

Antitrust Notice

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Under no circumstances shall CAS seminars be used as a means for competing companies or firms to reach any understanding – expressed or implied – that restricts competition or in any way impairs the ability of members to exercise independent business judgment regarding matters affecting competition.

It is the responsibility of all seminar participants to be aware of antitrust regulations, to prevent any written or verbal discussions that appear to violate these laws, and to adhere in every respect to the CAS antitrust compliance policy.

Marijuana and crash risk

Casualty Actuarial Society Spring Meeting

May 9, 2023



Chuck Farmer

Vice President, Research & Statistical Services



Saving lives. Preventing harm.

IIHS-HLDI mission:

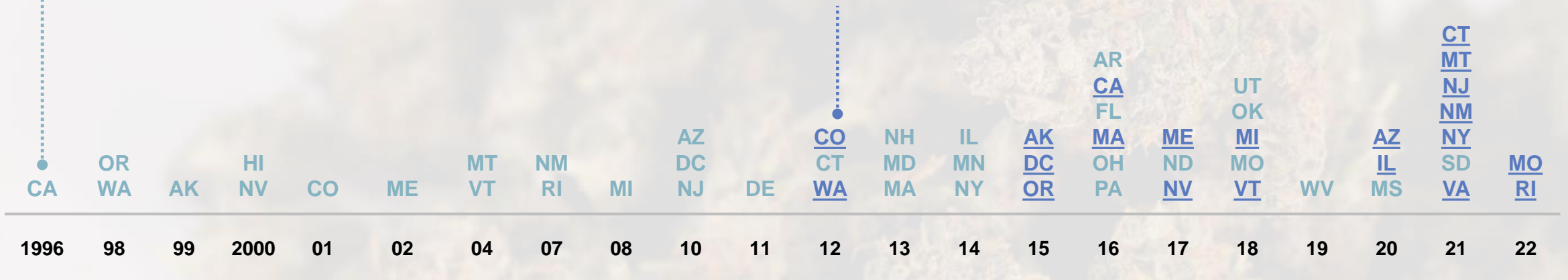
To reduce deaths, injuries and property damage from motor vehicle crashes through **research and evaluation** and through **education** of consumers, policymakers and safety professionals.

Marijuana



California was the 1st state to legalize marijuana for medical use

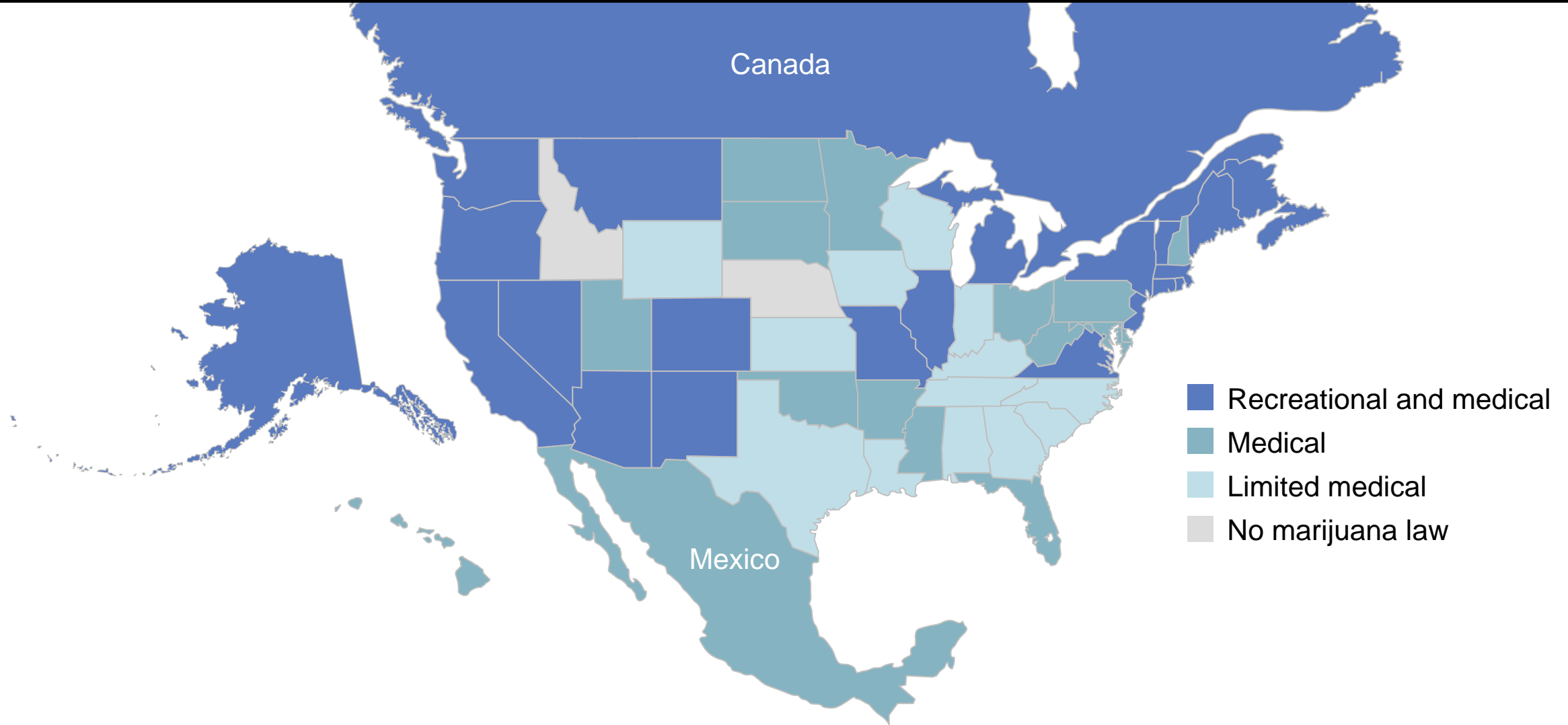
Colorado and Washington were the 1st states to legalize marijuana for recreational use



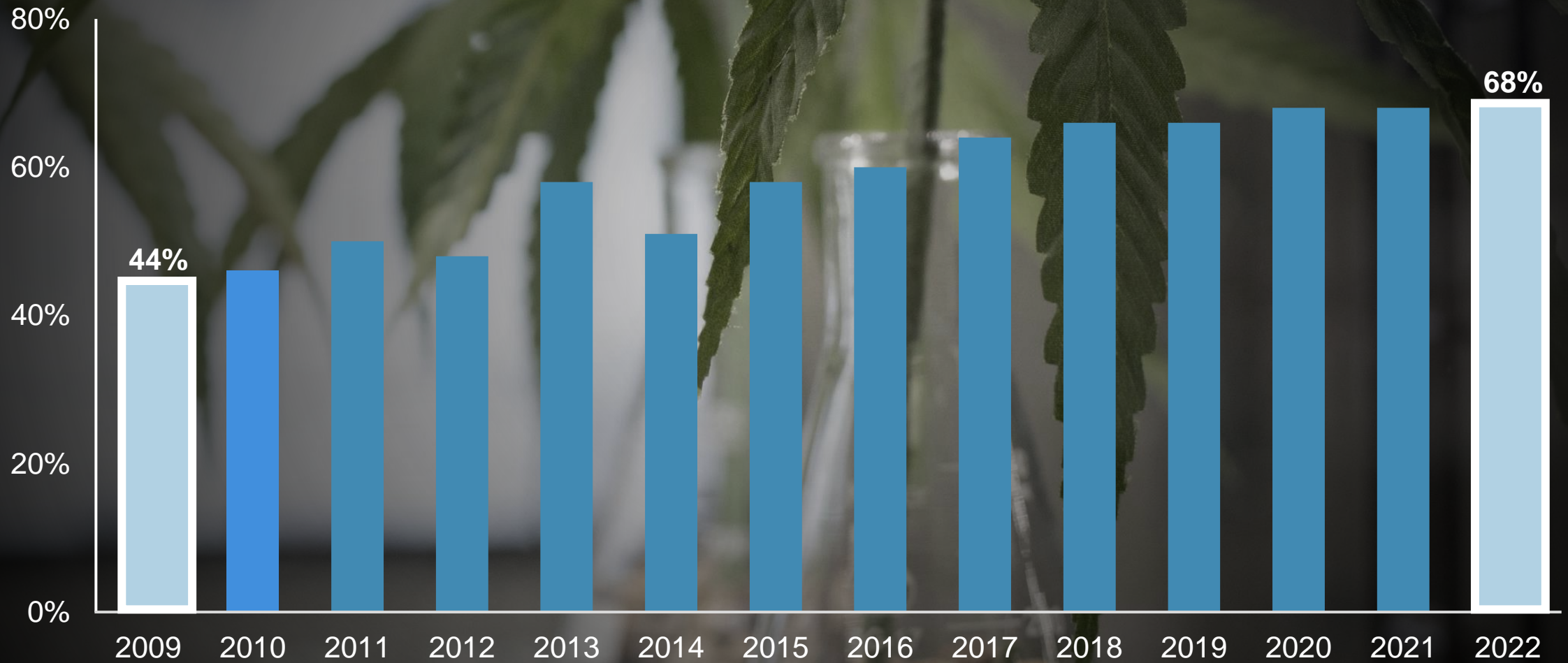
Medical use
Recreational use

Marijuana legalization in North America

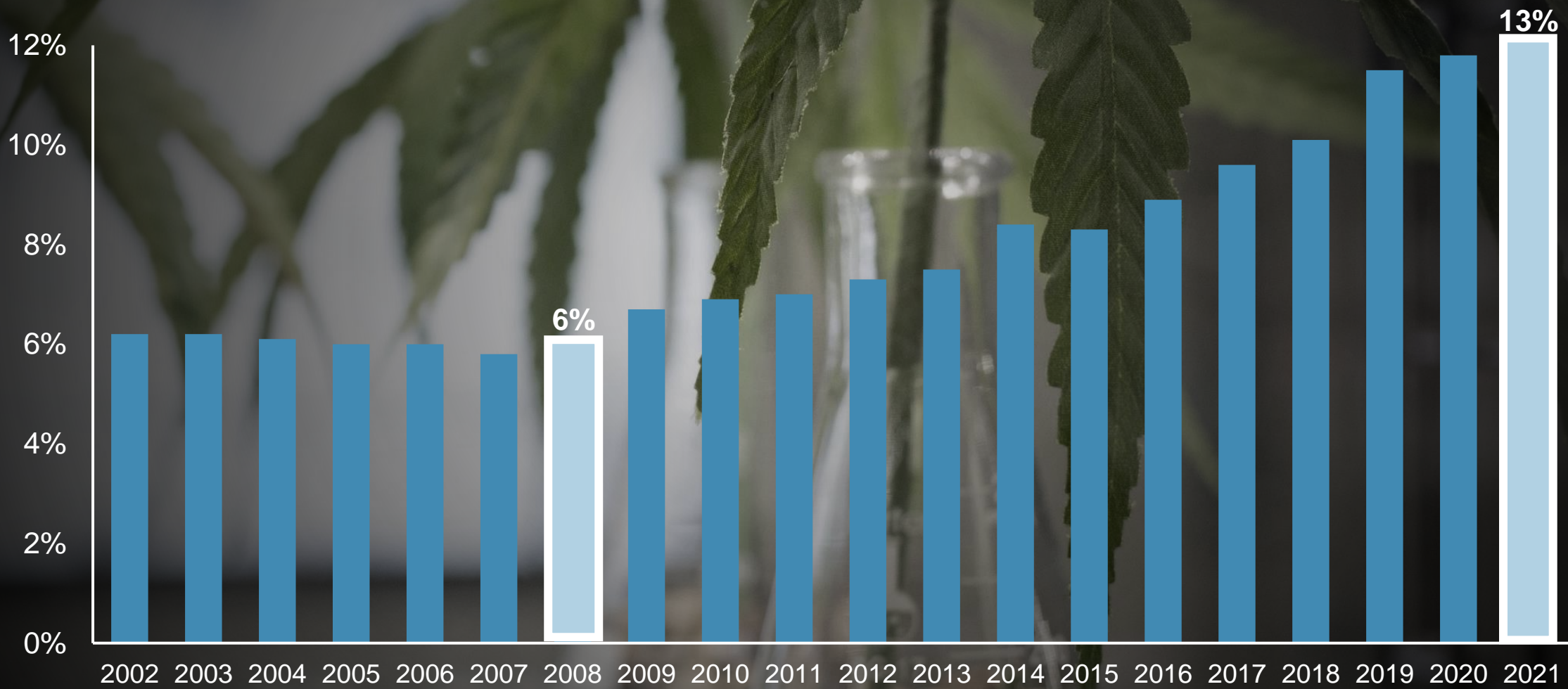
As of January 2023



U.S. residents age 18+ supporting marijuana legalization

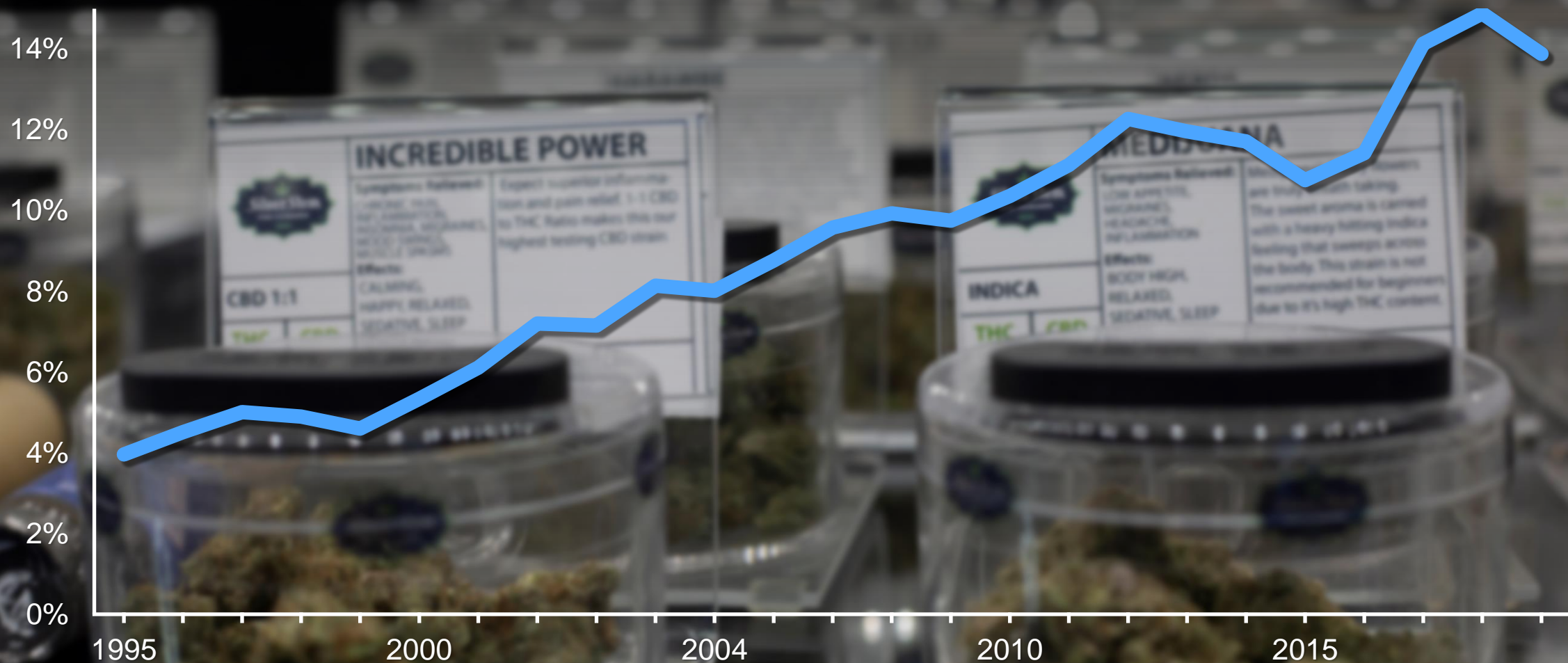


U.S. residents age 12+ who reported using marijuana during the past month



Marijuana potency

Average THC % concentration of DEA specimens by year



Source: A Comprehensive Review of Cannabis Potency in the United States in the Last Decade

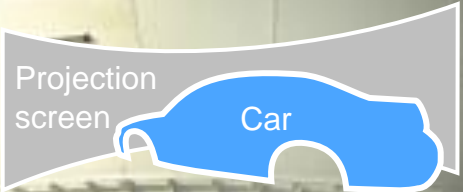
Marijuana-impaired driving still is not taken seriously

Stoned drivers are considered funny and harmless



Marijuana impairment





National Advanced Driving Simulator



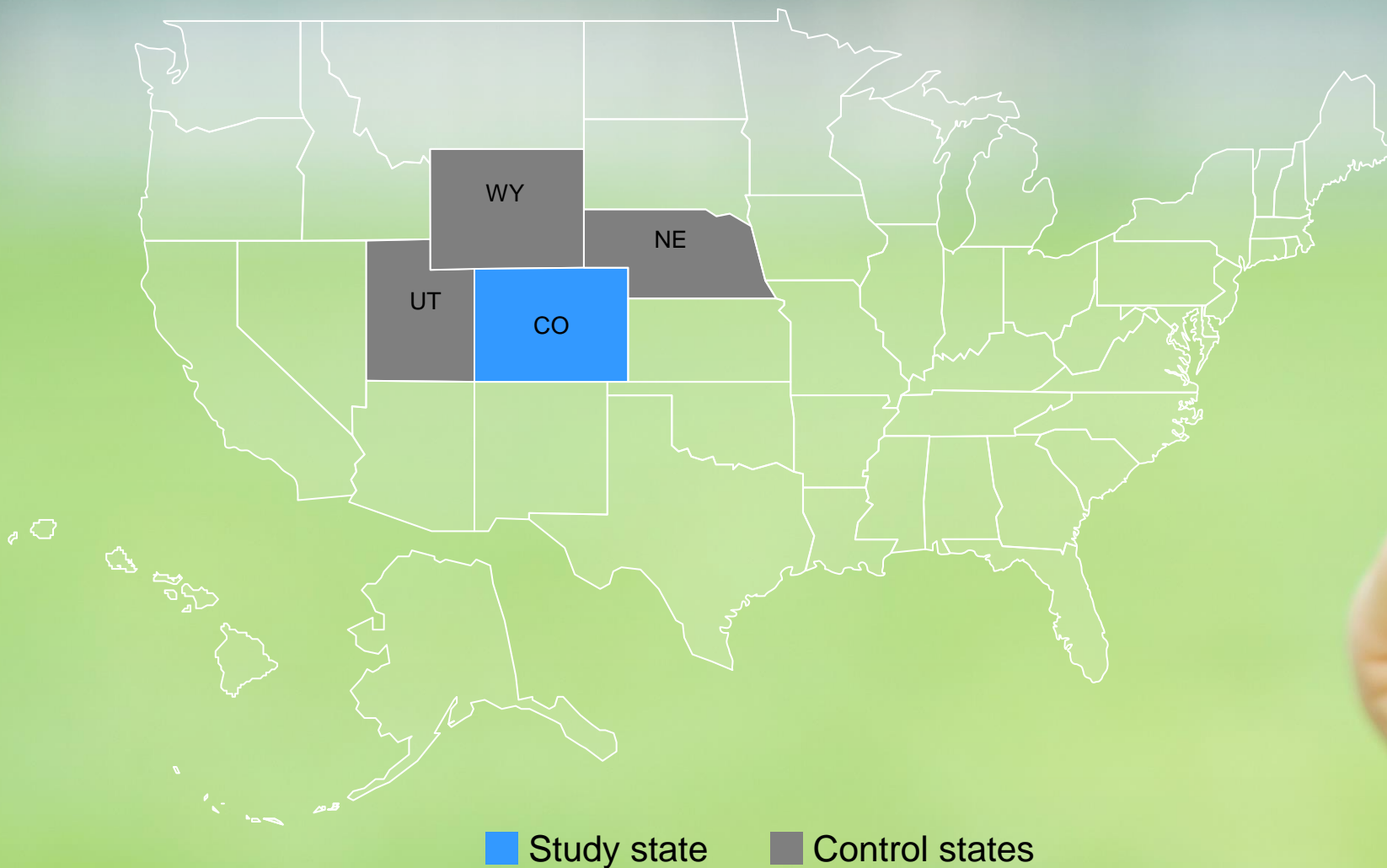
**National Advanced
Driving Simulator**

Changes in driving performance relative to placebo condition

| Measure | Alcohol only (BAC = 0.05%) | Marijuana only (THC = 5 ng/mL) | Both |
|----------------------|-------------------------------|-----------------------------------|-------|
| Lane weaving | +7% | +4% | +11% |
| Lane departures | +35% | no change | +35% |
| Lateral acceleration | +10% | no change | +10% |
| Speeding | +171% | no change | +104% |
| Below speed limit | no change | +40% | +40% |
| Speed variation | +8% | no change | +8% |
| Following distance | no change | +4% | +4% |

Effects of marijuana legalization on collision claims

Colorado evaluation



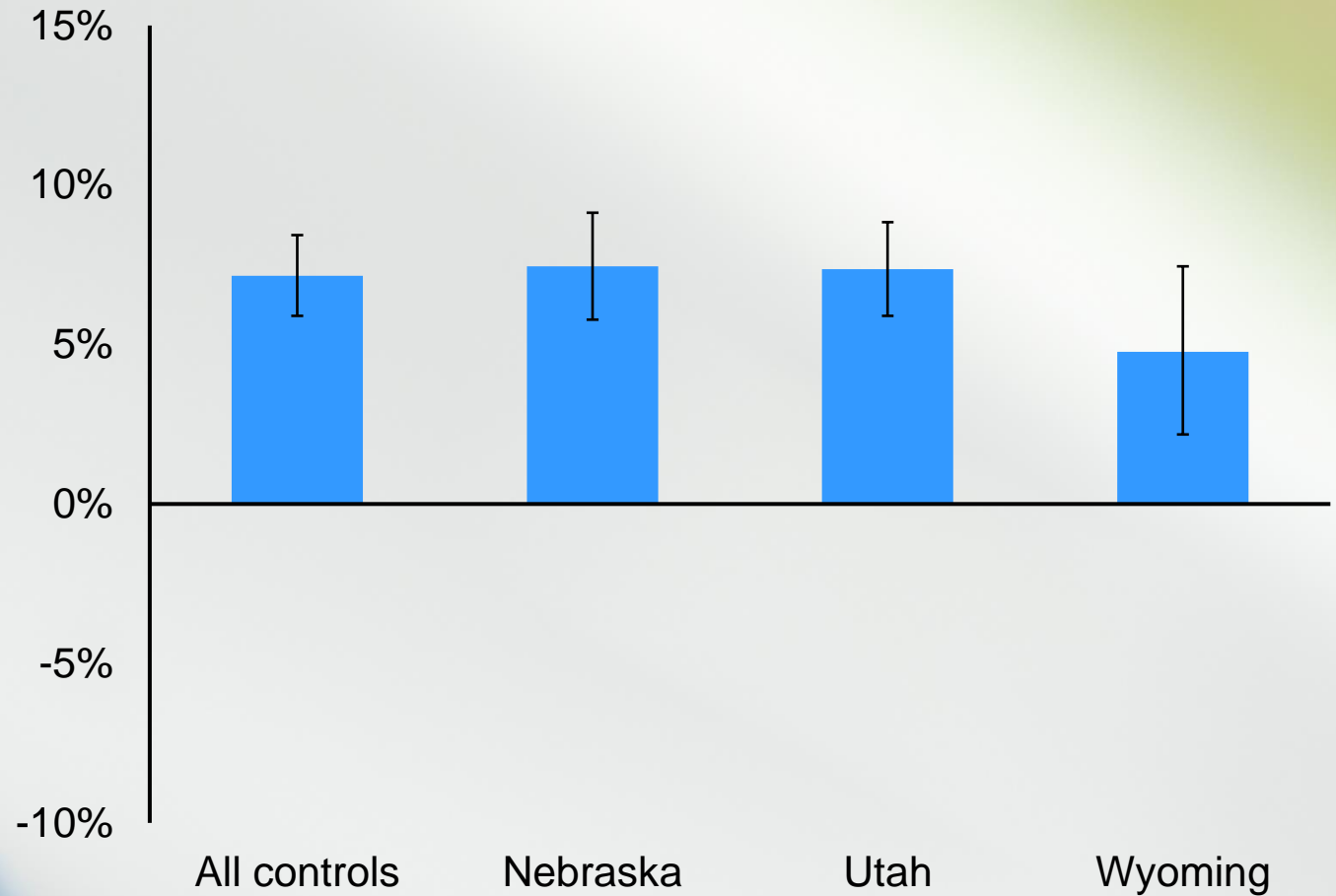
Monthly collision claim frequency over time, Jan. 2012–Dec. 2019

Colorado vs. control states (NE,UT,WY), for vehicles up to 33 years old



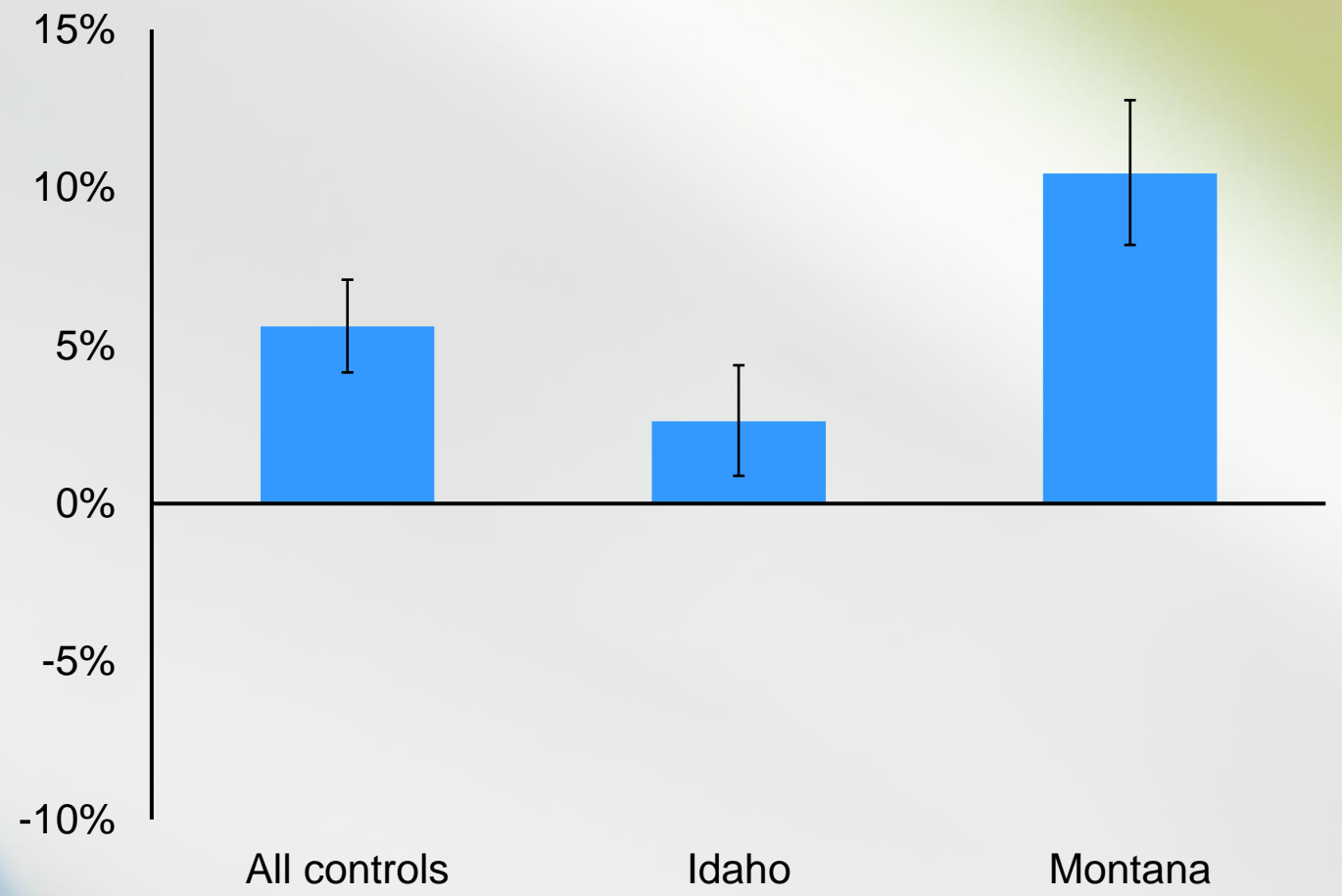
Changes in collision claim frequency associated with marijuana sales

Colorado vs. control states



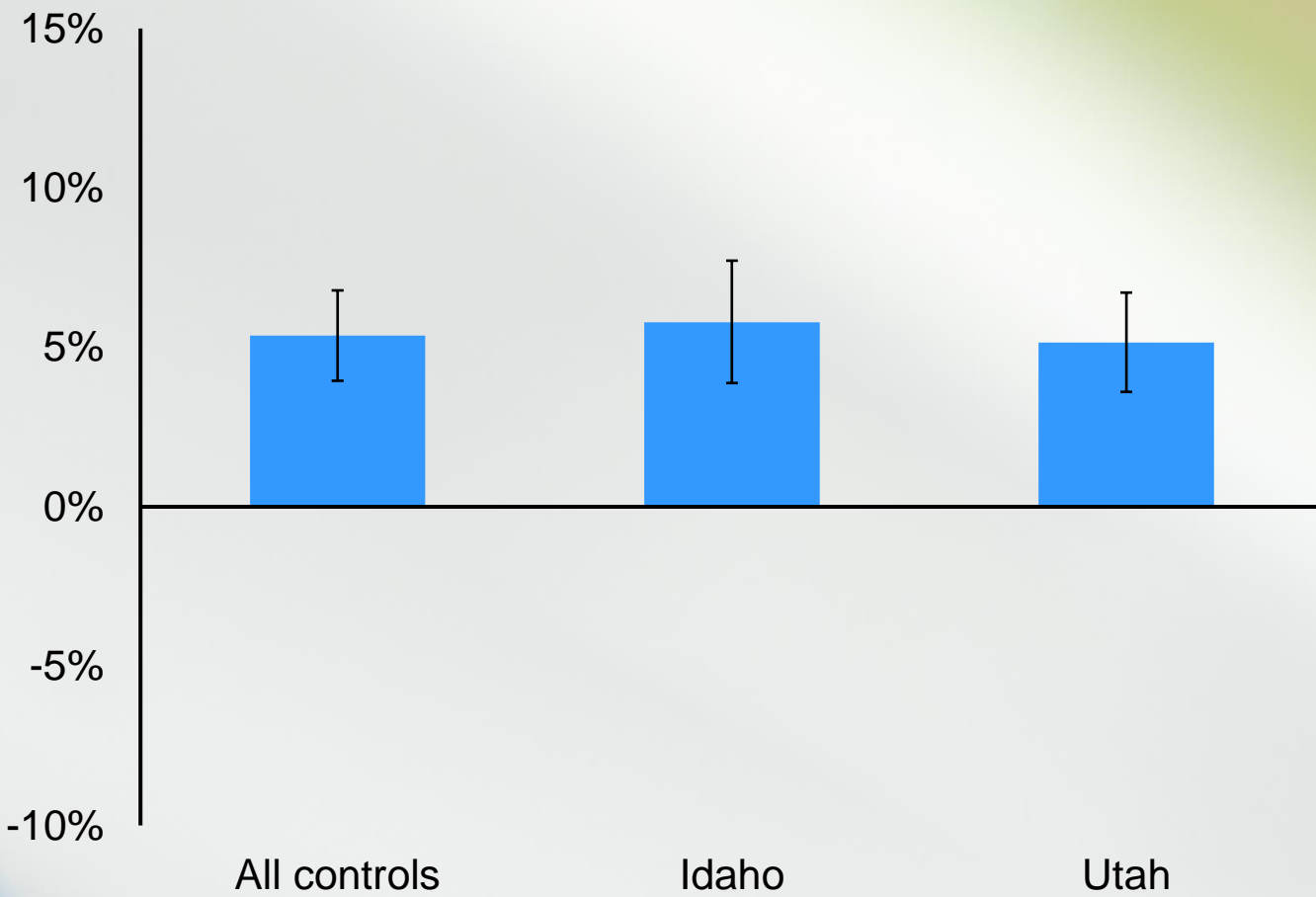
Changes in collision claim frequency associated with marijuana sales

Washington vs. control states



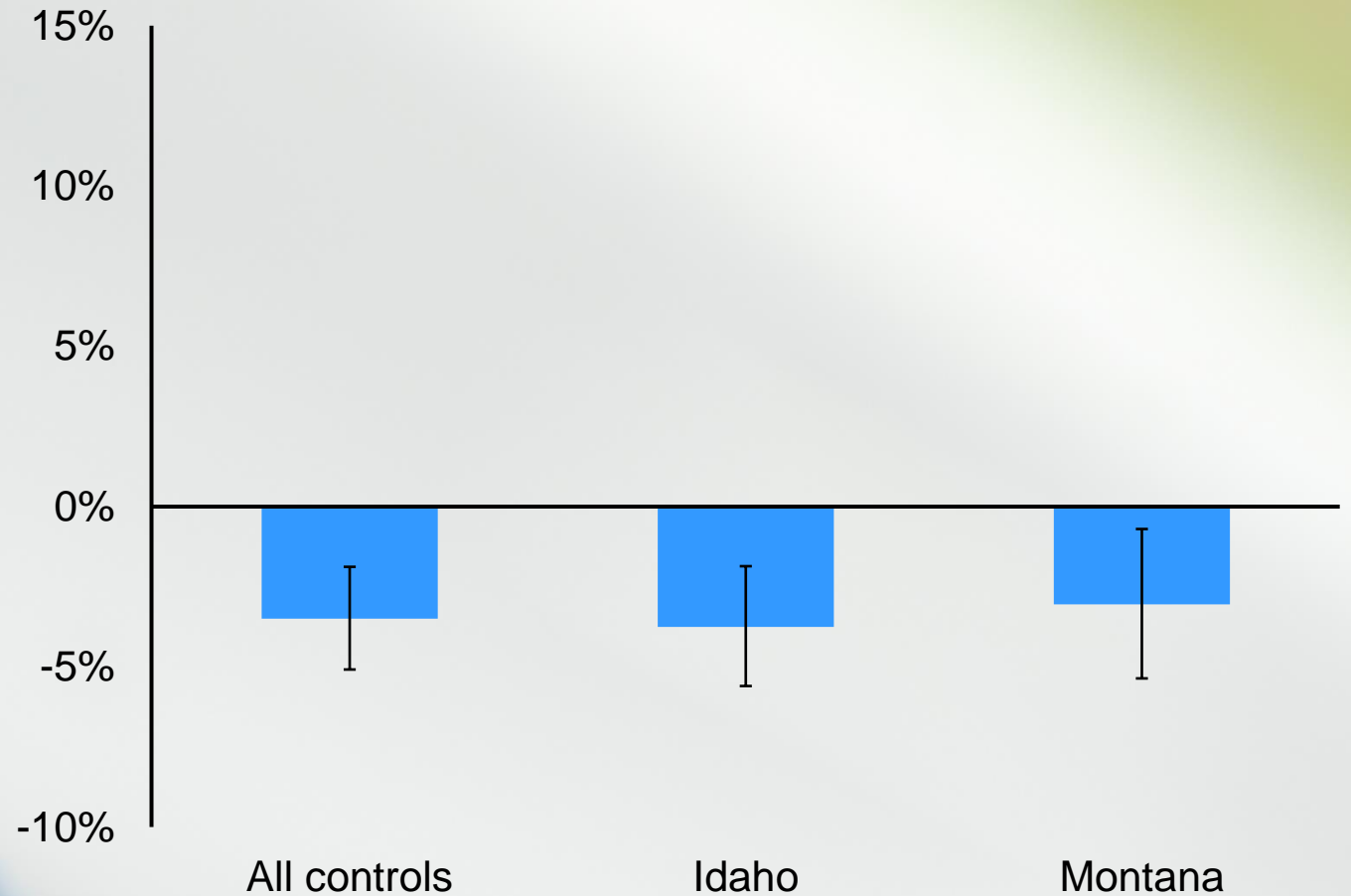
Changes in collision claim frequency associated with marijuana sales

Nevada vs. control states



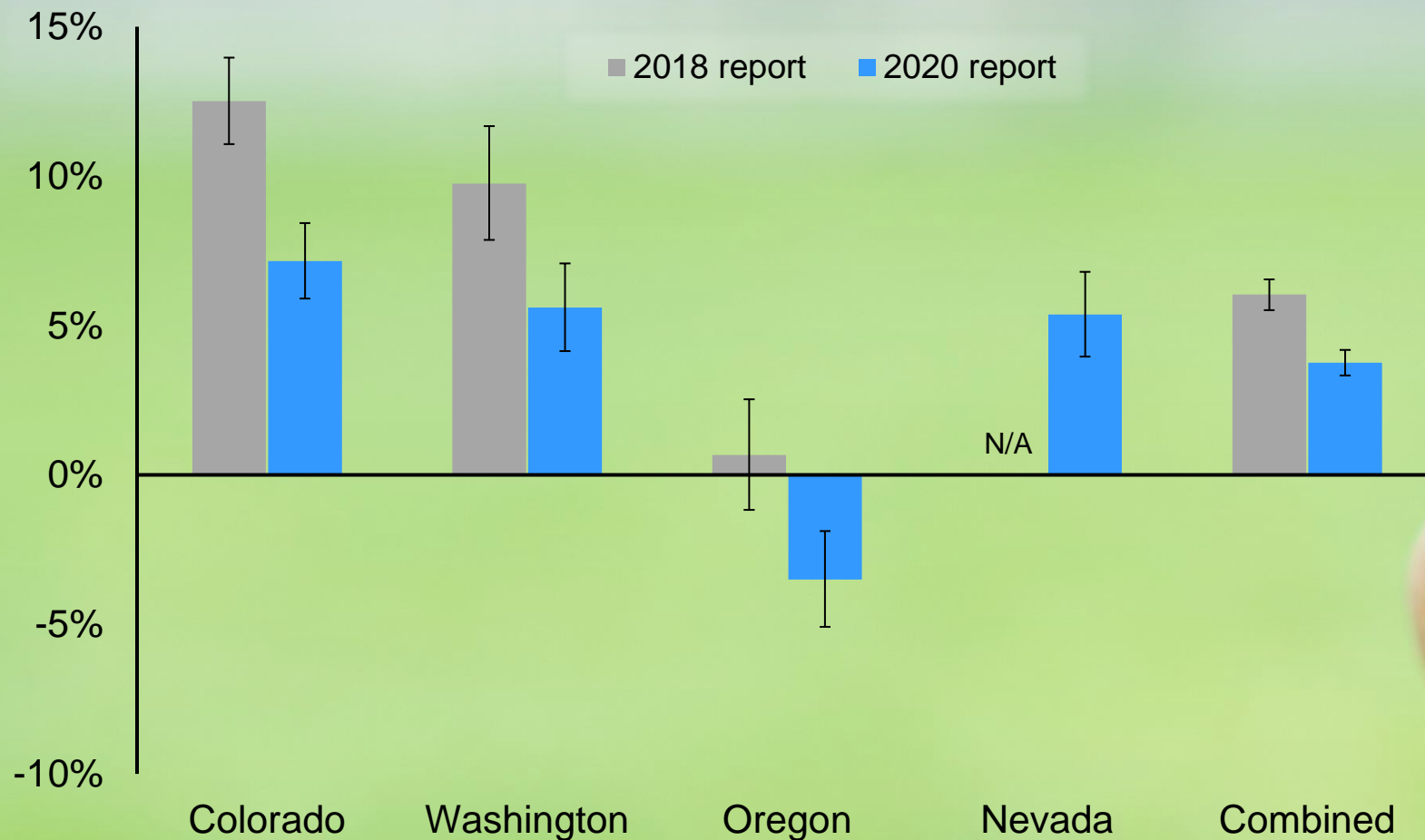
Changes in collision claim frequency associated with marijuana sales

Oregon vs. control states



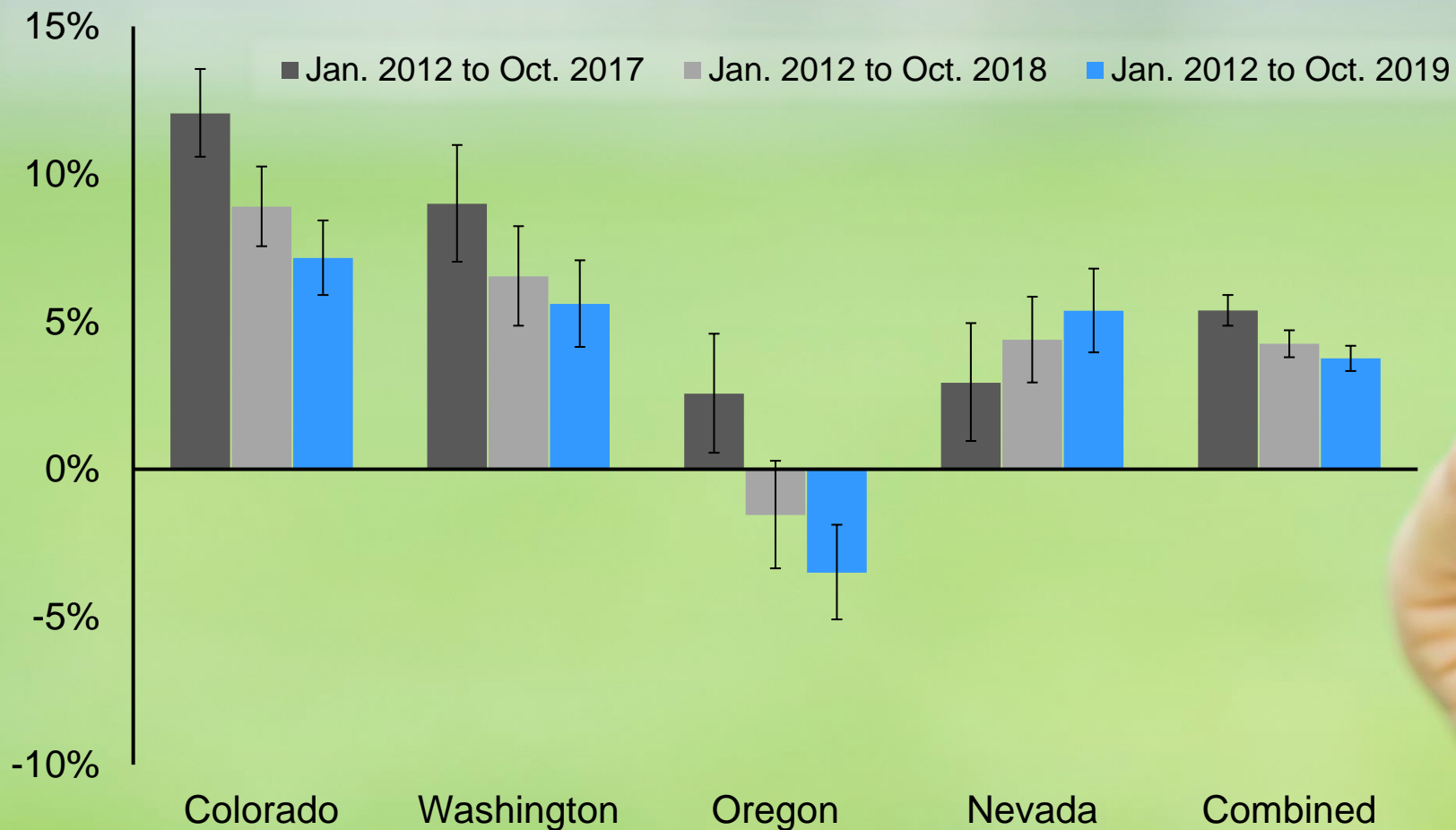
Changes in collision claim frequency associated with marijuana sales

2018 report and 2020 report



Changes in collision claim frequency associated with marijuana sales

By time range

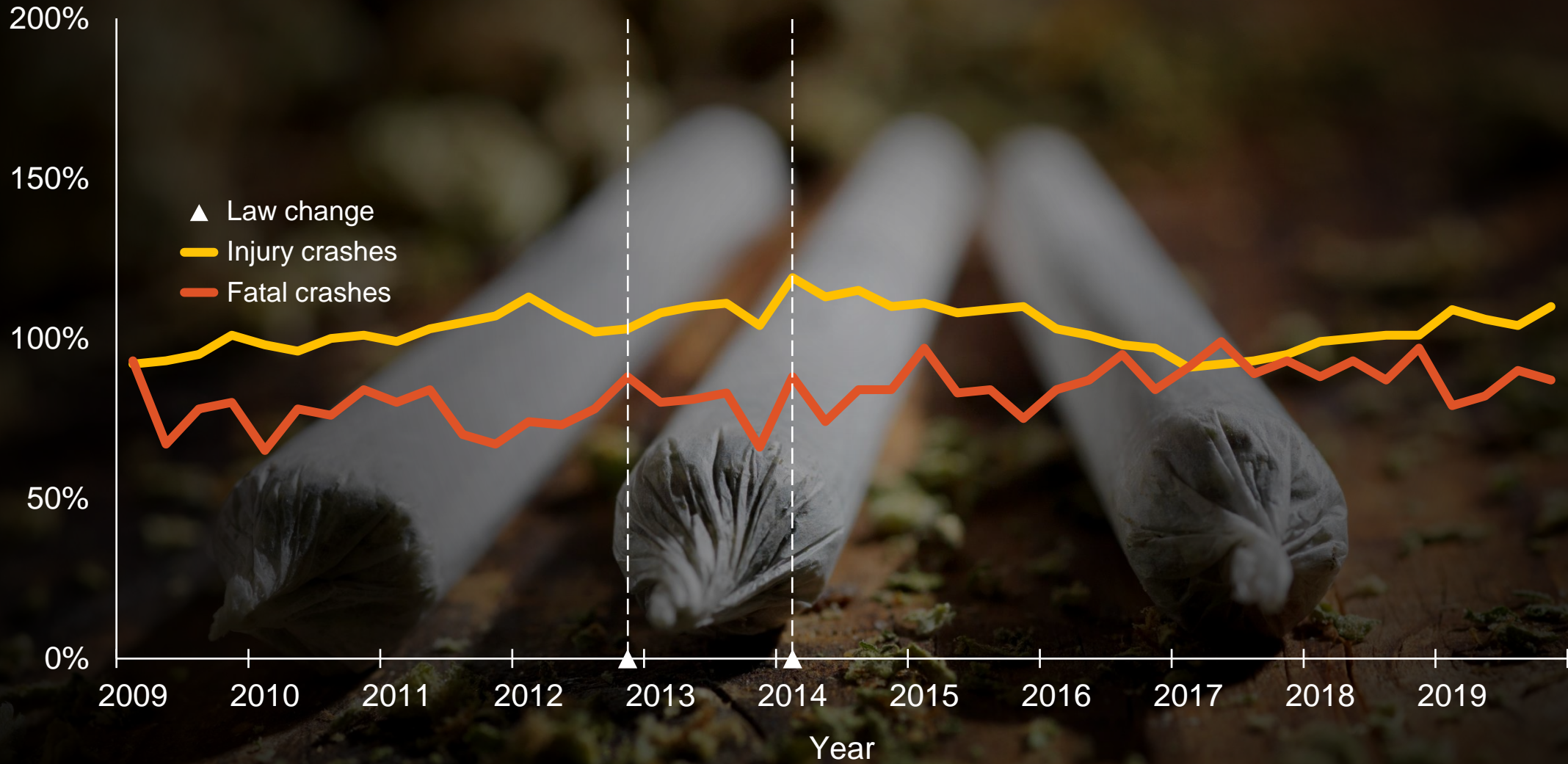


Effects of marijuana legalization on police reported crashes



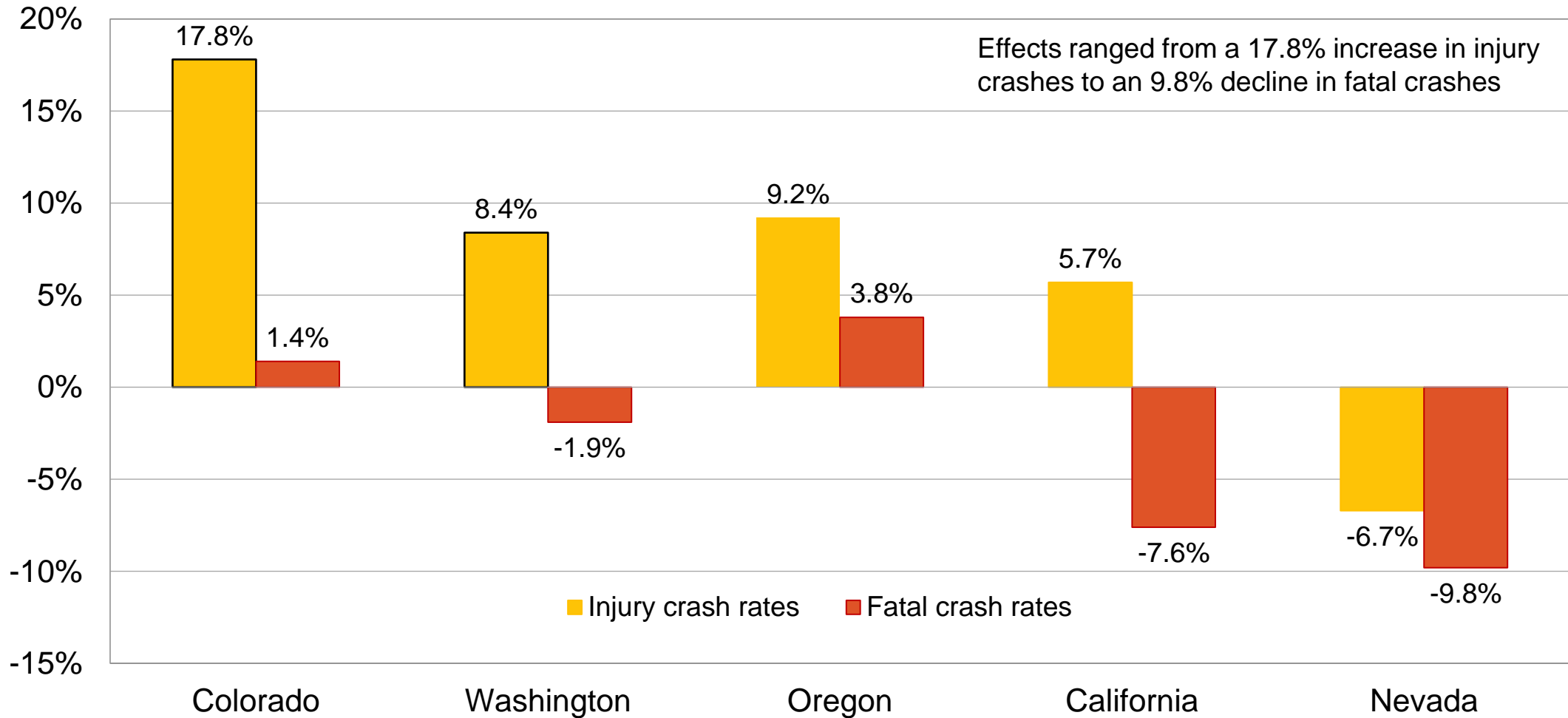
Crash rates relative to other western states, 2009–2019

Colorado



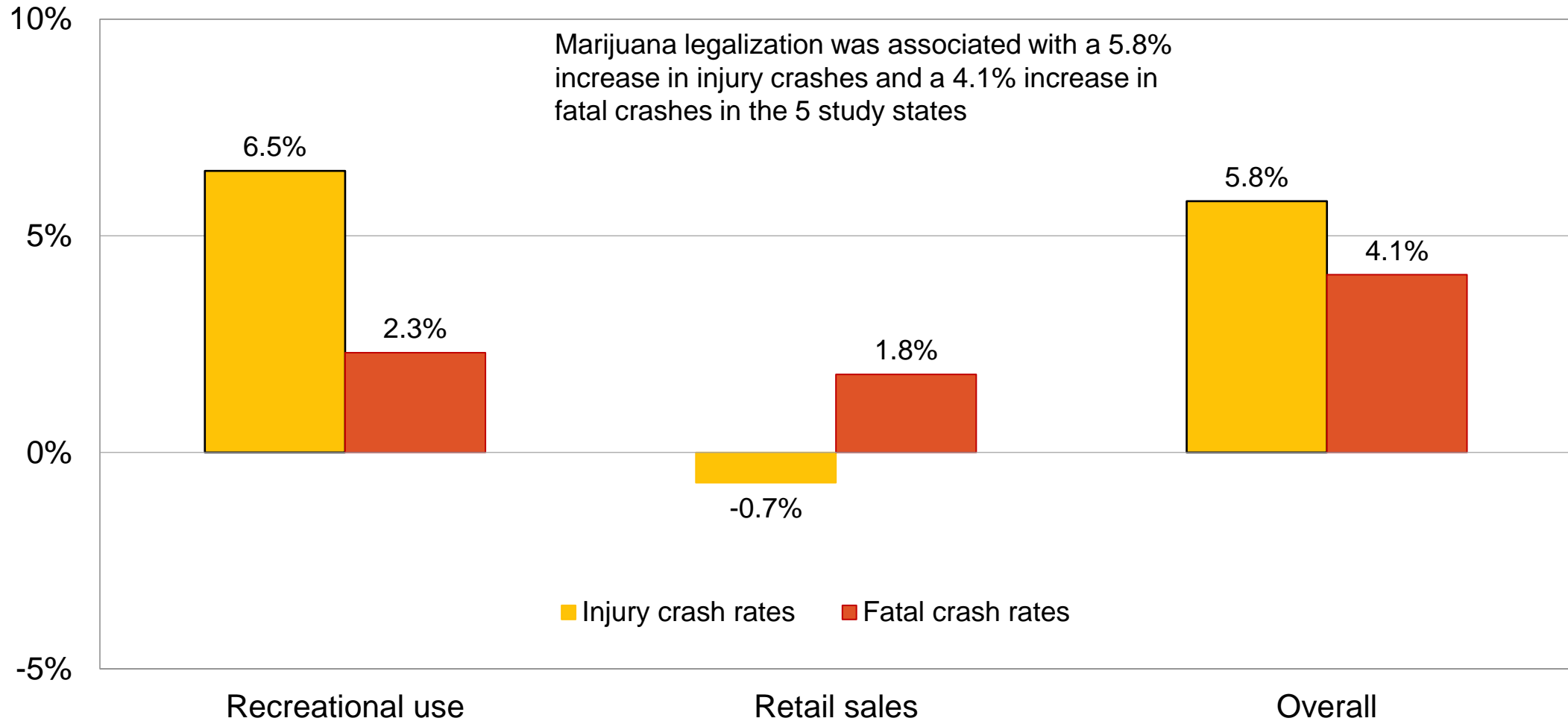
Changes in crash rates after legalized marijuana use and sales

By state



Changes in crash rates after legalized marijuana use and sales

Study states vs. comparison states

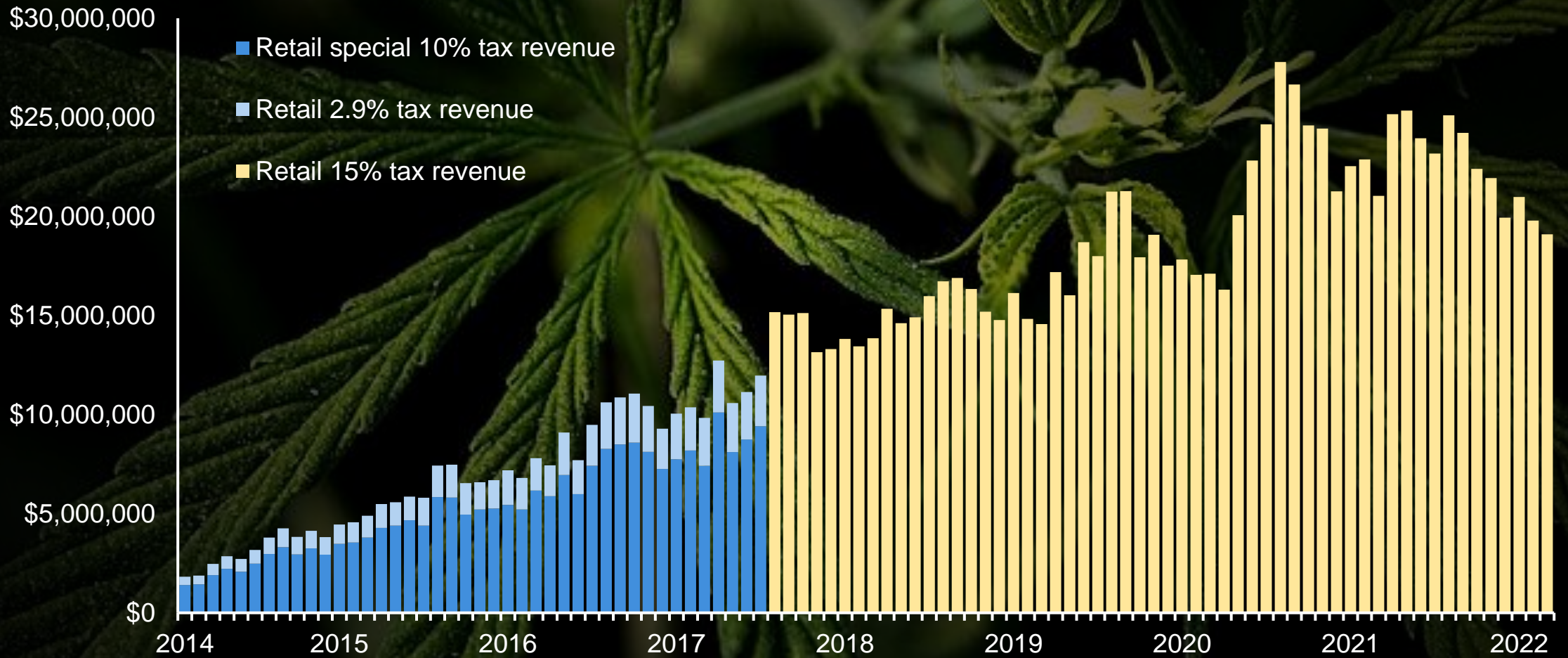


How much marijuana is being used?



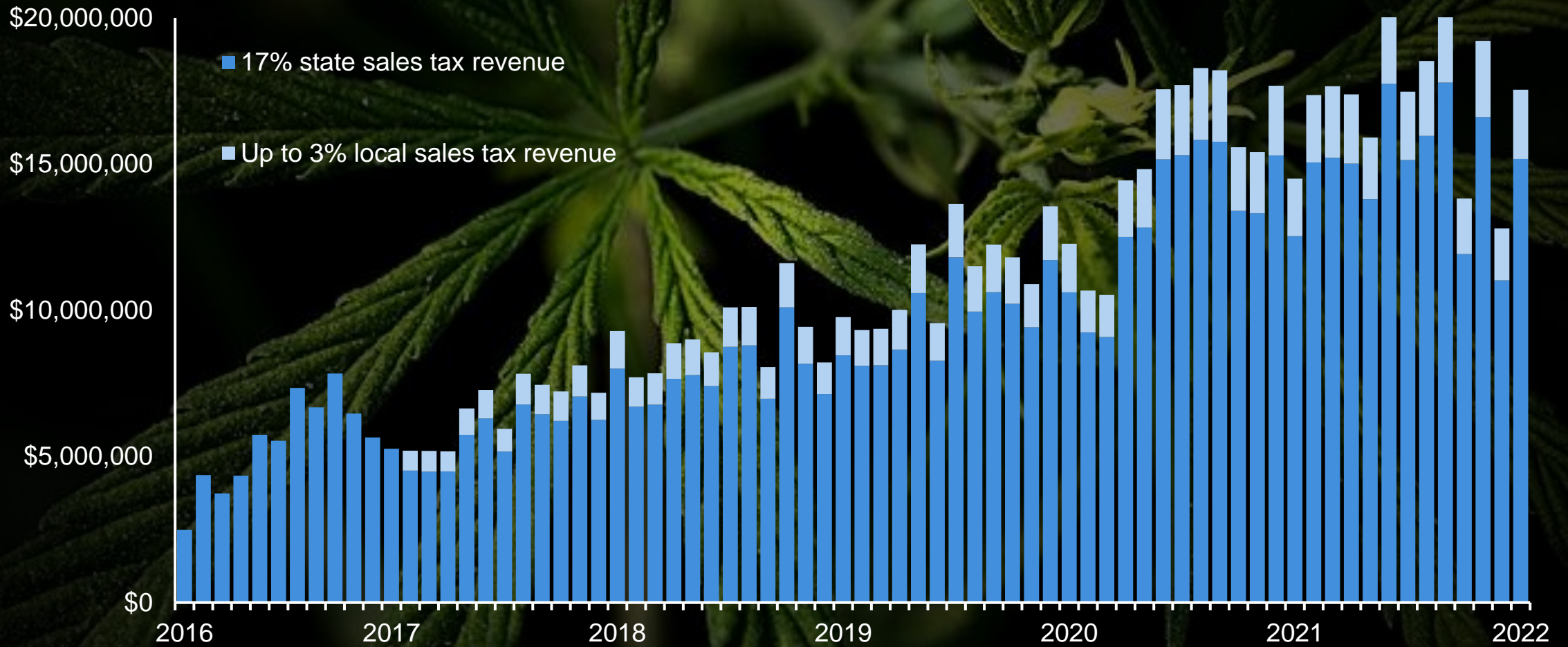
Colorado marijuana retail tax revenue

By month



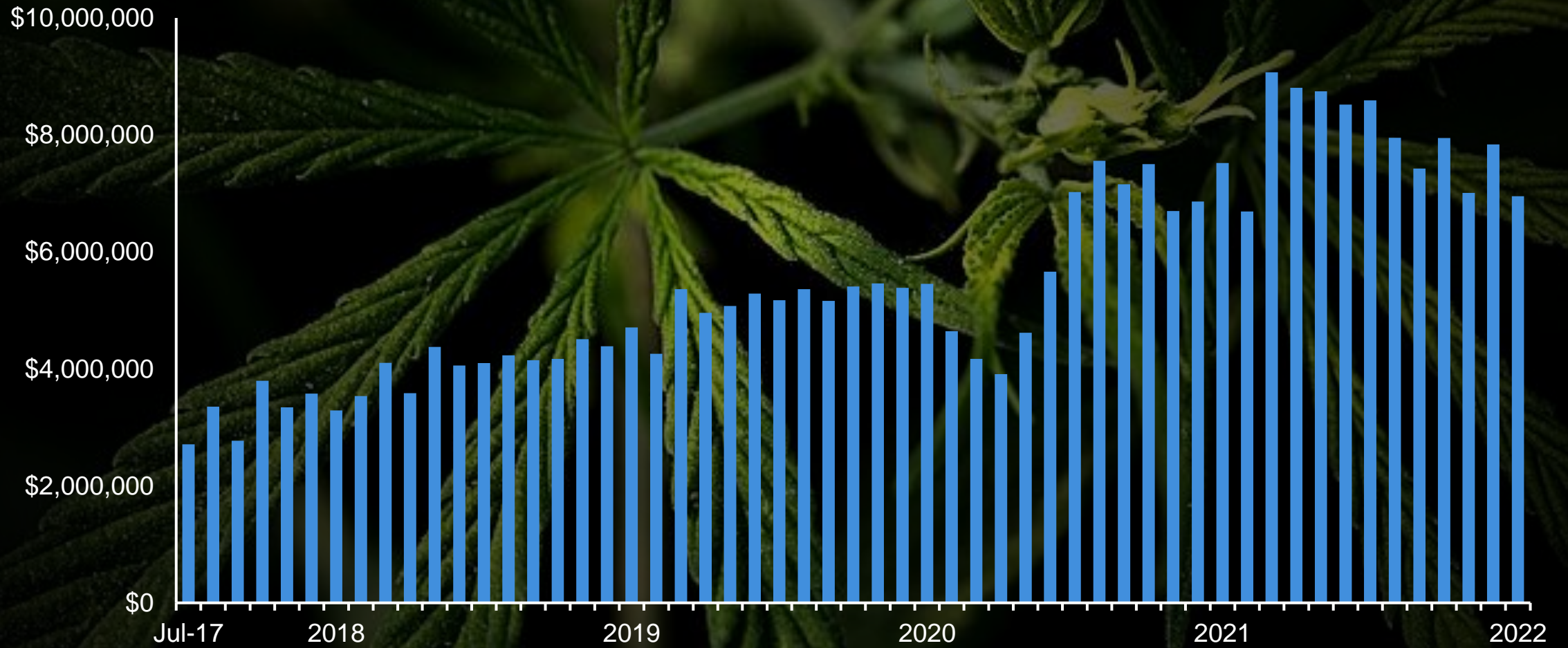
Oregon marijuana retail tax revenue

By month



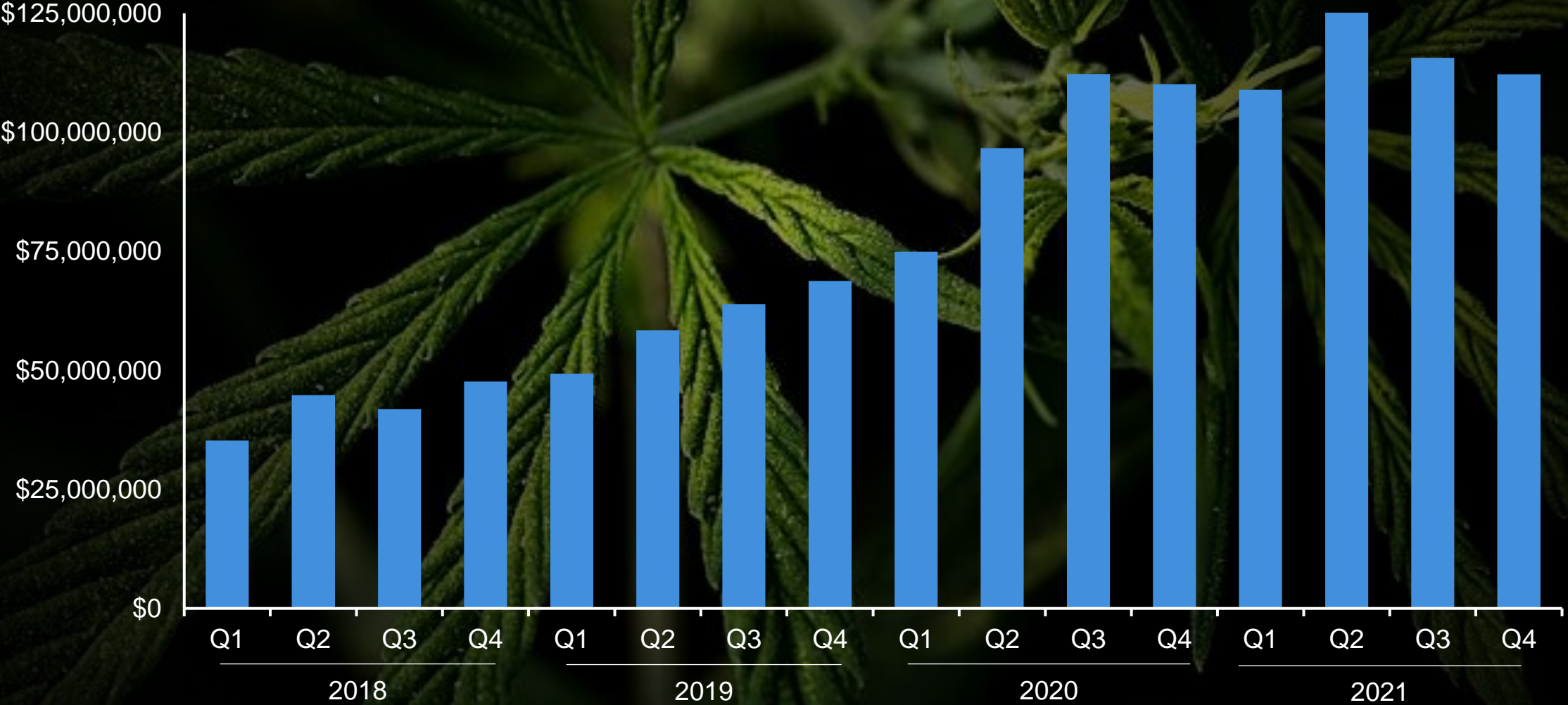
Nevada marijuana retail tax revenue

10% state sales tax



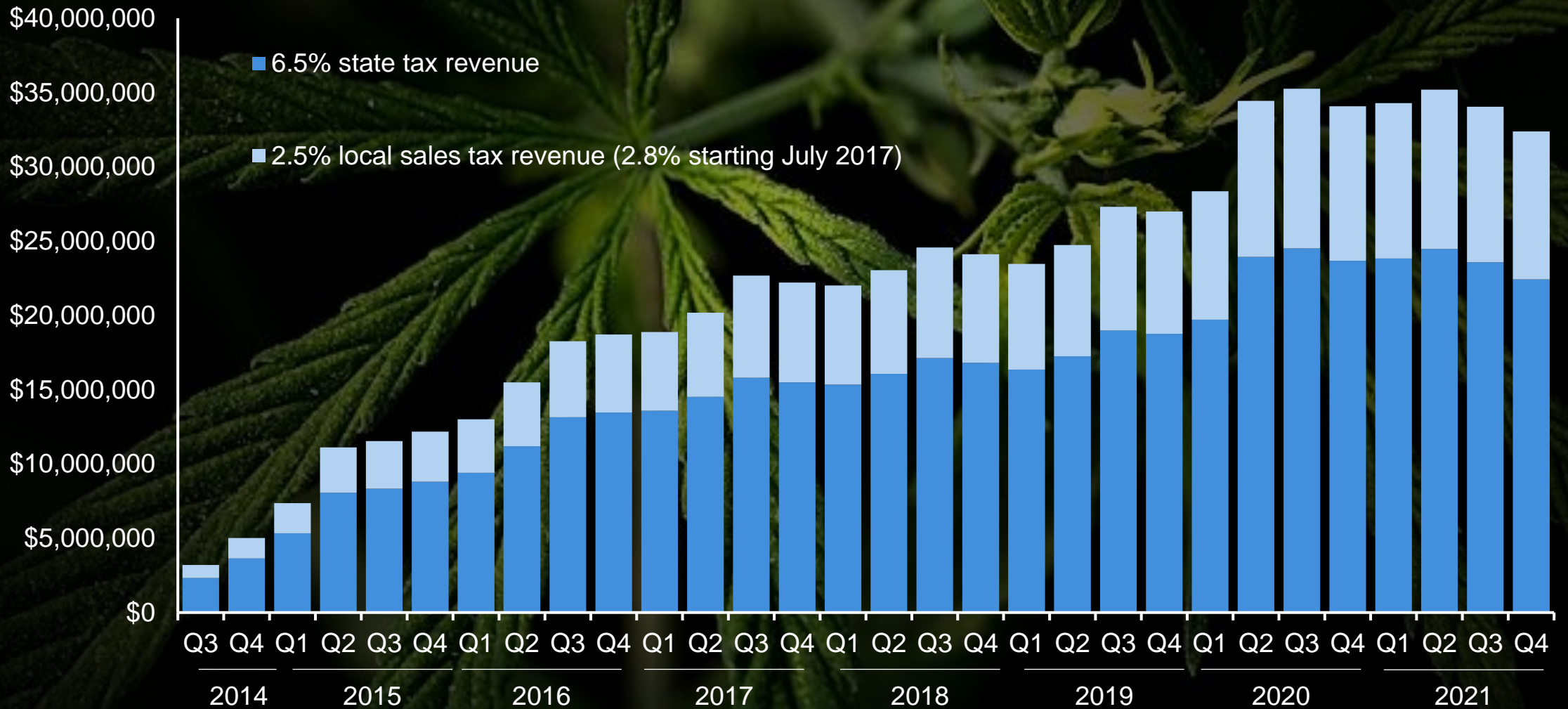
California marijuana retail tax revenue

8-10% state sales tax



Washington marijuana retail tax revenue

By quarter

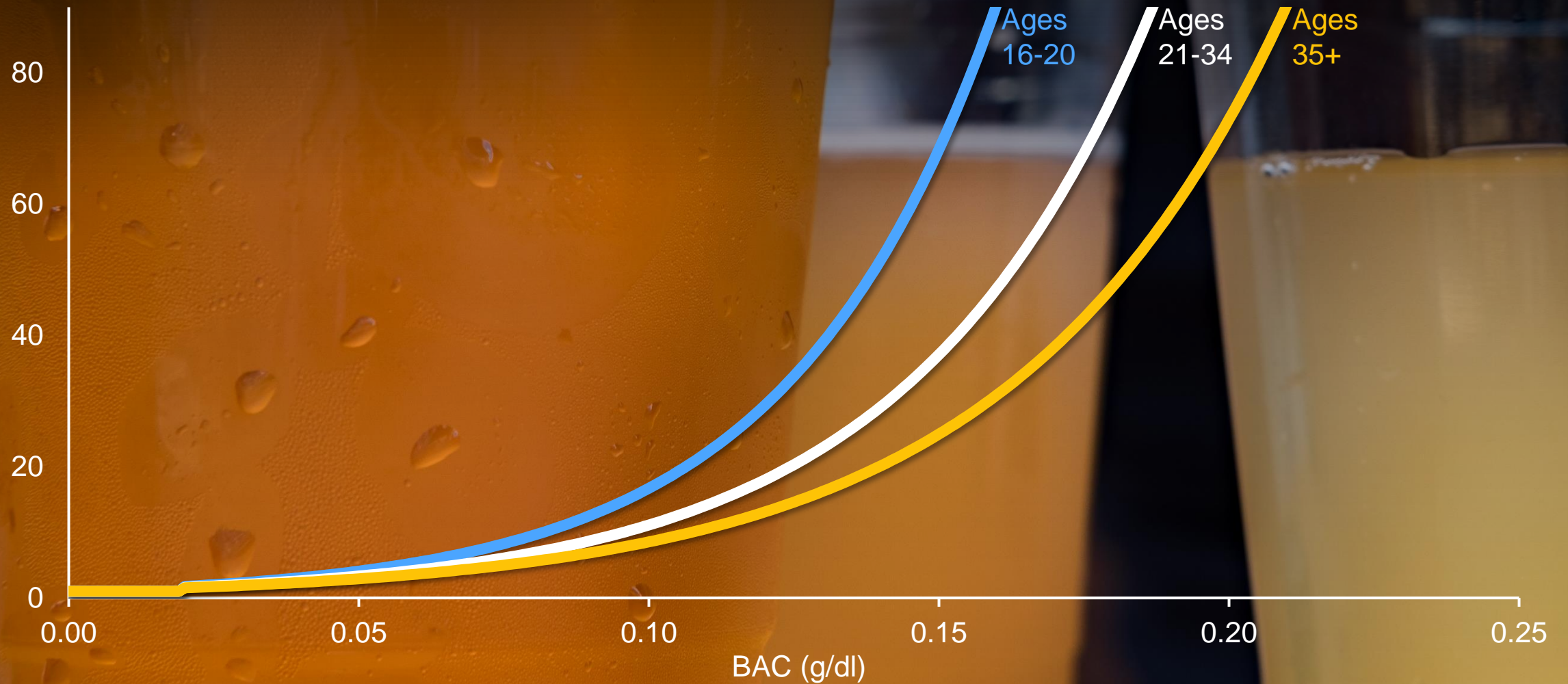


How does marijuana use affect crash risk?



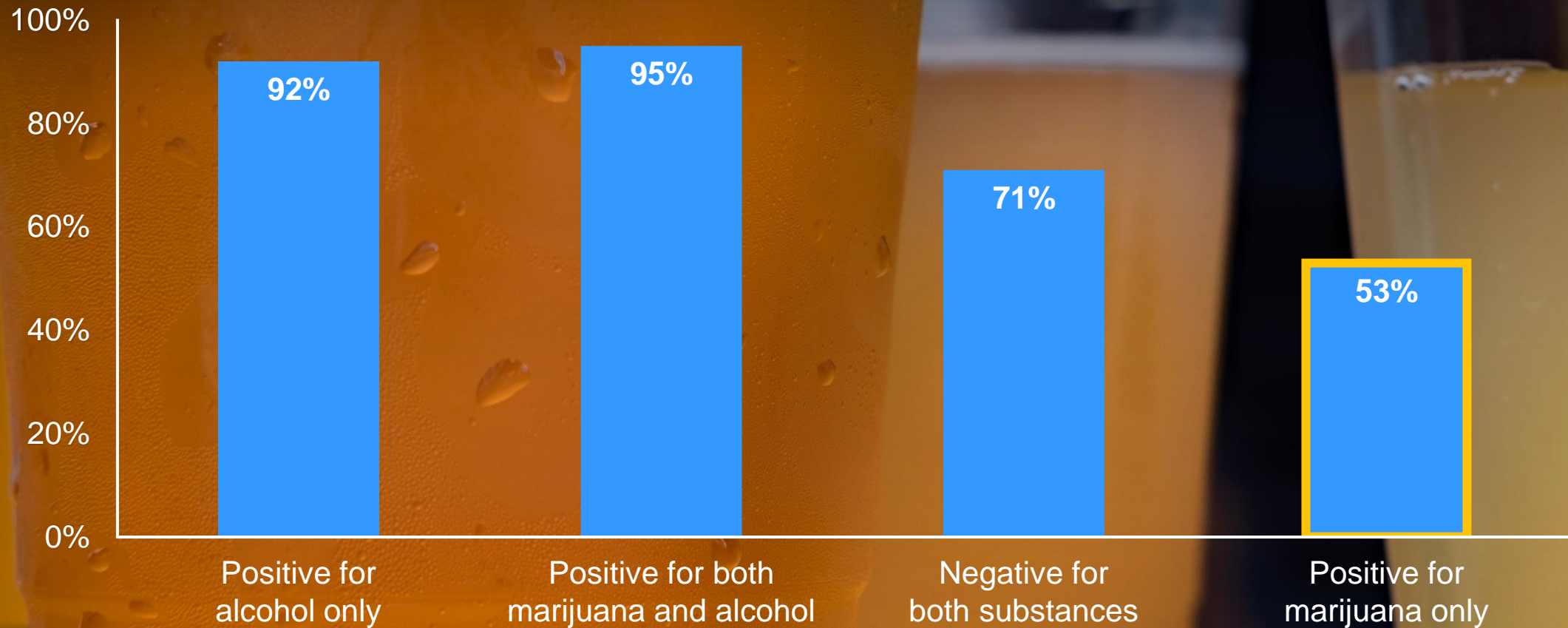
Relative risk of fatal crash involvement at various BACs compared to zero BAC

Passenger vehicle drivers by age (Voas et al., 2012)



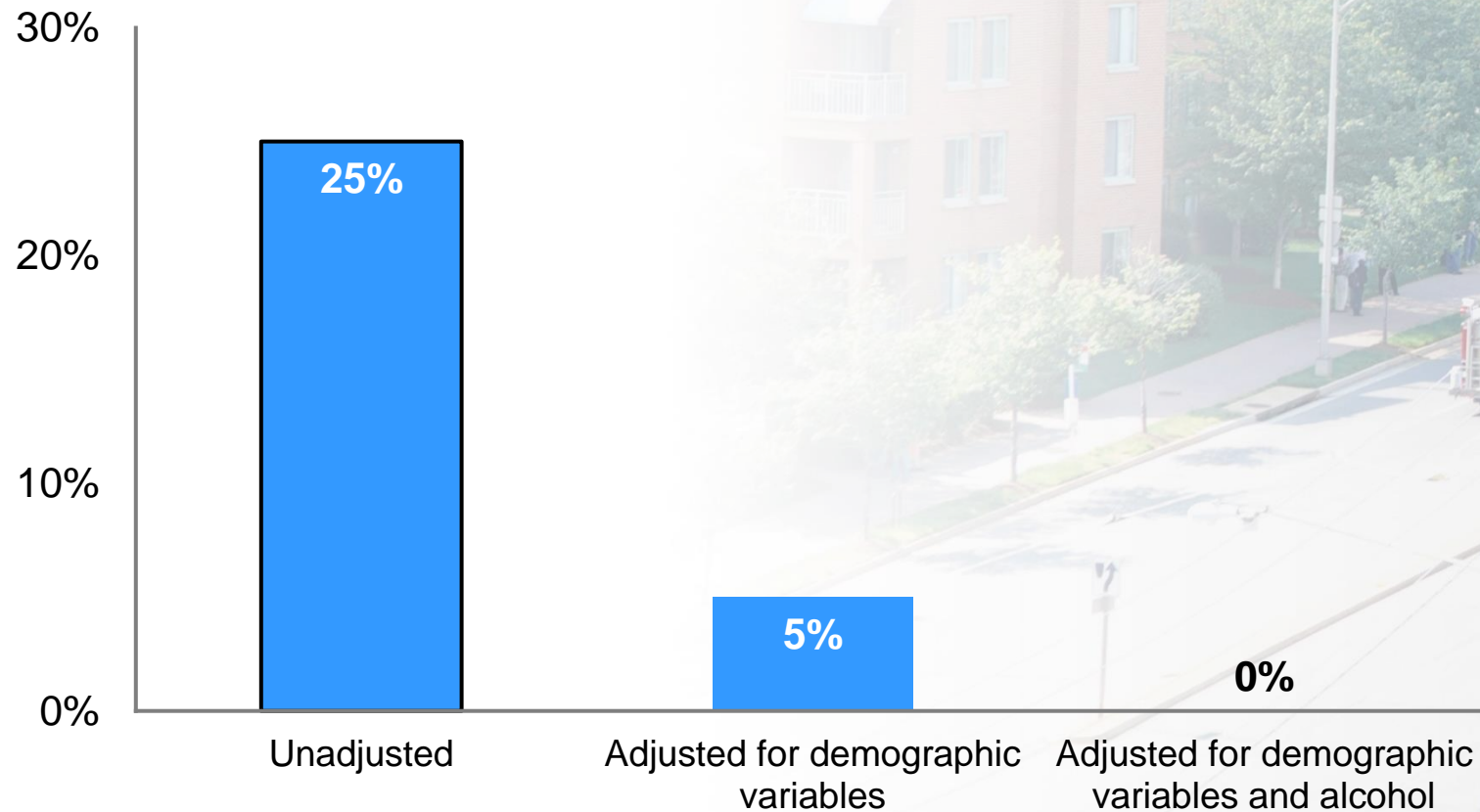
1985 study: Drivers killed in crashes were more likely to be responsible if they used alcohol, **but not marijuana alone**

Drivers who were responsible for their crashes



Federal study published in 2016 found no increase in crash risk associated with marijuana use

Increase in crash risk



How does marijuana use affect crash risk?

- ▶ Data collection sites

Oregon Health & Sciences University

University of California Davis Medical Center

Denver Health Medical Center

- ▶ Study participants

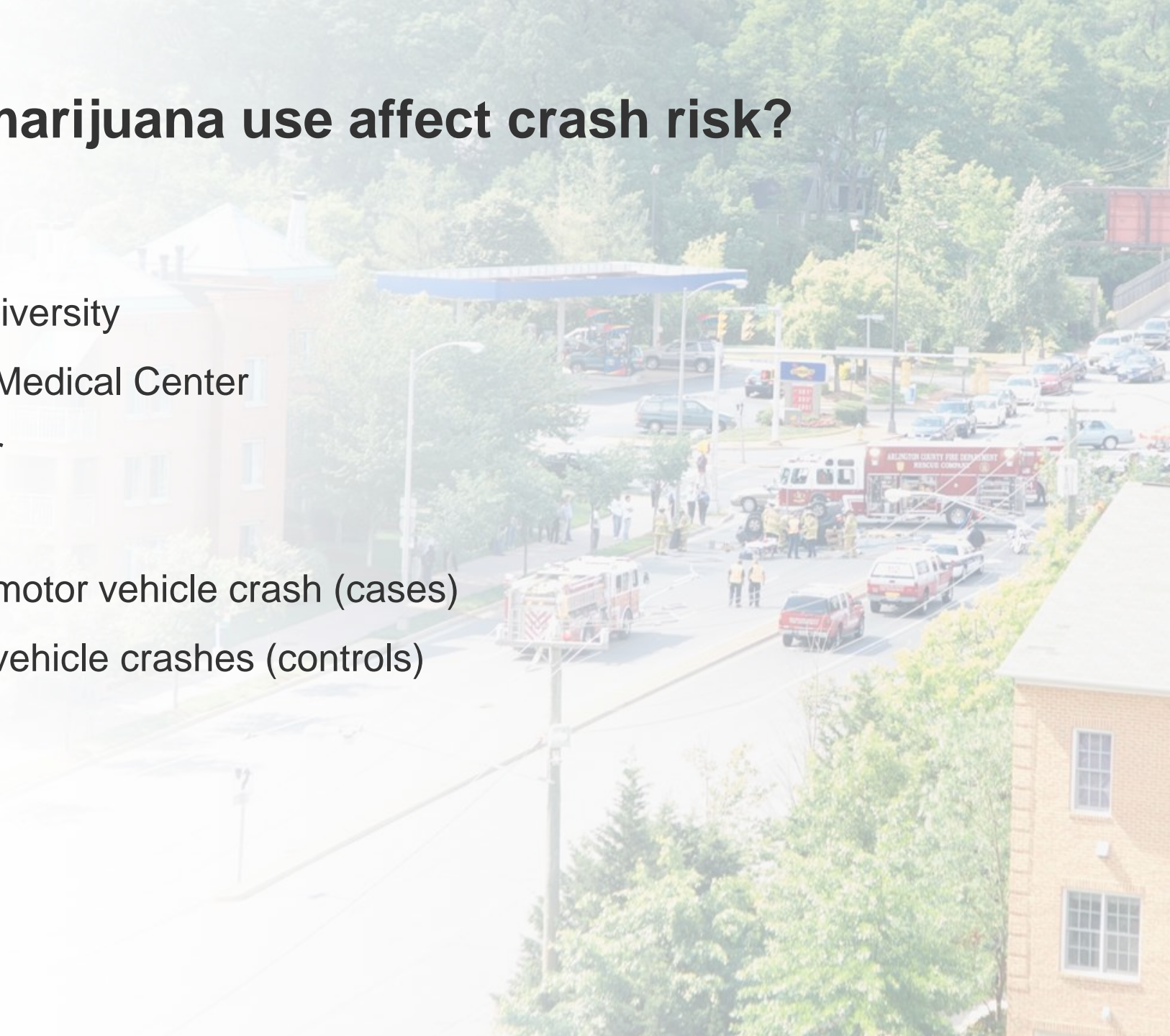
Injured drivers who were in a motor vehicle crash (cases)

Medical patients not in motor vehicle crashes (controls)

- ▶ Data collection

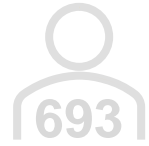
Blood and breath samples

Self-reported substance use

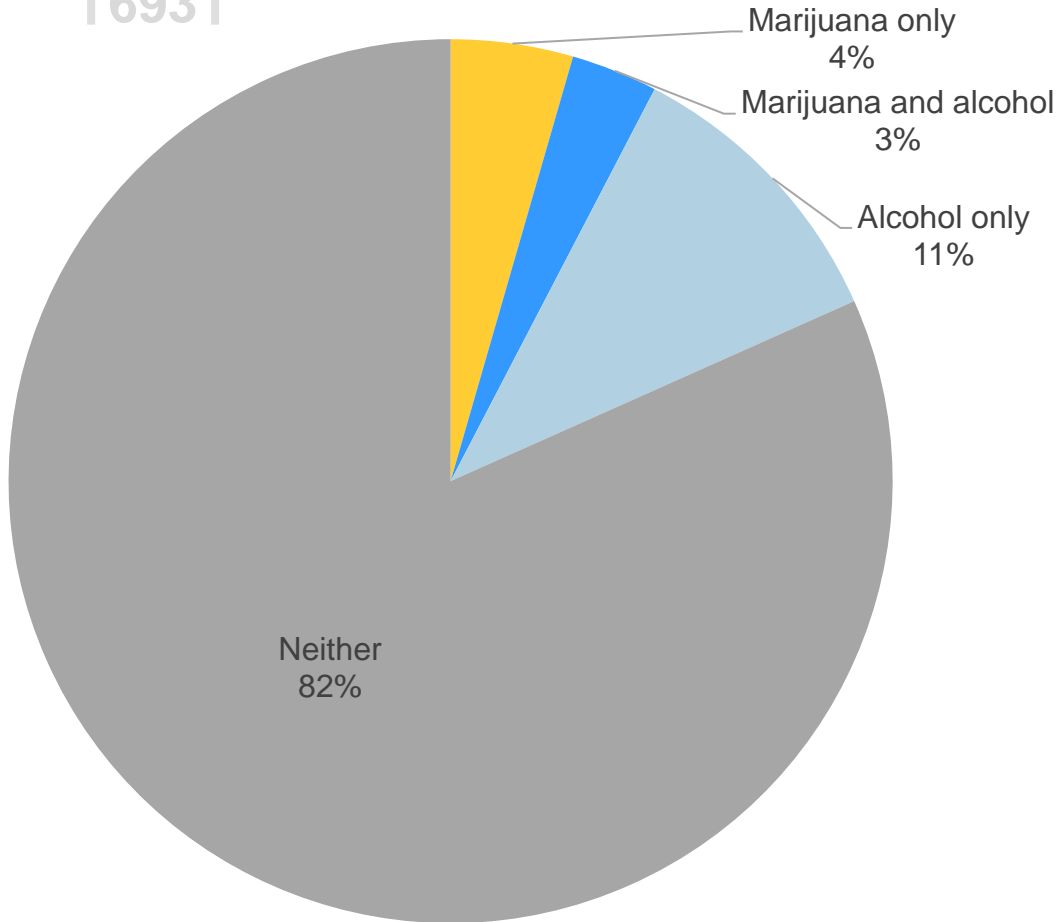


Self-reported substance use within 8 hours

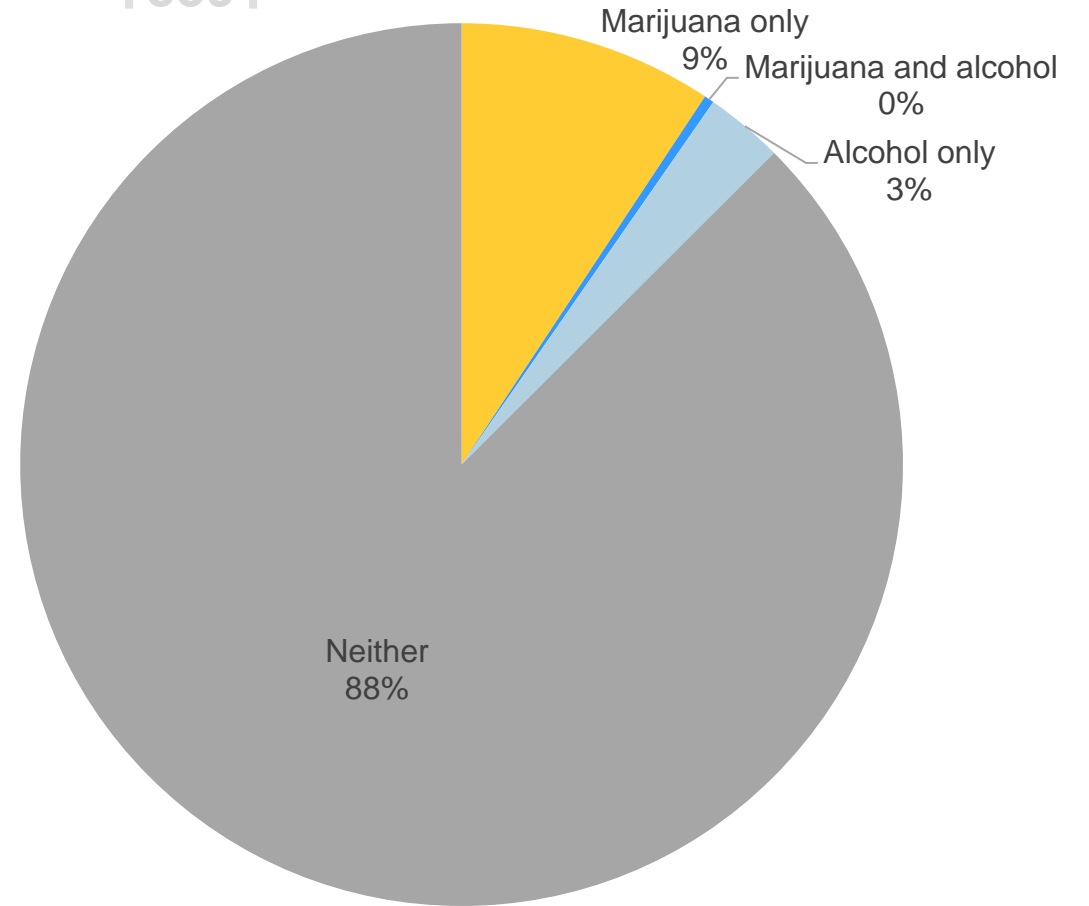
Crash cases vs. medical controls



Crashed drivers



Control drivers

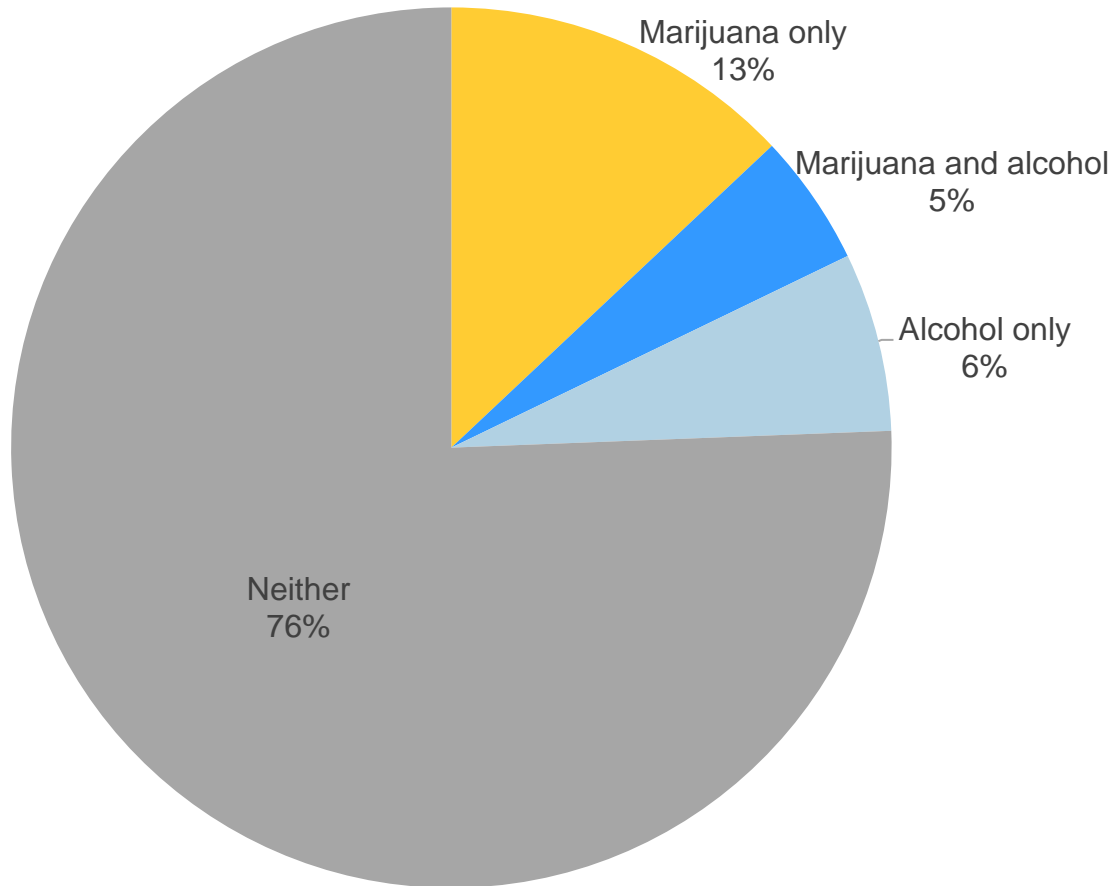


Lab results

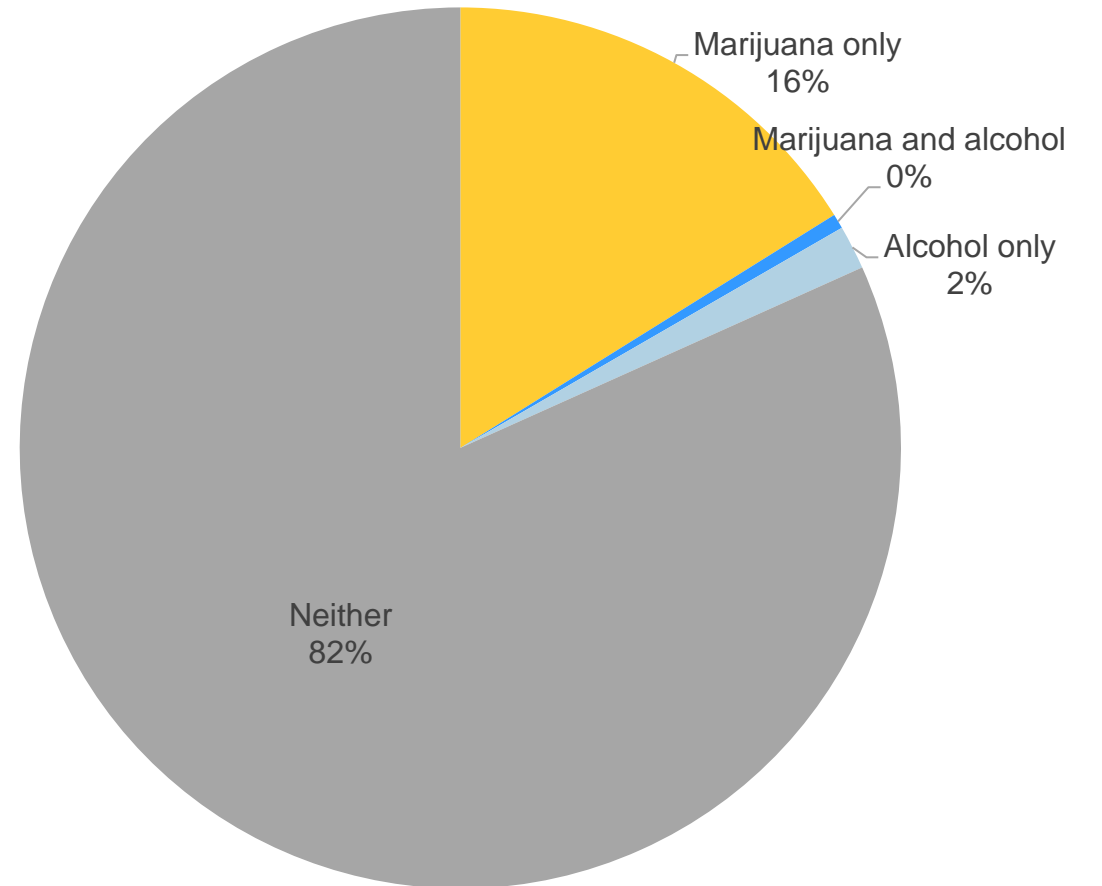
Crash cases vs. medical controls



Crashed drivers



Control drivers



Alcohol



Measuring marijuana impairment remains a challenge

Marijuana impairment

- ▶ Not defined by the amount of marijuana in the body
- ▶ No validated test of functional impairment
- ▶ Portable roadside devices for drug testing vary widely in their reliability and validity

Alcohol impairment

- ▶ Predictable relationship between alcohol in the body and impairment
- ▶ Well-validated field sobriety test
- ▶ Federal government has established model specifications for portable and evidentiary breath testing devices

Percent of traffic deaths involving alcohol-impaired drivers

1982-2021



Percent of traffic deaths involving alcohol-impaired drivers

1982-2021



Insurance Institute for Highway Safety
Highway Loss Data Institute

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THANK YOU



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