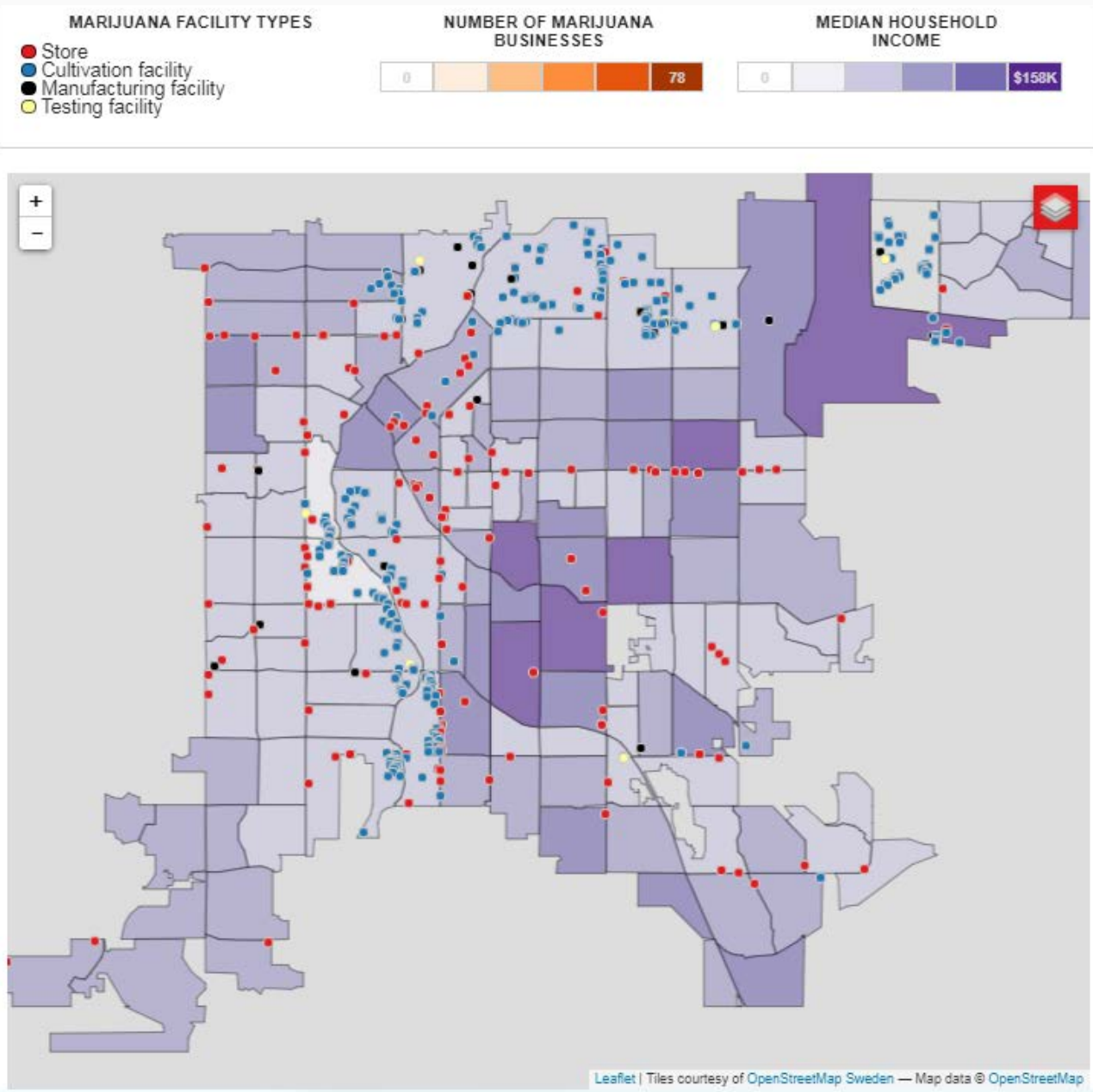


Colorado has more marijuana businesses than McDonalds and Starbucks combined

Source: Rocky Mountain HITDA report #4 (September 2016)



Denver's pot businesses mostly in low-income, minority neighborhoods



Considerations: Access

- Does it matter?
 - State level, absolutely
 - Greater exposure and availability + lower perceived risk = increase in use
 - Increase in use/exposure → increase in consequences
 - vs. community?
- Black market considerations
 - Higher taxes = more black market opportunity
 - Illegal storefronts – are we auditing?
 - Oversupply and diversion

Oregon marijuana regulators fail to meet even basic standards, state audit finds

Updated Feb 01, 2019; Posted Jan 30, 2019

Auditors concluded that regulators have failed to meet even basic promises. It found, for instance, that just 3 percent of recreational marijuana retailers had been inspected and only about a third of growers. It said the state's medical marijuana program, [long a source of black market diversion both in the state and nationally](#), has “structural weaknesses” that “greatly increase the risk of diversion.”

The audit also found an inadequate testing system. For years, Oregon has struggled with its pesticide testing regulations, which are intended to ensure that products meet certain standards before they land on retailers' shelves.

Oregon Cannabis Production vs Consumption

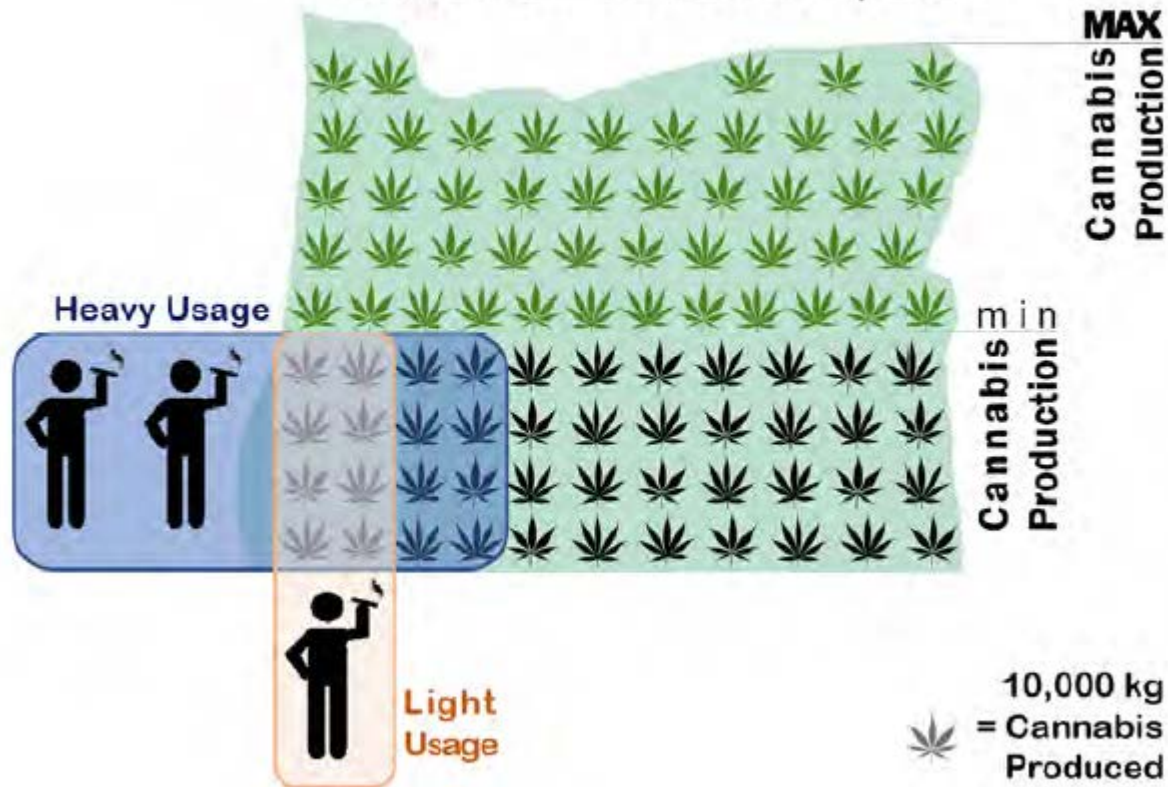


Figure 1: Comparing Potential Annual Production against Potential Annual Consumption and the Resulting Surplus Cannabis

Oregon has big pot overproduction problem, U.S. attorney says

Originally published February 3, 2018 at 1:46 pm | *Updated February 3, 2018 at 2:04 pm*

Marijuana's legalization fuels black market in other states

[Trevor Hughes](#), USA TODAY

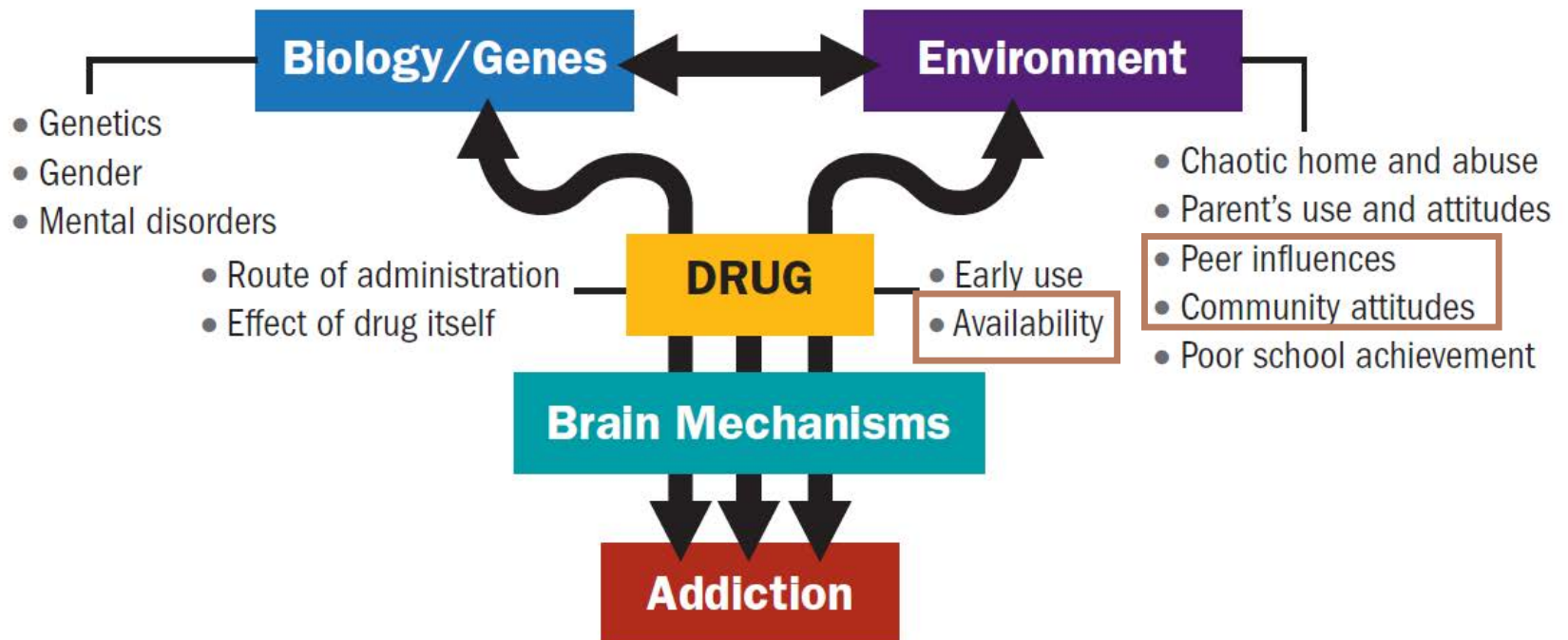
Published 3:03 a.m. ET July 31, 2017 | Updated 6:48 p.m. ET Aug. 1, 2017

Washington state cannabis oversupply spurs calls for change

Published January 10, 2018 | By Bart Schaneman

Considerations: Youth Messaging

- Does it matter what we endorse and promote as “recreation” to our youth?



Source: NIDA

Normalization of Use

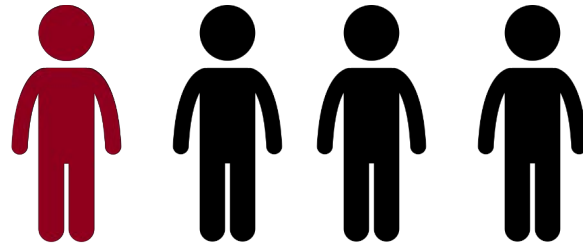


Medical pot dispensary faces backlash after handing out swag during Buffalo Grove Days



"While we focus our educational efforts primarily on adults, we have many minor patients across the country with debilitating conditions that use cannabis for relief through their caregivers," the statement reads.

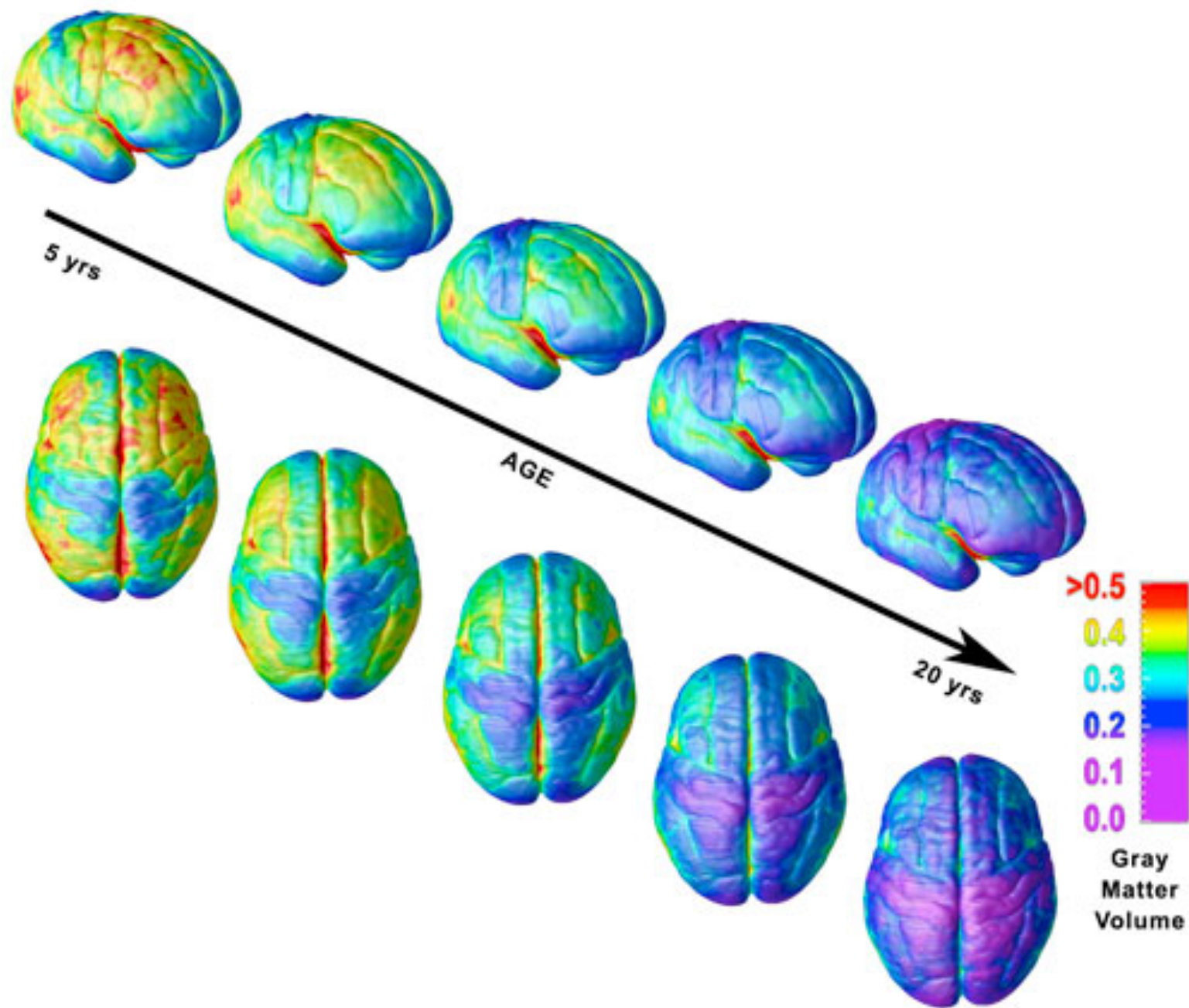
"We are happy to sponsor local events like Buffalo Grove Days and to be supportive in the community, and we will be discussing our educational tactics with our staff to make sure our outreach continues to be primarily medically and adult-focused."



- One in four 12th graders indicated they would try marijuana, or increase their current use more, **if it were legalized** (Monitoring the Future, 2018)

Cannabis – A Particularly Bad Idea for Kids

- Increased risk for addiction



Cannabis – A Particularly Bad Idea for Kids

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

Marijuana Potency

Percentage of THC and CBD in Cannabis Samples Seized by the DEA from 1995-2018

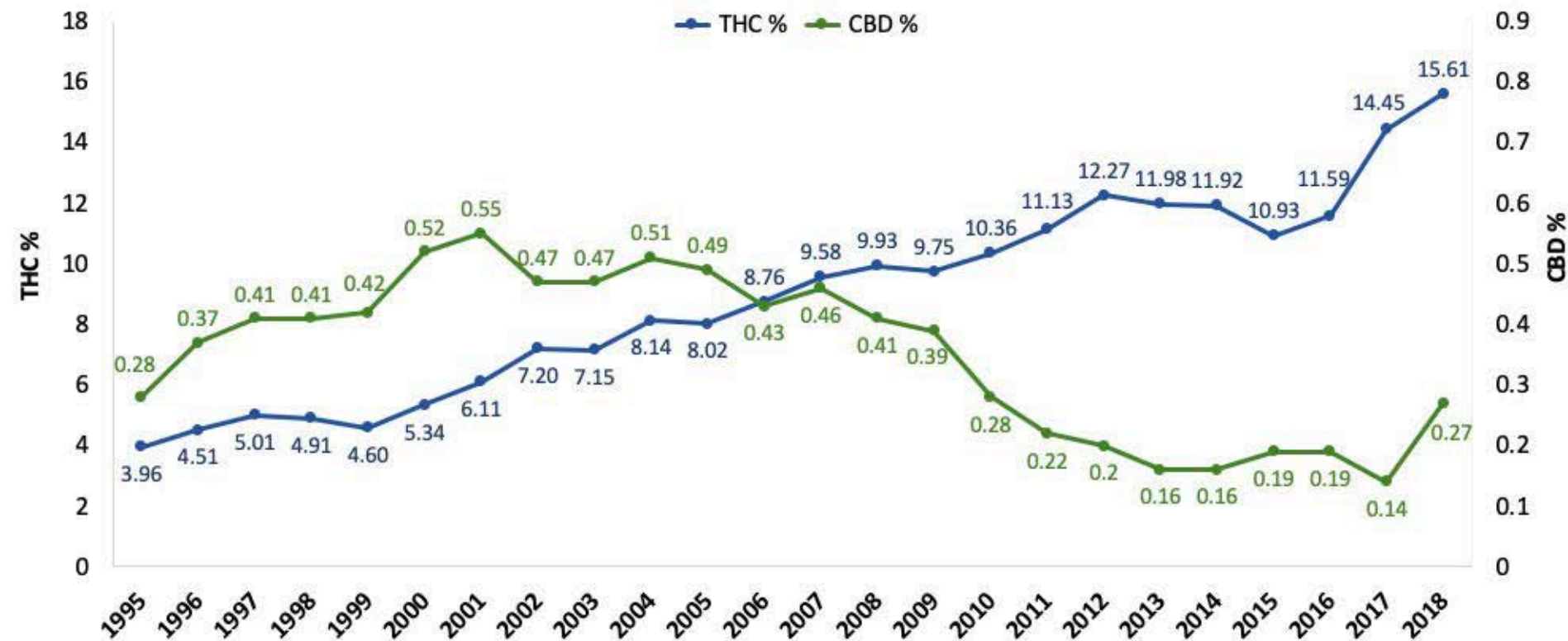
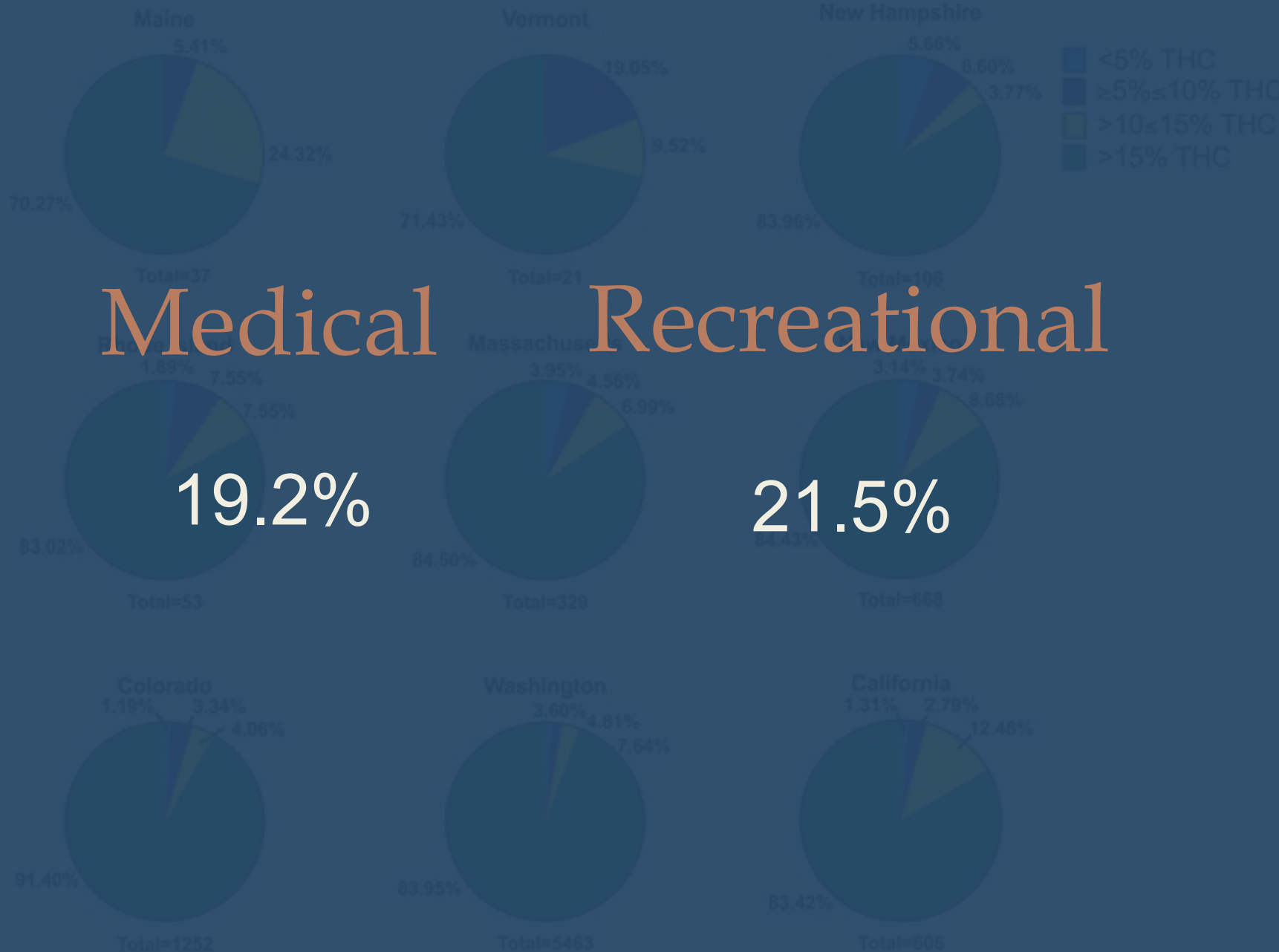


Fig 3. Proportion of products with different levels of THC per state.



Concentrates and Vaping

GUIDES

How to Fill Juul Pods with THC Oil

An essential guide for stealthy stoners.

BY AD HANNA · OCTOBER 24, 2018 · 3 MINUTE READ



HIGH TIMES



2019 Monitoring the Future Survey

Key Findings: Percent Reporting Use of Selected Substances

	8 th Grade	10 th Grade	12 th Grade		8 th Grade	10 th Grade	12 th Grade
Vaping, Any				Tobacco w/Hookah			
Past Year	20.1	35.7	40.6	Past Year			5.6
Past Month	12.2	25.0	30.9	Past Month	1.3	2.4	4.0
Vaping, Nicotine				Flavored Little Cigars			
Past Year	16.5	30.7	35.3	Past Month	2.2	3.7	7.7
Past Month	9.6	19.9	25.5	Narcotics Other than Heroin			
Vaping, Marijuana				Past Year			2.7
Past Year	7.0	19.4	20.8	Past Month			1.0
Past Month	3.9	12.6	14.0	Marijuana			
Vaping, Just Flavoring				Past Year	11.8	28.8	35.7
Past Year	14.7	20.8	20.3	Past Month	6.6	18.4	22.3
Past Month	7.7	10.5	10.7	Daily	1.3	4.8	6.4
Cigarettes				Alcohol			
Past Month	2.3	3.4	5.7	Past Month	7.9	18.4	29.3
Daily	0.8	1.3	2.4	Daily	0.2	0.6	1.7
½ Pack +/-Day	0.2	0.5	0.9	Binge	3.8	8.5	14.4

Change from 2018 to 2019



Significant Increase



Significant Decrease

Cannabis – A Particularly Bad Idea for Kids

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

Academic and Vocational Outcomes

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



Cannabis – A Particularly 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

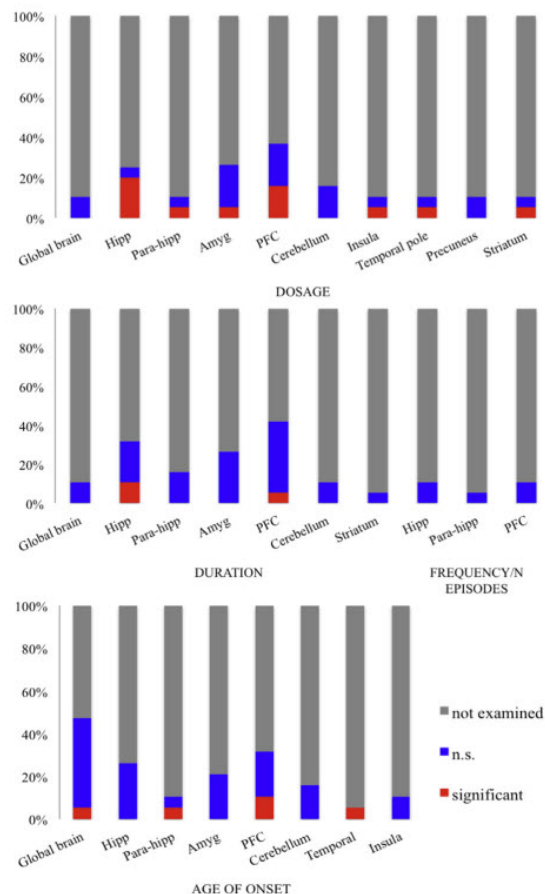


Figure 4. Percentage of studies reporting associations between regional neuroanatomy and cannabis use measures. Significant associations (red), nonsignificant associations (n.s.; blue), and associations unexamined (gray). Amyg, amygdala; Hipp, hippocampus; Para-hipp, parahippocampal gyrus; PFC, prefrontal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



**128
brain
regions**

studied to predict
the chronological
age of a patient

Accelerated Aging Prediction



Schizophrenia

4 years



Cannabis Abuse

2.8 years



Bipolar Disorder

1.6 years



ADHD

1.4 years



Alcohol Abuse

0.6 years

**Aging
SPECT
scans**



Age 20



Age 50



Age 80

"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."

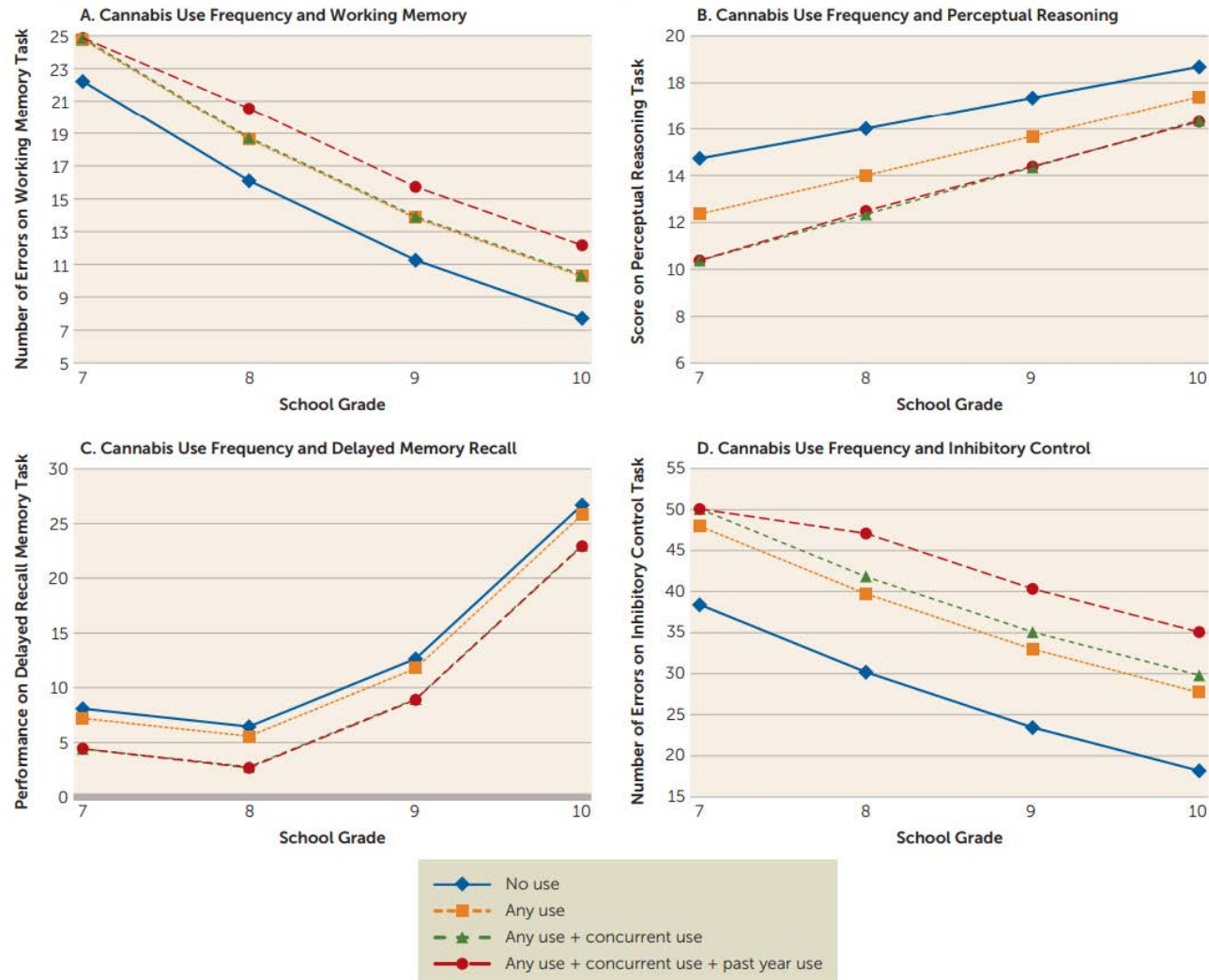
The cannabis abuse result was especially important, as our culture is starting to view marijuana as a harmless substance. These findings invite us to rethink its effects on the brain."

~ 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



Gateway Drug?

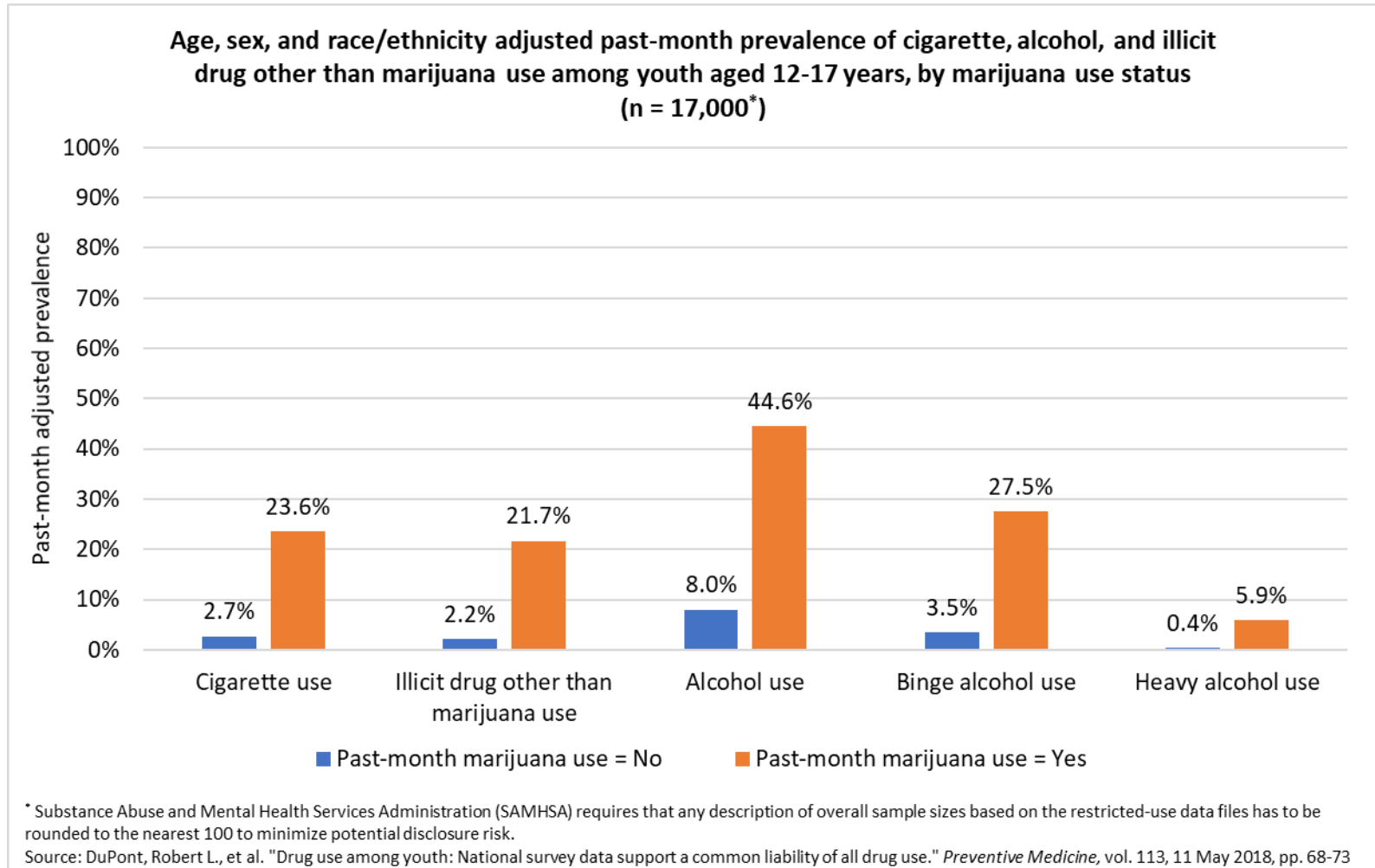
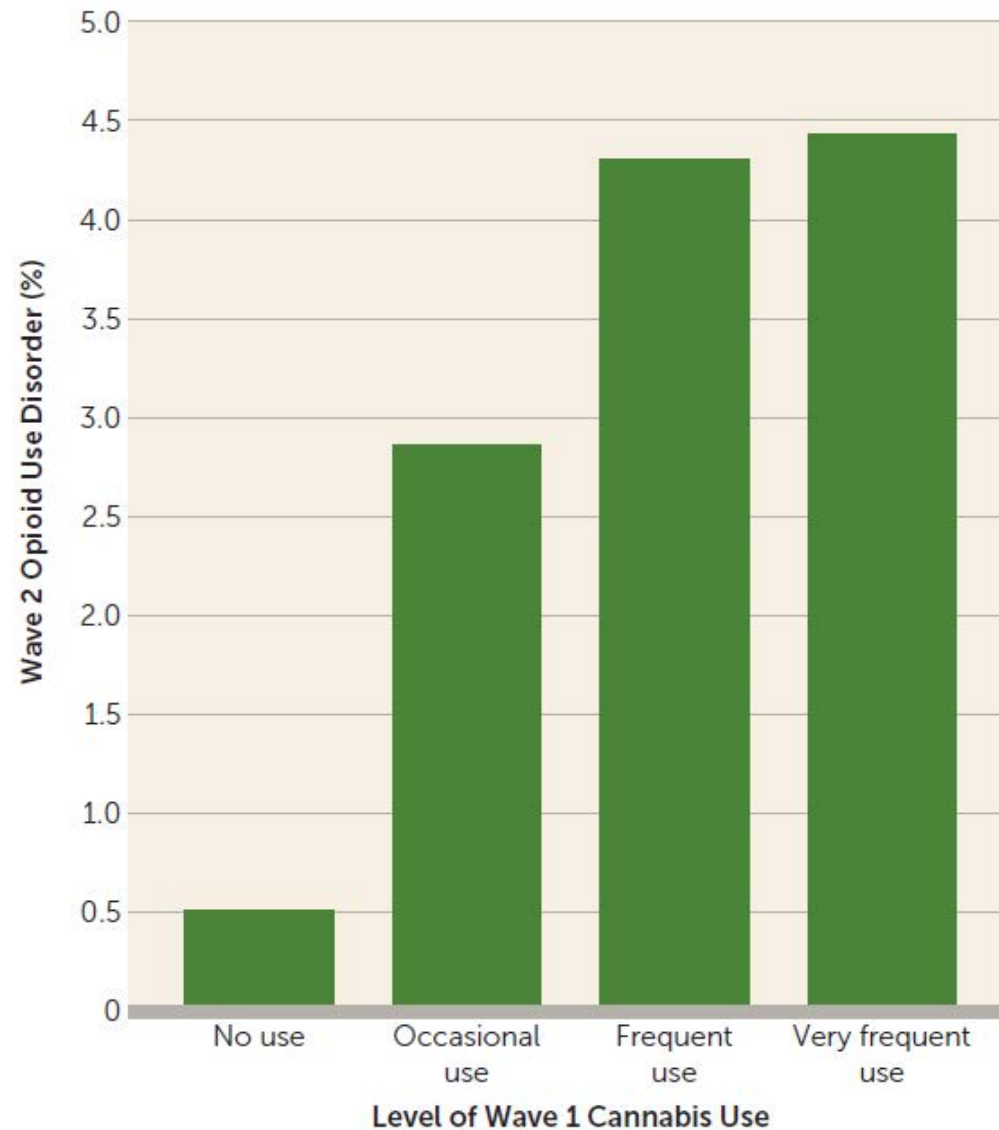
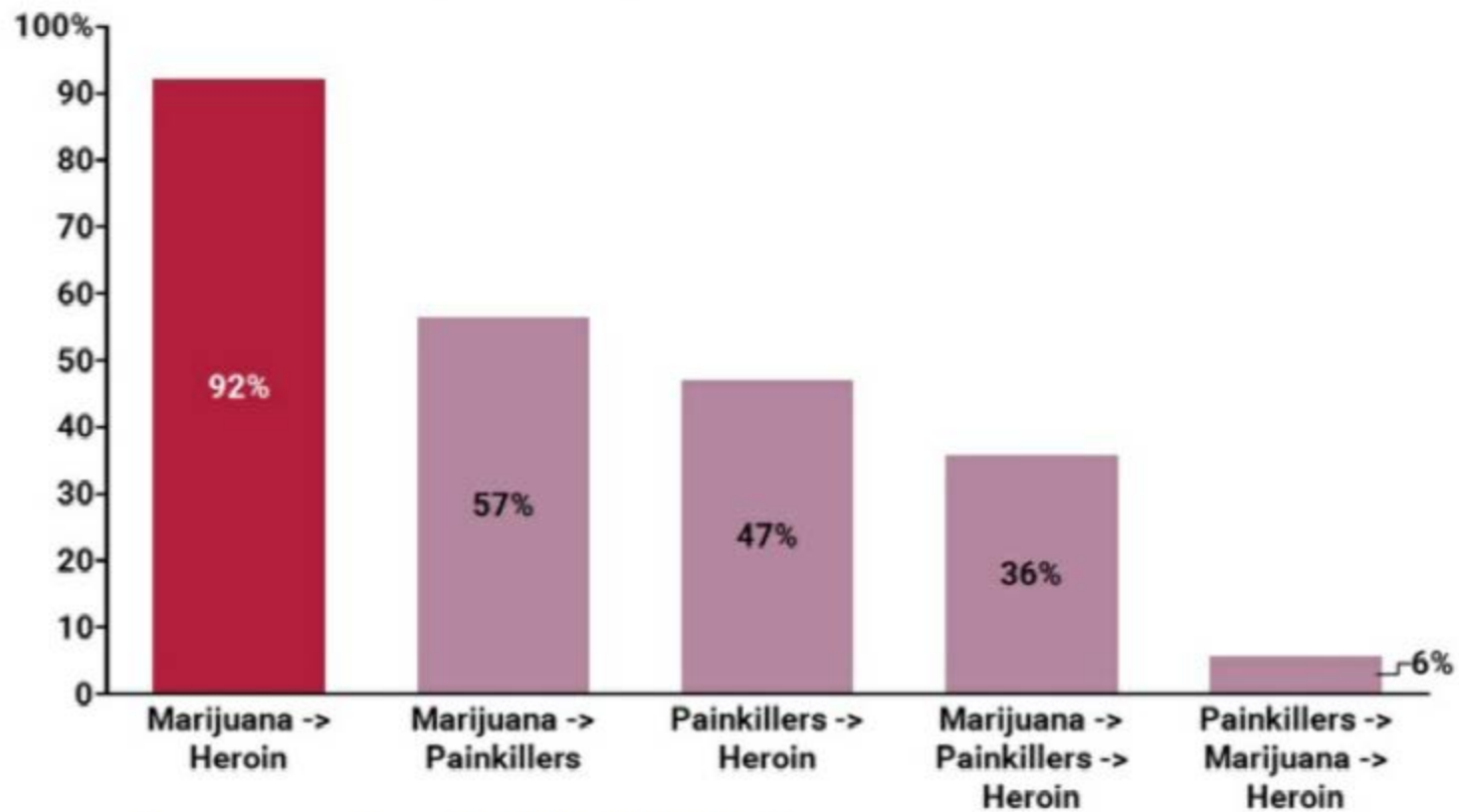


FIGURE 1. Level of Wave 1 Cannabis Use and Incident Wave 2 Prescription Opioid Use Disorder in the NESARC^a



^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)

Considerations: Adults

- Utility of social acceptability of recreational drug use
 - DCFS?
 - Rates of addiction?
 - Workplace concerns?

Marijuana – Workplace Considerations

TOP 5 CONCERNS OF IMPACT ON WORKFORCE

SOURCE: HIRPA JUNE 2017 MEMBER SURVEY

1. EMPLOYEES OPERATING
MOTOR VEHICLES



2. DISCIPLINARY PROCEDURES



3. DECREASED WORK
PERFORMANCE



4. EMPLOYEES USING HEAVY
MACHINERY



5. ATTENDANCE



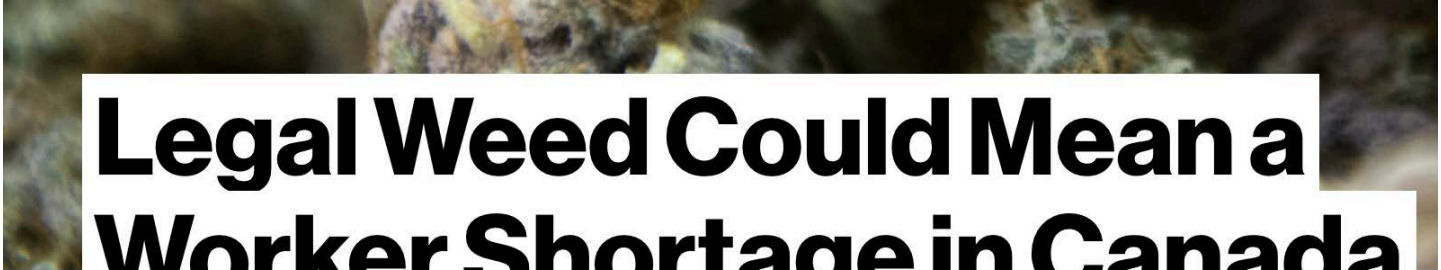
Marijuana – Workplace Implications

- If marijuana goes recreational, data suggests use rates will increase significantly in 18+ demographic.
- Disciplinary procedures
 - If testing positive...
 - Discriminating against employee if medical marijuana?
 - Discriminating against employee if medical condition (addiction)?
 - Were they **impaired** at work?
 - Can we even tell when they used in the first place?
 - We have no firm biomarkers for impairment
 - Zero tolerance vs. Per se limit
 - Is abstinence a bonafide occupational qualification (BFOQ)?
 - We have no good data on a per se limit

Productivity Concerns

- Marijuana has been linked to...
 - Less dedication to work
 - Increased worker's compensation cases
 - Job turnover
- Employees who test positive versus negative at pre-employment have...
 - 55% more industrial accidents
 - 85% more injuries
 - 75% higher absenteeism rates
- Also consider impact on memory, processing time, mental health

Also - Worker Shortages



Legal Weed Could Mean a Worker Shortage in Canada

By **Jen Skerritt** and **Kevin Orland**

January 31, 2018, 6:00 AM CST

-
- No way to tell if joint smoked before work or over the weekend
 - Safety concern for Canada industry with lots of dangerous jobs
-

Ohio factory owner: I need sober workers



Thomas Gnau - Staff Writer

2:33 p.m Tuesday, Aug. 1, 2017 Filed in [Business](#)

Youth – Target Market

- 90% of addictions start in adolescence
- Current practices





Youth – Target Market

- 90% of addictions start in adolescence
- Current practices



- Local Example / Another Local Example

Take-Homes

- The social zeitgeist around drugs is changing
 - Pros and cons...
- Greater population exposure → greater use → greater addiction & more negative consequences
- Whatever our goals were behind policy change, creating Big Marijuana was not necessary
 - All opposed: AMA, ASAM, IAFP, AAP, State Chiefs of Police, NAACP
- 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 just below the throat—where your voice is produced. It's the growing ground for any virus, like the one that causes the common cold. And here it all starts your throat. On the basis of the importance of this zone, many millions of smokers, the whole world, will use your "E-Zone" as a "C."



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 too 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

The figures quoted have been checked and verified as by LEBRAND, ROSE BROS. AND MONTGOMERY, Accountants

THE SHOCK OF FACING *what your figure may become*



AVOID FUTURE

by refraining
indulgences,
maintain the
line of

We do not represent that
smoking Lucky Strike
cigarettes will help
or cause the
We do not
ed so do not
you will "Reach
instead, you
over-indulgence
cause excess
weight gain,
maintain a trim figure.

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"
(These depicted are those)

AVOID THAT FUTURE SHADOW

by refraining from
over-indulgence

We do not represent that
smoking Lucky Strike Cigarettes
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, maintain 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., Manufacturer



NOW...Scientific Evidence on Effects of Smoking!

A MEDICAL SPECIALIST is making regular bi-monthly examinations of a group of people from various walks of life. 45 percent of this group have smoked Chesterfield for an average of over ten years.

After ten months, the medical specialist reports that he observed...

no adverse effects on the nose, throat and sinuses of the group from smoking Chesterfield.

MUCH Milder
CHESTERFIELD
IS BEST FOR YOU

Copyright 1953, Lorain & Mays Tobacco Co.



Take-Homes

- The social zeitgeist around drugs is changing
 - Pros and cons...
- Greater population exposure → greater use → greater addiction & more negative consequences
- We legislate to influence behavior – whatever our goals behind policy change, creating Big Marijuana was not necessary
 - All opposed: AMA, ASAM, IAFP, AAP, State Chiefs of Police, NAACP
- Do these ads look familiar...

...let's do better this time.

Thank You!

Aaron Weiner, PhD
aaron@weinerphd.com

