

Painweek.

ADVANCED EDUCATION

CERTIFICATION SERIES

CANNABINOIDS

A repeating pattern of cannabis leaves in a dark green color, serving as a background for the 'CANNABINOIDS' text.

Cannabis & Cannabinoids Policy & History

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Faculty Disclosure

- **Consulting Fee:** HealthXL, Speranza
- **Other:** Expert Witness—Cardinal Health

This presentation was not a part of the presenter's official duties at the WVU and does not represent the opinion of WVU

Learning Objectives

- Recall national and international substance-related death trends including alcohol, tobacco, marijuana, and all other drugs.
- Recall the general history of cannabis on state, federal, and international levels.
- Explain the United States controlled substance scheduling classes and rescheduling process.



Cannabis/Cannabinoid History

Ancient Weeds

10,000 BC

- Cannabis plant domesticated for fiber products and nutraceuticals

3,000 BC

- Cannabis used for medicinal and recreational purposes

2,727 BC

- Chinese Emperor Shen Nung used cannabis as medicine

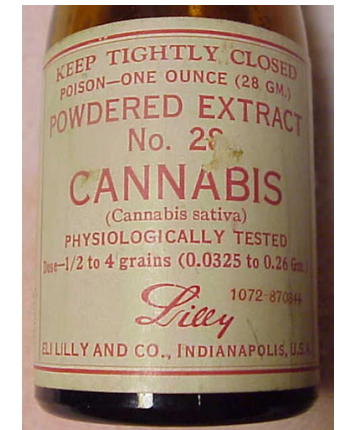
Colonial Cannabis

1600s

- Washington, Jefferson, and Adams were known growers of hemp
- King James ordered every colonist to cultivate and export 100 hemp plants to England (1619)
- Hemp was legal tender in Pennsylvania, Virginia, and Maryland
- Cannabis in US tinctures and medicines

1919 Medical Catalog and Antique Cannabis Book

- Approximately 6% of all manufactured drugs contained a form of cannabis
- Cannabis products listed
 - Squibb (15)
 - UpJohn & Co. (30)
 - Parke Davis (27)
 - Eli Lilly (23)
 - Parke Davis & Eli Lilly produced Cannabis Americana Strain
 - Abbott Laboratories (4)
 - Research Arm, AbbVie Pharmaceuticals, went on to manufacture dronabinol



www.forbes.com/sites/debraborchardt/2015/04/08/pfizer-eli-lilly-were-the-original-medical-marijuana-sellers/?sh=414fd3d93026

20th Century Plants

1920

- US Companies sell cannabis extract for medicinal use
- Mexico banned the production, sale, and recreational use of cannabis
 - “Marihuana” was a new term from stereotypically unwelcomed Mexican immigrants

1916 to 1931

- 29 US states outlawed marijuana

1937 Marihuana Tax Act

- MariHuana: derived from Mexican Spanish
- Taxed transfers of marihuana-like narcotics
 - Farmers could purchase \$1 tax stamps to grow
 - Prescribers and dispensers taxed on sales
- *Reefer Madness* (1936) movie stimulated anti-cannabis movement
- Paper and newspaper industries feared hemp could replace wood derived paper, but hemp has less cellulose than wood-derived paper
 - Industry Investors: Andrew Mellon, William Hearst, DuPont Family
- 1st person arrested: Moses Baca (Mexican-American man)
 - Personal possession of 1/4 ounce of marijuana



20th Century Plants

1940: THC identified as psychoactive component

1960: CBD isolated from cannabis plant

1970: Controlled Substance Act

1971: “Waldos” in California

1972: Shafer Report: favored ending prohibition, but ignored

- “Marihuana: A Signal of Misunderstanding”

1973: DEA created

420 Origin

- In 1971, five high school students in San Rafael, California, called themselves the “**Waldos**” because they hung out by a wall outside the school (ie, Wall-Dos)
- The Waldos used “**4:20 Louis**” as a code name for a (failed) plan to search for an abandoned cannabis crop using a treasure map created by the grower. They would meet at the Louis Pasteur statue at 4:20pm
- Steven Hager of *High Times* took the Waldos story mainstream into the cult reference that it remains today



1980's Endo Endeavors

1980s

- “Just Say No” Partnership for Drug-Free Kids
- The “Egg Ad”

1988

- Office National Drug Control Policy created

1988

- CB1 receptor identified

1990's Cannabis Century Finale

1992: 1st endocannabinoid identified (anandamide)

1994: Violent Crime Control and Law Enforcement Act

- Marijuana arrests doubled from 1991 to 2000

1993: CB2 receptor identified

1995: 2nd endocannabinoid identified (2-AG)

1996: endocannabinoid degrading enzyme (FAAH) is cloned

1996: California legalized “medical” marijuana

21st Century Weeds

2013: Cole Memorandum “hands-off”

2014: DEA \$1 budget restriction (*renewed – 2021)

2016: DEA reviews, confirms marijuana classification as “CS-1”

2017: AG Jeff Sessions abandoned Cole Memorandum

2018: Agriculture Improvement Act 2018 (Farm Bill)

- Removed hemp CBD < 0.3% from CSA

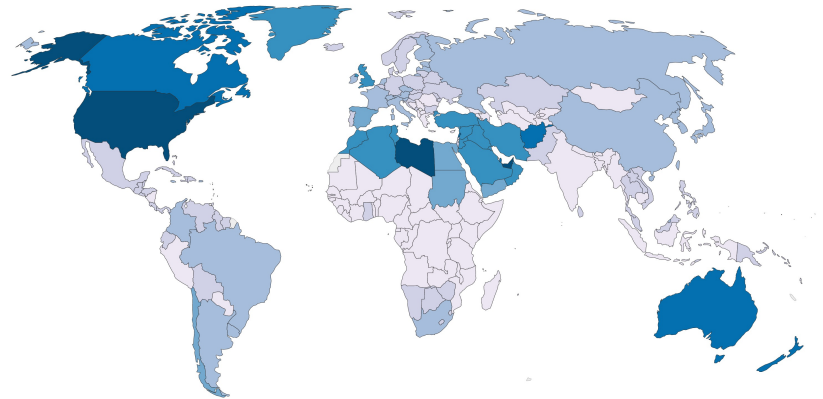


Drug Pandemic

International SUDs and Deaths

Share of population with drug use disorders, 2017

Drug dependence is defined by the International Classification of Diseases as the presence of three or more indicators of dependence for at least a month within the previous year. Drug dependency includes all illicit drugs.

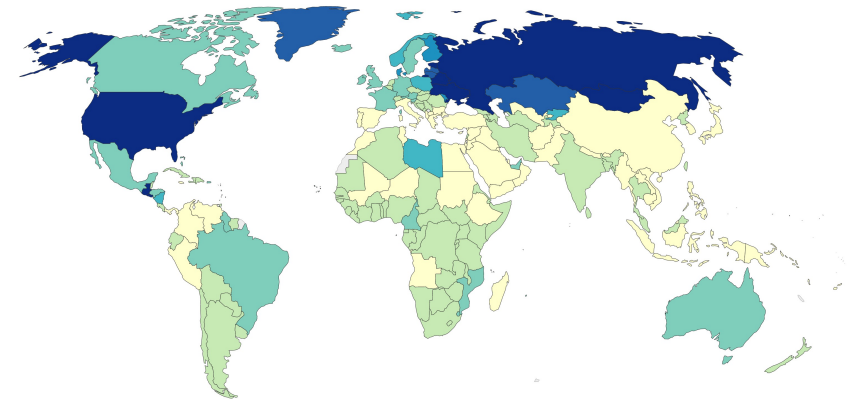


Source: IHME, Global Burden of Disease

CC BY

Death rates from substance use disorders, 2017

Substance use disorders refers to direct deaths from overdoses of alcohol or illicit drugs (which include opioids, cocaine, amphetamines and cannabis). Death rates are measured as the number of deaths per 100,000 population.



Source: IHME, Global Burden of Disease

Note: To allow comparisons between countries and over time this metric is age-standardized.

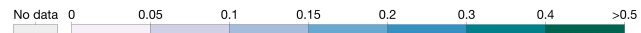
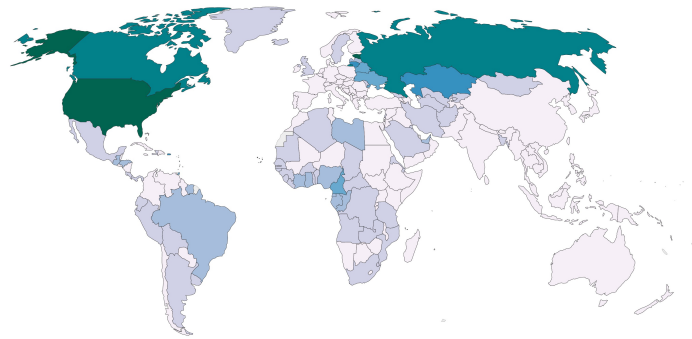
OurWorldInData.org/substance-use • CC BY

ourworldindata.org/illicit-drug-use#deaths-from-drug-use.

International Drug Deaths

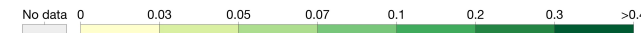
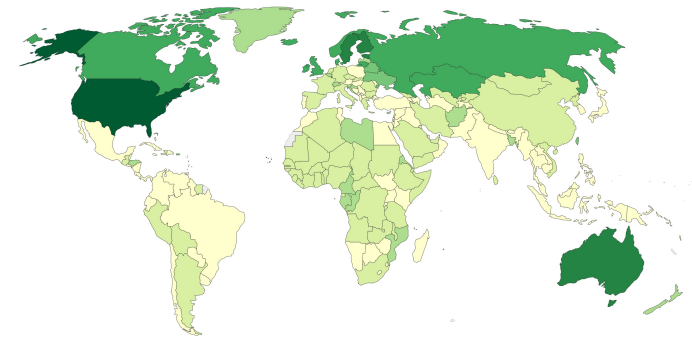
Death rates from cocaine overdoses, 2017

Death rates from cocaine use disorders are measured as the number of deaths per 100,000 individuals.



Death rate from amphetamine overdoses, 2017

Death rates from amphetamine overdoses are measured as the number of deaths per 100,000 individuals.



Source: IHME, Global Burden of Disease

Note: To allow comparisons between countries and over time this metric is age-standardized

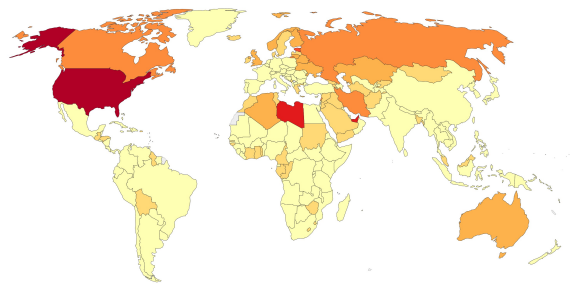
Death rate from opioid overdoses, 2017

Death rates from opioid use disorders are measured as the number of deaths per 100,000 individuals.



f Disease between countries and over time this metric is age-standardized.

OurWorldInData.org/drug-use · CC BY



Source: IHME, Global Burden of Disease (GBD) to allow comparisons between countries and over time this metric is age-standardized. · CC BY

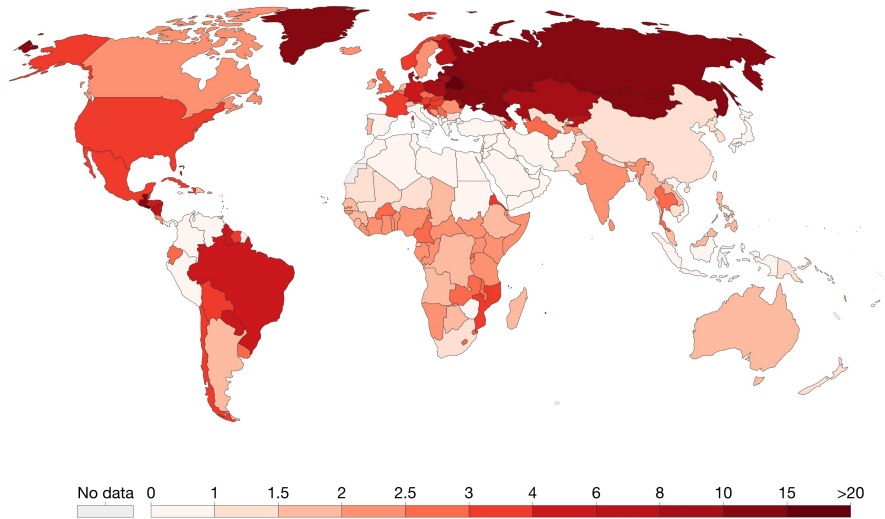
ourworldindata.org/illicit-drug-use#deaths-from-drug-use.

International Drinking Deaths

Death rates from alcohol use disorders, 2017

Age-standardized death rates from alcohol use disorders, measured per 100,000 individuals. Figures do not include indirect suicide deaths which may otherwise be related to alcohol use disorders.

Our World in Data



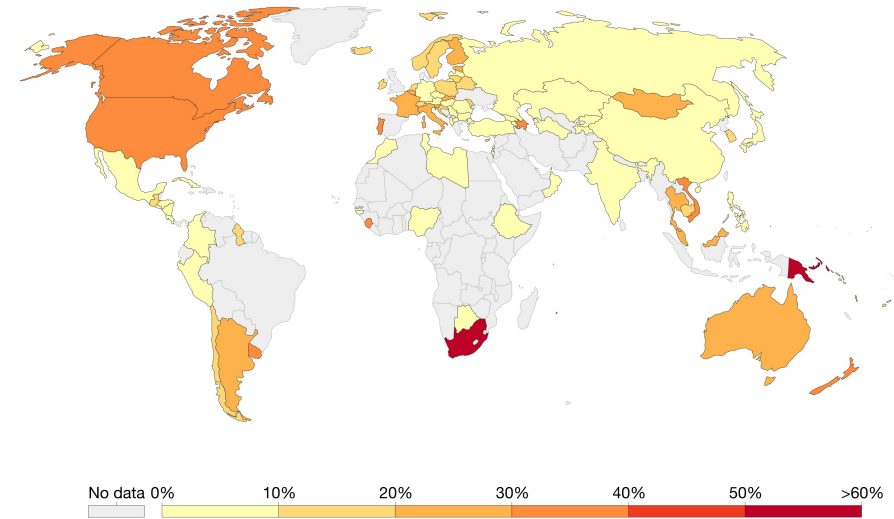
Source: IHME, Global Burden of Disease

OurWorldInData.org/mental-health • CC BY

Share of road traffic deaths attributed to alcohol, 2013

Share of all road traffic deaths attributed to alcohol consumption above the national legal limit for alcohol consumption. It includes deaths in vehicles, of pedestrians and of cyclists.

Our World in Data



Source: WHO, Global Health Observatory

OurWorldInData.org/alcohol-consumption • CC BY

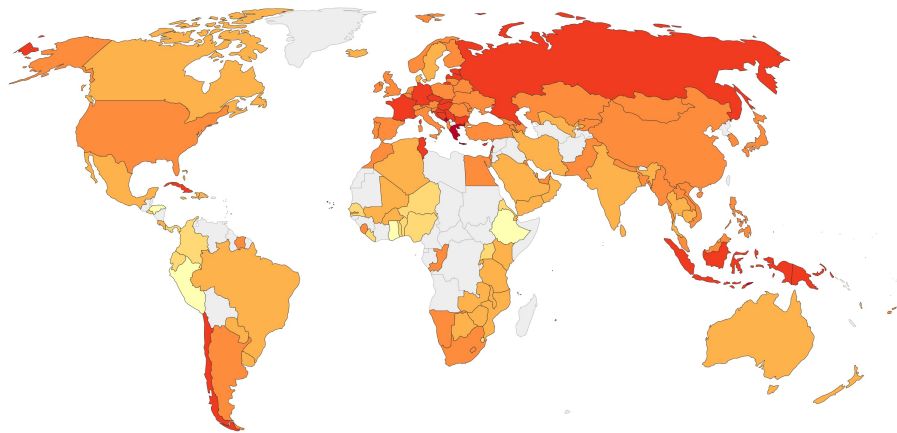
ourworldindata.org/illicit-drug-use#deaths-from-drug-use

International Smoking Deaths

Share of adults who smoke, 2016

The share of men and women aged 15 and older who smoke any tobacco product on a daily or non-daily basis. It excludes smokeless tobacco use.

Our World
in Data

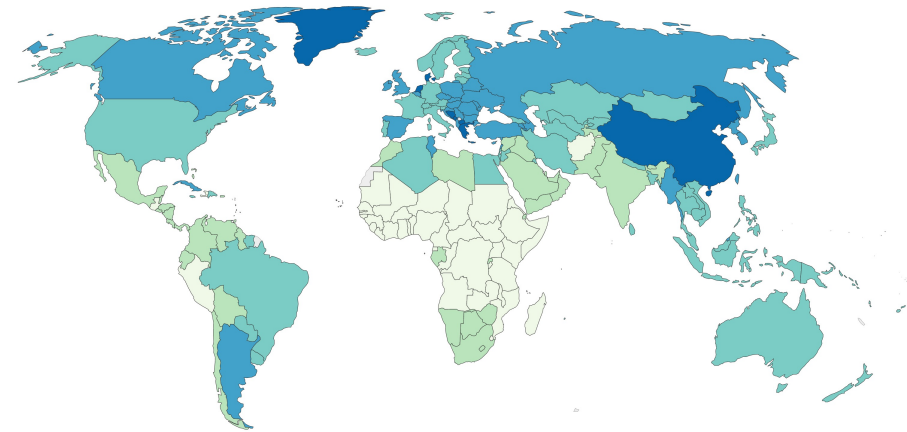


Source: World Bank

OurWorldInData.org/smoking • CC BY

Share of deaths from smoking, 2017

Our World
in Data



Source: IHME, Global Burden of Disease

OurWorldInData.org/smoking • CC BY

ourworldindata.org/illicit-drug-use#deaths-from-drug-use.

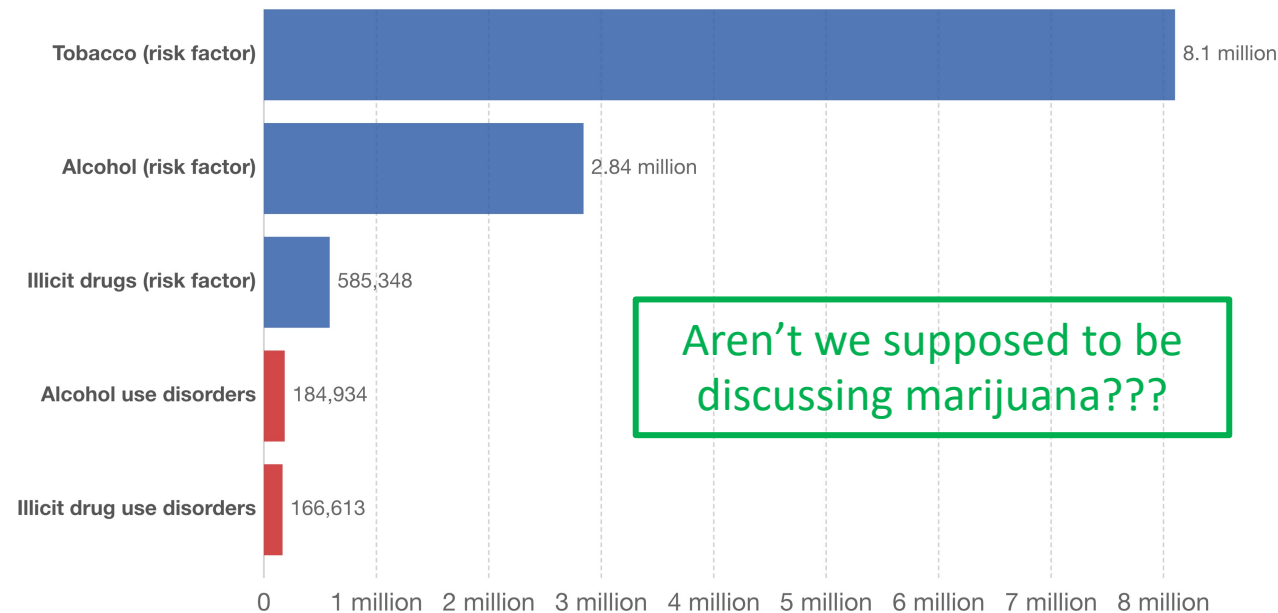
Worldwide Death Causes: Tobacco, Alcohol, and “Drugs”

Deaths from tobacco, alcohol and drugs, World, 2017



Deaths from substance use are distinguished by two measures:

- direct deaths from substance use disorders (in red). These are deaths which result from alcohol or illicit drug use overdoses.
- indirect deaths (in blue) which result from substance use acting as a risk factor for the development of various diseases and injury.



Aren't we supposed to be discussing marijuana???

Source: IHME, Global Burden of Disease

OurWorldInData.org/drug-use • CC BY

Note: Illicit drugs are drugs that have been prohibited under international drug control treaties. They include opioids, cocaine, amphetamines and cannabis.

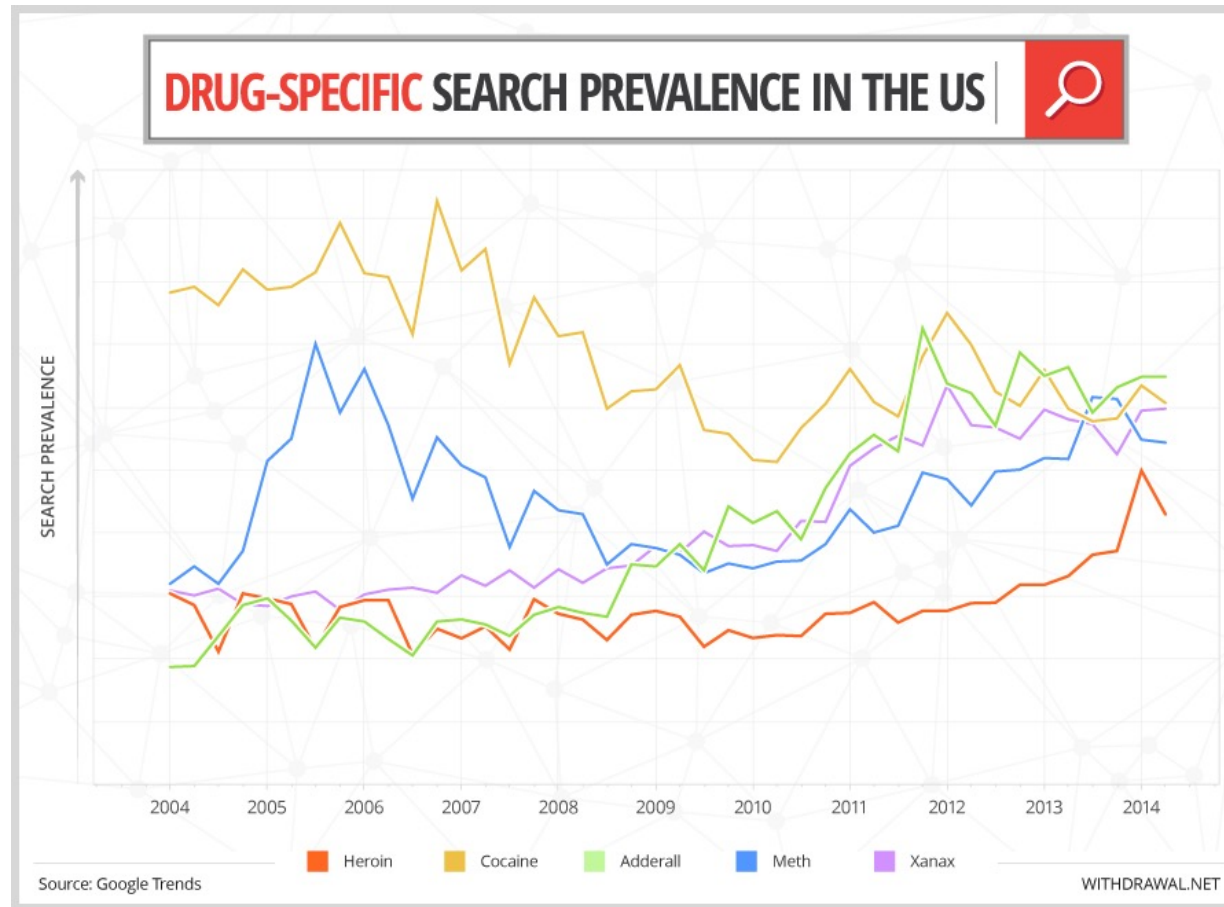
ourworldindata.org/illicit-drug-use#deaths-from-drug-use.

“Of all the nations of the world, the United States consumes the most habit-forming drugs per capita”

**Hamilton Wright
US Opium Commissioner 1911**

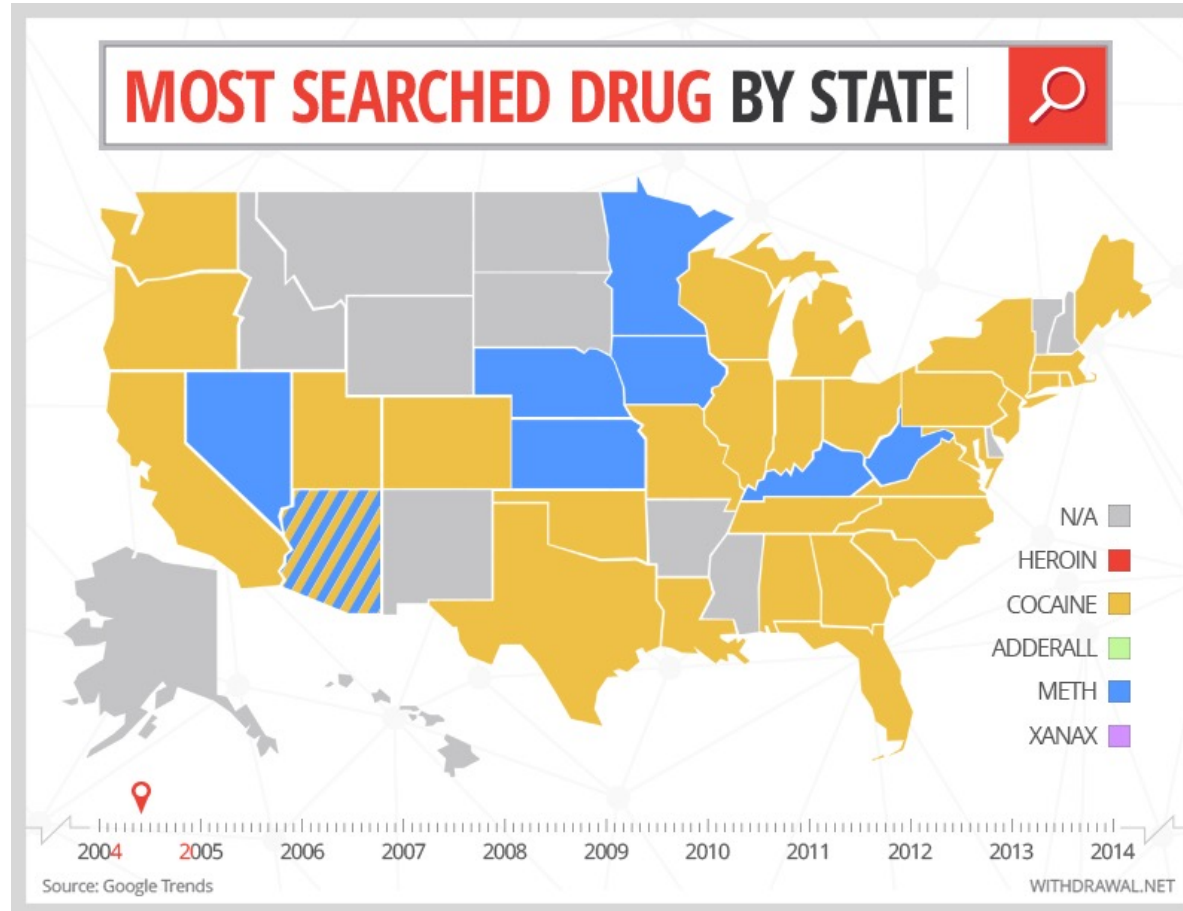
Wright On! Over a Century Later....

Dr. Google National Searches



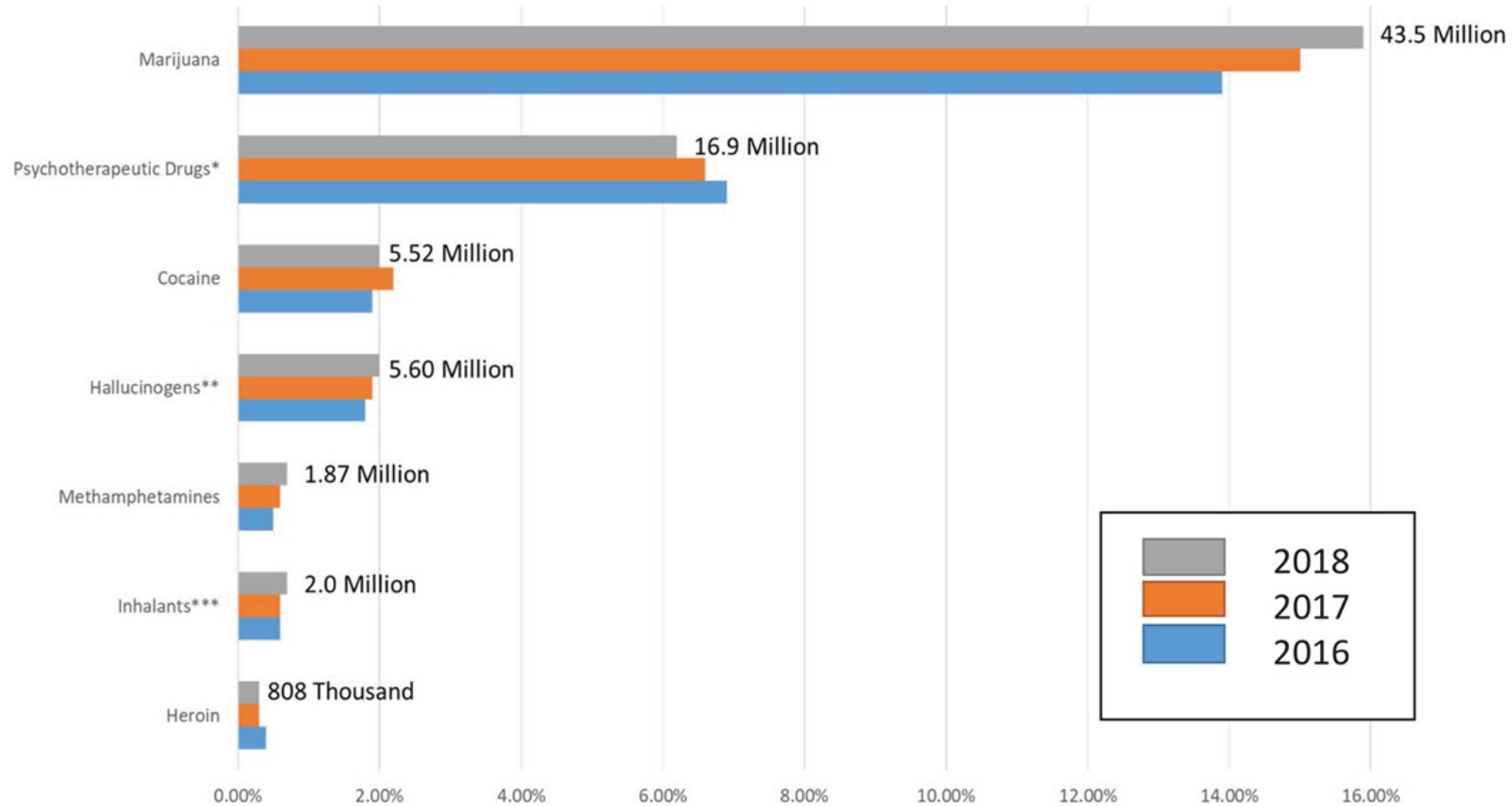
www.withdrawal.net/realize/drug-related-web-searches-across-us/

Dr. Google State Searches



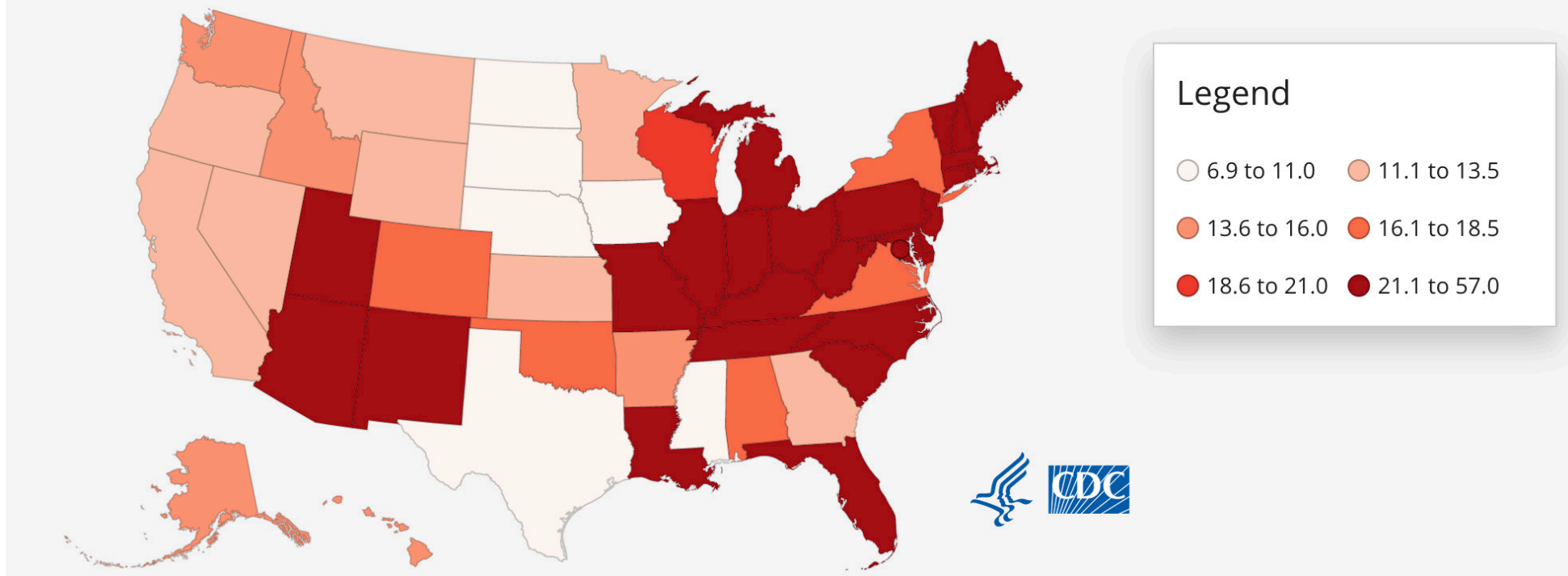
www.withdrawal.net/realize/drug-related-web-searches-across-us/

2016-2018 US Substance Utilization Trends



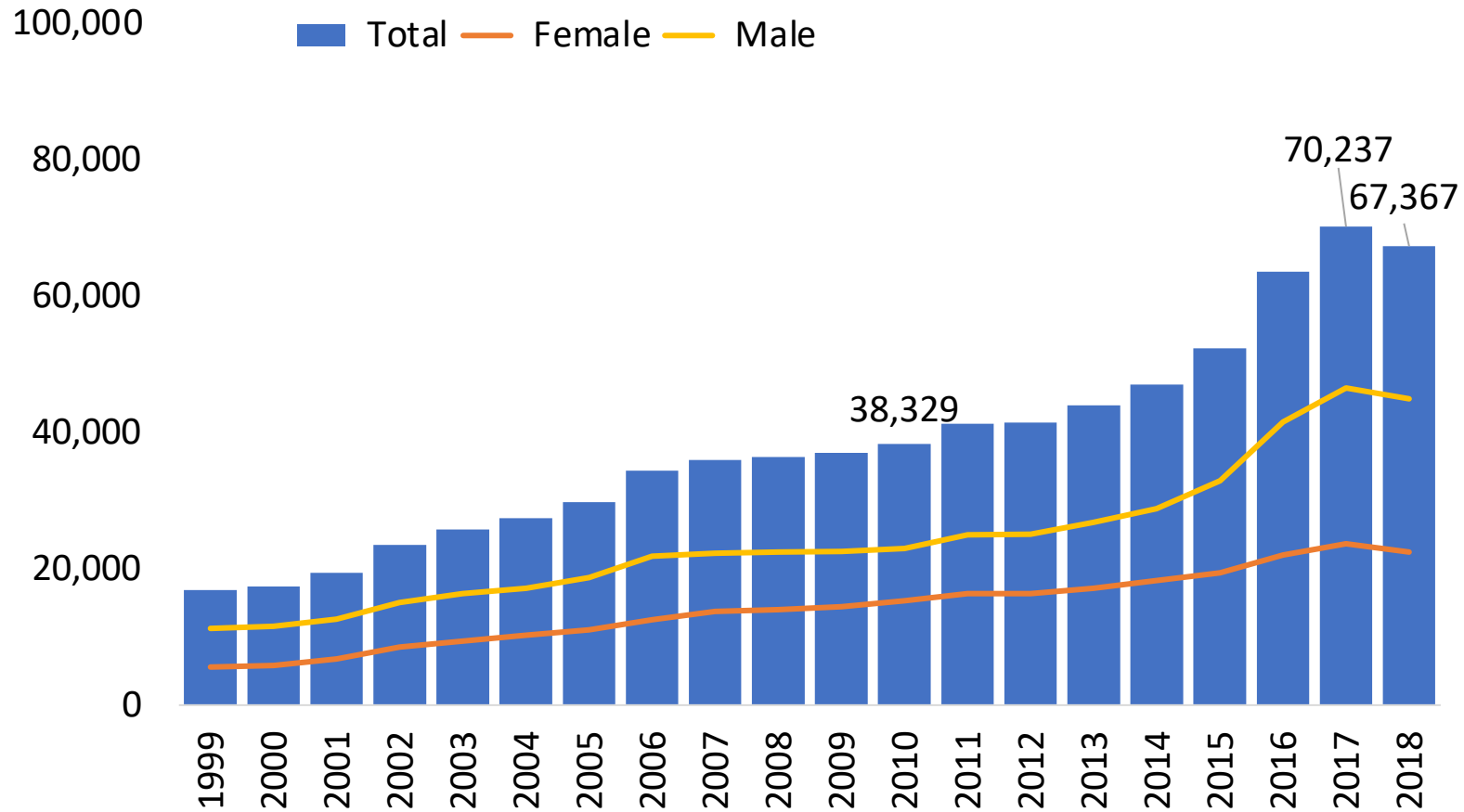
US Drug Overdose Deaths

Number and age-adjusted rates of drug overdose deaths by state, US 2018



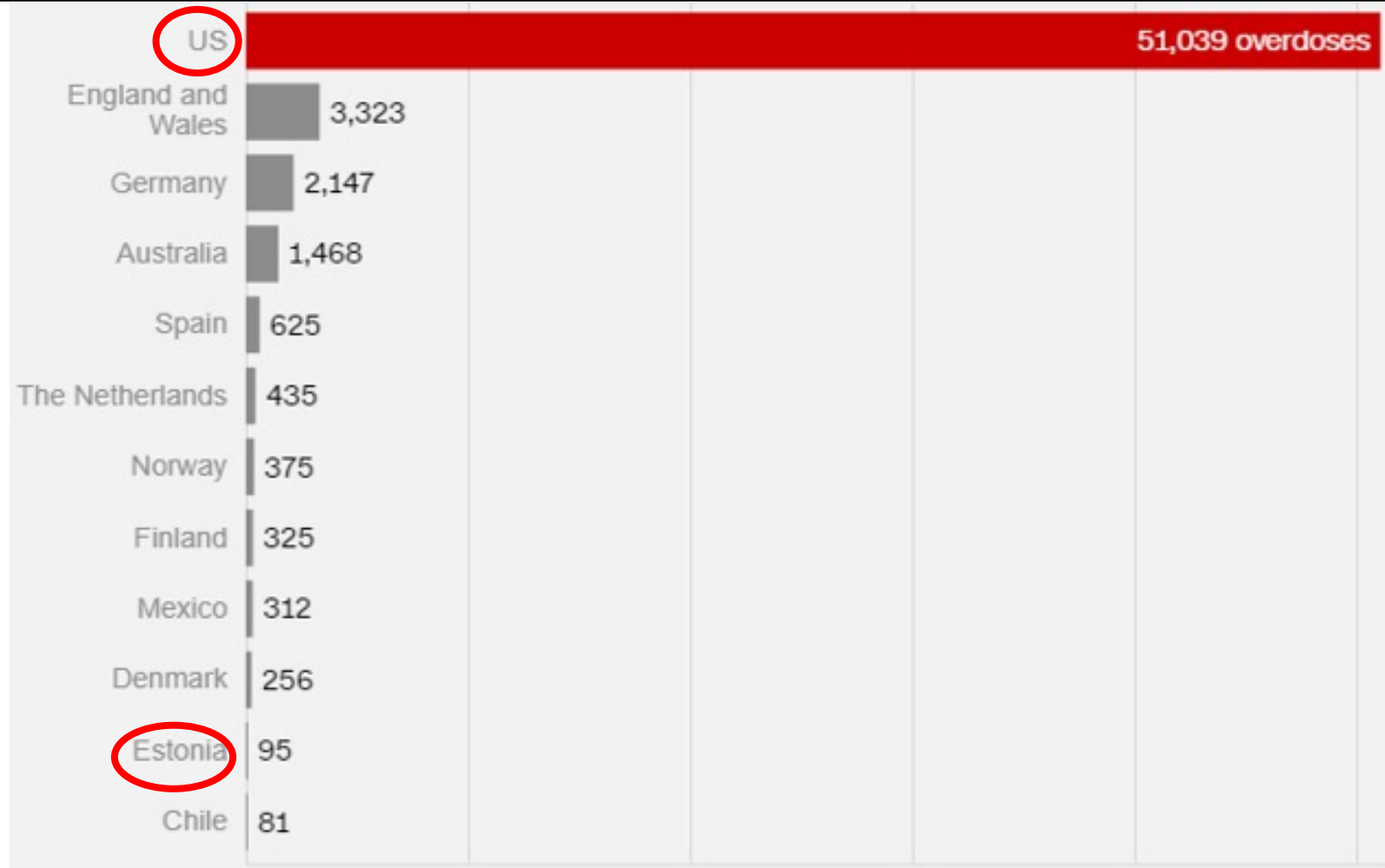
www.cdc.gov/drugoverdose/data/statedeaths/drug-overdose-death-2018.html.

US Drug Overdose Deaths



CDC. National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released January, 2019.

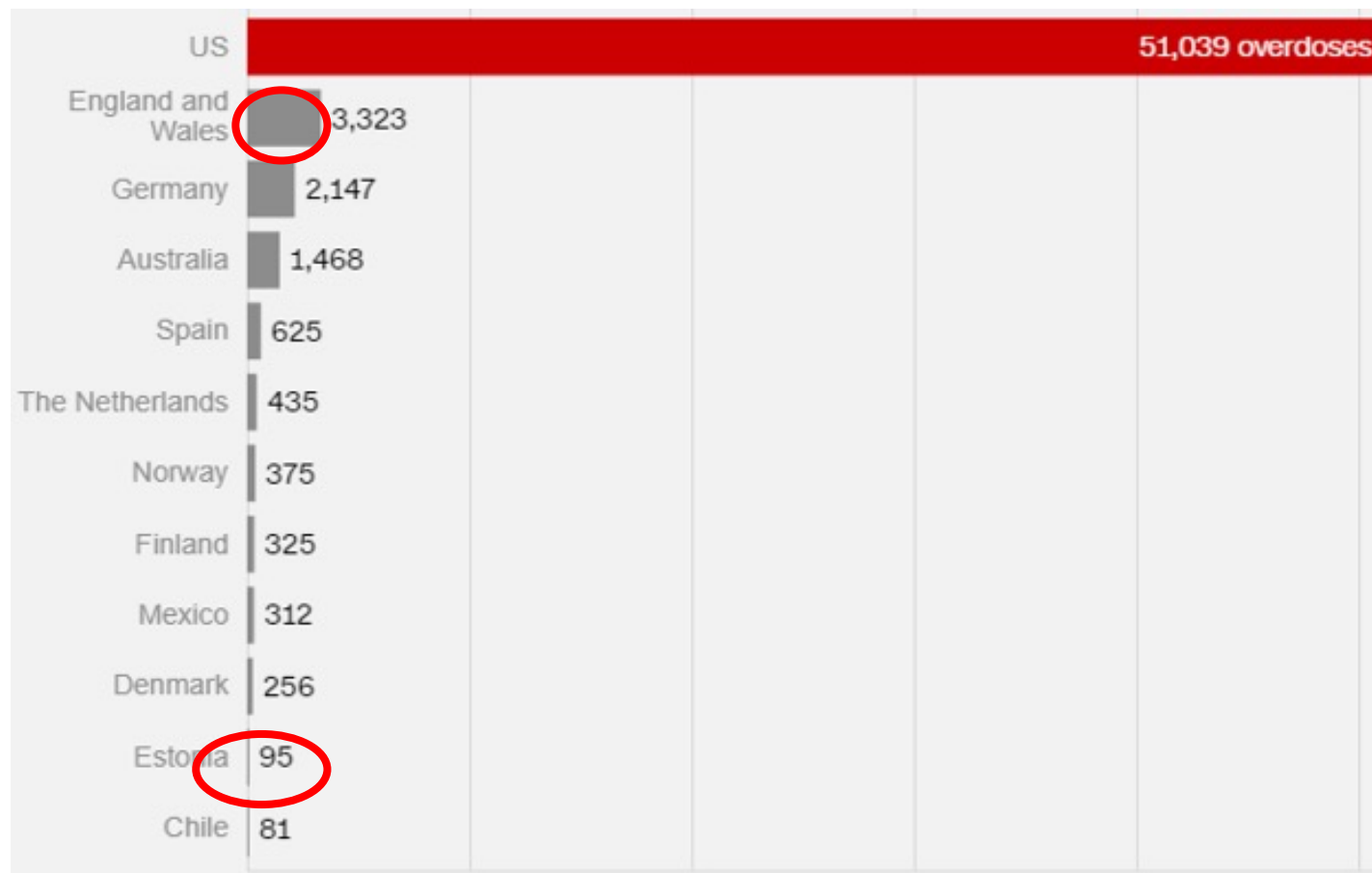
Numbers vs Percentages



Chen. *Ann Intern Med.*
2019;170(5):352-354.

Numbers vs Percentages

~Population (Millions)	Drug Overdose Population %
326	0.016
58	0.006
83	0.003
25	0.006
47	0.001
17	0.003
5	0.008
6	0.005
129	0.0002
6	0.004
1	0.010
18	0.0005



Percentages vs Numbers

State	Overdose Rate 2017
West Virginia	57.8%
Ohio	46.3%
Pennsylvania	44.3%
North Dakota	9.2%
South Dakota	8.5%
Nebraska	8.1%

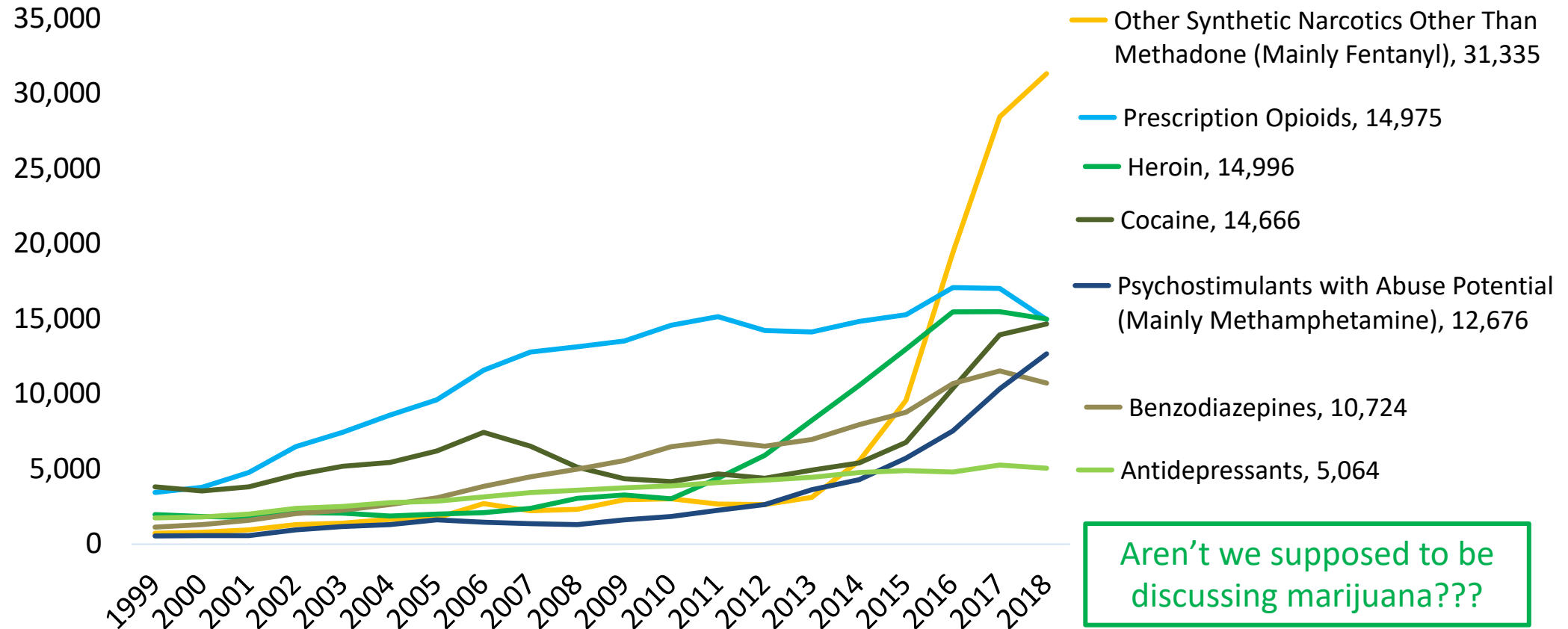
worldpopulationreview.com/states/. www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm.
Hedegaard. Drug Overdose Deaths in the United States, 1999–2017. CDC-NCHS Brief. No. 329. November 2018.

Percentages vs Numbers

State	Overdose Rate 2017	Population 2017	Overdose #s 2017
West Virginia	57.8%	~2M	974
Ohio	46.3%	~12M	5,111
Pennsylvania	44.3%	~13M	5,388
North Dakota	9.2%	~1M	68
South Dakota	8.5%	~1M	73
Nebraska	8.1%	~2M	152

worldpopulationreview.com/states/. www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm.
Hedegaard. Drug Overdose Deaths in the United States, 1999–2017. CDC-NCHS Brief. No. 329. November 2018.

US Drug Overdose Deaths



CDC, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released January, 2019.

Incredible Loss

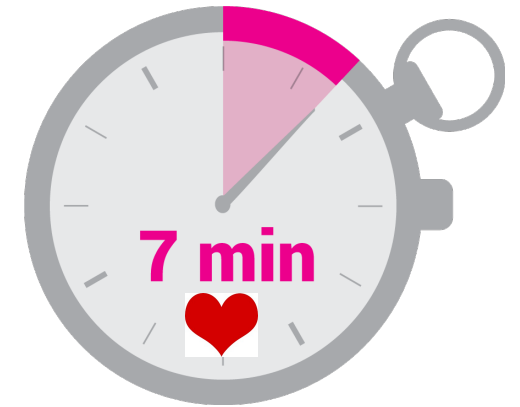
Event	Approximate US Deaths
2020 COVID-19 Deaths	350,000
2019 USA Drug Overdoses	67,000
Vietnam War Deaths (over 20 years total)	58,000
2015 Suicides (all-time highest year)	44,000
2015 Car Crash Deaths (peak year in history)	35,000
2019 Influenza (Flu) Deaths	34,000

www.drugwarfacts.org/node/1854.

CDC, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released January, 2019.

US “Drug” Deaths

Substance	US Annual Deaths (Approx.)
“Drugs”	70,000
Rx Opioids <small>(Source?)</small>	15,000
Heroin	15,000
Fentanyl/Analogues	31,000



www.drugwarfacts.org/node/1854.

CDC, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released January, 2019.

The Study Misheard Around the World

Research

Original Investigation

The Changing Face of Heroin Use in the United States

A Retrospective Analysis of the Past 50 Years

Theodore J. Cicero, PhD; Matthew S. Ellis, MPE; Hilary L. Surratt, PhD; Steven P. Kurtz, PhD



75% of Heroin Users
Started with
Prescription Opioids



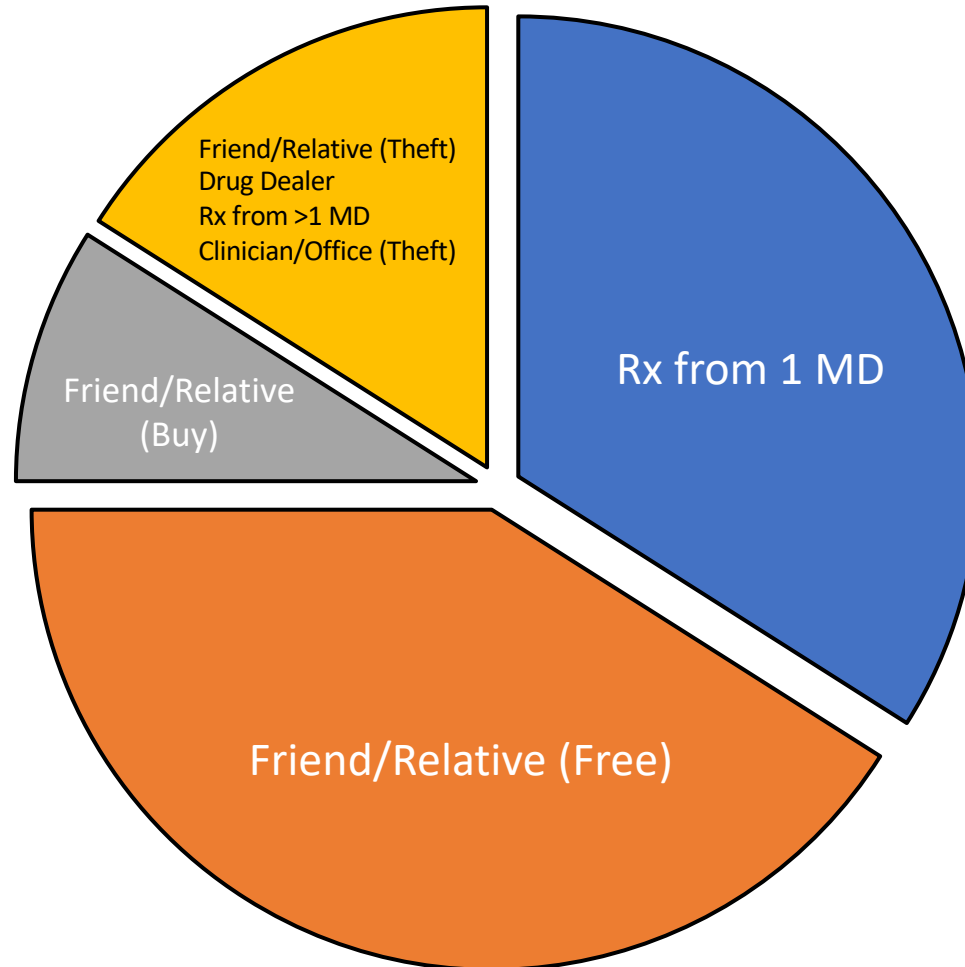
Family, Friends, Theft???



Healthcare Professional(s)

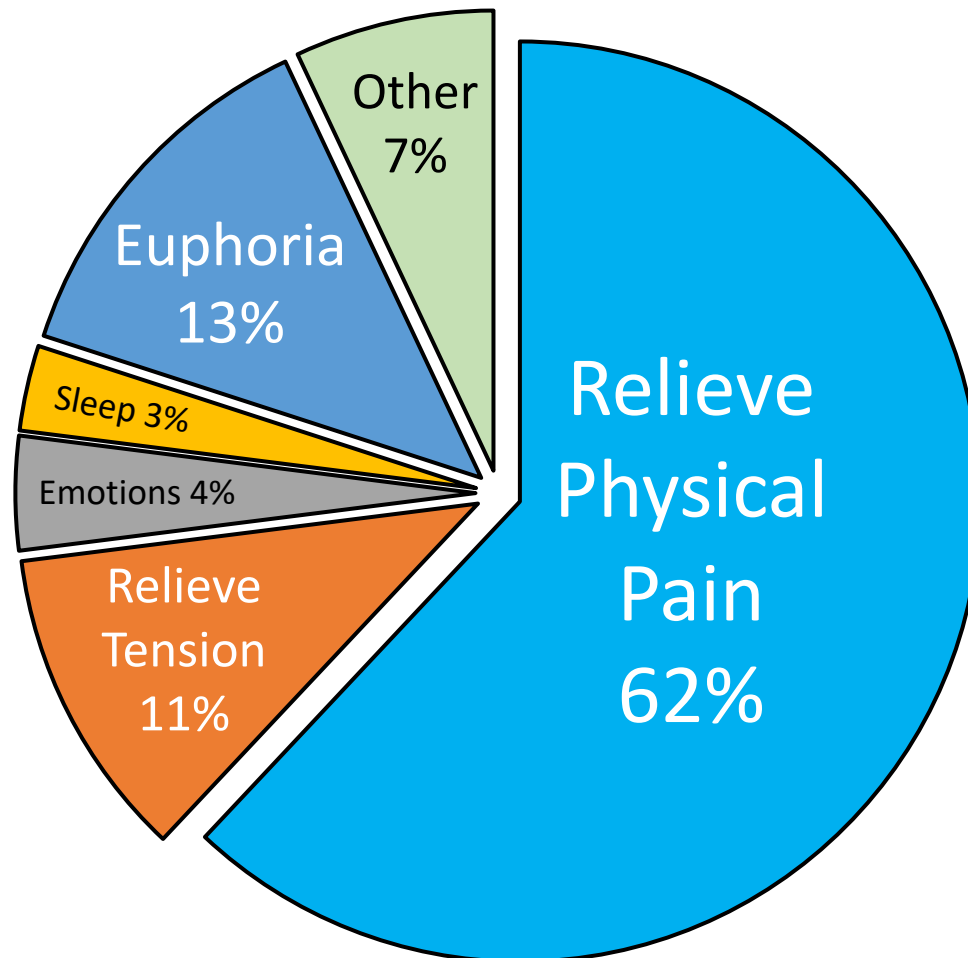
Cicero. *JAMA Psychiatry*. 2014;821-826.

Where Are These Opioids Coming From?



HEALTHCARE
PROFESSIONAL
~1/3rd

80% of Prescription Drug Misuse Due to Poor/Missing Original Treatment?



www.dea.gov/docs/DIR-040-17_2017-NDTA.pdf

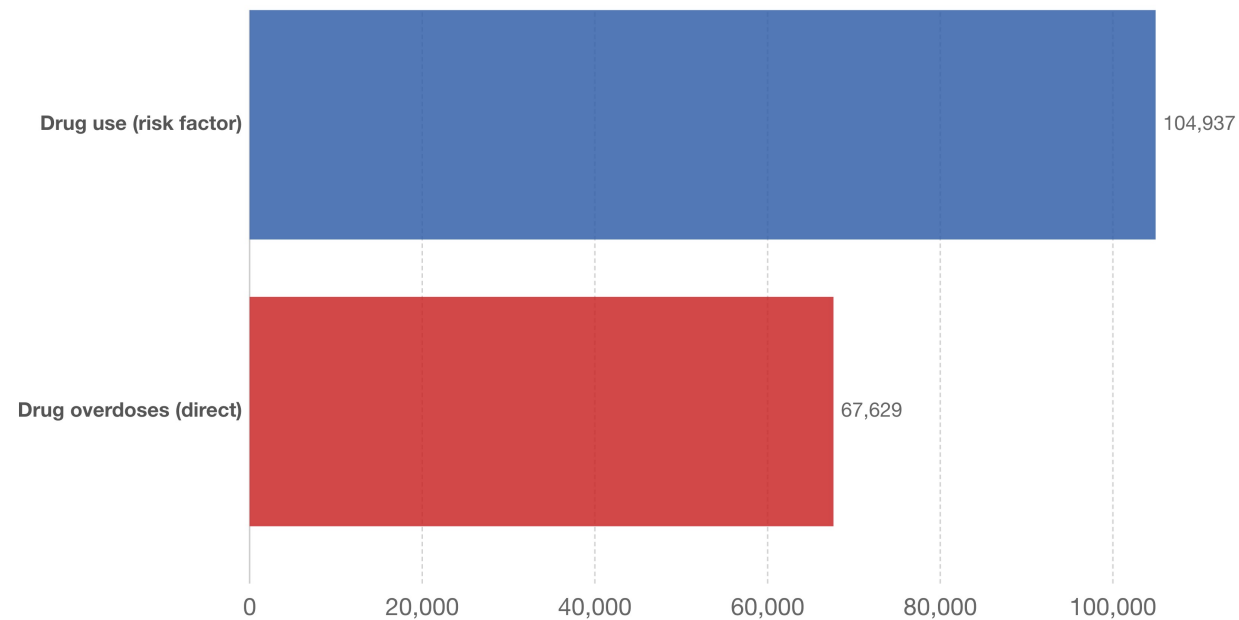
US Drug Overdose Deaths

Number of deaths from illicit drugs, United States, 2017

Our World
in Data

Deaths from drug use are distinguished by two measures:

- direct deaths from drug use disorders (in red). These are deaths which result from illicit drug overdoses.
- indirect deaths (in blue) which result from illicit drug use acting as a risk factor for the development of various diseases and injury.



Source: IHME, Global Burden of Disease

Note: Illicit drugs are drugs that have been prohibited under international drug control treaties. They include opioids, cocaine, amphetamines and cannabis.

OurWorldInData.org/drug-use • CC BY

ourworldindata.org/illicit-drug-use#deaths-from-drug-use.

US Substance-Related Deaths

Annual Approximate

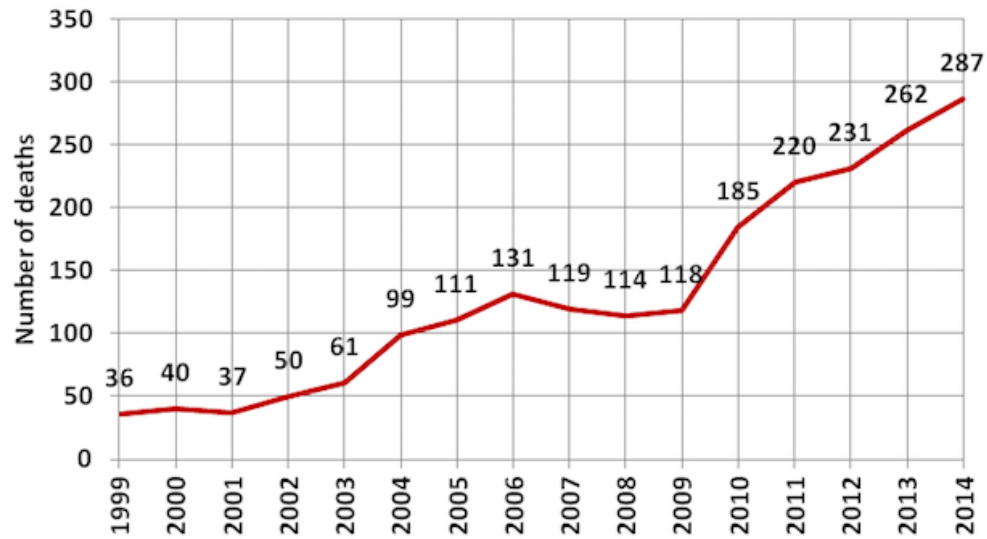
Substance	Deaths
Tobacco	500,000
“Drugs”	172,000
Alcohol	100,000
Marijuana	18

www.drugwarfacts.org/node/1854.

CDC, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released January, 2019.

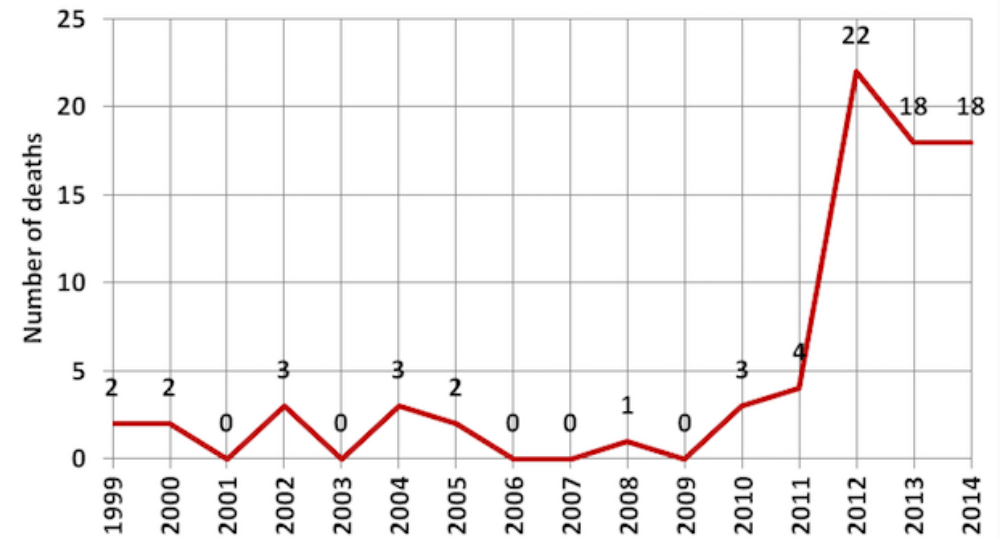
US Marijuana Deaths

Figure 1. Number of marijuana poisoning deaths US 1999-2014



Combined with Other Substances

Figure 2. Poisoning deaths due to cannabis alone US 1999-2014



www.rehabs.com/pro-talk/fatal-marijuana-overdose-is-not-a-myth/

US Marijuana Deaths

- 2 deaths due to cardio issues (2014)
- 1 death due to dehydration (2018)
 - Hyperemesis syndrome
- Additional unreported/diagnosed???

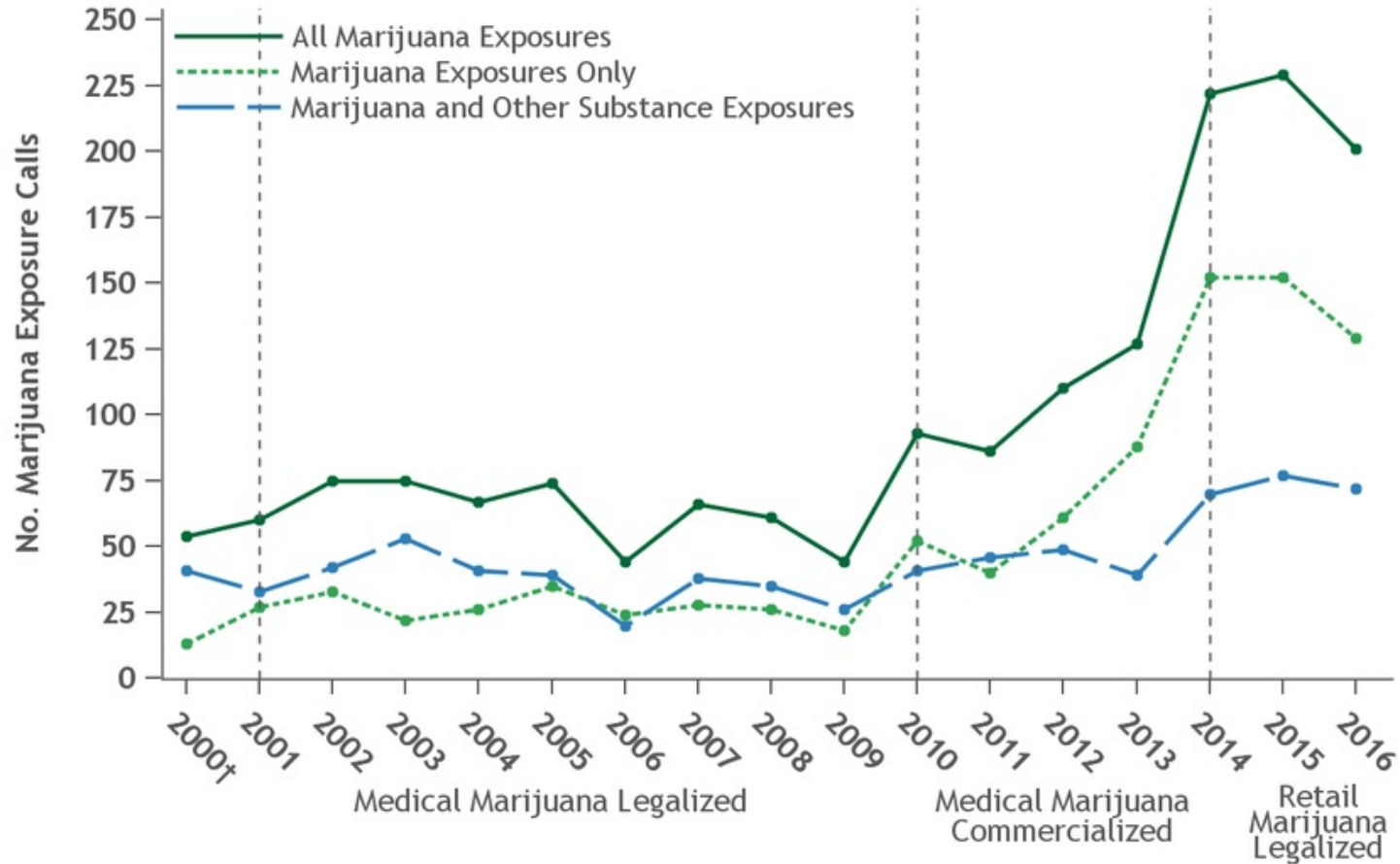


www.drugwarfacts.org/node/1854.

www.medicalnewstoday.com/articles/327126.

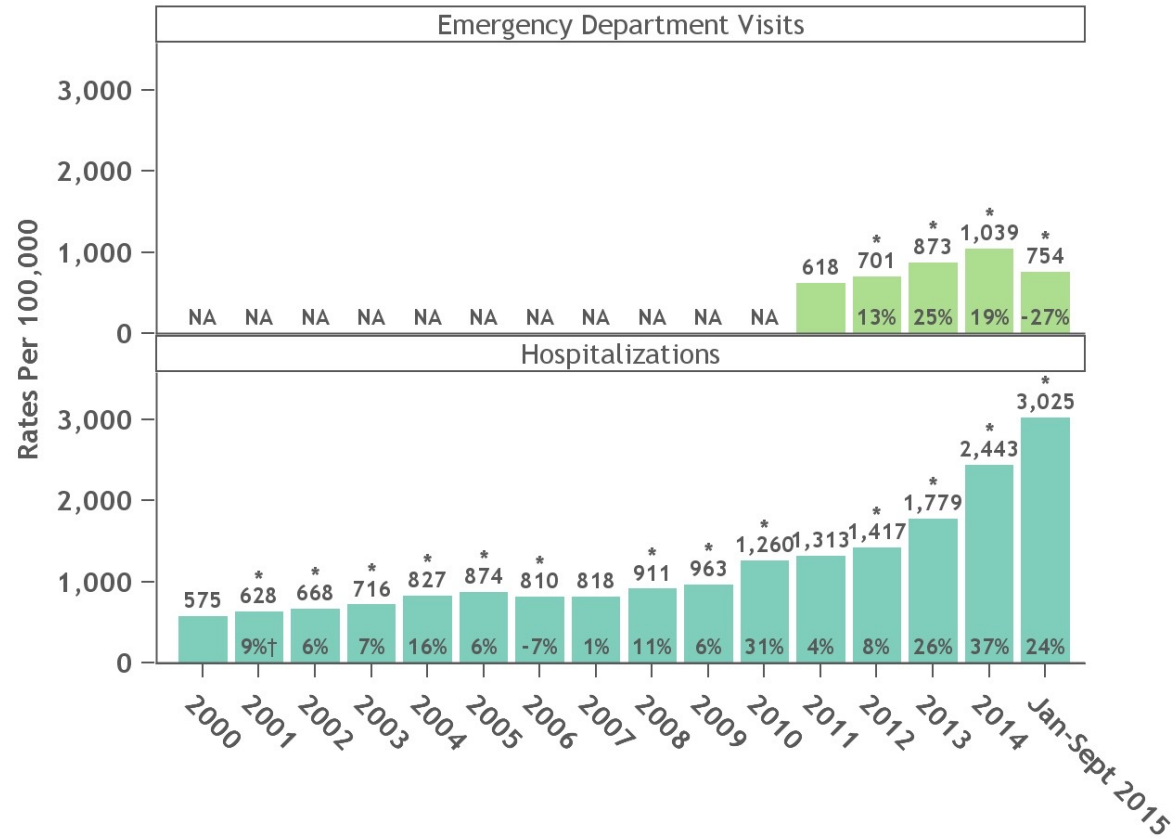
www.cannabisskunksense.co.uk/uploads/site-files/CannabispapersDeathsfromcannabisfullpaper2014.pdf.

Colorado Poison Center Calls



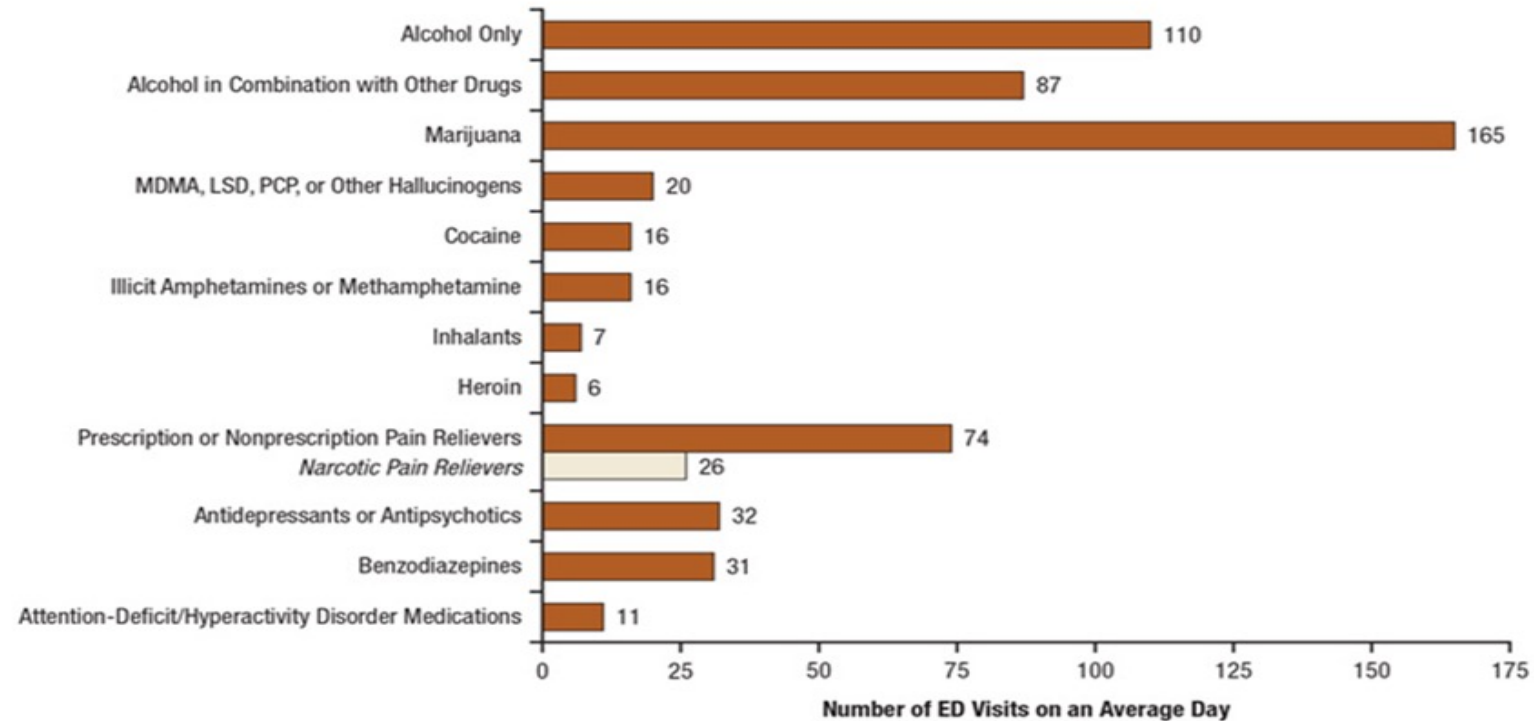
Colorado Department of Public Health and Environment. Monitoring Health Concerns Related to Marijuana in Colorado. 2016.

Colorado Marijuana Related Hospital Visits



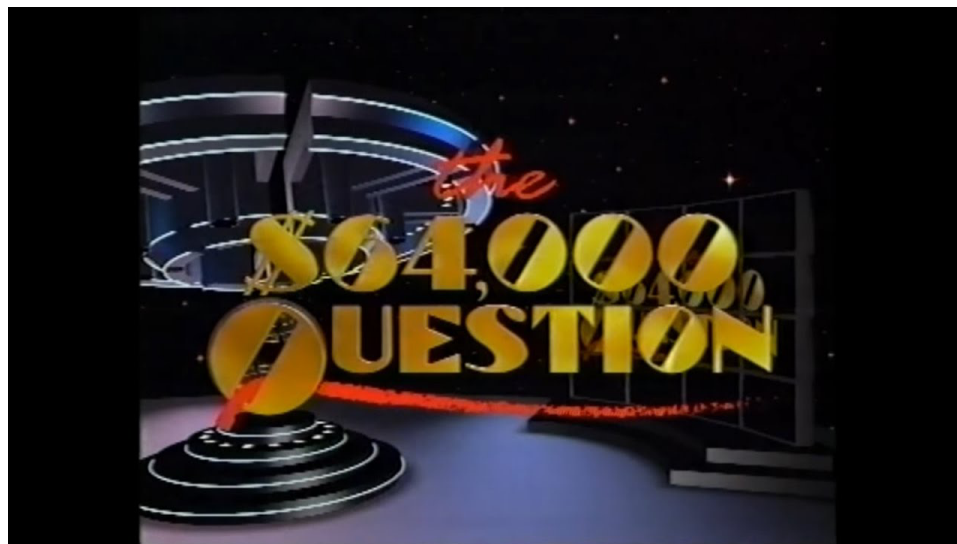
Colorado Department of Public Health and Environment. Monitoring Health Concerns Related to Marijuana in Colorado. 2016.

Emergency Room Substance Abuse Visits



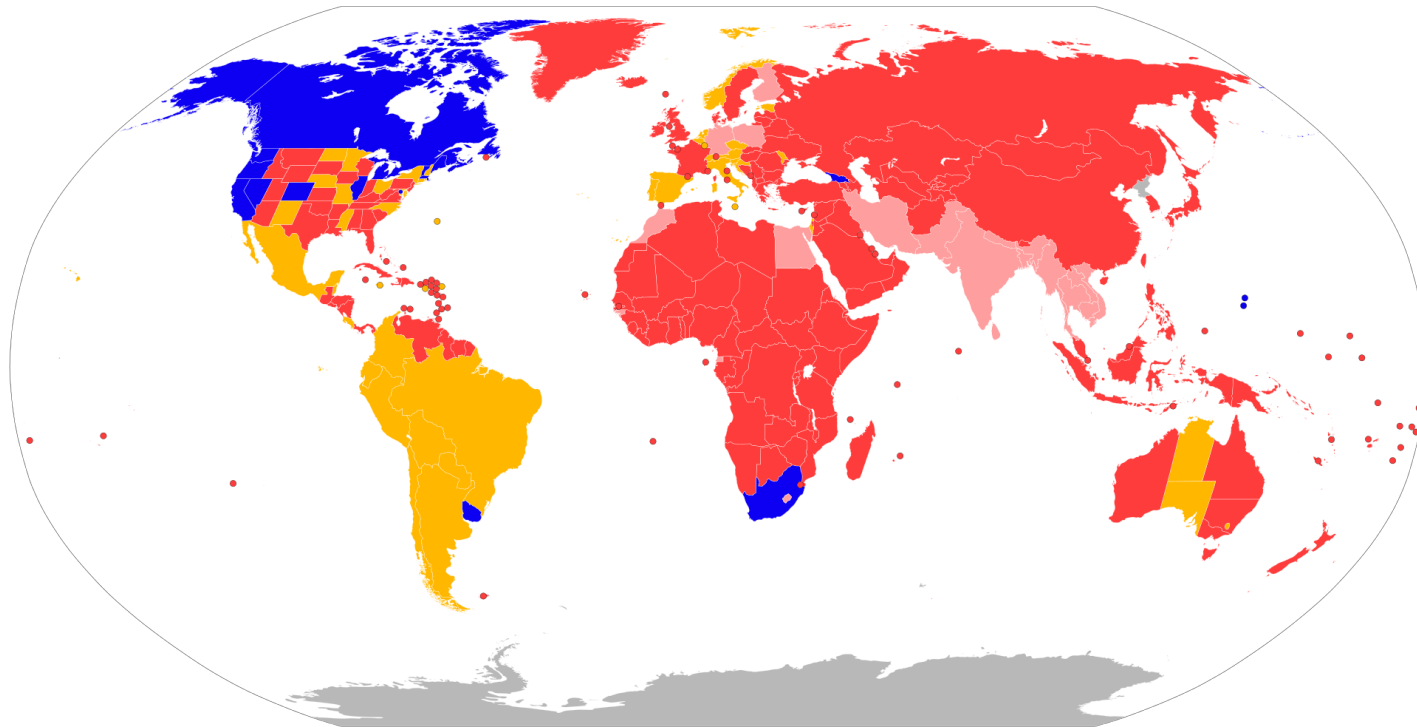
Source: 2011 SAMHSA Drug Abuse Warning Network (DAWN).

www.medicalnewstoday.com/articles/327126.



**To Legalize or Decriminalize?
That is the \$64M Question**

International Cannabis Laws



- **LEGAL**
- **ILLEGAL BUT DECRIMINALIZED**
- **ILLEGAL BUT OFTEN UNENFORCED**
- **ILLEGAL**

blog.marketresearch.com/the-state-of-the-medical-marijuana-market-in-2020.

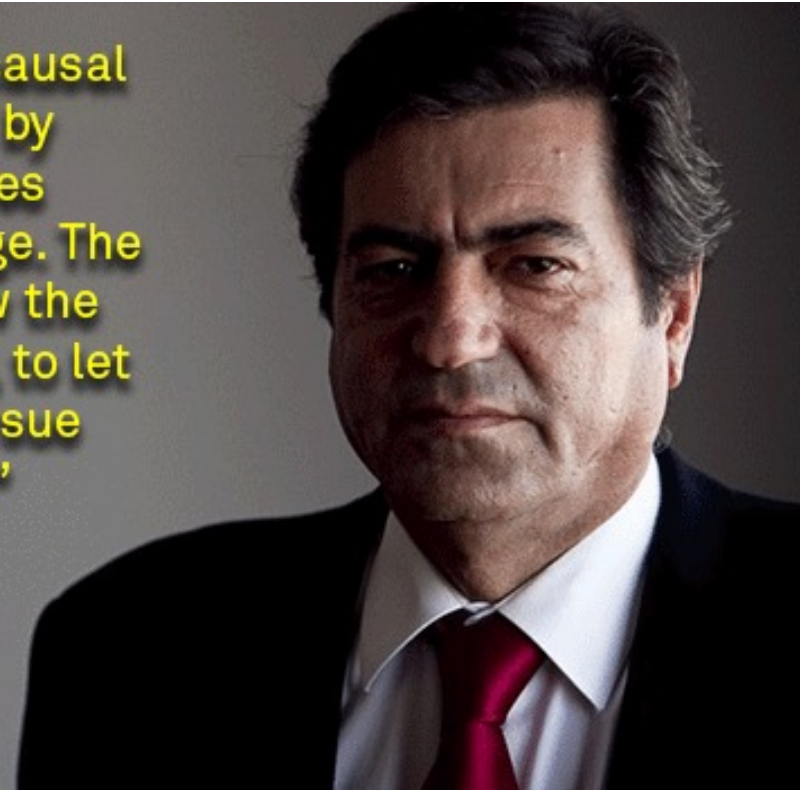
Global Decriminalization

- Personal possession of “small quantities” decriminalized, often only bearing administrative penalties/fines instead
 - Armenia
 - Chile
 - Colombia
 - Costa Rica
 - Croatia
 - Czech Republic
 - Ecuador
 - Estonia
 - Italy
 - Latvia
 - Netherlands (criminal, but non-prosecution policy)
 - Paraguay (people must register for drug use)
 - Peru
 - Portugal
 - Slovenia
 - Spain
 - Uruguay (never criminalized to begin with)

Portugal Decriminalization of All Drugs

“It’s very difficult to identify a causal link between decriminalisation by itself and the positive tendencies we’ve seen ... It’s a total package. The biggest effect has been to allow the stigma of drug addiction to fall, to let people speak clearly and to pursue professional help without fear.”

Dr João Goulão
Architect of Portugal’s
decriminalisation policy



transformdrugs.org/drug-decriminalisation-in-portugal-setting-the-record-straight/

O' Canada



Canada just legalized marijuana. That has big implications for US drug policy.

It's the second country in the world to legalize pot, following Uruguay.

By German Lopez | @germanrlopez | german.lopez@vox.com | Updated Jun 20, 2018, 8:05am EDT

f   SHARE



Marijuana in Mexico

The New York Times

A Green Wave? Mexico's Marijuana Market May Be Middling

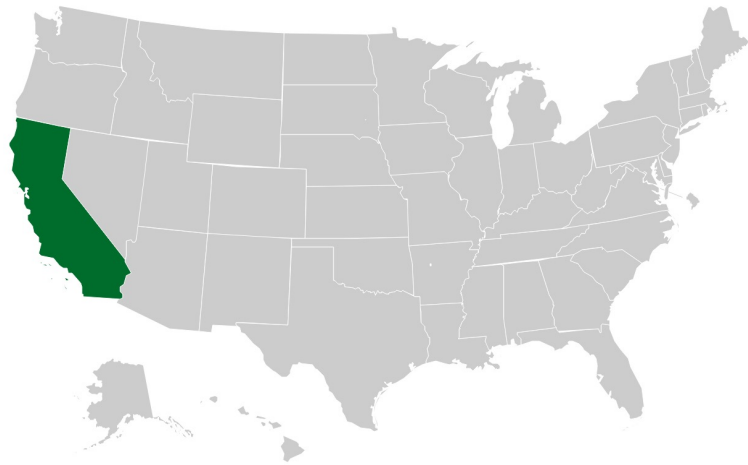
Lawmakers in Mexico are on the verge of legalizing marijuana, but economists and industry analysts warn against expecting much monetary benefit.



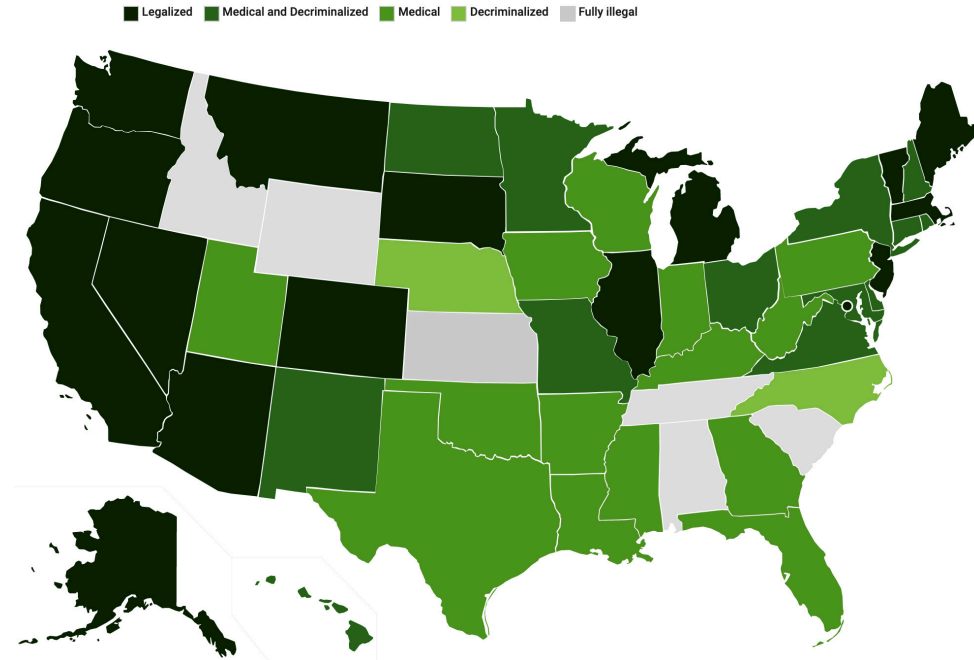
www.nytimes.com/2021/03/12/world/americas/mexico-marijuana-legalization.html

Marijuana America

- <https://disa.com/map-of-marijuana-legality-by-state>



1996



2021

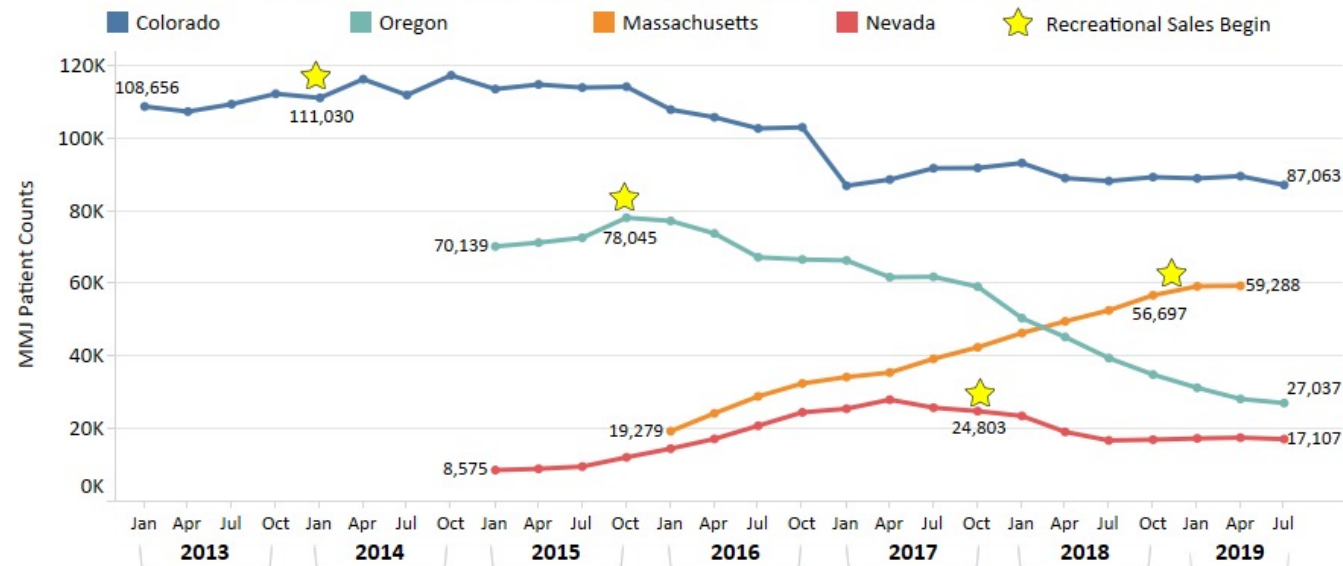
Recreational Legalization Impact on “Medical “



Chart of the Week

Marijuana Business Daily®

Impact of Legalizing Recreational Marijuana on
MMJ Patient Counts In Colorado, Nevada, Massachusetts & Oregon



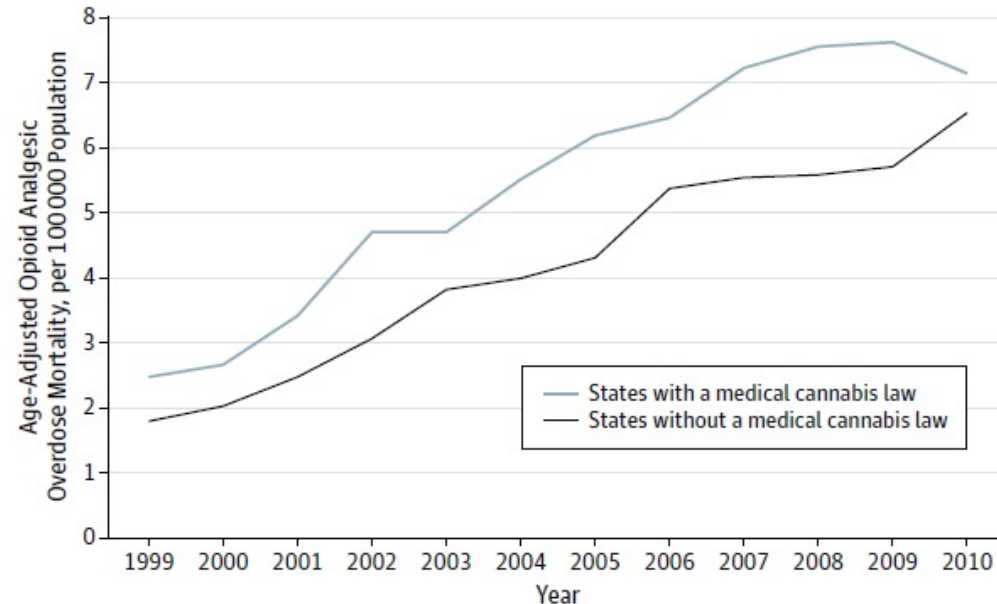
Source: Oregon Medical Marijuana Program, Colorado Marijuana Enforcement Division, Nevada Division Of Public and Behavioral Health, Massachusetts Medical Use of Marijuana Program
© 2019 Marijuana Business Daily, a division of Anne Holland Ventures Inc. All rights reserved.

mjbizdaily.com/charts/

Medical Cannabis vs Opioid Overdose Deaths

Medical Marijuana	
California	1996
Alaska	1998
Oregon	1998
Washington	1998
Maine	1999
Colorado	2000
Hawaii	2000
Nevada	2000
Montana	2004
Vermont	2004
Rhode Island	2006
New Mexico	2007
Michigan	2008
Arizona	2010
New Jersey	2010
Washington, DC	2010
10 of 16 < US Avg Opioid Overdoses	

Figure 1. Mean Age-Adjusted Opioid Analgesic Overdose Death Rate



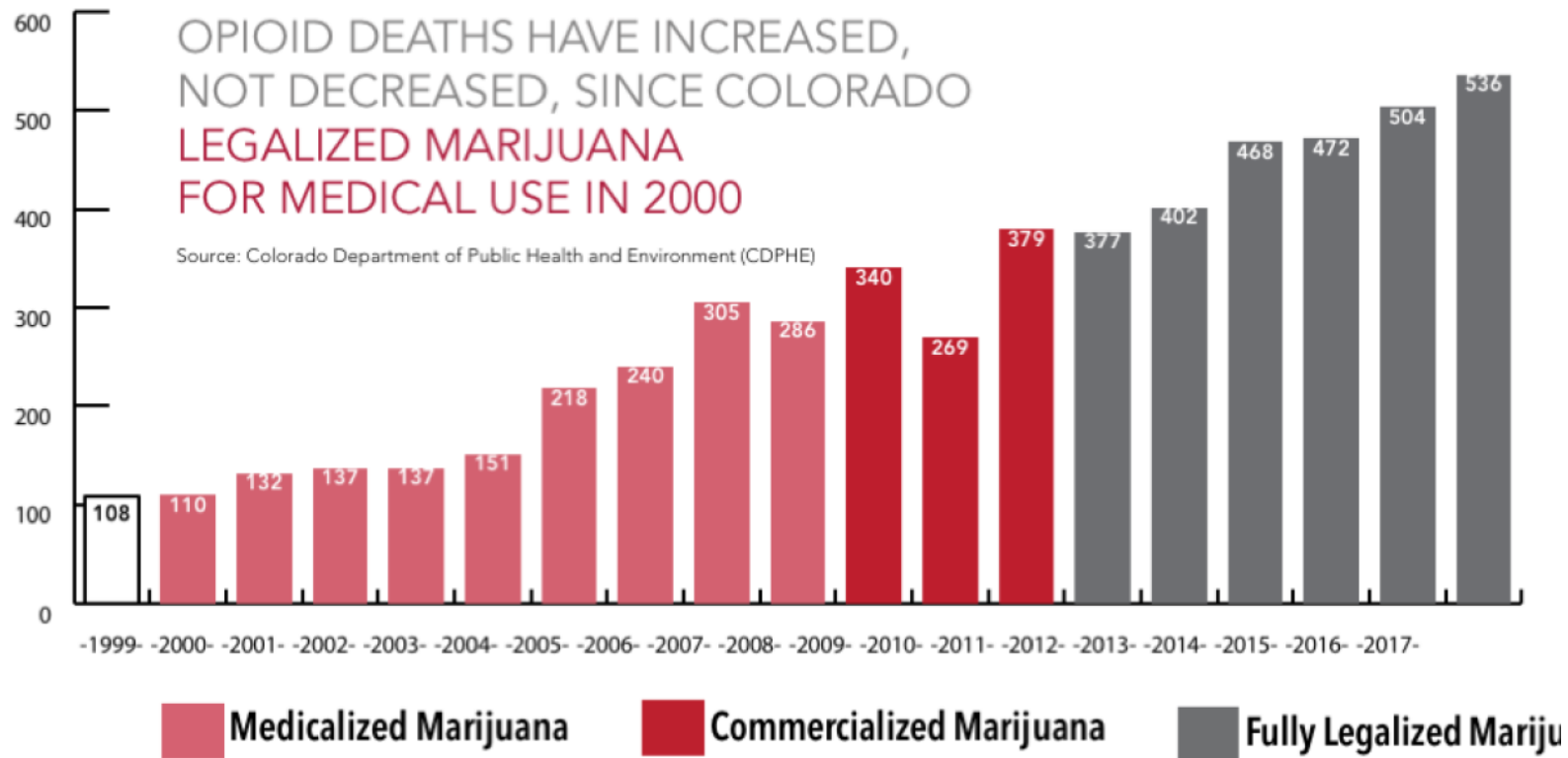
States passing a medical cannabis law experienced a 22.7% increase in opioid overdose deaths²



1. Bachhuber. *JAMA Intern Med.* 2014;174(10):1668-1673.

2. Shover. *PNAS.* 2019;1073(10):1-3.

Medical/Recreational Cannabis vs Opioid Overdose Deaths



Observation Does Not Always Correlate to Causation

Colorado Department of Public Health and Environment. Monitoring Health Concerns Related to Marijuana in Colorado. 2016.

Food for Thought...

Perhaps a Brownie?

- 50 years from now, will society exclusively blame healthcare professionals for increased marijuana emergency room visits due to prescribing FDA-approved cannabinoids and/or “medical” marijuana?
- Or would the ever increasing THC concentrations of general commerce (not the healthcare system) be an incredibly larger proportion of the causes?

Research

Original Investigation

The Changing Face of Heroin Use in the United States
A Retrospective Analysis of the Past 50 Years

Theodore J. Cicero, PhD; Matthew S. Ellis, MPE; Hilary L. Surratt, PhD; Steven P. Kurtz, PhD

75% of Heroin Users Started with Prescription Opioids (Source???)

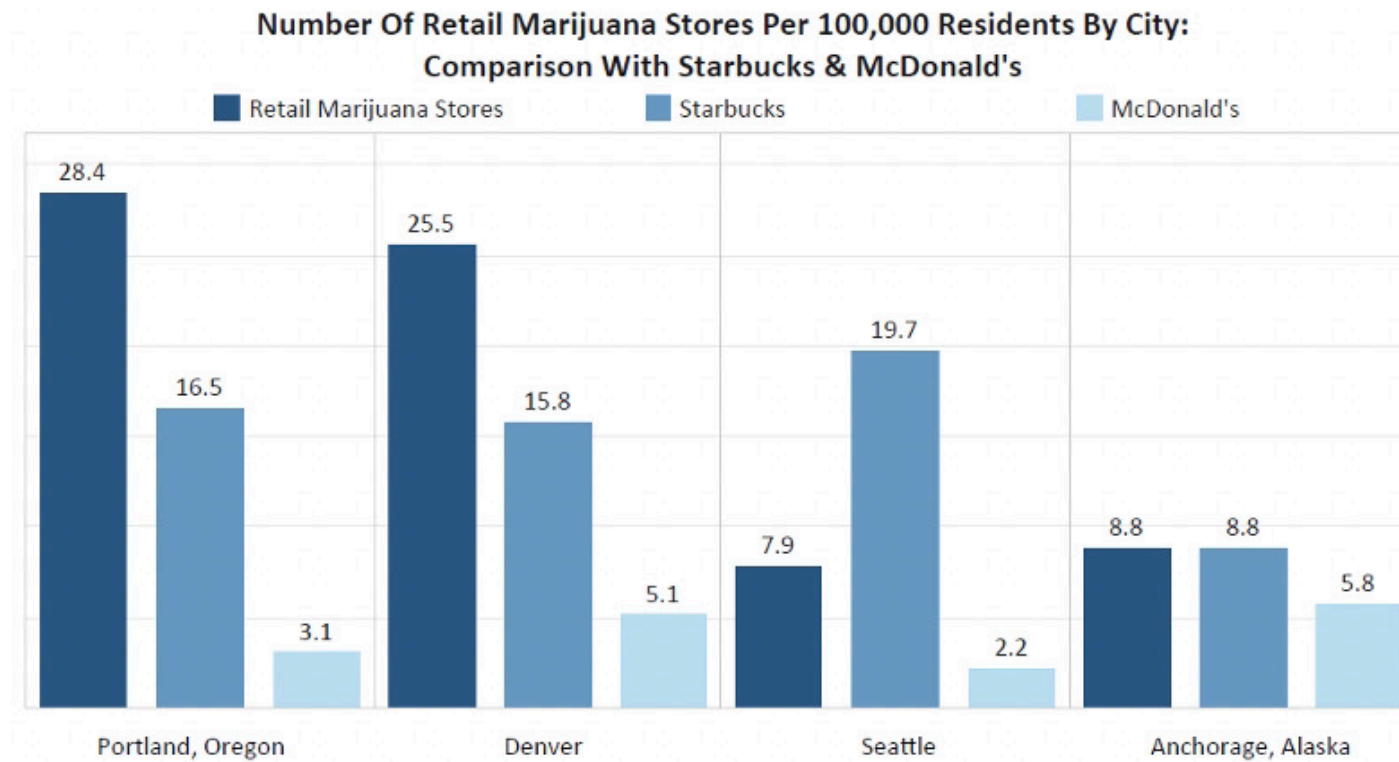




Cannabis Cash Crop

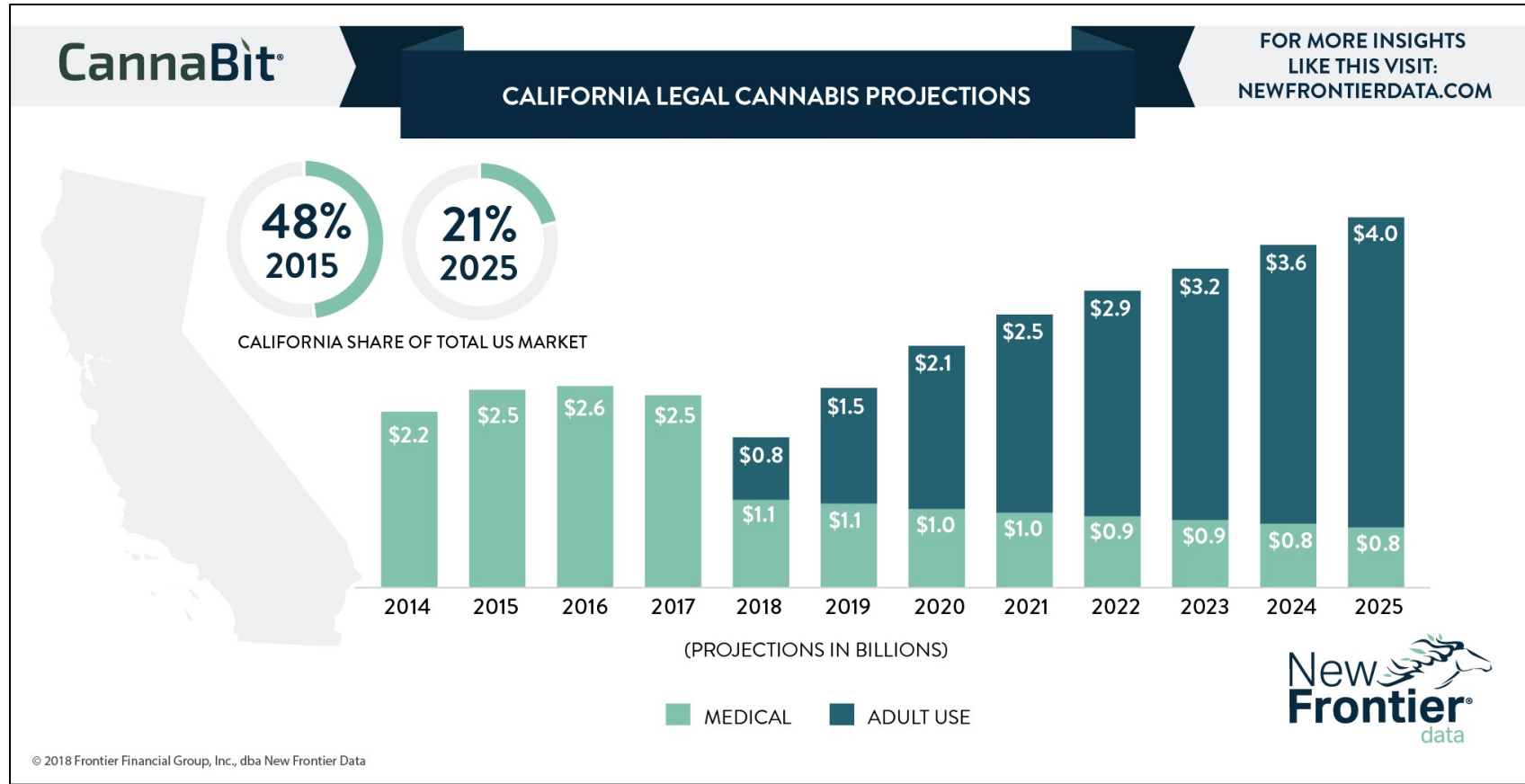
www.bloomberg.com/news/articles/2019-07-18/booming-demand-for-cbd-is-making-hemp-the-cannabis-cash-crop.

Venti McCannabis



mjbizdaily.com/marijuana-store-density-surpasses-starbucks-and-mcdonalds-in-many-mature-cannabis-markets/

Cannabis Taxes



www.fool.com/investing/2019/02/24/californias-marijuana-tax-revenue-badly-misses-the.aspx

Cannabis Taxes

California's Marijuana Tax Revenue Badly Misses the Mark

Pot tax revenue was nearly 50% lower than initial projections in California's first year of recreational weed sales.



 **Sean Williams** (TMFUltraLong)

 Updated: Apr 18, 2019 at 4:31PM

 Published: Feb 24, 2019 at 11:41AM

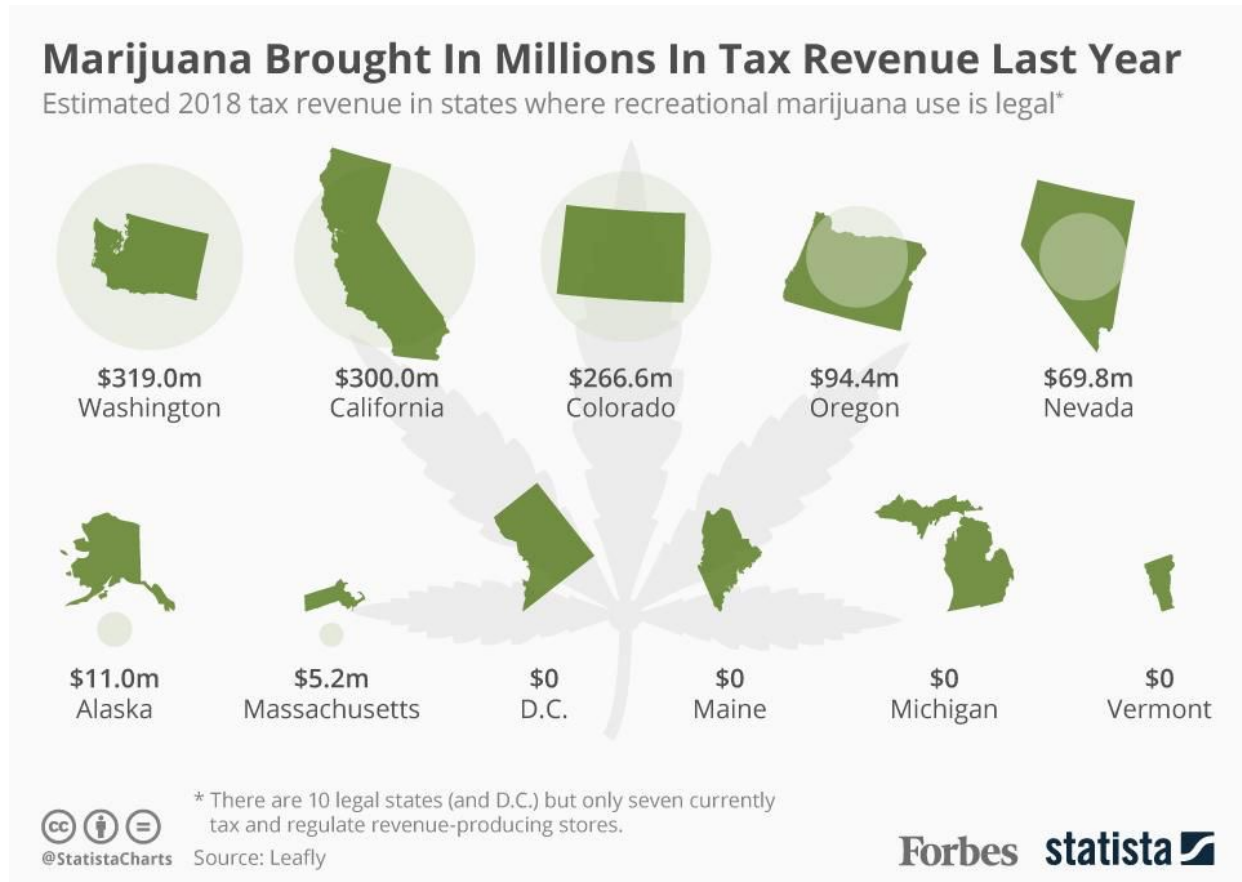
 [Author Bio](#)



www.fool.com/investing/2019/02/24/californias-marijuana-tax-revenue-badly-misses-the.aspx

Cannabis Taxes

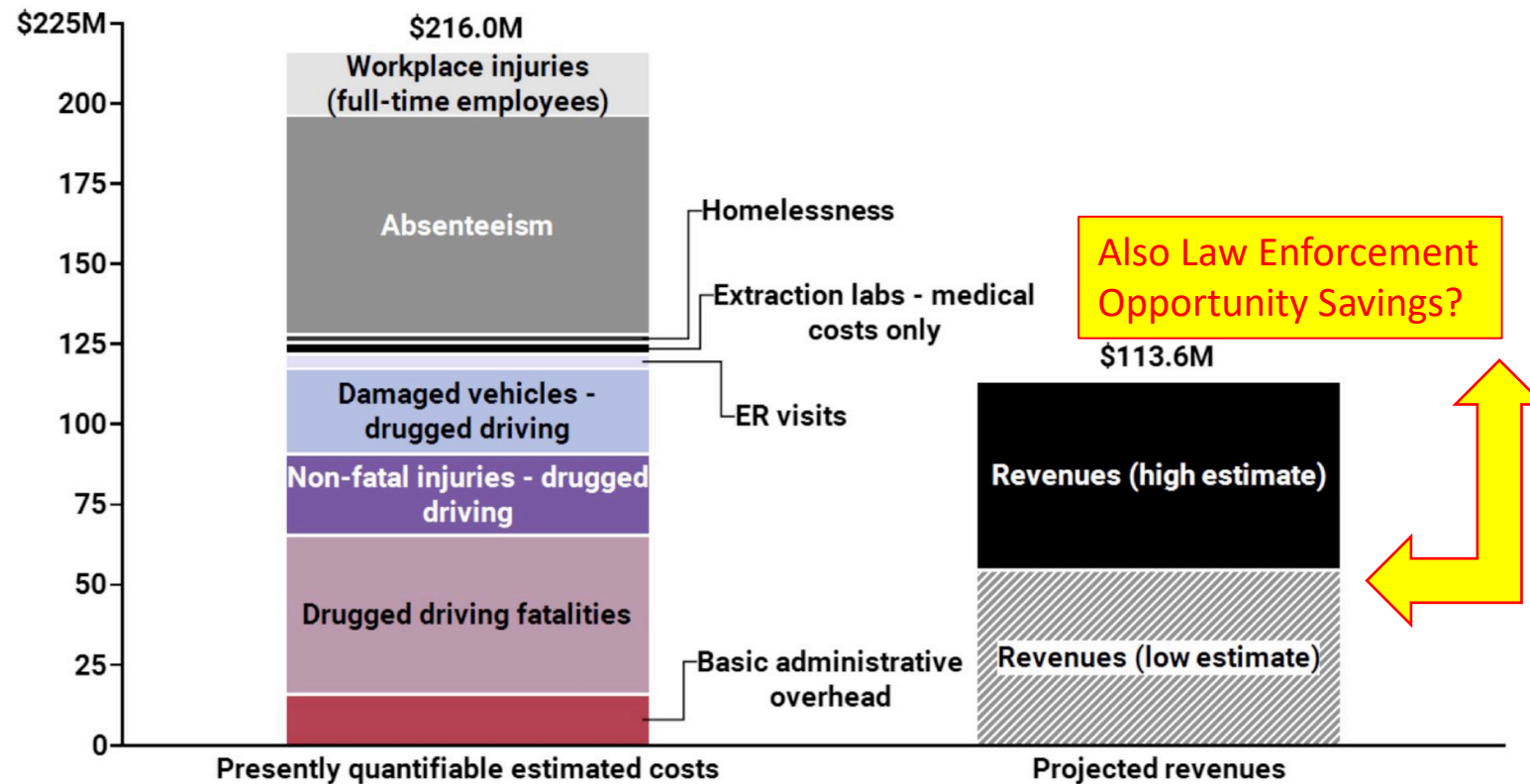
All States
<1% of Budget



www.forbes.com/sites/niallmccarthy/2019/03/26/which-states-made-the-most-tax-revenue-from-marijuana-in-2018-infographic/?sh=3c3d6bd07085

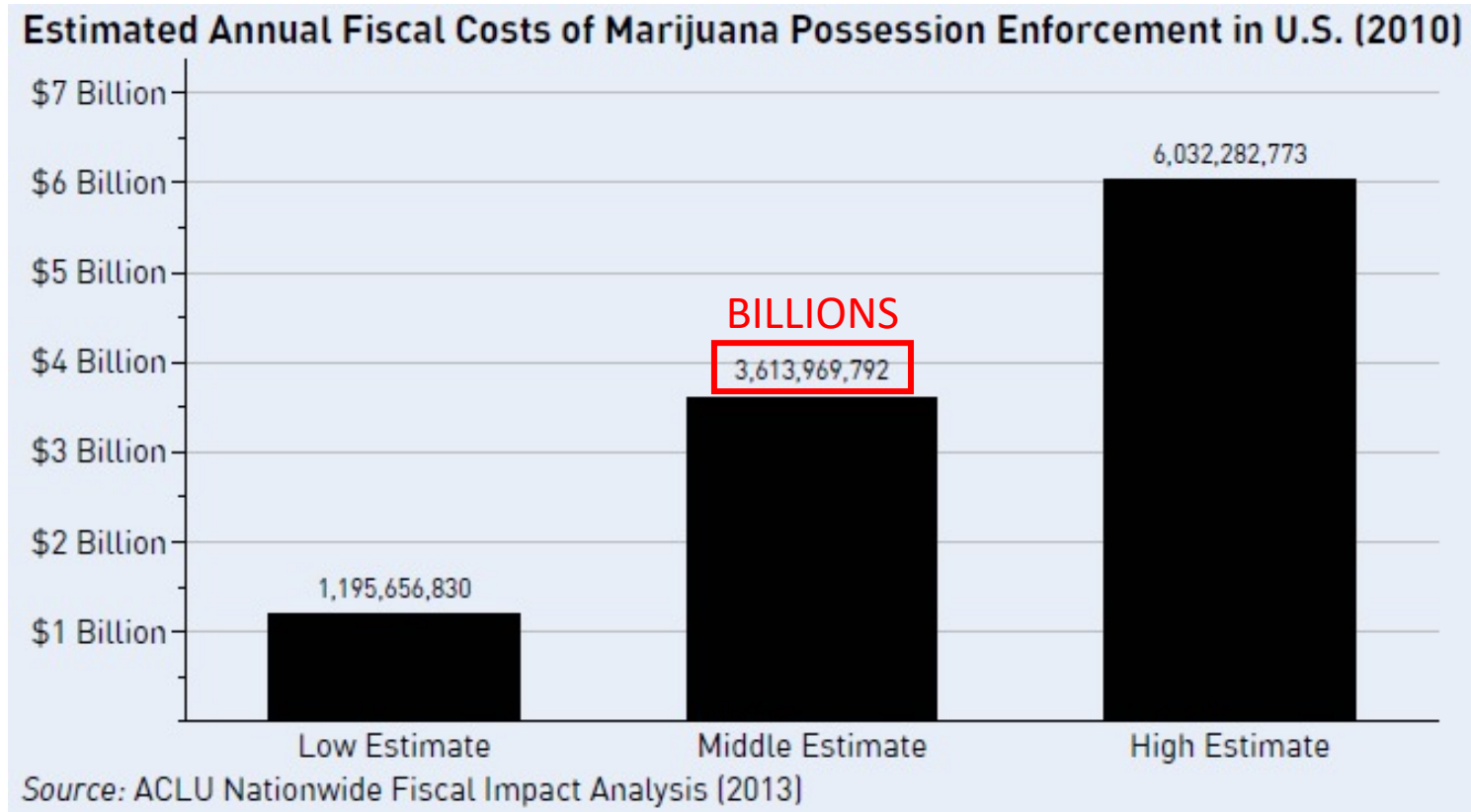
Connecticut Cannabis Costs vs Revenues

Estimated value for 2020
(in millions of 2016 dollars)



Connecticut Smart Approaches to Marijuana 2018 Report.

Marijuana Possession Enforcement Cost



Cannabis Rescheduling

NATURAL Controls???



Controlled Substances Classes

Controlled Substance Class	Criteria	Medications
Four (C4)	Medical Use Low Abuse Potential	tramadol & pentazocine/naloxone
Three (C3)	Medical Use Moderate Addiction Potential	buprenorphine, dihydrocodeine/APAP-ASA, & APAP/codeine
Two (C2)	Medical Use High Addiction Potential	tapentadol, morphine, hydrocodone, hydromorphone, oxycodone, oxymorphone, methadone, fentanyl, cocaine, & methamphetamine
One (C1)	No Accepted Medical Use High Addiction Potential	Diacetylmorphine (Heroin) Cannabis

www.deadiversion.usdoj.gov/schedules/

CSA Rescheduling Process Flow

- Congress passes legislation, or
- Petition/AG → HHS (FDA) → AG
- If rescheduling is deemed economically significant, then White House Office of Information & Regulatory Affairs & Office of Management & Budget also reviews (Executive Branch involvement)

A Sobering Volkow Thought...

- “Repeated marijuana use during adolescence may result in long-lasting changes in brain function that can jeopardize educational, professional, and social achievements.”
- “The effects of a drug (legal or illegal) on individual health are determined not only by its pharmacologic properties but also by its availability and social acceptability.”
- “Legal drugs (alcohol and tobacco) offer a sobering perspective, accounting for the greatest burden of disease associated with drugs, not because they are more dangerous than illegal drugs, but because their legal status allows for more widespread exposure.”

Substance	US Annual Deaths (Approx.)
“Drugs”	70,000
Alcohol	100,000
Tobacco	500,000
Marijuana	18

www.drugwarfacts.org/node/1854.

Volkow. *N Engl J Med*. 2014;370(23).

CDC, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released January, 2019.

Painweek.

ADVANCED EDUCATION

CERTIFICATION SERIES

CANNABINOIDS

A repeating pattern of cannabis leaves in a dark green color, serving as a background for the 'CANNABINOIDS' text.

Cannabis & Cannabinoids Policy & History

Mark Garofoli, PharmD, MBA, BCGP, CPE