


The Opioid Epidemic and Impacts in Colorado

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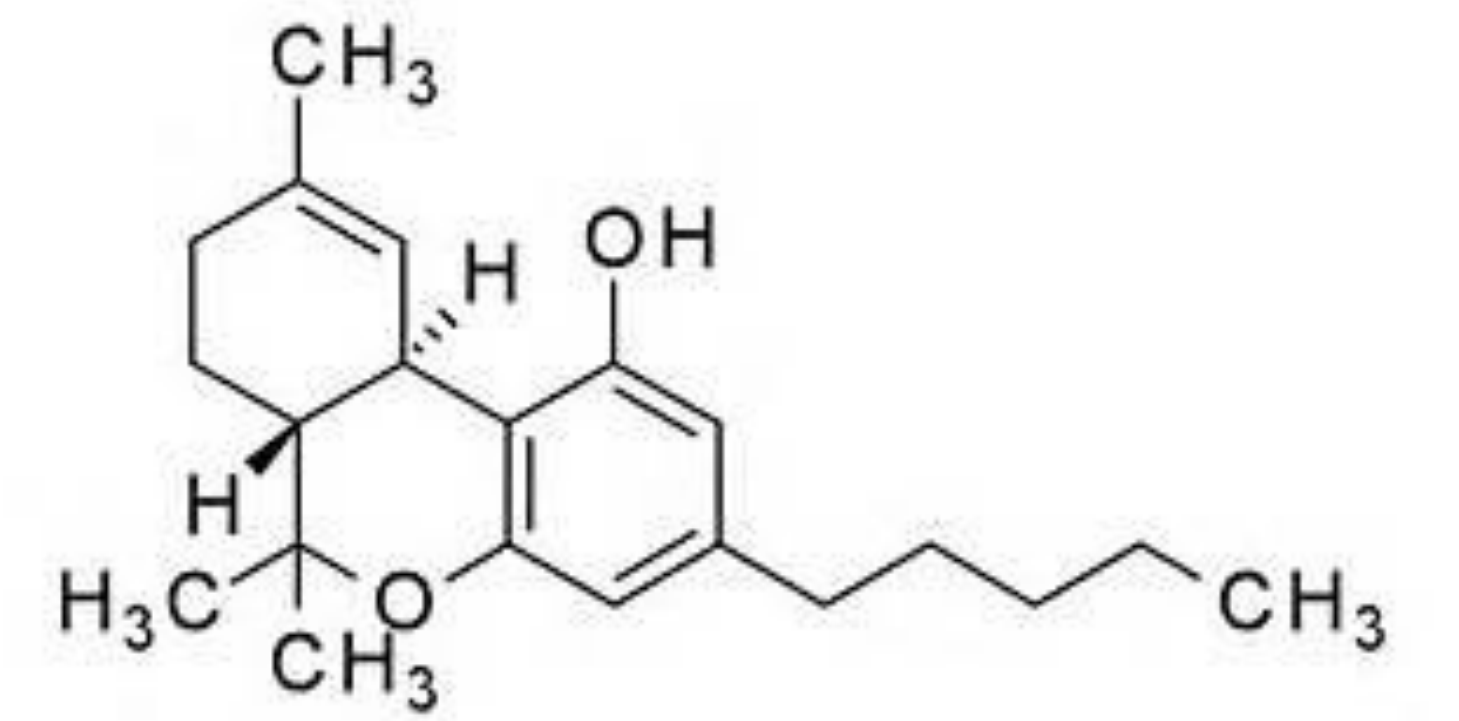
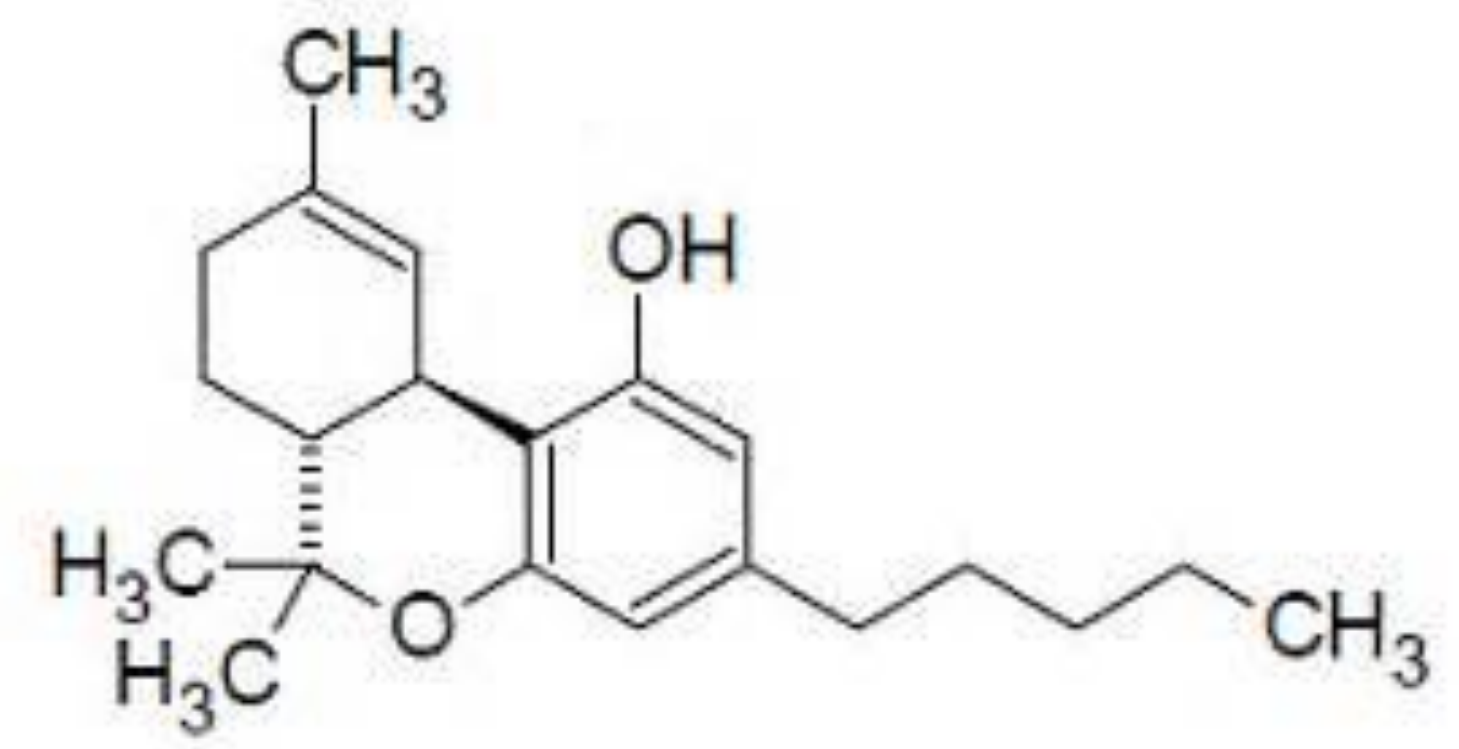
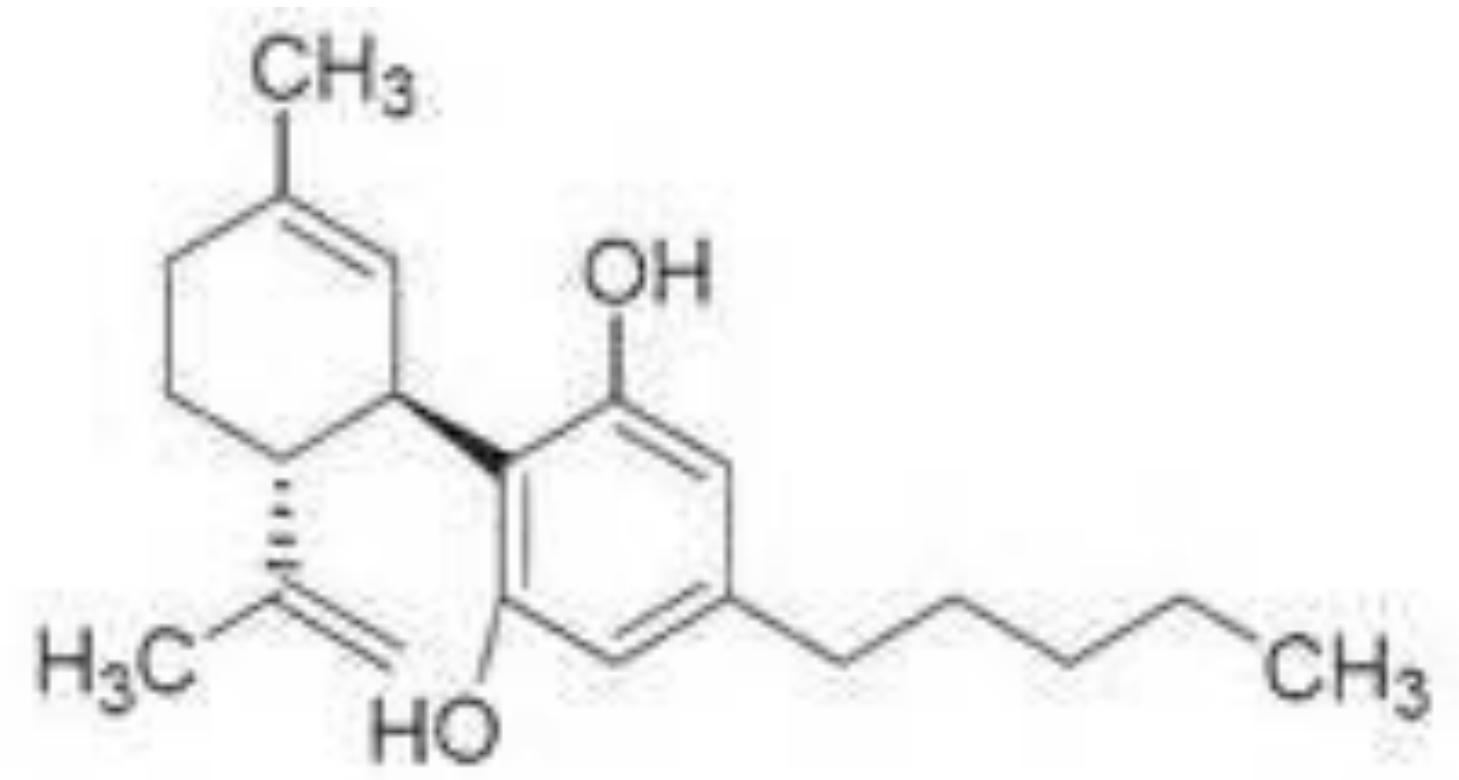
OPIOID EPIDEMIC

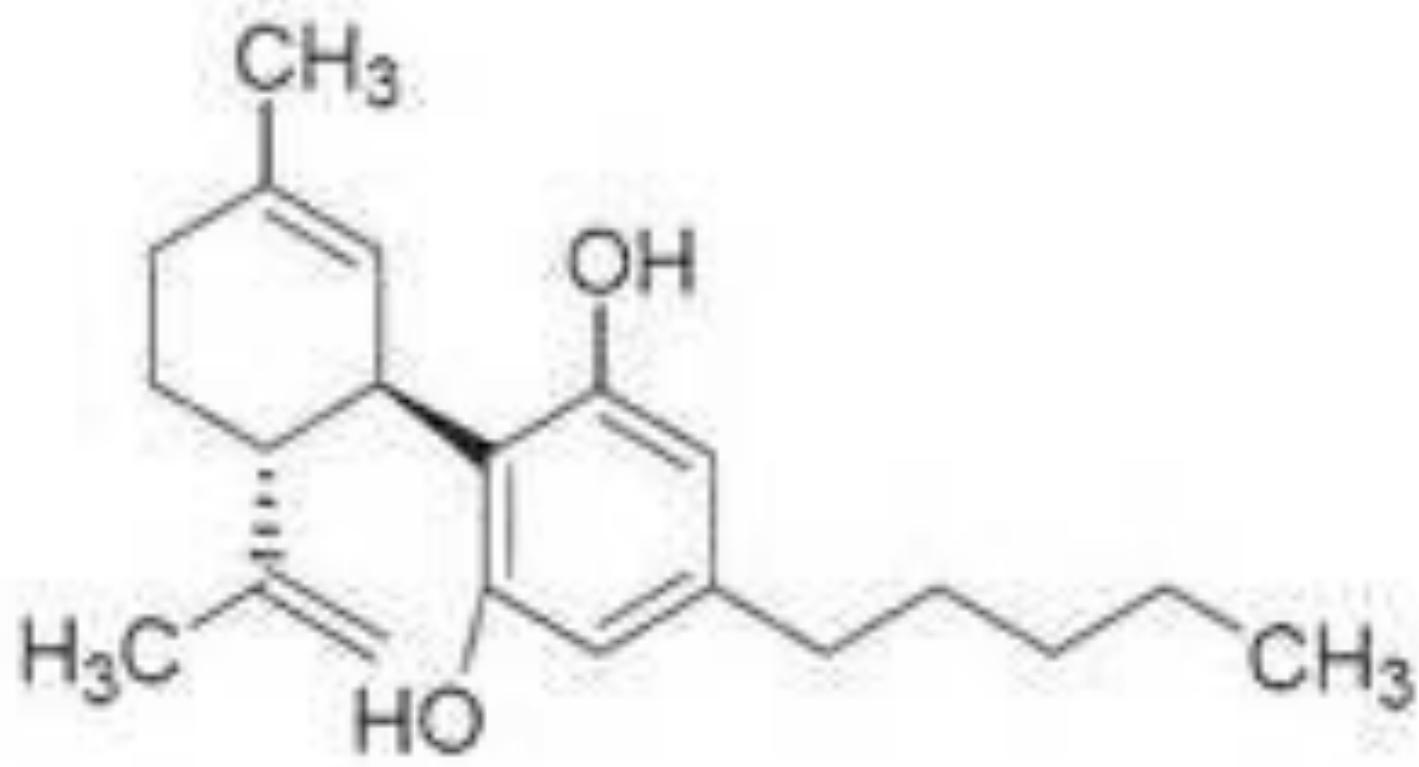
Endocannabinoid System

- CB1 receptor
- Primarily localized in the central nervous system
 - Brain and spinal cord
 - Multiple neurotransmitter effects
- Can be found in the peripheral nervous system

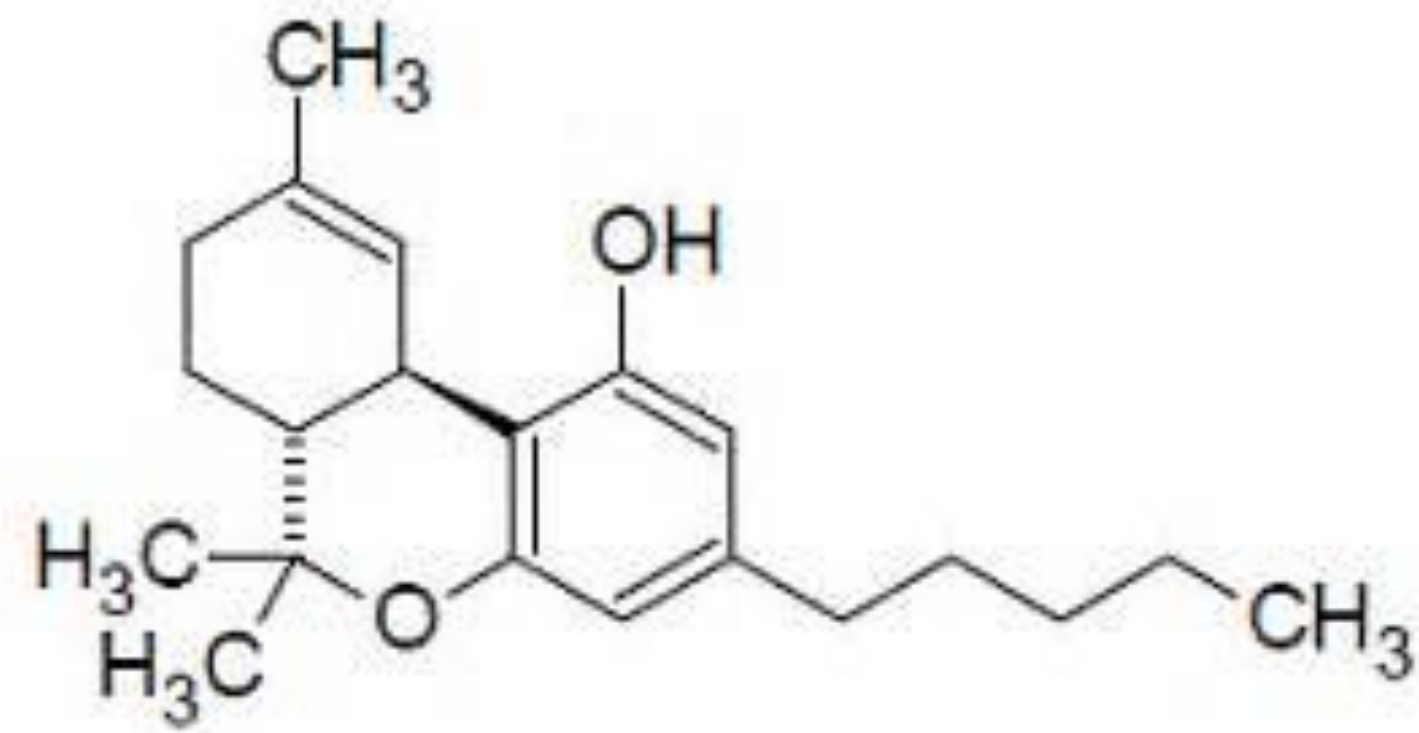
Endocannabinoid System

- CB2 receptor
 - Inflammation
 - Neuropathic pain
 - Cancer pain





CBD



Dronabinol



THC



Opioids and Cannabinoid Signaling

- **Synergistic systems**
- Both belong to the rhodopsin subfamily of **G-protein coupled receptors**
- Both, when activated, reduce cellular levels of cyclic adenosine monophosphate (**cAMP**) by inhibiting adenylyl cyclase

<https://www.tandfonline.com/doi/full/10.1080/24734306.2017.1392715>

Opioids and Cannabinoid Signaling

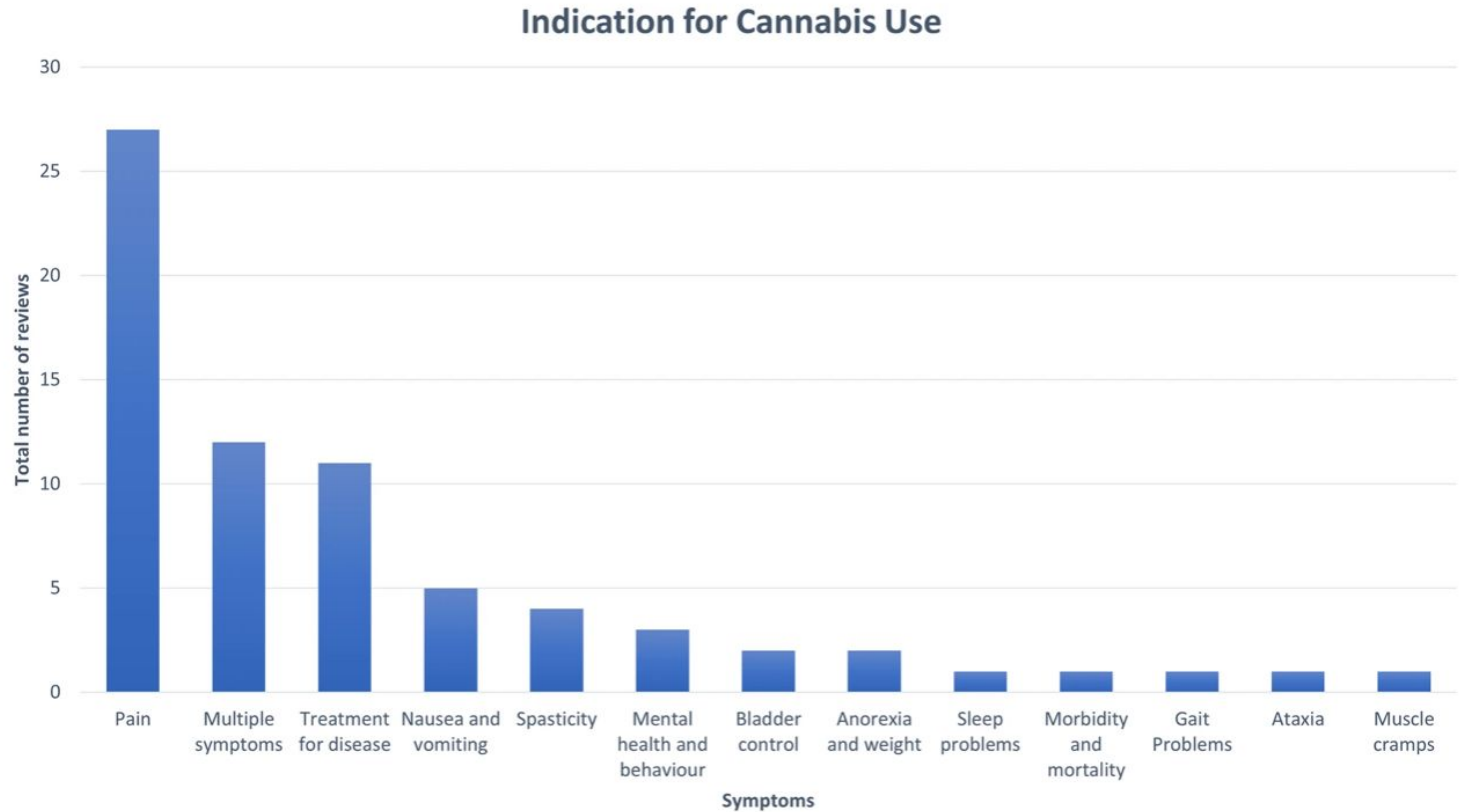
- Both receptors found at **presynaptic terminals**
- Both receptors co-localize in **GABA-ergic neurons**
- Both systems **share** pharmacologic profiles
- Sedation, antinociception, hypotension, hypothermia, decreased intestinal motility, drug-reward reinforcement
- Naloxone may have effects on the cannabinoid system in several animal models

Terminology

- Cannabis-based medication
 - Registered medicinal cannabis extracts with defined and standardized THC and THC/CBD content should be classified as ‘cannabis-derived’ or ‘cannabis-based’ medicines.
 - Examples: Epidiolex®, Sativex ®(natural); dronabinol (semi-synthetic); nabilone (synthetic)
- Medical cannabis
 - Cannabis plants and plant material, for example flowers, marijuana, hashish, buds, leaves or full plant extracts used for medical reasons.
 - Poorly regulated and poorly tested for contaminants

National Ambulatory Care Survey, 2016

- National Survey
- Why people see their doctor
- **Knee pain** the only pain diagnosis in top 20 reasons
- Others **not** in top 20: Back pain, Shoulder pain, Neck pain, Neuropathy, Headache, Fibromyalgia, Cancer, Seizure, other
- https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2016_namcs_web_tables.pdf



Indications for cannabis use across included reviews

Evidence

- 2014, JAMA Internal Medicine, Bachhuber: Medical cannabis laws are associated with **lower state-level opioid overdose** mortality rates
- 2015, JAMA, Whiting: evidence to **support** the use of cannabinoids for chronic pain (N=2,454; 28 studies)
- 2016, Health Affairs, Bradford: Medical Marijuana State Laws Associated With **Reduced Medicare Prescriptions**
- 2017, American Journal of Public Health, Livingston: Recreational Cannabis Legalization and **Opioid-Related Deaths** in Colorado, 2000–2015
- 2017, National Academies: **uncommon** pain conditions, nabiximols, synthetics, **not dispensary cannabis**

Evidence

- 2018, American Journal of Psychiatry, January, Olfson: Cannabis use **increases** risk of opioid use disorder and non-medical opioid use (N=34,000)
- 2018, JAMA Internal Medicine, Bradford: Association Between US State Medical Cannabis Laws and **Opioid Prescribing** in the Medicare Part D Population
- 2018, Journal of Addiction Medicine, April, Caputi: MMJ users are **more likely** to use prescription drugs medically and non-medically
- 2018, European Pain Federation, June: Do not prescribe cannabis-based medicines to patients taking high doses of **opioids or benzodiazepines** and **no products > 12.5%** THC
- 2018, Lancet Public Health, Australian Study, July: **No evidence** that cannabis use **reduced pain severity** or exerted **opioid sparing effect**

Evidence

- 2018, Journal of Pain, October: **Unlikely** that cannabinoids are highly effective medicines for chronic non-cancer pain (N=9,958)
- 2019, JAMA, Columbia University, July, Segura: People **do not** substitute marijuana for prescription opioids
- 2019, PNAS, Stanford University, July, Shover: States with medical marijuana laws have seen a 23% **INCREASE** in opioid overdose deaths
- 2019, University of Houston, August, Rogers: Adults who mix cannabis with opioids for pain report **higher levels** of anxiety and depression
- 2019, Pain Medicine, September, Nugent: Legalizing marijuana has **contributed** to the national opioid mortality epidemic

Evidence

- 2019, J Pain, September, Boehkne; **High frequency medical cannabis** use is associated with **worse pain** among individuals with chronic pain
- 2019, BMC, December, Pratt; **Results** from the included reviews were **mixed**, with most reporting an **inability to draw conclusions** due to **inconsistent findings** and a **lack of rigorous evidence**.
- 2020, BMJ, Palliative and Supportive Care, February, Boland: For adults with advanced cancer, the addition of cannabinoids to opioids **did not** reduce cancer pain
- 2020, Int. J. Drug Policy, February, Cooke: Individuals with **high pain** are more likely to consume cannabis **multiple times a day**
- 2020, Neurosurgery, March, Kim: There is currently a **paucity of clinical data** supporting the use of cannabinoids in the treatment of back pain

Evidence

- 2020, Pain Medicine, March, Sturgeon: Patients who reported ongoing cannabis use tended toward **greater levels of pain intensity**, emotional distress, social isolation, fatigue, pain catastrophizing, sleep disturbance
- 2020, Drug and Alcohol Dependence, Wadekar: The **dominant predictor** of OUD is **first use of marijuana before the age of 18 years**
- 2020, Elsevier, April, Babalonis: Current data **does not strongly support** the use of cannabinoids for chronic pain nor do prospective studies demonstrate significant cannabinoid mediated **opioid-sparing effects**.

Evidence

- 2020, October, Turna; Comprehensive Psychiatry; Of all medical users, only **23.4%** reported authorization from a **health professional**
- Medical users modally reported **daily use**
- Compared to recreational users, medical users reported **more problematic cannabis use** in addition to greater psychiatric symptomatology (anxiety, depression and trauma)
- A large majority of **medical users also reported using recreationally (80.6%)**, while exclusive medical use was **less common (19.3%)**

Comprehensive Psychiatry 102 (2020)

Evidence

- 2020, December; J. Clinical Anesthesia
- Increased **anesthesia requirements** for marijuana users undergoing surgery for tibial fracture
- Marijuana users had **higher pain scores** in recovery
- Marijuana users received **58% more opioids per day** while in the hospital

Holmen, I., Beach, J., Kaizer, A.; The association between preoperative cannabis use and intraoperative inhaled anesthetic consumption: A retrospective study

Evidence

- 2019, Pratt; Systematic review of systematic reviews
 - 72 systematic reviews were included.
 - Results from the included reviews were mixed, with most reporting an **inability to draw conclusions** due to inconsistent findings and a lack of rigorous evidence.
 - Mild **harms were frequently reported**, and it is possible the **harms** of cannabis-based medicines **may outweigh benefits**

Evidence

- 2020, Campeny; Systematic review of systematic reviews
- 44 systematic reviews, including 1,053 different studies, were eligible for inclusion.
- Evidence shows a **clear association** between cannabis use and psychosis, affective disorders, anxiety, sleep disorders, cognitive failures, respiratory adverse events, cancer, cardiovascular outcomes, and gastrointestinal disorders
- Cannabis use is a **risk factor** for motor vehicle collision, suicidal behavior and partner and child violence.

Evidence

- 2021, International Association for the Study of Pain
- Due to the **lack of high-quality clinical evidence**, IASP does not currently endorse general use of cannabis and cannabinoids for pain relief.
- 2021, Australian and New Zealand College of Anaesthetists, Faculty of Pain Medicine
- The evidence available is either **unsupportive** of using cannabinoid products in chronic non-cancer pain (CNCP), or is of **such low quality** that no valid scientific conclusion

https://journals.lww.com/pain/Citation/9000/International_Association_for_the_Study_of_Pain.98086.aspx

<https://www.choosingwisely.org.au/recommendations/fpm6>

Evidence

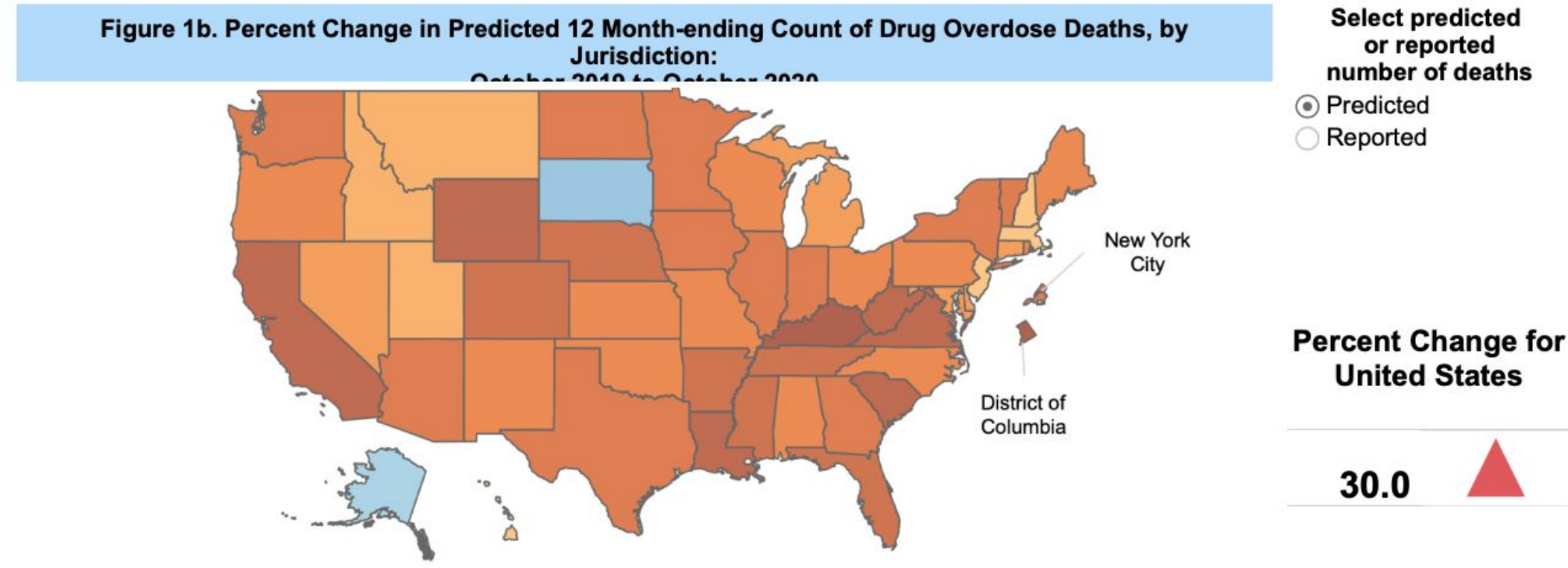
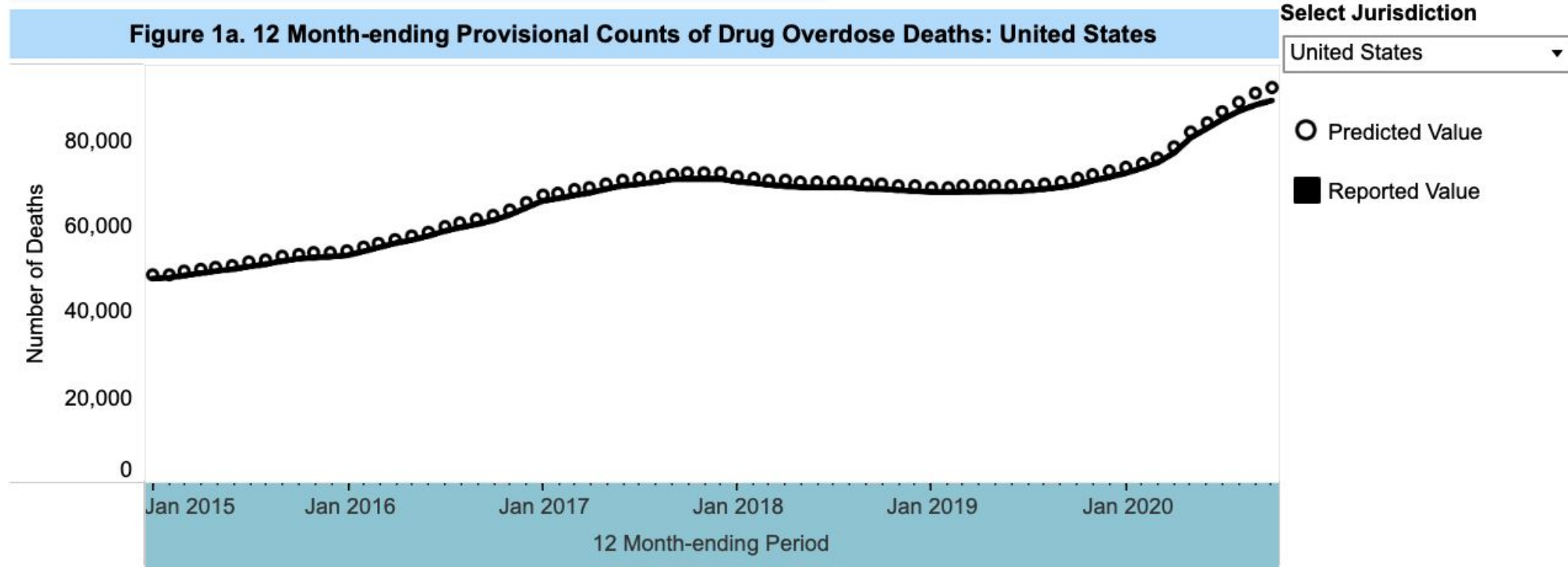
- March 2021; Chiu; Spine; Cannabis Abuse and **Perioperative Complications** Following Inpatient Spine Surgery in the United States
- N=2,393; statistically significant **higher rates** of perioperative thromboembolism, respiratory complications, neurologic complications such as stroke and anoxic brain injury, septicemia/sepsis, and non-routine discharge, as well as increased lengths of stay and hospitalization charges (\$137,631.30 vs. \$116,112.60).

Cannabinoid Use in the Preoperative Period

- Mar/Apr 2021; Finn
- Outlines peri-operative issues related to use of marijuana before and after spine surgery intervention, drug interactions with inhaled and injected anesthetics, concerns regarding pain control post-operatively, concomitant use of opioids and cannabinoids

12 Month-ending Provisional Number of Drug Overdose Deaths

Based on data available for analysis on: **5/2/2021**



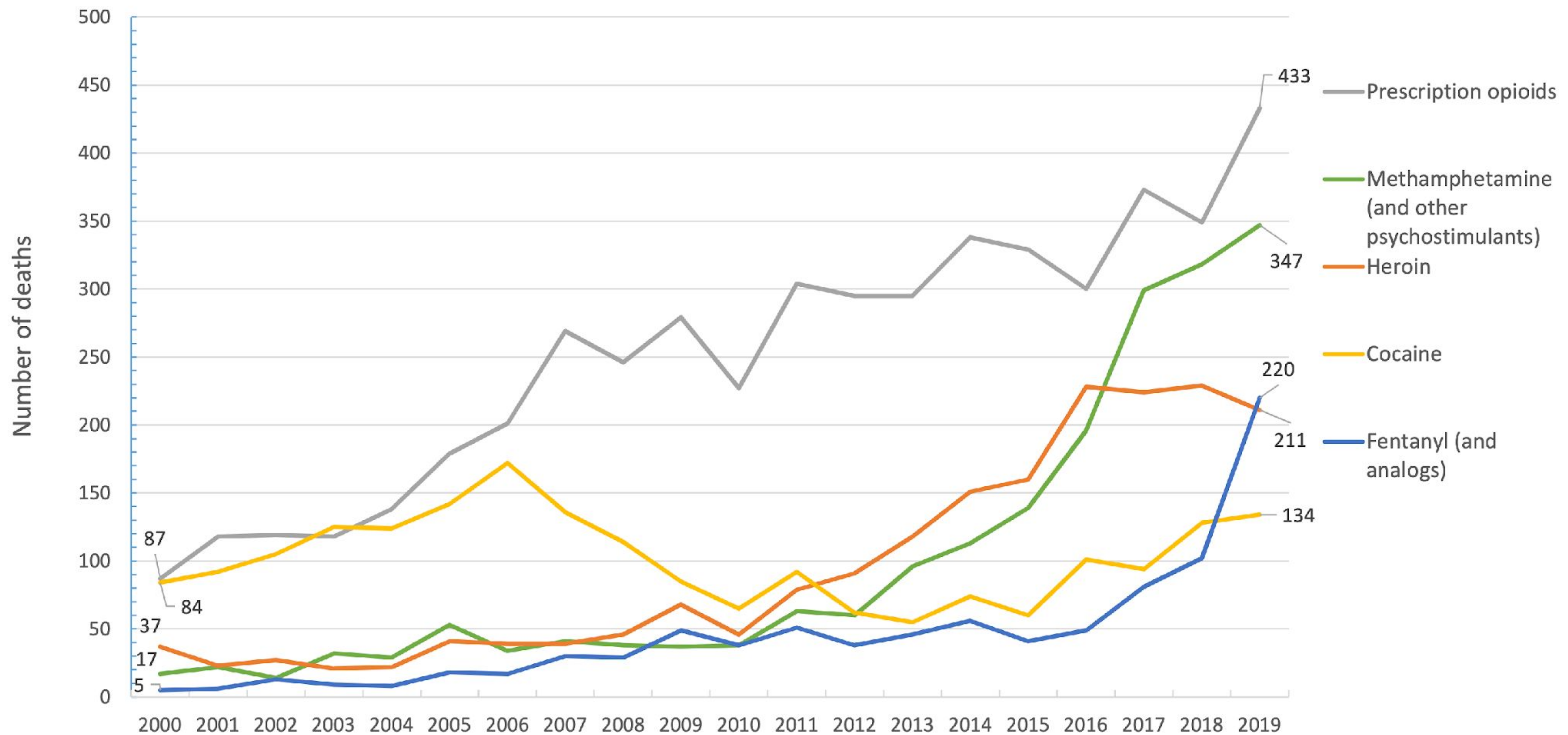
NOTES: *Reported* provisional counts for 12-month ending periods are the number of deaths received and processed for the 12-month period ending in the month indicated. Drug overdose deaths are often initially reported with no cause of death (pending investigation), because they require lengthy investigation, including toxicology testing. Reported provisional counts may not include all deaths that occurred during a given time period. Therefore, they should not be considered comparable with final data and are subject to change. *Predicted* provisional counts represent estimates of the number of deaths adjusted for incomplete reporting (see **Technical notes**).

Deaths are classified by the reporting jurisdiction in which the death occurred. Percent change refers to the relative difference between the reported or predicted provisional numbers of deaths due to drug overdose occurring in the 12-month period ending in the month indicated compared with the 12-month period ending in the same month of the previous year. Drug overdose deaths are identified using ICD-10 underlying cause-of-death codes: X40–X44, X60–X64, X85, and Y10–Y14.

Drug overdose deaths in the United States rose by an estimated 29% between September 2019 and September 2020 to **90,237**

<https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm#dashboard>

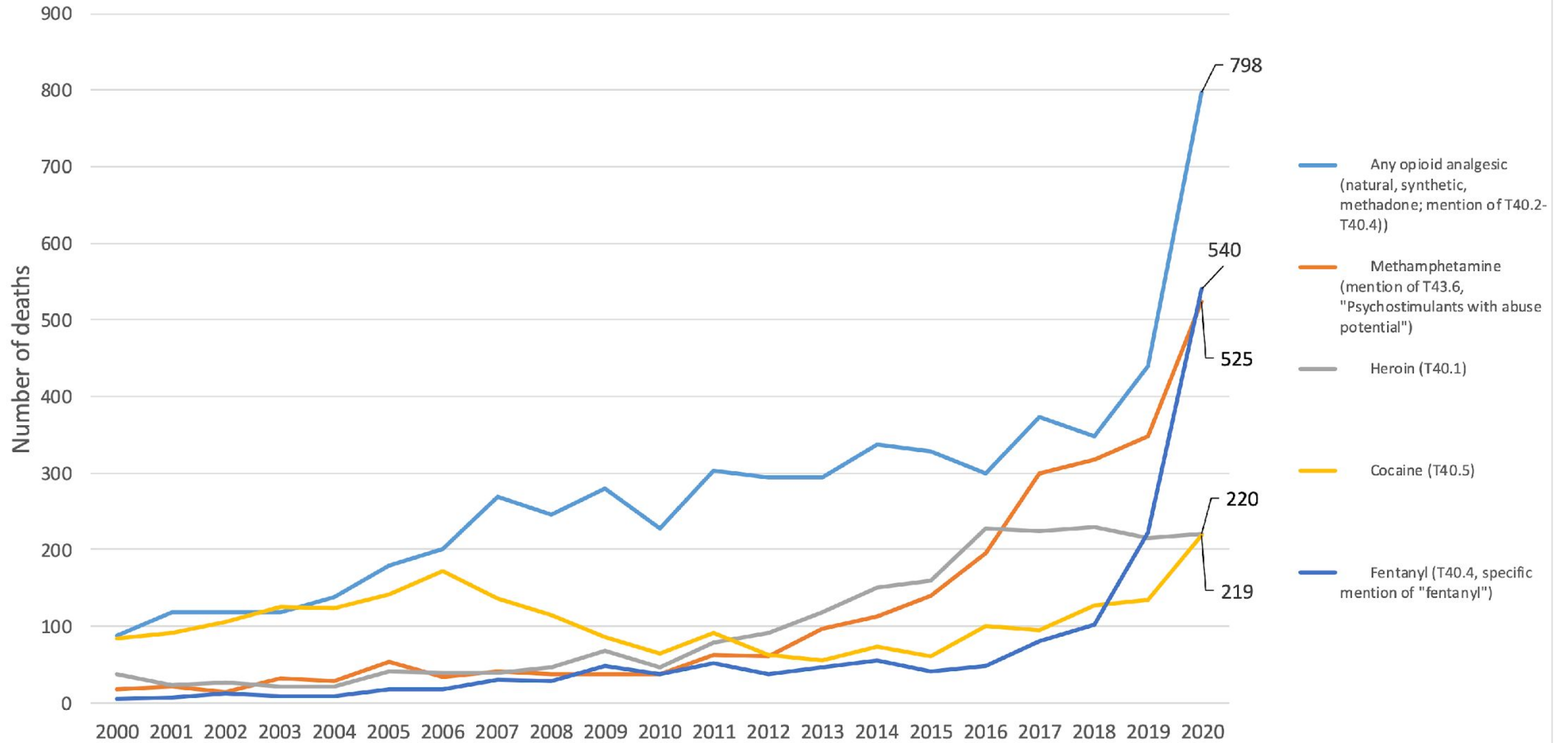
Number of drug overdose deaths by substances mentioned: Colorado residents, 2000-2019



Source: Vital Statistics Program, Colorado Department of Public Health and Environment

2019 data shows a **24% increase** (433 total) in prescription opioid overdose deaths and **115% increase** (220 total) in fentanyl deaths

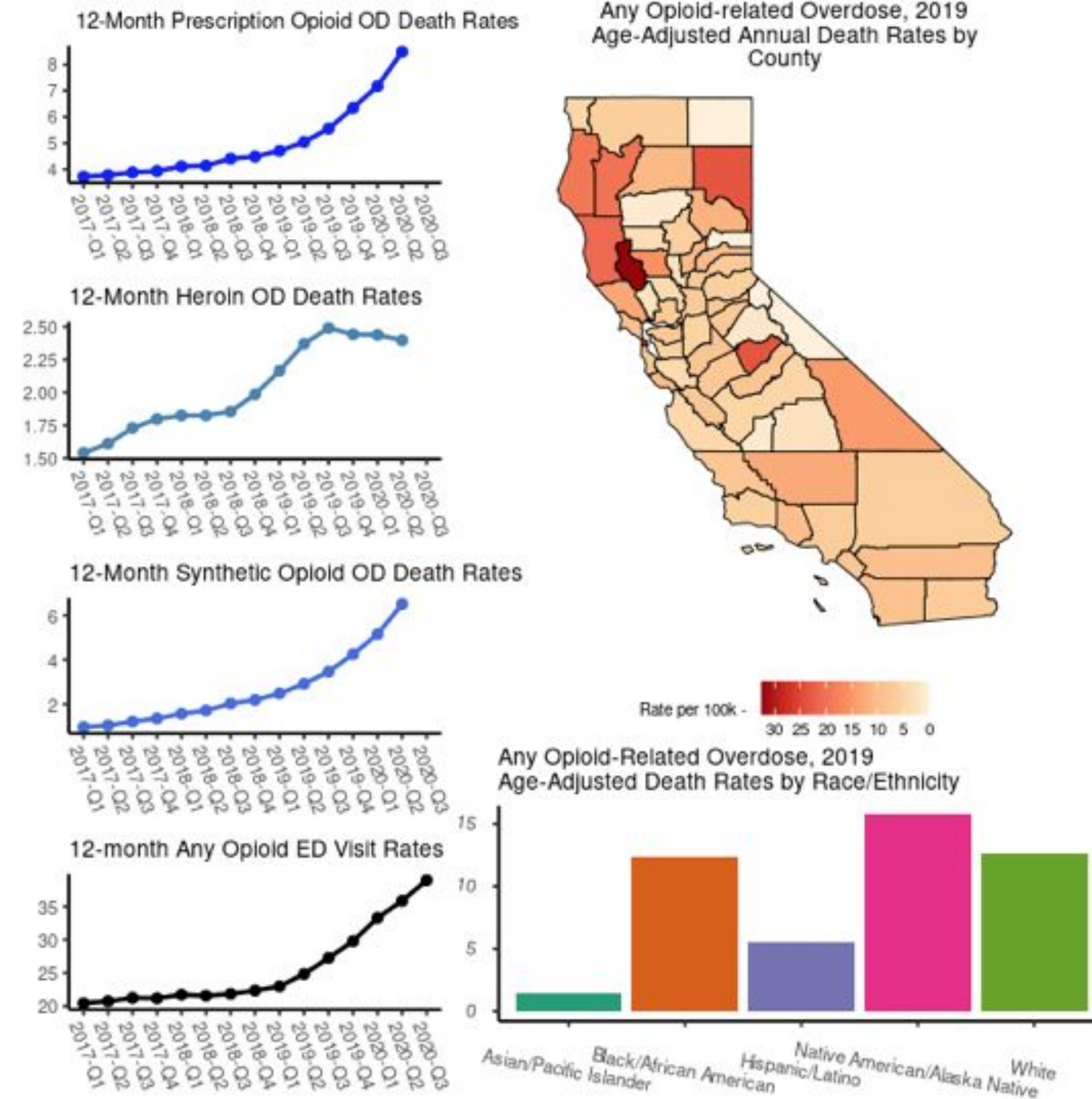
Number of drug overdose deaths by substances mentioned: Colorado residents, 2000-2020



Source: Vital Statistics Program, Colorado Department of Public Health and Environment

Report downloaded 05-04-2021

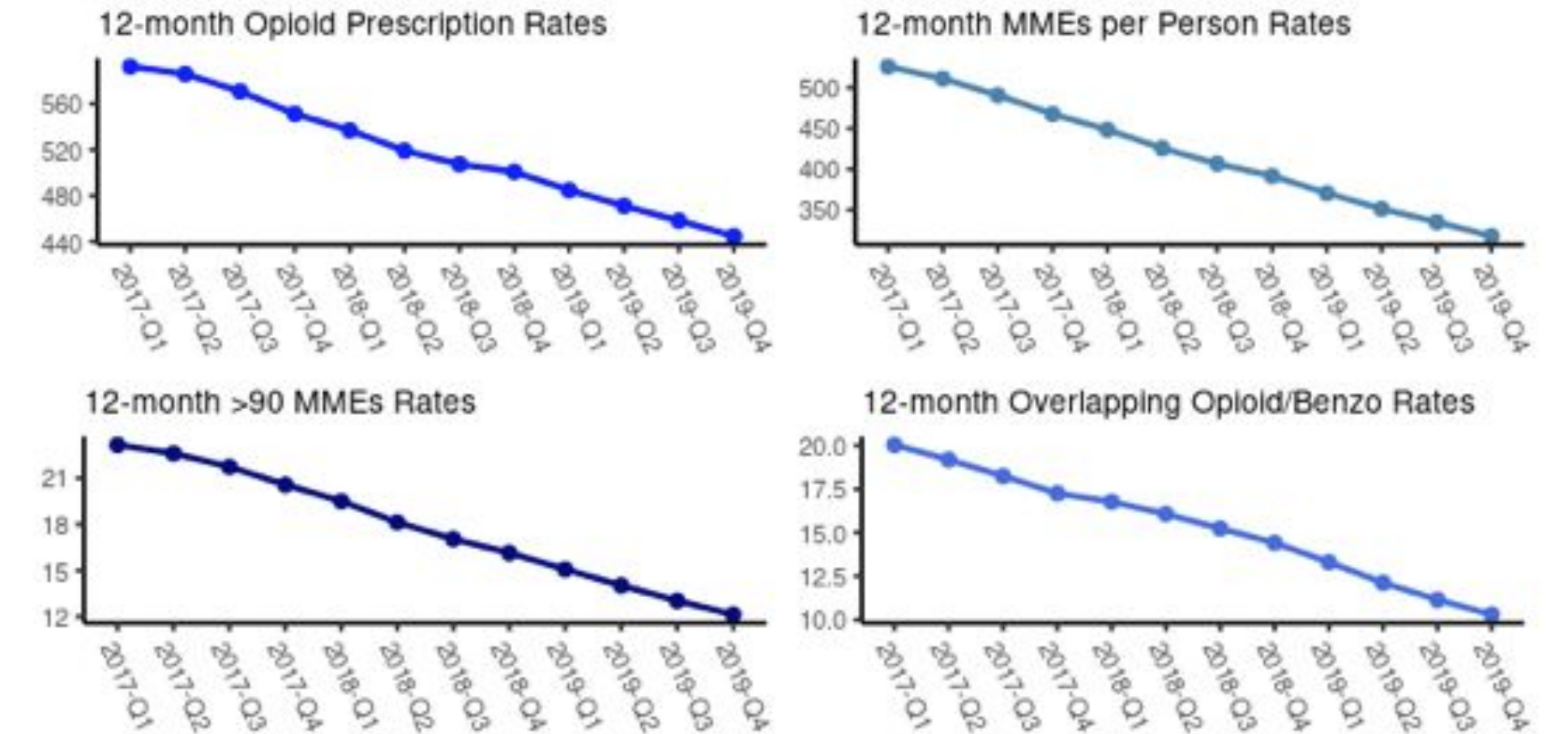
California experienced 3,244 opioid-related overdose deaths in 2019, the most recent calendar year of data available. The annual crude mortality rate for 2019 was 8.21 per 100k residents. This represents a 48% increase from 2017. The following charts present 12-month moving averages for selected opioid indicators (prescription-, heroin-, and synthetic opioid-related overdose deaths, and ED visits related to any opioid) and include trend data for 2020*. The map displays the annual county level age-adjusted rates for any opioid-related overdose deaths. Synthetic overdose deaths may be largely represented by fentanyl.



Footnotes: *Trend data for most recent year may be preliminary and may not be available for all data sources. 12-month rates are based on moving averages; OD = Related Overdose. Report produced by the California Opioid Overdose Surveillance Dashboard - <https://cdph.ca.gov/opioidsdashboard/>

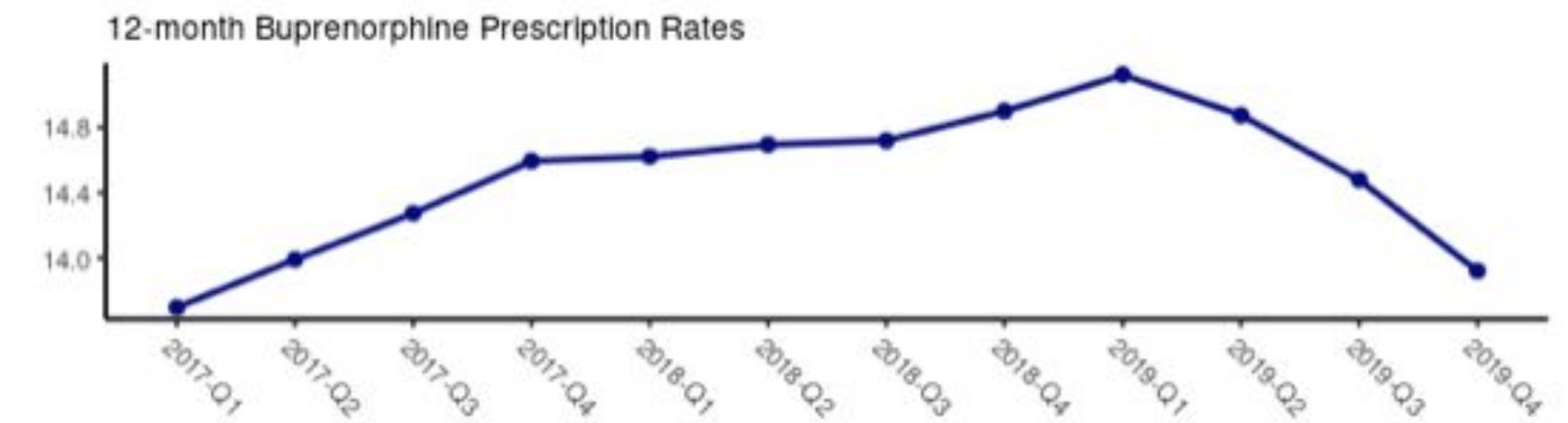
Prescribing

There were 17,576,679 prescriptions for opioids (excluding buprenorphine) in California in 2019. The annual crude opioid prescribing rate for 2019 was 444.84 per 1,000 residents. This represents a 19% decrease in prescribing from 2017. The following charts present 12-month moving averages for crude opioid prescribing rates, the crude rate of MMEs (morphine milligram equivalents) per person, the crude high dosage rate (greater than 90 Daily MMEs in the quarter), and the crude opioid/benzodiazepine overlap rate from 2017 to 2019.



Treatment

Buprenorphine prescriptions in the state are used to gauge the expansion of medication-assisted treatment (MAT). The annual crude buprenorphine prescribing rate for 2019 was 13.92 per 1,000 residents. This represents a 5% decrease in buprenorphine prescribing from 2017.

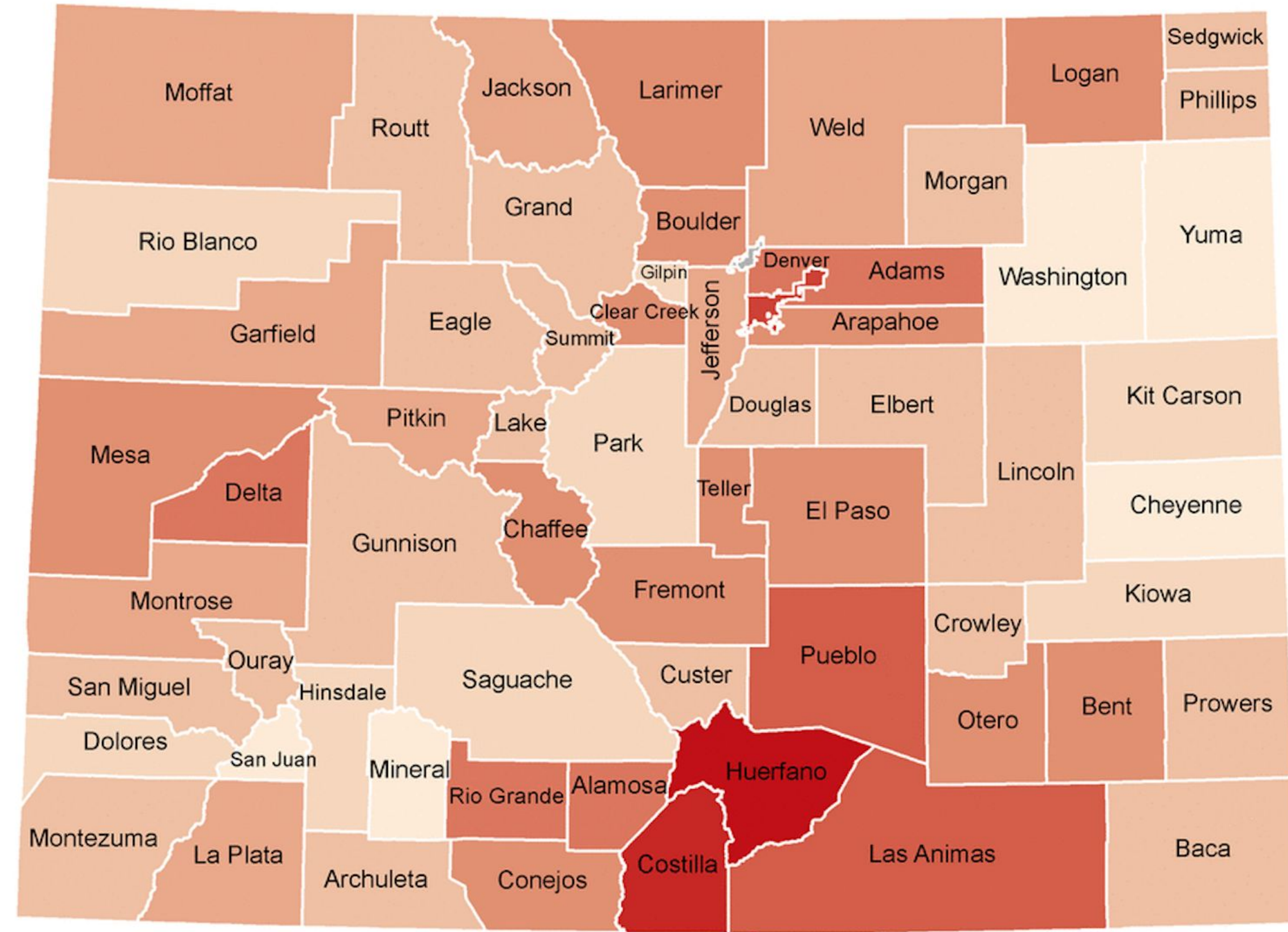


Footnotes: *Trend data for most recent year may be preliminary and may not be available for all data sources. 12-month rates are based on moving averages; OD = Related Overdose. Report produced by the California Opioid Overdose Surveillance Dashboard - <https://cdph.ca.gov/opioidsdashboard/>

Colorado Health Institute
Opioid Overdose Deaths
by County 2002-2014

coloradohealthinstitute.org

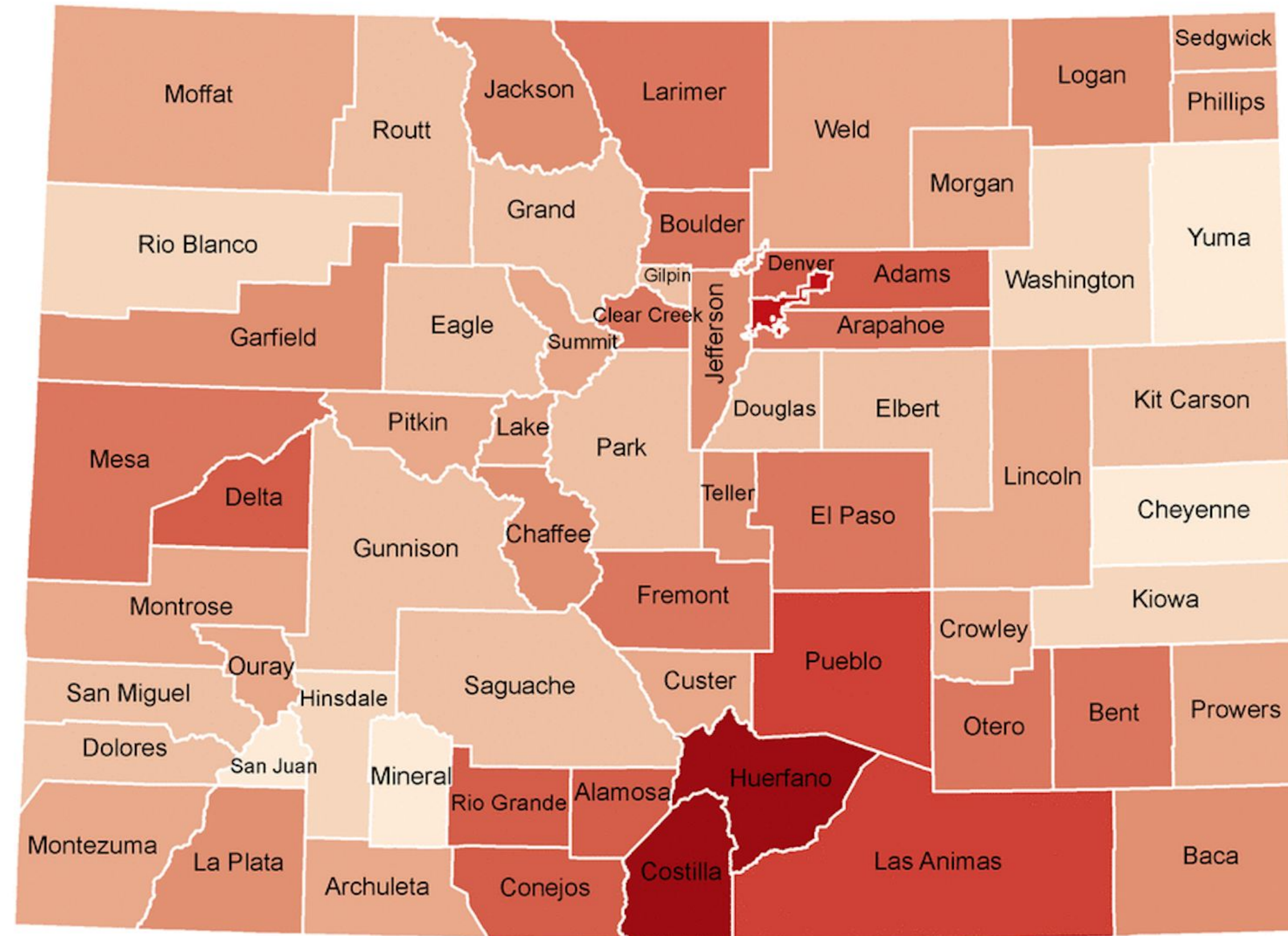
Colorado Drug Overdose Death Rate, 2002



Legend



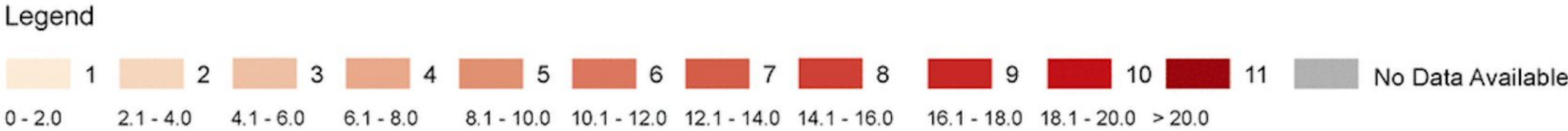
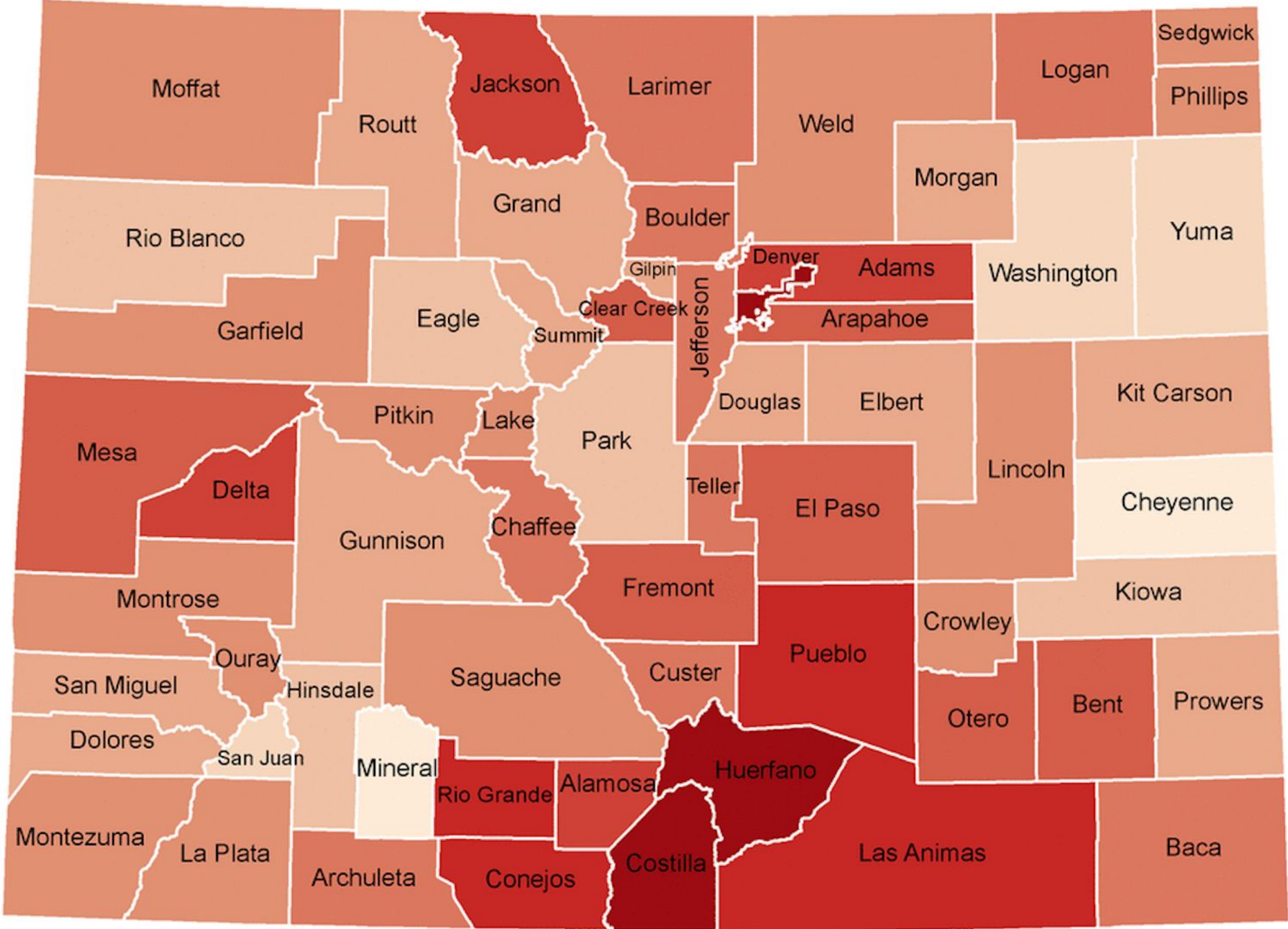
Colorado Drug Overdose Death Rate, 2005



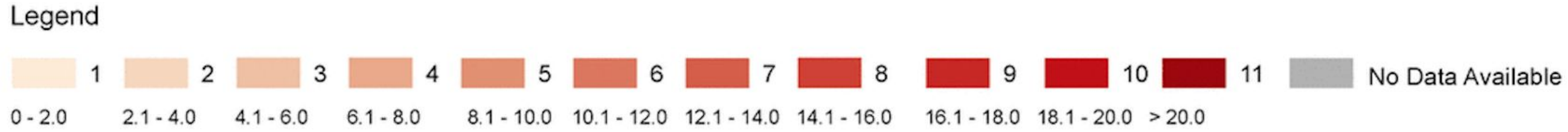
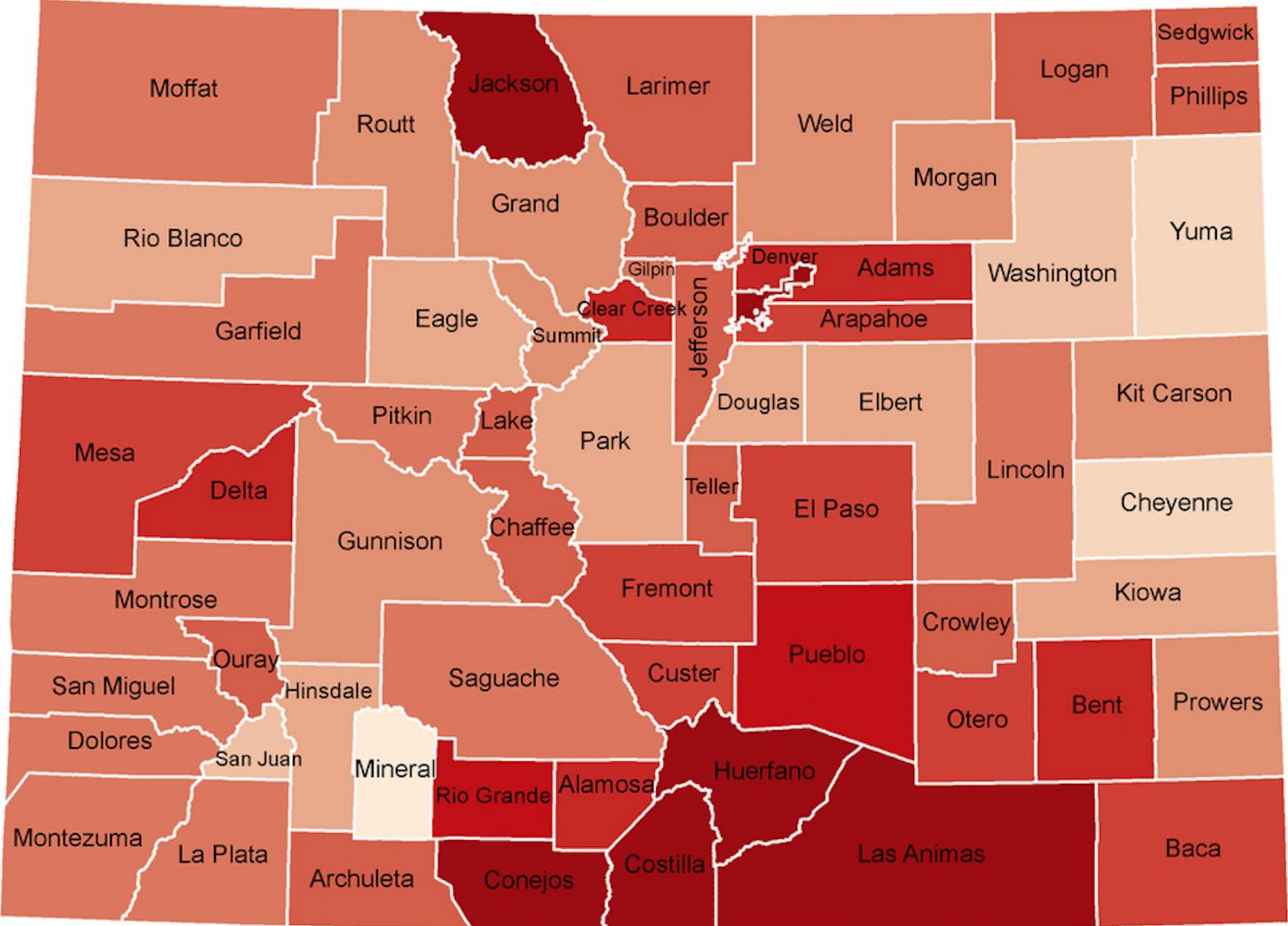
Legend

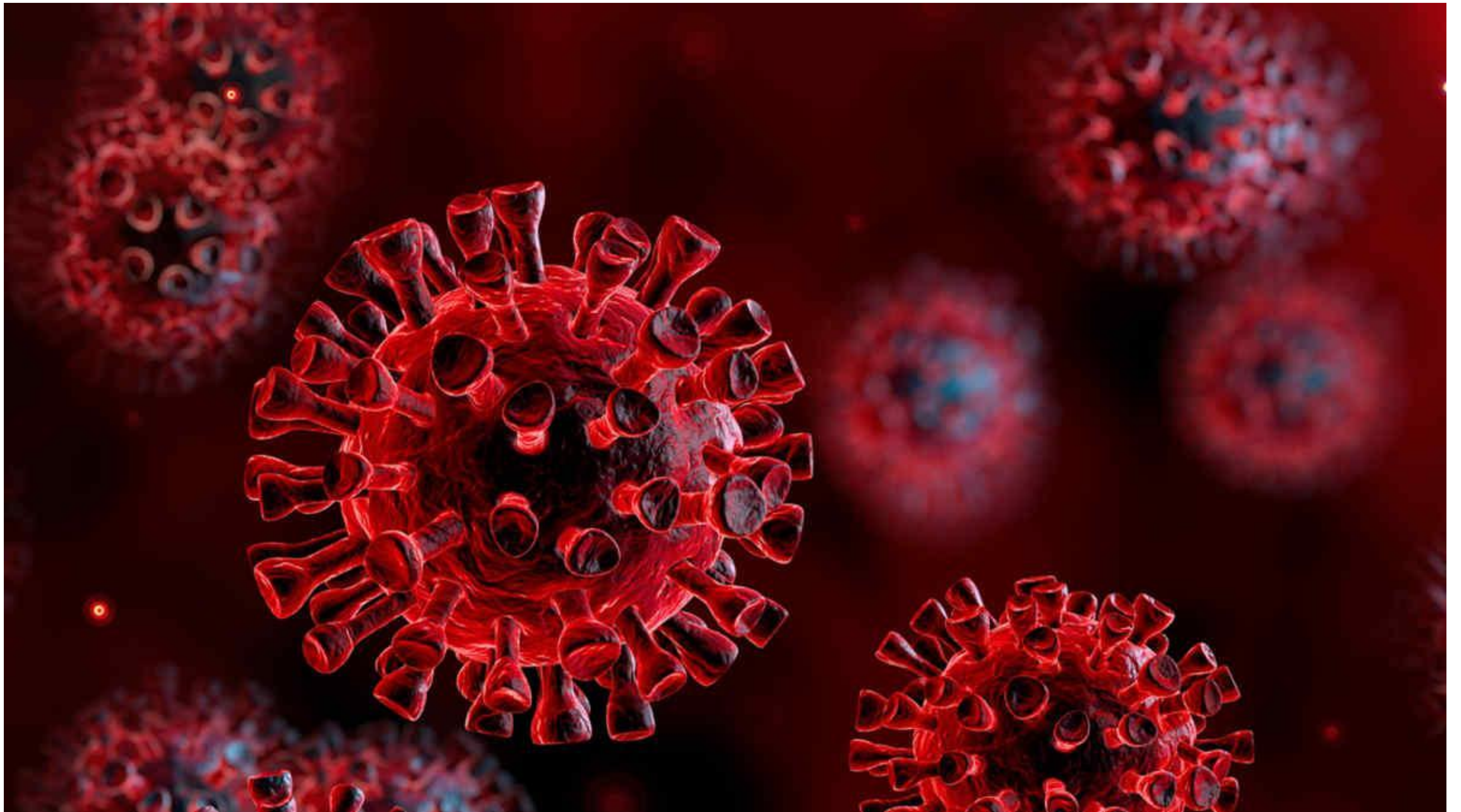


Colorado Drug Overdose Death Rate, 2008



Colorado Drug Overdose Death Rate, 2011





Increased Medical Cannabis Use During Pandemic

September 2020

- N=1,202 **adults >18**
- Mental health (76.7%), **pain** (43.7%), cardiometabolic (32.9%), respiratory (16.8%), and autoimmune (12.2%) conditions were **most reported**.
- Those with **mental health** conditions reported **increased** medicinal cannabis use by 91%
- **Clinical indications** for medicinal cannabis include **chronic conditions**; thus users (MCUs) are at an **increased risk** of morbidity and mortality resulting from COVID-19

Drug Overdoses Increase During Pandemic

Multifactorial

New Suppliers/Substances

Social Distancing/Isolation

Shutdowns (drug courts, treatment centers, recovery programs)

Lack of funding

Deaths data pending

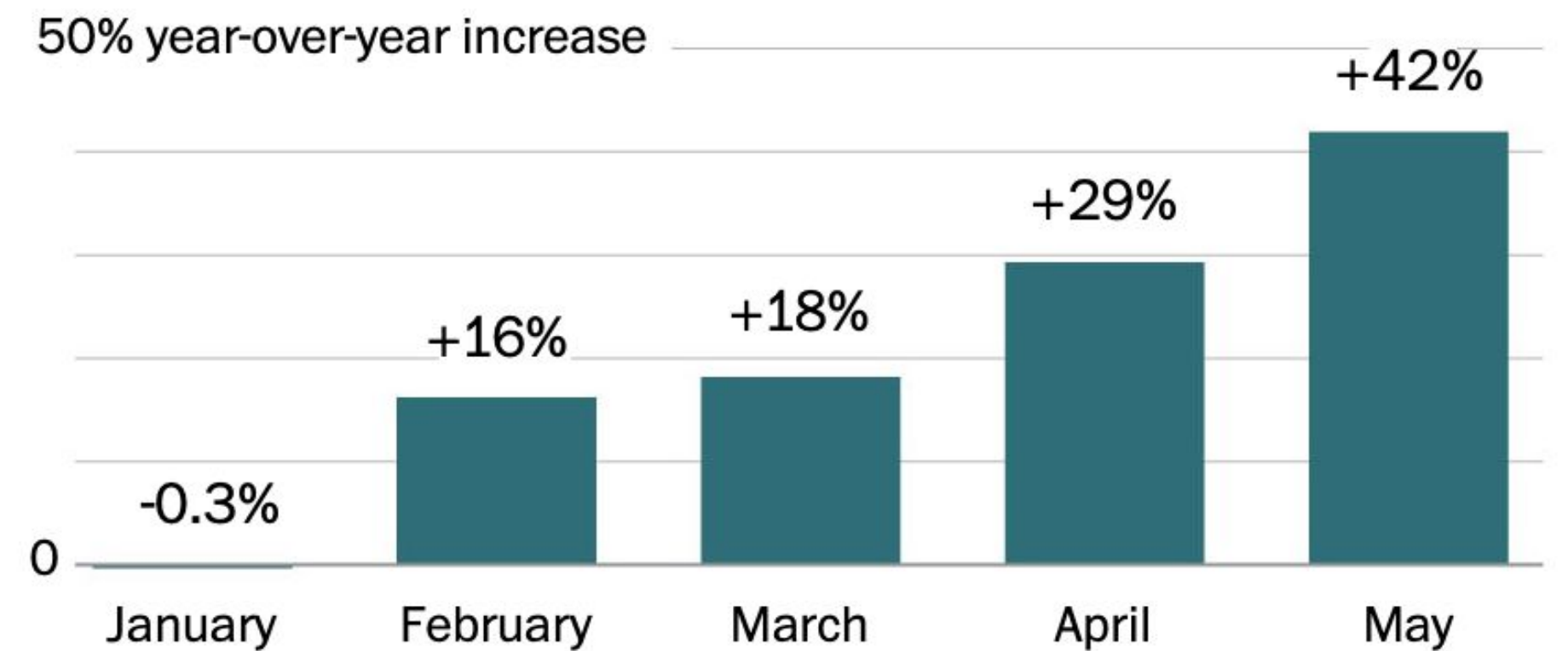
Monthly overdoses grew dramatically during the pandemic

For every **10** suspected overdoses reported to ODMAP in **May 2019** ...

... **14** overdoses were reported in **May 2020**.



Overdoses increased up to 42% per month during the pandemic, as compared to the same months in 2019.



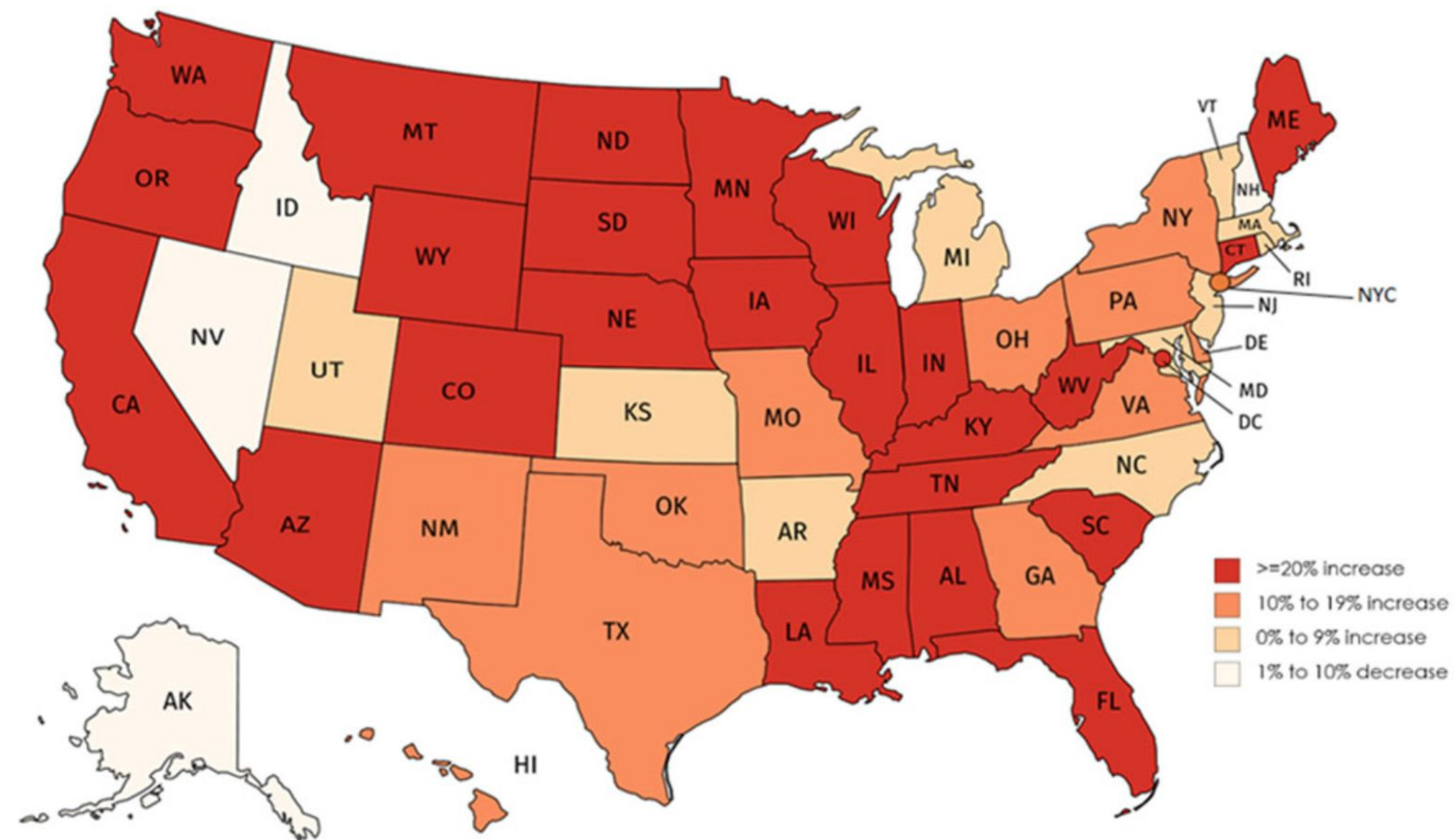
Note: Percent growth references the 1,201 agencies reporting to ODMAP by January 2019.

Source: ODMAP

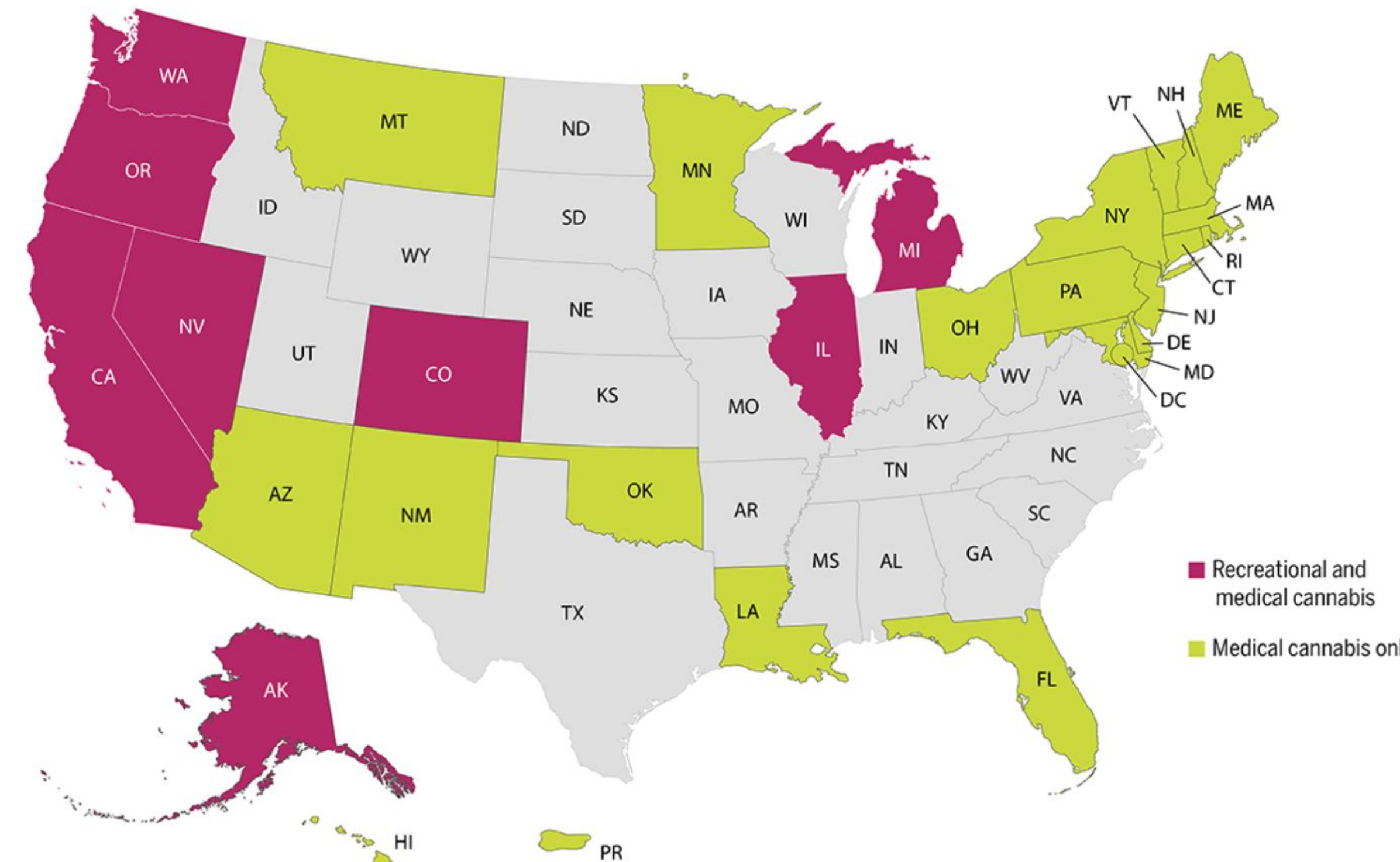
ALYSSA FOWERS/THE WASHINGTON POST

Drug Overdoses and Marijuana is “Essential”

Figure 2: Percentage change in 12-months ending provisional^a data on all fatal drug overdoses^b, 50 states, the District of Columbia, and New York City: Overdose deaths from 12-months ending in June 2019 to 12-months ending in May 2020^c



States allowing marijuana businesses to operate despite lockdown/stay-at-home orders*



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*As of 10 a.m. MT April 2

Distributed via the CDC Health Alert Network
December 17, 2020, 8:00 AM ET

Global Drug Survey Results During Pandemic

September 11, 2020

- N=55,000
- A considerable proportion of respondents **increased their use of cannabis** (44%), prescription benzodiazepines (34%) and prescription opioids (28%).
- Almost half (48%) survey respondents said they had increased the amount of **alcohol** they drank during the pandemic

Cannabis and COVID

- December 2020, Frontiers in Psychiatry, Netherlands
- During the lockdown more users **increased rather than decreased** cannabis consumption according to both **frequency** and **quantity**
- **41.3%** of all respondents indicated that they had **increased** their cannabis use since the lockdown measures
- Among users of joints, **39.4%** reported an **increase** in the average number consumed per use day

Cannabis Use and Opioid Misuse in Adults

September 2020

- 75,949 adults **aged ≥ 50** who participated in the year 2002–2014 (NSDUH)
- **3.8%** of the older adults reported past-year marijuana use (estimate **3.5 million** older adults Americans)
- **Past-year marijuana use** was significantly associated with an increase in odds of reporting **opioid dependence**, and past-year **non-medical use opioids**

Opioids

- There is **no evidence** supporting the use of **dispensary** cannabis for chronic non-cancer pain
- There is **no evidence** for substituting opioids with **dispensary** cannabis
- Cannabis users are **more likely** to develop opioid use disorder or misuse their opioids and have higher depression and anxiety scores, and other negative psychiatric effects
- States with medical marijuana programs typically have **higher opioid overdose deaths** than non-medical marijuana states
- Any real or perceived benefit **outweighed** by current evidence



Increased Adolescent Cannabis Use During Pandemic

September 2020

- N=1,054
- Since COVID-19-related social distancing began, the **frequency** of adolescent **alcohol and cannabis** use has **increased**.
- The frequency of **cannabis** use (average number of cannabis using days) **increased significantly** from pre-COVID to post-COVID
- The greatest percentage of adolescents was engaging in **solitary substance use** (49.3%), many were still using substances with peers via technology (31.6%) and, even face to face (23.6%)

Adolescent Medical Marijuana Use

August 20, 2020

- **Medical** cannabis adolescent use group reported (N=3,221, 6.9%)
 - using cannabis **more frequently**,
 - were more likely to report **vaping and eating** cannabis,
 - had **greater risk** for cannabis dependence,
 - **perceived** cannabis as less harmful,
 - were **more likely** to report tobacco use, recreational use of other drugs, and medicinal use of sedatives or tranquilizers, and
 - were **less likely** to report good health and sleeping for seven or more hours per night

Youth Risk Behavior Survey

August 2020

- Every other drug among young people is going down with the exception of marijuana.
- Lifetime marijuana use is the number one risk factor for prescription opioid misuse.
- 21.7% of high schoolers report marijuana use
- 43.5% of students who reported currently abusing prescription opioids also reported currently using marijuana

Adolescent vs Young Adult Onset Use

- January 23, 2021, Drug and Alcohol Review
- People who began **using pot as adolescents** were:
 - 20 times more likely to be **illicit drug users** and
 - 3.7 times more likely to be a **high-risk alcohol drinkers**;
 - 7.2 times more likely to **smoke cigarettes daily** and
 - **less likely** to be in a relationship

- Teen visits to Emergency Departments **increase** post legalization **with 71%** for psychiatric events (Colorado, Wang, 2018)

G.S. Wang et al. / Journal of Adolescent Health 63 (2018) 239–241

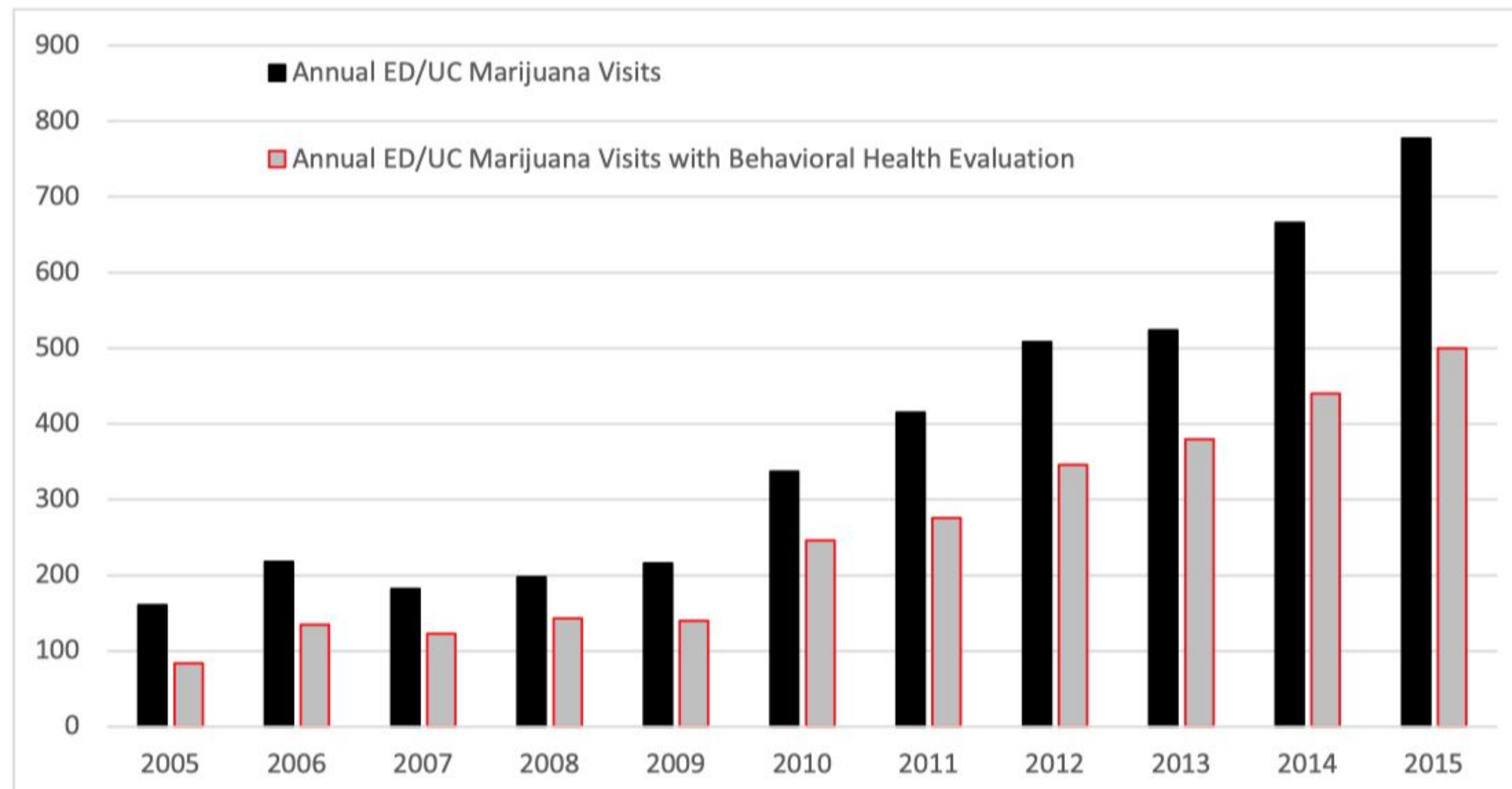


Figure 1. Annual marijuana-related emergency department (ED) and urgent care (UC) visits from a tertiary care children's hospital in Colorado.



wild berry peach

MEDICATED
Nerds

SUPER POTENT FORMULA
Rope

FOR MEDICAL USE ONLY
WARNING:
KEEP OUT OF REACH OF
CHILDREN AND ANIMALS
21 AND OVER

500
MG
THC
PER ROPE

HEALTHCARE

(26g)

Nutrition Facts / Dosage Facts - Per Serving - Total Dosage 420MG / THC Servings 8

Serving Size: 50MG **Amount Per Serving:** **Calories 8, Total Fat 0 g. Protein 0 g.** *Not a significant source of calories from fat, saturated fat, trans fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium and iron. Percent Daily Values (DV) are based on a 2,000 calorie diet.*

WARRANTY
KEEP
MEDICATED
Nerds

ROPE



SUPER POT

Table 1. Substance Use and Sexual Behavior among Colorado High-School Students, According to Use or Nonuse of Electronic Vapor Products, in 2017.*

Variable	All Students (N=45,385)	Recent Use of Electronic Vapor Product†	
		No (N=31,991)	Yes (N=13,394)
		<i>percent (95 percent confidence interval)</i>	
Binge drinking on ≥1 day in past 30 days‡	16.0 (15.2–16.8)	6.1 (5.6–6.5)	43.0 (41.3–44.7)
Use of opioid pain medicine without a prescription in lifetime	12.4 (11.8–12.9)	7.1 (6.7–7.5)	26.0 (24.8–27.2)
Use of marijuana in past 30 days	19.4 (18.4–20.4)	7.6 (6.7–8.4)	50.1 (49.2–52.7)
Use of cocaine >1 time in lifetime	5.0 (4.5–5.4)	1.4 (1.1–1.6)	14.2 (13.2–15.2)
Sex with ≥1 partner during past 3 mo	22.9 (21.9–24.0)	14.6 (13.7–15.5)	45.1 (43.8–46.4)
Use of heroin >1 time in lifetime	1.5 (1.3–1.7)	0.5 (0.3–0.6)	3.7 (3.2–4.1)
Use of methamphetamines >1 time in lifetime	2.0 (1.8–2.2)	0.6 (0.5–0.8)	5.0 (4.5–5.6)

* Data are from the Healthy Kids Colorado Survey. Of the 47,146 students who were surveyed, 45,385 provided answers to the questions listed in the table. Data were weighted to reflect the sociodemographic profile of the high school students in Colorado.

† Recent use was defined as the use of an electronic vapor product not including marijuana during the past 30 days.

‡ Binge drinking was defined as four or more drinks per day for female students and five or more for male students.

Monitoring the Future Study

September 15, 2020

- **Frequent (>10x/mo) vaping** of cannabis significantly increased from 2.1% to 4.9%, a 131.4% increase.
- Students **aged ≥18 years** (a 154.9% increase)
- **Female** students (a 183.5% increase)
- **Those who go out** 4–7 evenings per week (a 163.0% increase)
- Those reporting past-year **non-medical prescription opioid use** (a 184.7% increase)

<http://www.monitoringthefuture.org/pressreleases/19collegepr.pdf>

Healthy Kids Colorado Survey

August 2020

- **32.4%** of youth **drove a vehicle after using marijuana** in the past month, **up from 9.0%** in 2017
- **More than half** of high school students who use marijuana reported that they **dab marijuana** to get high
- Dabbing” is a method of inhaling **highly concentrated THC** (commonly referred to as hash oil, wax or shatter) using a **blow torch-heated** delivery system commonly referred to as a dab rig
- Results also show a **69% increase** in students vaping marijuana in two years
- More than 20% of adolescents have **used in the past 30 days** and got their marijuana **from an adult**

Youth Risk Behavior Survey

August 2020

- Every other drug among young people is going down with the exception of marijuana.
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- 21.7% of high schoolers report marijuana use
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Adolescent Cannabis Use and Opioids

- March 29, 2021; JAMA Pediatrics
- “Within a year of first trying marijuana, 10.7% of adolescents (12-17 yo) had become addicted to it....within three years of first trying the drug, 20% of adolescents became addicted to it.”
- Compared to opioids (11.2%, 10.6%)
- At 3 years of first trying marijuana vs. opioids (12-17 yo), marijuana has a higher percentage of addiction

STUDY SUBJECTS (FIRST TIME USERS)	ADDICTION RATE AFTER 1 YEAR	ADDICTION RATE AFTER 3 YEARS
Cannabis (age 12-17)	10.7%	20.1%
Cannabis (18-25)	6.4%	10.9%
Opioid (12-17)	11.2%	10.6%
Opioid (18-25)	6.9%	7.3%
Cocaine (18-25)	5.6%	6.4%
Heroin (18-25)	30.9%	42.5%

Cannabis Use and Depression

- JAMA Psychiatry, August 18, 2020
- Adults 20-50 yo, N=16,216
- Individuals with depression are at increasing risk of cannabis use, with a particularly strong increase in daily or near daily cannabis use
- Individuals with depression had approximately double the odds of using cannabis compared with people without depression

Suicidality

- American Academy of Pediatrics, March 2021
- Current **adolescent prescription opioid misuse** is associated with **increases in the risk for suicide-related behaviors**
- Adolescent marijuana use —> opioid misuse —> suicidality

Self-Harm and Mortality Risk

January 2021

- Cannabis use disorder is a common comorbidity and **risk marker** for self-harm, all-cause mortality, and **death** by unintentional overdose and **homicide** among youths with mood disorders
- Cannabis use disorder was significantly associated with nonfatal **self-harm** and all-cause **mortality**

JAMA Pediatrics; January 19, 2021

<https://jamanetwork.com/journals/jamapediatrics/article-abstract/27752>

Circumstances

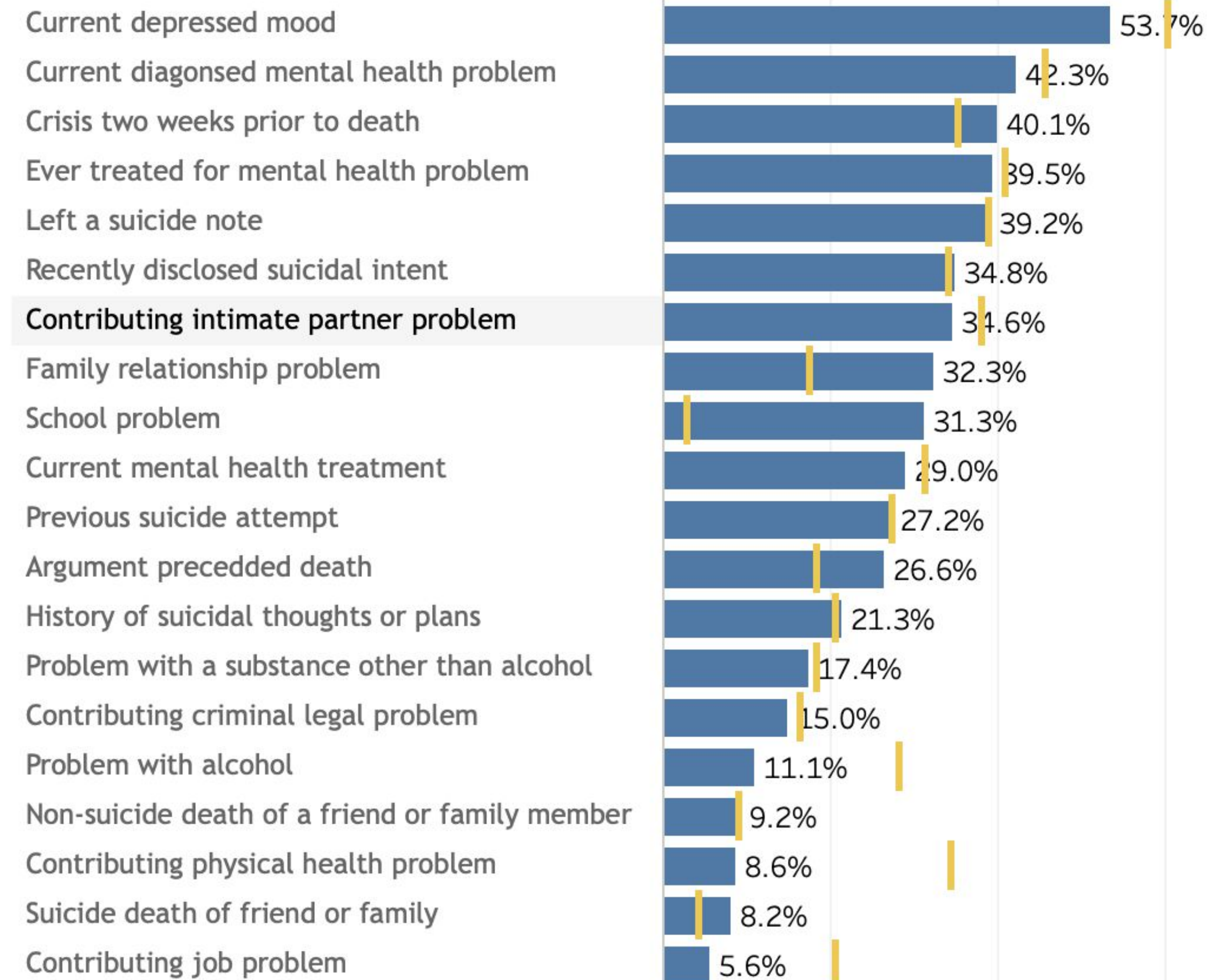
Toxicology

Entire state:

1+ circumstances known	12,254
No circumstances known	733

Selected population:

1+ circumstances known	12,254
No circumstances known	733

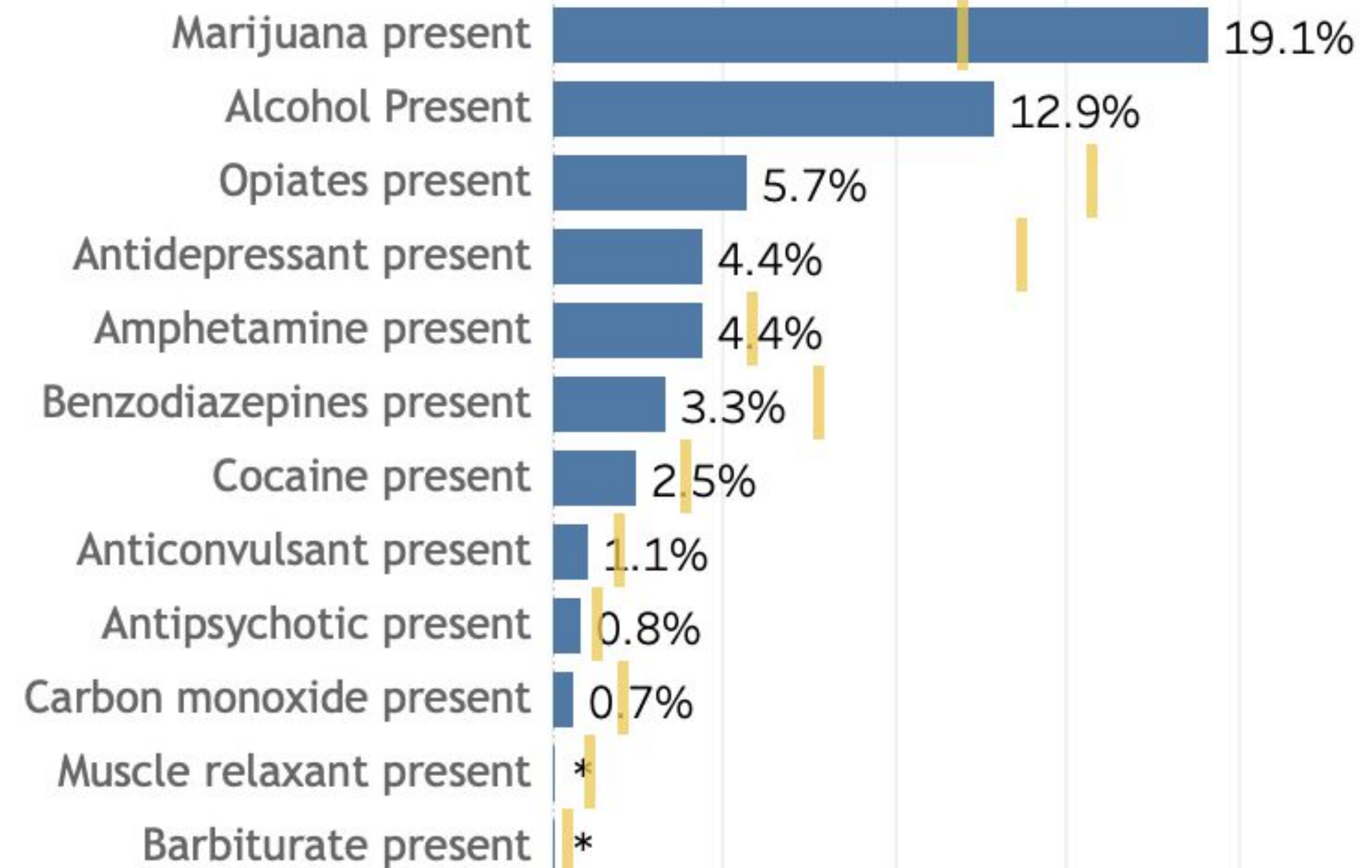


Entire state:

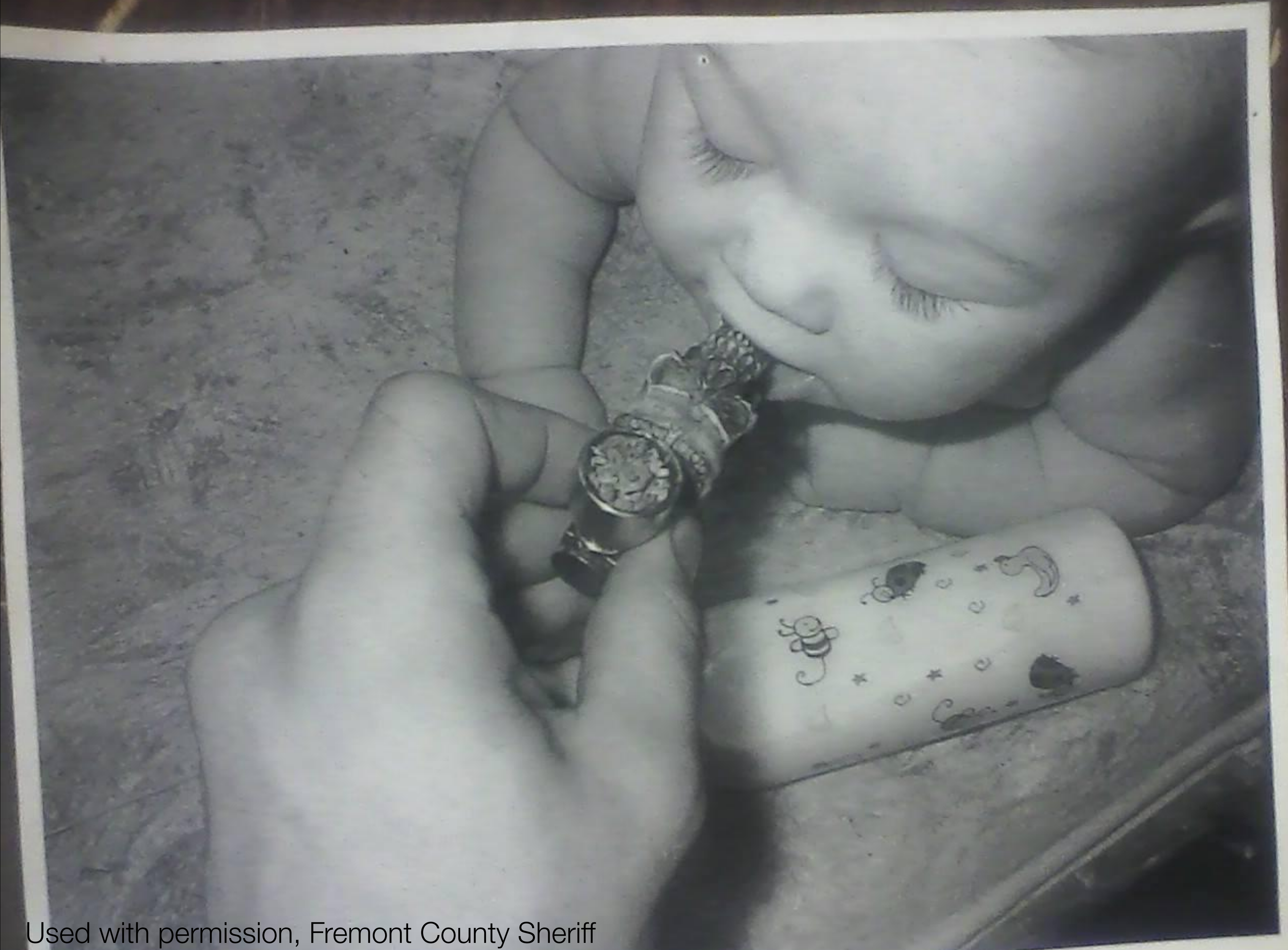
Toxicology info available	10,781
No toxicology info available	2,206

Selected population:

Toxicology info available	10,781
No toxicology info available	2,206



Trend **began 2012** and has **remained #1** since then



Used with permission, Fremont County Sheriff

Industry Failures

- Oregon Secretary of State, 2019: “Oregon’s marijuana testing program **cannot ensure** that test results are reliable, and products are **safe**”. Only **3% of stores** had a compliance inspection.
(<https://sos.oregon.gov/audits/Documents/2019-04.pdf>)
- California has an 18% fail rate and **“unacceptable”** levels of pesticides, solvents, and bacteria, including E. coli and Salmonella”
(<https://www.breitbart.com/local/2018/09/12/report-california-regulators-fail-18-of-recreational-marijuana-tested/>)
- Colorado **does not test or recall** products on a regular basis

Colorado, October 8, 2020



- CDPHE and DOR safety advisory
- Yeast, mold, and arsenic at unacceptable limits
- “Return” your product
- Dispensaries (med and rec) do not require customers register for recall notices
- By the time you get notice, product likely consumed
https://drive.google.com/file/d/1xowig7vPtI-lz_xUAALt3DIxeGua1xY6/view

Colorado, March 31, 2021



- Unsafe levels of cadmium
 - Known human carcinogen, teratogen, and can cause renal damage
 - Pulmonary edema, anemia
- Products from November 2020-January 2021

Recall deals blow to California's marijuana industry

December 2018

- Sacramento laboratory was caught **faking** pesticide test results
- The director had been **faking test results** for 22 of the 66 pesticides he was required under California law to analyze.
- Nearly 850 batches — tens of **thousands of pounds** of flower, and an **equal amount** of other products, like oils and vaping material — are under the recall.

Med Man Issues Voluntary Nationwide Recall of Up2 Due to Presence of Undeclared Sildenafil November 8, 2019 FDA

- Sildenafil is an FDA-approved prescription drug for erectile dysfunction.
- The presence of sildenafil in Up2 products renders them **unapproved drugs** for which safety and efficacy have not been established, therefore subject to recall.
- **Undeclared ingredient** may interact with nitrates found in some prescription drugs, such as nitroglycerin, and may **lower blood pressure** to dangerous levels which can be life threatening

<https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts/med-man-issues-voluntary-nationwide-recall-up2-due-presence-undeclared-sildenafil>

Florida August 18, 2020

- Florida medical cannabis company told to recall moldy flower
- The state health department's Office of Medical Marijuana Use said the product, Granddaddy Purple Whole Flower, tested **above the acceptable limit** for **aspergillus**
- Surterra Wellness dispensed **17,448,318 ounces** of medical marijuana flower, a little more than **545 tons**, in July

January 2021

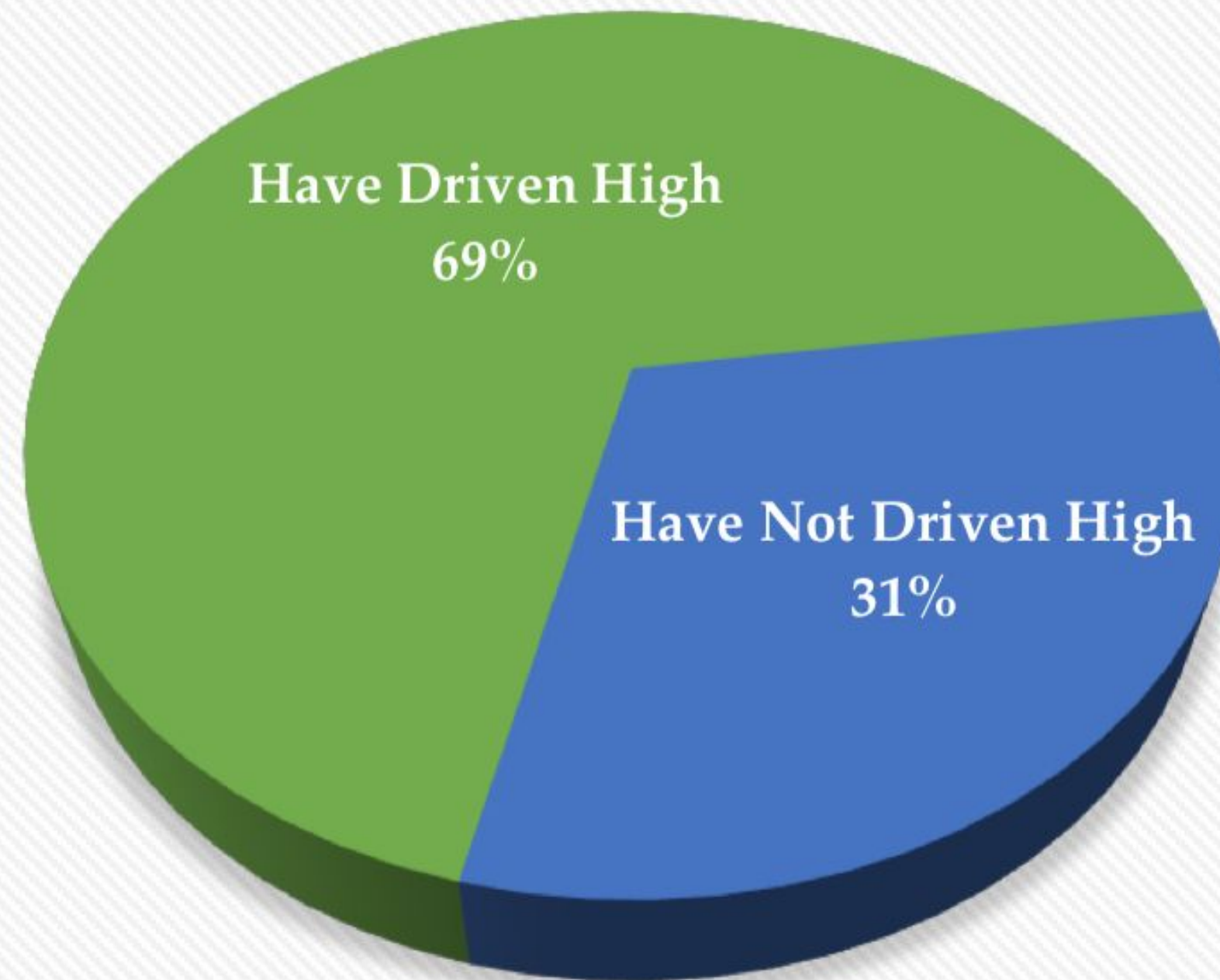
Nevada Lab Faking Data

- **Hiding** the presence of potentially **dangerous contaminants** and also **inflating THC levels** in marijuana
- Routinely passing samples that had previously failed testing for **pesticides, microtoxins, heavy metals and microbials**, all regulated contaminants. Samples, which are supposed to be tested once, were **sometimes tested up to five times** before "passing."
- Routinely **inflating THC levels** up to 5 percent higher than the actual THC levels. THC potency is known to drive **higher retail prices**
- **Failing** to properly dispose of more than 12,000 samples

Driving, Marijuana, and Opioids

- Drivers who **test positive for marijuana** are significantly **more likely** to test positive for prescription opioids
- Those testing positive for marijuana were **28% more likely** to test positive for prescription opioids (Fatality Analysis Reporting System, N=47,602)
- Those testing positive for marijuana were **twice as likely** to test positive for prescription opioids (National Roadside Survey, N=7,881)

Percentage of Marijuana Users Who Admit to Driving High within the Last Year



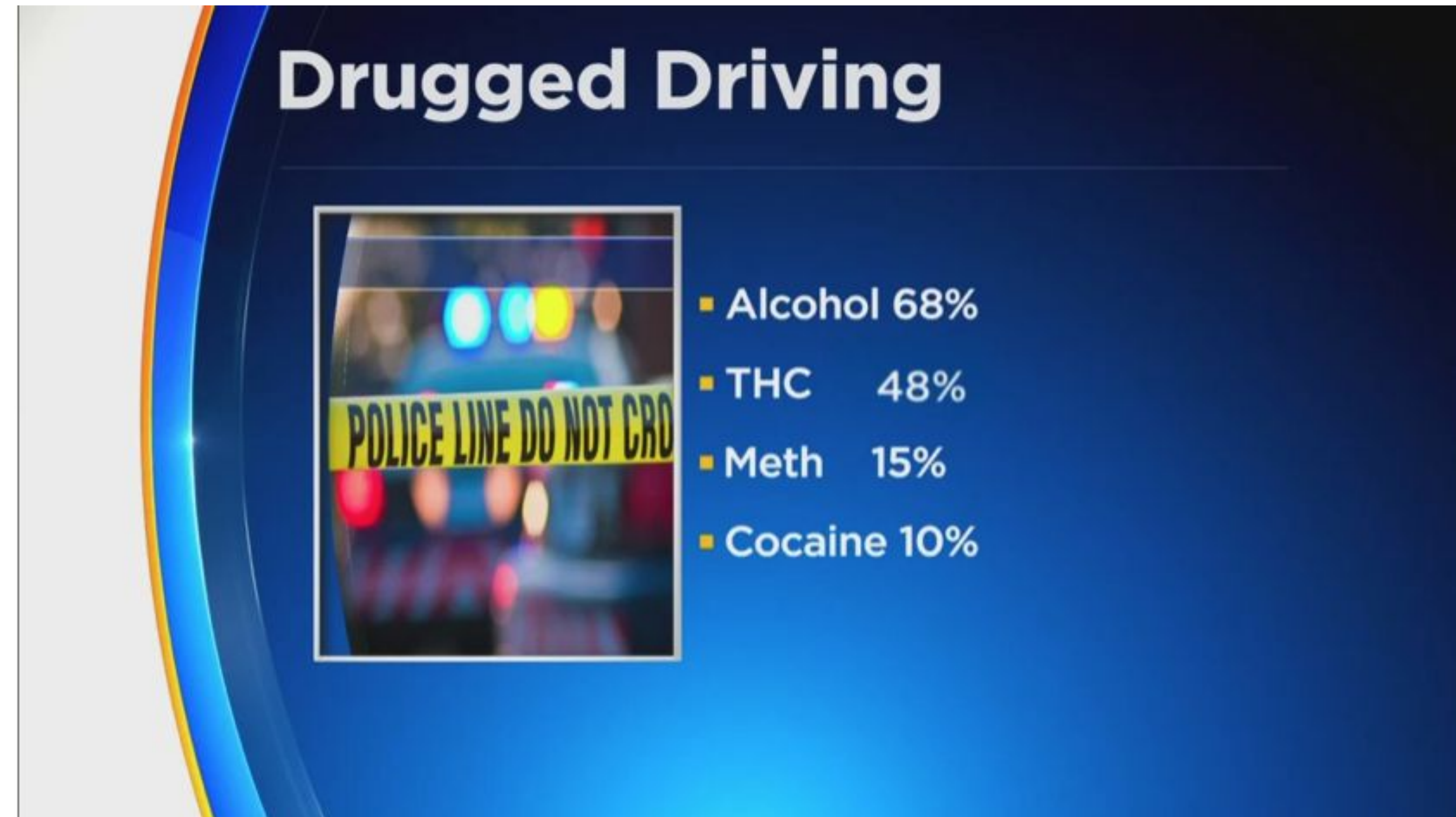
The Colorado Department of Transportation (CDOT) collected survey responses from over 11,000 anonymous marijuana users and non-users.

The above data is part of the preliminary data released by CDOT in April of 2018.

SOURCE: Colorado Department of Transportation, *Cannabis Conversation Survey*

Colorado DUI 2020

- Colorado State Patrol says DUI arrests involving marijuana are **up 48%** in the last year (2019-2020)
- The number of marijuana impaired drivers involved in deadly crashes has risen every year between 2017 and 2019



Cannabis Recommendations and Car Crashes; Canada, 2021

- Study to assess the impact of medical cannabis authorization on motor vehicle-related health utilization visits (hospitalizations, ambulatory care, emergency department visits, etc) between 2014 and 2017 in Ontario, Canada.
- After accounting for both the immediate and trend effects, **authorization for medical cannabis** was associated with an increase of 2.92 events/10,000 (up from 0.50/10,000)
- This effect was largely driven by MVC-related emergency department visits

Lee, C., Voaklander, D., Minhas-Sandhu, J.K. et al. Cohort study of medical cannabis authorization and motor vehicle crash-related healthcare visits in 2014–2017 in Ontario, Canada. Inj. Epidemiol. 8, 33 (2021)

Alcohol + Marijuana + Driving

- People who use both alcohol and marijuana are **some of the most dangerous drivers on the road** – they are significantly more likely to speed, text, intentionally run red lights, and drive aggressively than those who don't
- Drivers who use both **marijuana and alcohol** were significantly more prone to driving under the influence of alcohol versus those who only drink alcohol but do not use marijuana

A Few Other Medical Impacts

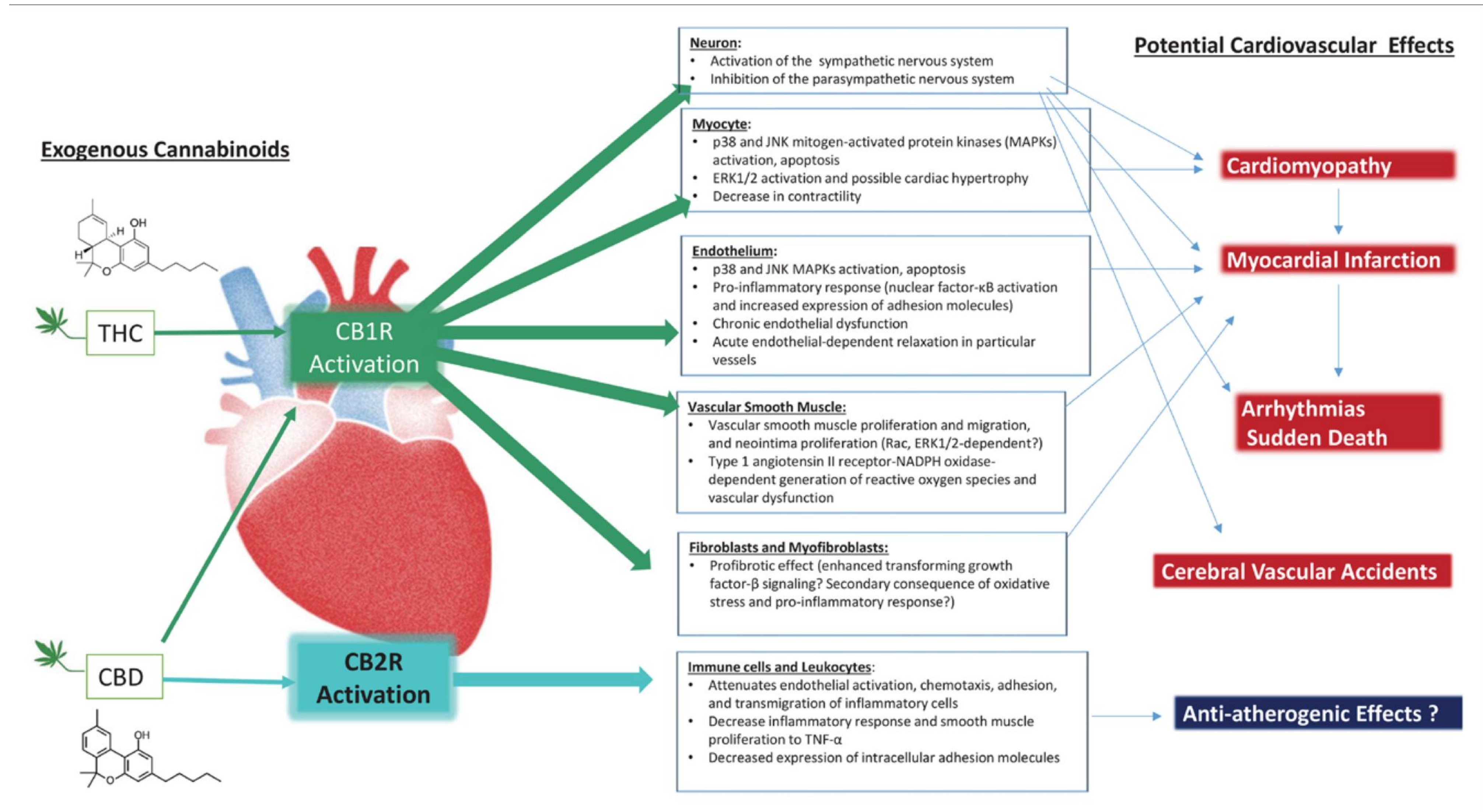
COVID: FOLLOW THE SCIENCE



POT: FOLLOW THE MONEY

American Heart Association

August 5, 2020



Overdose-Related Cardiac Arrests Observed by Emergency Medical Services During the US COVID-19 Epidemic

- **Overdose-related cardiac arrests** rose sharply during April 2020, reaching 74.1 per 100 000 EMS activations (123.4% above baseline) by May 4
- a **large-magnitude, national surge** in overdose-related cardiac arrest during the initial months of the COVID-19 epidemic in the US
- Over 81,000 drug overdose deaths occurred in the United States in the 12 months ending in May 2020, the **highest number of overdose deaths ever** recorded in a 12-month period

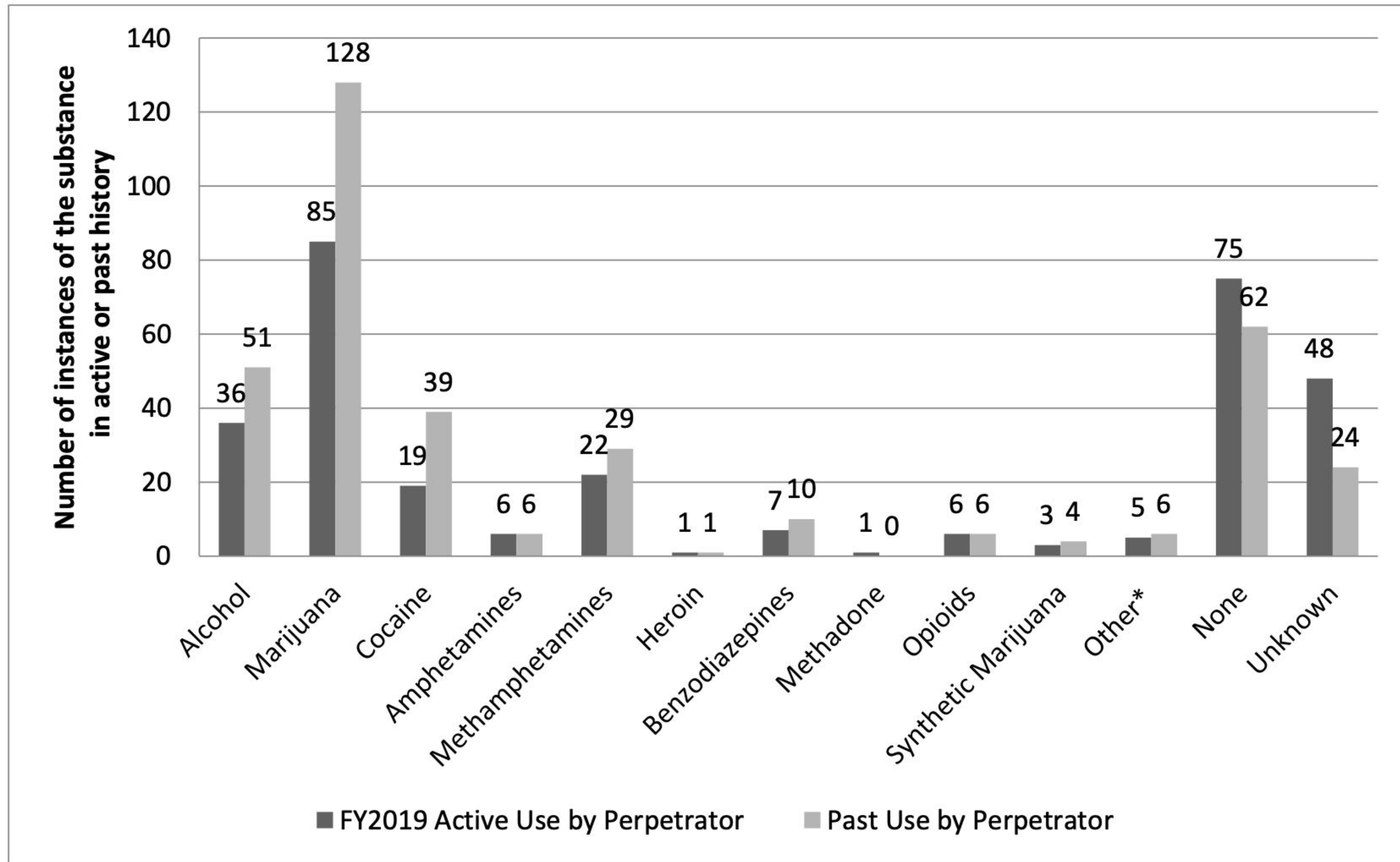
Maternal cannabis use in pregnancy and child neurodevelopmental outcomes, August 2020

- Cannabis use in pregnancy was linked to an **increased risk of preterm birth**
- Women who used cannabis during pregnancy **often used other substances** including tobacco, alcohol and opioids.
- Considering those findings, in the current study the researchers specifically looked at 2,200 women who reported using **only cannabis** during pregnancy, and no other substances.
 - Babies born to this group **still had an increased risk of autism** compared to those who did not use cannabis.

Associations Between Prenatal Cannabis Exposure and Childhood Outcomes; Results From the ABCD Study September 2020

- N=11,875, **ages 9-11**
- Cannabis exposure only, before and after maternal knowledge of pregnancy, were associated with **greater offspring psychopathology** characteristics
- Exposure after maternal knowledge of pregnancy remained associated with greater **psychotic-like experiences**, attention, thought, and social problems
- Prenatal cannabis exposure and its correlated factors are associated with greater risk for **psychopathology** during middle childhood.

Figure 11. Confirmed Child Abuse or Neglect Fatality by Substance Abuse by Perpetrator



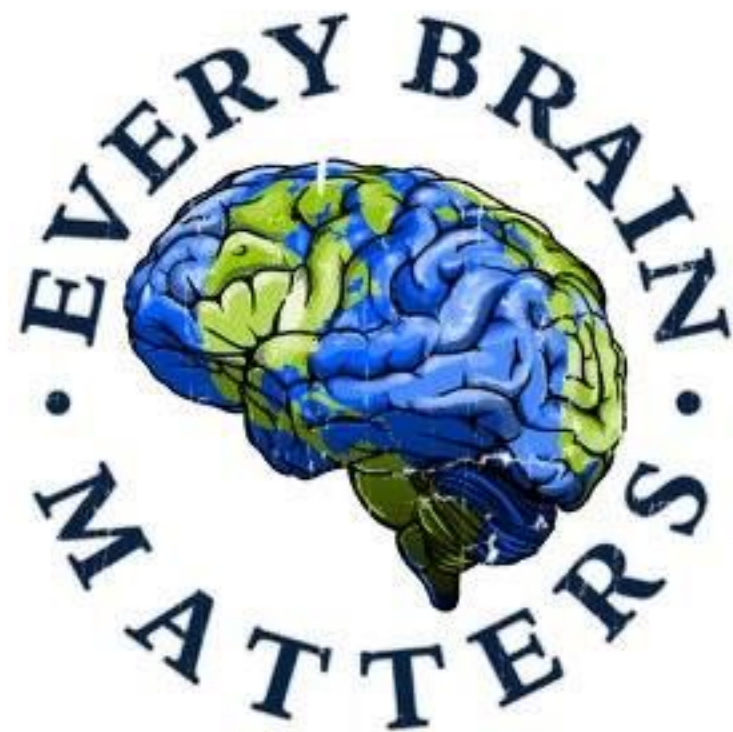
*Other includes lighter fluid, Kratom, ecstasy, morphine and Benadryl.

https://www.dfps.state.tx.us/About_DFPS/Reports_and_Presentations/PEI/documents/2020/2020-03-01_FY2019_Child_Fatality_and_Near_Fatality_Annual_Report.pdf

Out of all the drugs that can induce psychosis, cannabis has the highest conversion rate to bi-polar or schizophrenia.

<u>Drug</u>	<u>Conversion Rate</u>
cannabis	47.00%
amphetamines	30.00%
hallucinogens	24.00%
opioids	21.00%
alcohol	5.00%

<https://ajp.psychiatryonline.org/doi/10.1176/appi.ajp.2017.17020223>



EveryBrainMatters.org



Kevin Neal, California

- Marijuana grower
- **Killed 5 people**, including his wife who he stuffed in a hole under his mobile home
- Went to a **nearby school** and opened fire but no access into the school
- Injured 14 others
- Likely associated mental health issues
- Prior run-ins with the law

CVT CENTRAL VALLEY TOXICOLOGY, INC.

Case Name: Neal, Kevin
TOXICOLOGY NUMBER: CVT-17-12040

Specimen Description: 9.5 ml femoral blood (2 gray top vials), 14 ml central blood (1 gray top vial, 1 red top vial & 1 lavender top vial), 2.5 ml vitreous humor & 3.75 ml urine each labeled "Neal, Kevin; Tehama County Coroner; 17-02057; Drawn at autopsy; 11/15/2017"

Delivered by Tricor Date 01-Dec-17 Received by Bill Posey Date 01-Dec-17

Request: Complete Drug Screen & THC Agency Case # 17-02057

Requesting Agency: Tehama County Coroner
P.O. Box 729
Red Bluff CA 96080

Report To: Tehama County Coroner
P.O. Box 729
Red Bluff CA 96080

Specimen: Femoral Blood Sample RESULTS

Complete Drug Screen: Specific drug assay for THC performed.
No common acidic, neutral or basic drugs detected.
No Ethyl Alcohol detected.

Cannabinoids (THC metabolite) by Immunoassay = Positive

delta-9-THC = 97 ng/mL
delta-9-THC-COOH = 37 ng/mL
delta-9-THC-OH = 3.7 ng/mL



Joe Amon, The Denver Post

Marijuana plants are lined up on the driveway outside of a suspected illegal grow operation at a home in Aurora on Wednesday morning, Oct. 10, 2018. Federal and local agents fanned out across the Denver metro area Wednesday morning executing more than two dozen search warrants on suspected illegal marijuana grow houses, authorities say.



Joe Amon, The Denver Post

A DEA agent carries marijuana plants out of a suspected illegal grow operation at a home in Aurora on Wednesday morning, Oct. 10, 2018. Federal and local agents fanned out across the Denver metro area Wednesday morning executing more than two dozen search warrants on suspected illegal marijuana grow houses, authorities say.



Altered Electrical



Hazards for First Responders



Altered electrical systems and wiring

Hazards for First Responders



Tripping / entanglement hazards

LIGHTS



Grow House Damage



**DIY
Ventilation**



<https://www.greeleytribune.com/news/greeley-police-bust-sizable-black-market-grow-operation-in-t-bone-ranch/>



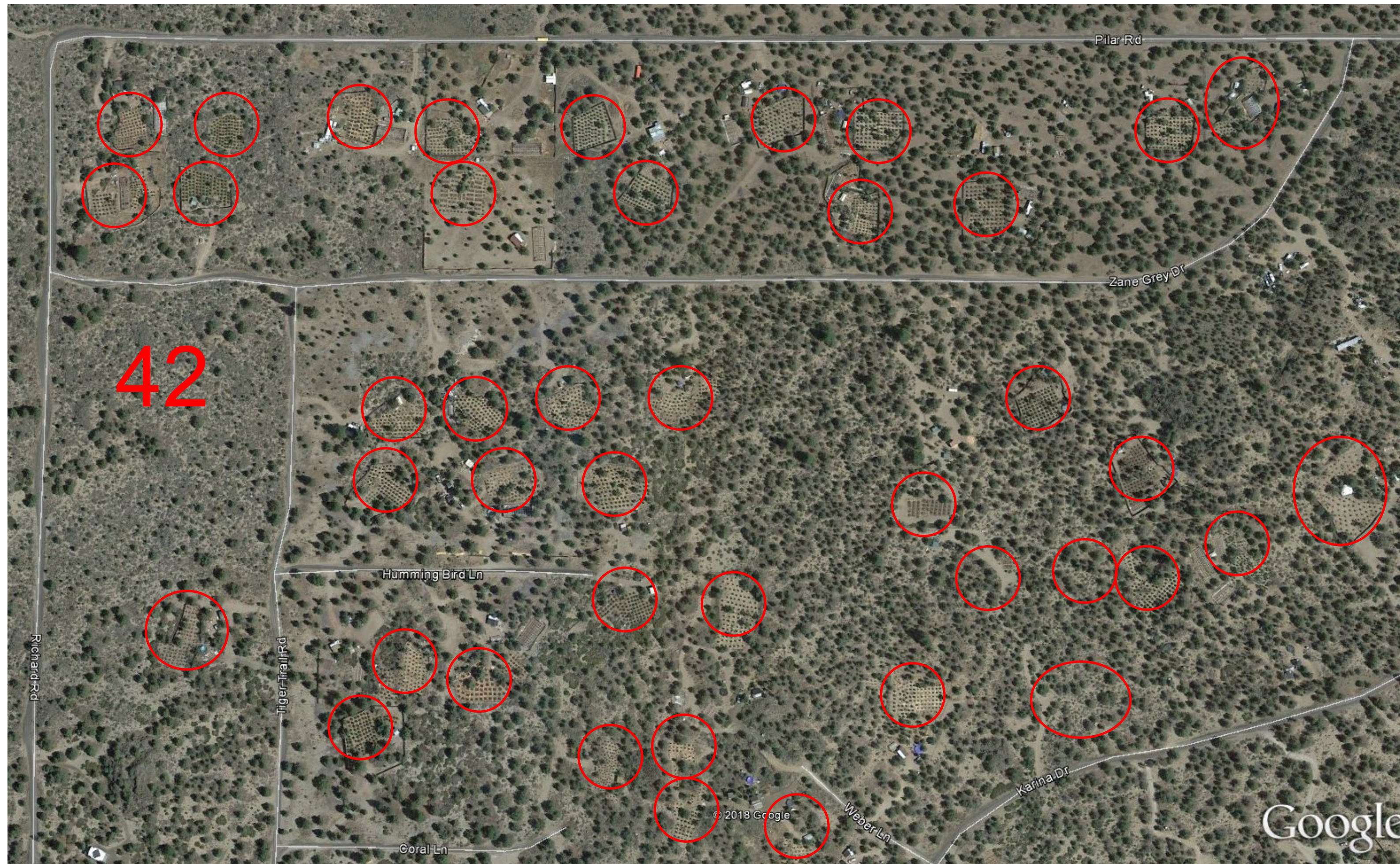




Environment



Marijuana in Siskiyou County – Mt. Shasta Vista



Law Enforcement Discovers and Reports Dead Wildlife Discovered at Grow Sites













<https://kymkemp.com/2019/04/23/over-4000-pounds-of-trash-cleaned-from-illegal-marijuana-complex-in-klamath-river-watershed-but-crews-face-dilemma-of-how-to-deal-with-miles-of-plastic-waterline/>



Oregon Problem, May 2021



A helicopter flyover of Jackson County focused on large apparent marijuana and hemp growing operations, but the Sheriff's Office said **they don't know** how many are legal and licensed.

Oregon Problem May 2021





Action Plan

- Marijuana is not a medication. Marijuana is a plant
- Support FDA drug-development process for cannabinoids, including evidence-based dosing guidelines of cannabis-based medications
- Support potency cap (15% THC)
- Eliminate home grows: breeding ground for illegal activity
- Track, monitor, and document public health impact (health care utilization, ER, birth defects, etc)

Action Plan

- Mandatory drug testing for all violent crimes (cannabis induced psychosis)
- Monitor adolescent use closely
- Discourage smoking and vaping (EVALI)
- Discourage use during pregnancy and lactation
- Drug testing/toxicology on all suicides, including adolescents
- Monitor marijuana-related driving fatalities

COVID: FOLLOW THE SCIENCE



POT: FOLLOW THE MONEY

Kenneth Finn *Editor*
Cannabis in Medicine
An Evidence Based Approach

Legalization of marijuana is becoming increasingly prominent in the United States and around the world. While there is some discussion of the relationship between marijuana and overall health, a comprehensive resource that outlines the medical literature for several organ systems, as well as non-medical societal effects, has yet to be seen. While all physicians strive to practice evidence-based medicine, many clinicians aren't aware of the facts surrounding cannabis and are guided by public opinion.

This first of its kind book is a comprehensive compilation of multiple facets of cannabis recommendation, use and effects from a variety of different perspectives. Comprised of chapters dedicated to separate fields of medicine, this evidence-based guide outlines the current data, or lack thereof, as well as the need for further study. The book begins with a general overview of the neurobiology and pharmacology of THC and hemp. It then delves into various medical concerns that plague specific disciplines of medicine such as psychiatry, cardiology, gastrointestinal and neurology, among others. The end of the book focuses on non-medical concerns such as public health and safety, driving impairment and legal implications.

Comprised of case studies and meta-analyses, *Cannabinoids in Medicine: An Evidence-Based Approach* provides clinicians with a concise, evidence-based guide to various health concerns related to the use of marijuana. By addressing non-medical concerns, this book is also a useful resource for professionals working in the public health and legal fields.

Finn *Ed.*



Cannabis in Medicine

Cannabis in Medicine

An Evidence Based Approach

Kenneth Finn
Editor

<https://www.springer.com/us/book/978303045967>