



Marijuana and driving in the United States: prevalence, risks, and laws

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iihs.org

IIHS is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from crashes on the nation's roads.

HLDI shares this mission by analyzing insurance data representing human and economic losses from crashes and other events related to vehicle ownership.

Both organizations are wholly supported by auto insurers.

Where are we?



Washington, DC



Arlington, VA



Ruckersville, VA

Overview of marijuana and driving

- Alcohol-impaired driving provides a useful comparison for what we would like to know about marijuana and driving
- Measuring marijuana in a driver's system
- Prevalence of marijuana among drivers
- Effects of marijuana on driving performance and crash risk
- Laws governing use of marijuana and driving after using marijuana

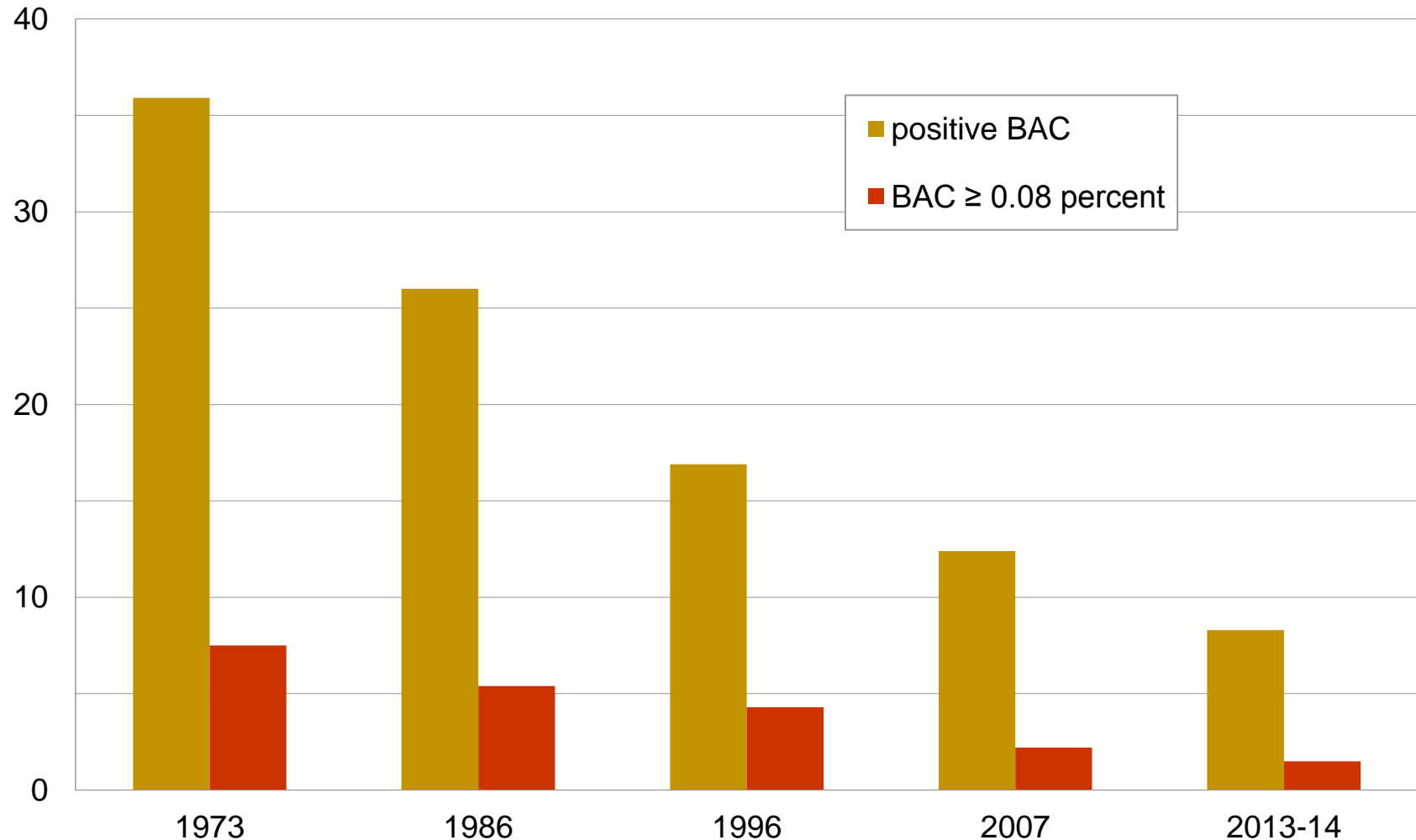


Alcohol-impaired driving provides a useful comparison

Measuring alcohol impairment

- Blood alcohol concentration (BAC) describes amount of alcohol in blood, e.g., 0.08 percent BAC indicates 80 mg of alcohol per 100 ml of blood
- BAC can be measured precisely by analyzing exhaled breath
- Following arrest for alcohol-impaired driving, evidentiary breath test is inexpensive, easy to administer, and produces accurate and precise measure of BAC
- Relationship between BAC and amount of degradation in driving performance and driving-related skills and functions is well established across population

Percent of weekend late nighttime drivers with positive alcohol test in national roadside surveys

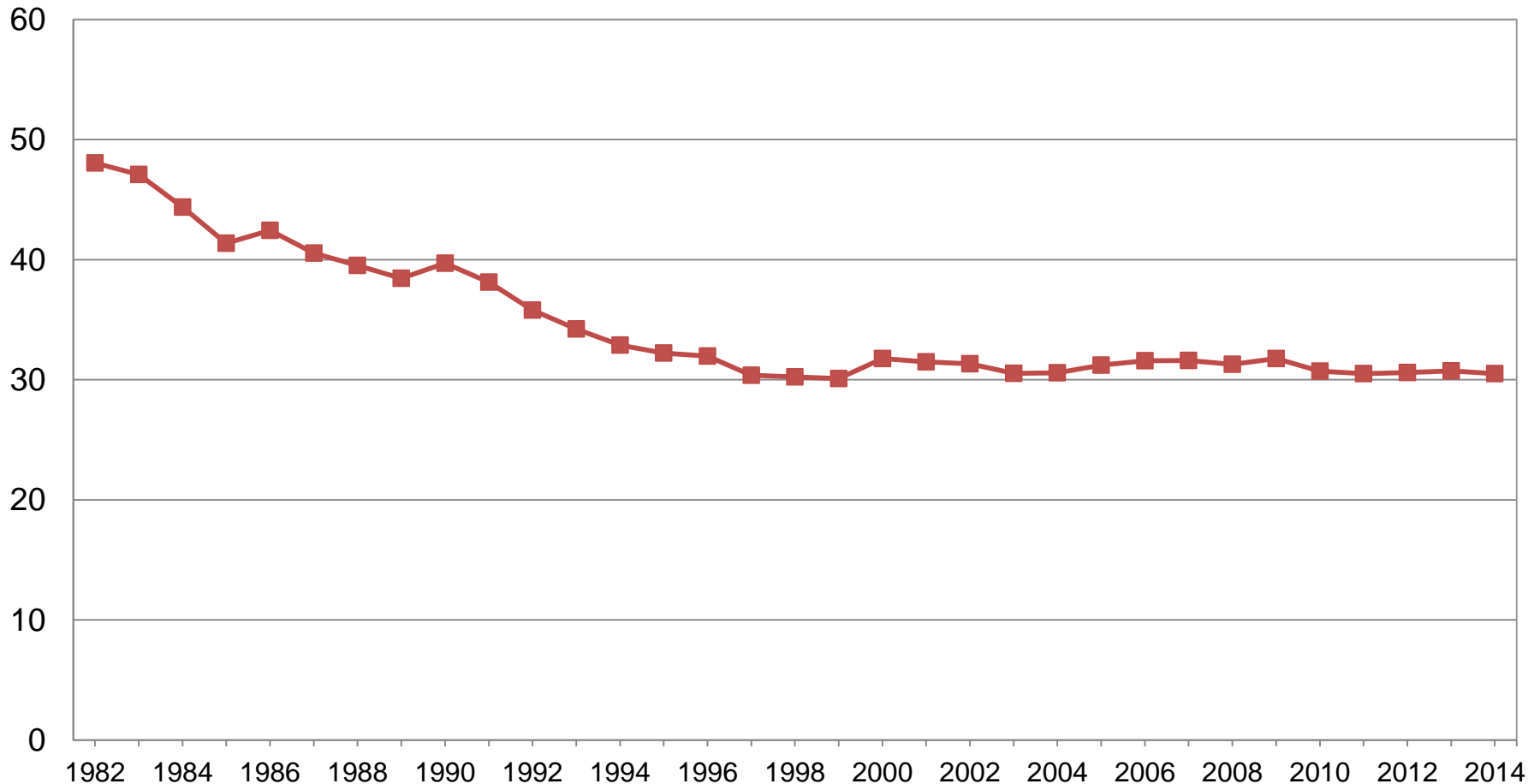


Information on BACs in fatal crashes

- In national database of fatal crashes, BACs were reported for 71 percent of fatally injured drivers, 27 percent of surviving drivers, and 47 percent of all drivers in 2014
- However, BACs are imputed for drivers with missing BACs so that actual or imputed BACs are available for all drivers
- In 2014, 21 percent of drivers in fatal crashes had BACs of 0.08 percent or higher

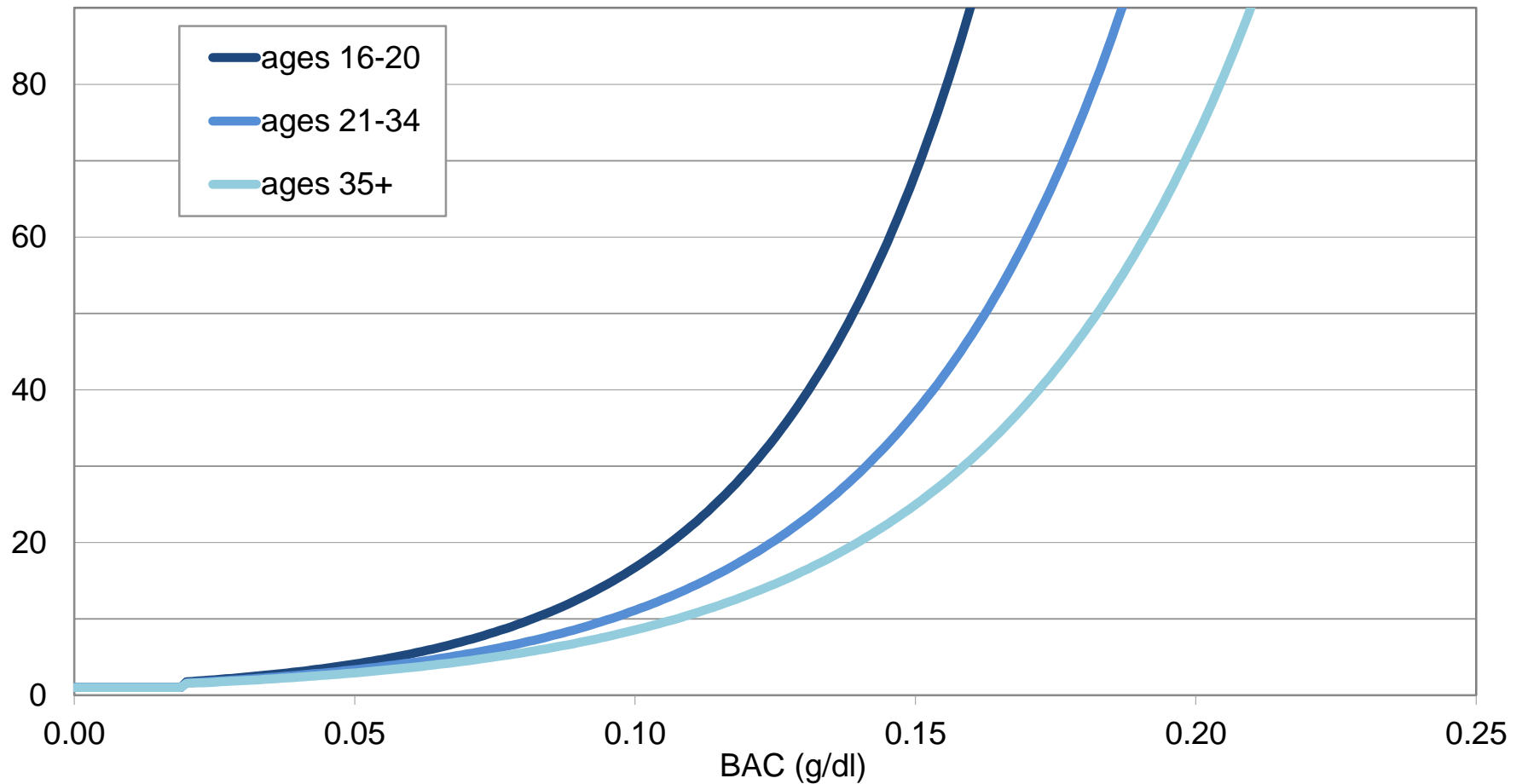
Percent of crash deaths involving at least one driver with BAC ≥ 0.08 percent

By calendar year, 1982-2014



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

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



Well-established and enforceable body of laws prohibiting alcohol-impaired driving

- In all states, *per se* laws make it a crime to drive with BAC of 0.08 percent or higher
- Regardless of alcohol test result, police officer may charge person with alcohol-impaired driving based on observed driving and behavioral signs of impairment after driver is stopped
- All states have strong penalties for drivers convicted of driving while intoxicated (DUI)
- Most states have administrative driver license suspension laws for refusing or failing alcohol tests
 - License removed after arrest regardless of court outcome

Current knowledge about marijuana and driving

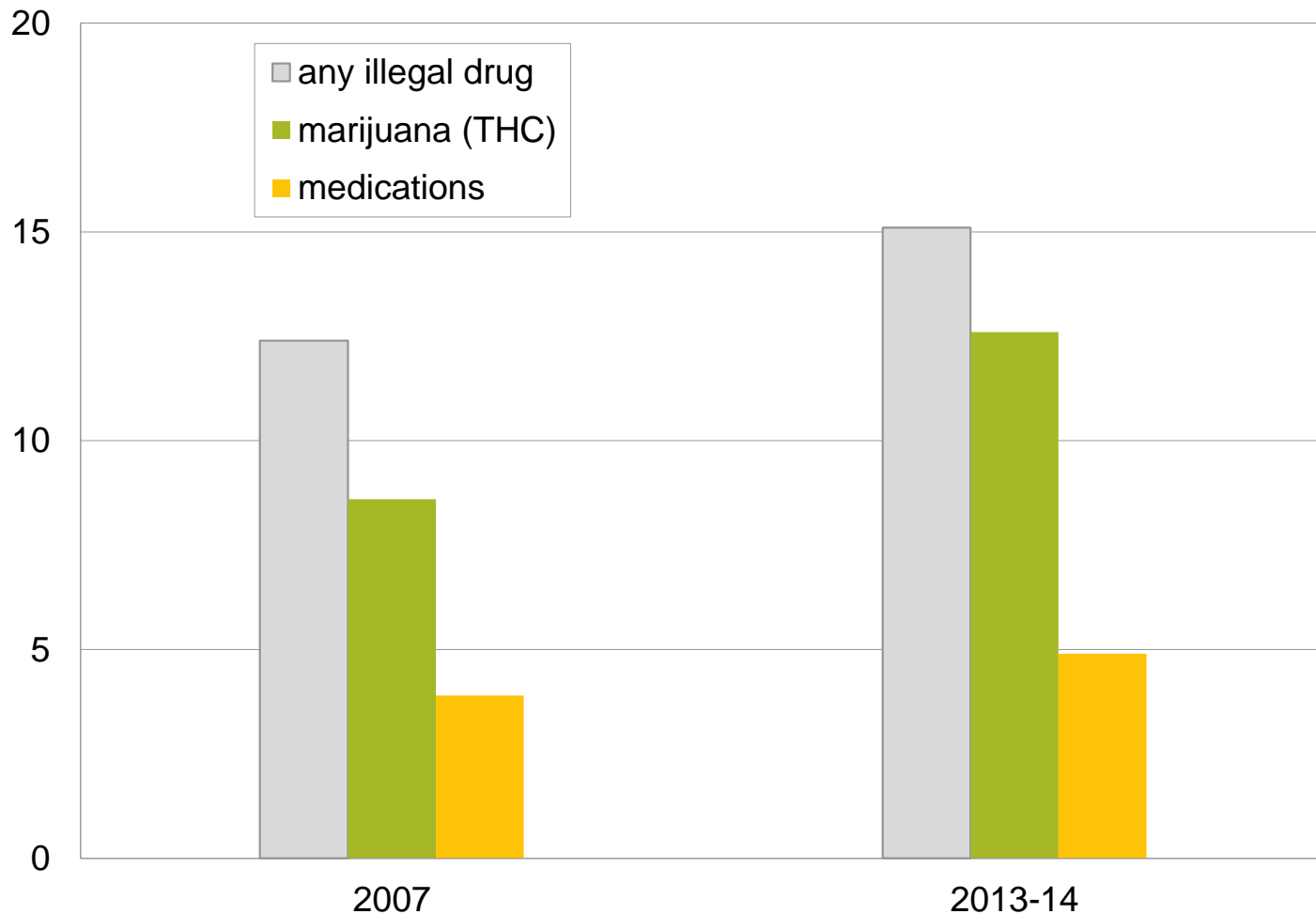


Measuring marijuana in a driver's system

- Absorption, action, and elimination from body difficult to predict and considerable difference across individuals
 - Unknown sensitivity of tests to repeated use of marijuana
- Tests may be based on THC (psychoactive ingredient of cannabis) or metabolites that may persist in blood, urine, or oral fluid for several weeks following use
- Blood far superior to urine in indicating drug is active, although blood test also imperfect measure of recent use
- Oral fluid increasingly regarded as readily available and unobtrusive alternative for testing drugs
 - Research to date shows good correspondence with blood
- No evidence-based threshold for impairment

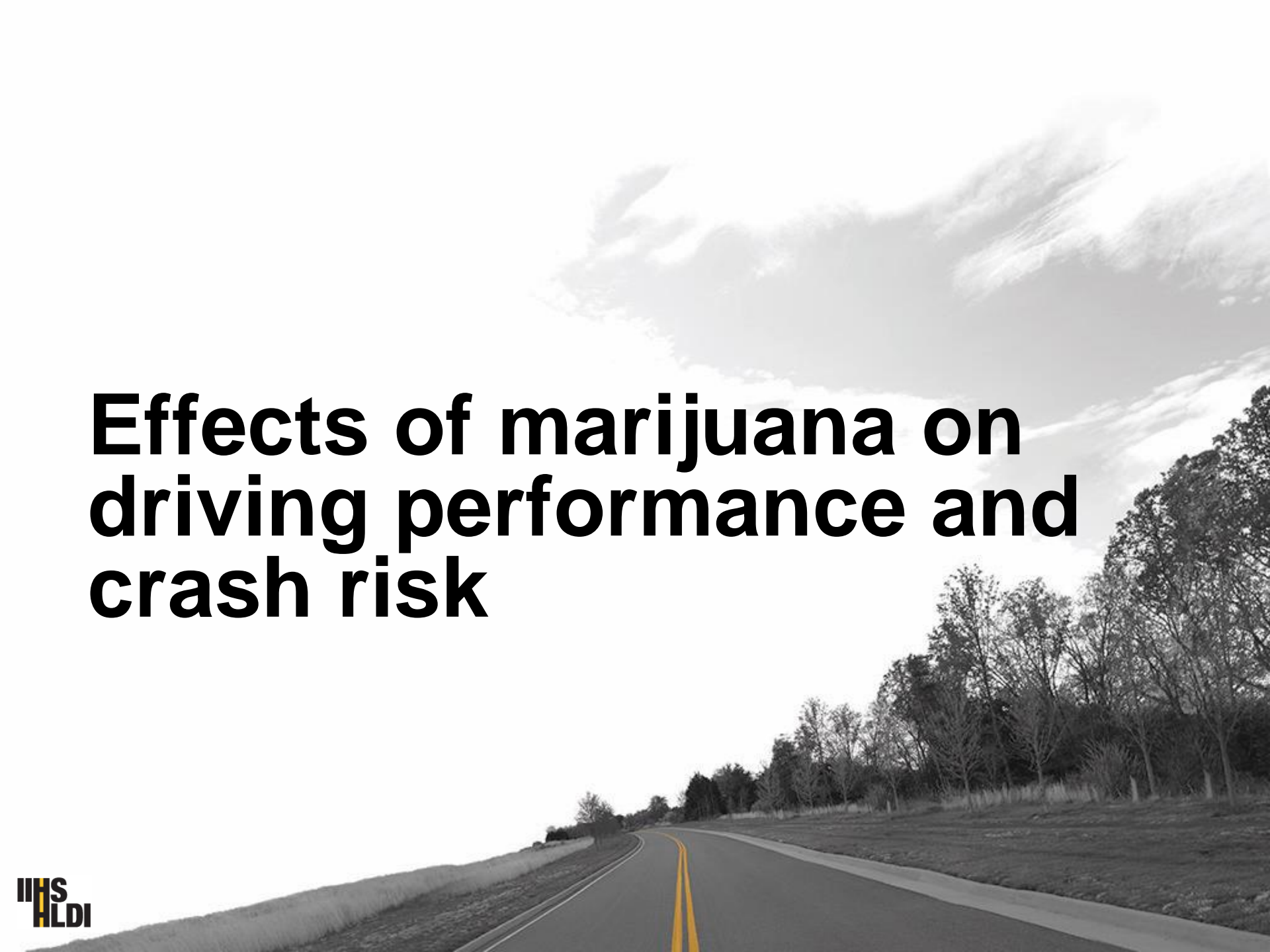
Prevalence of marijuana among drivers

Percent of weekend late nighttime drivers with positive drug test in national roadside surveys



Information on marijuana use among drivers in fatal crashes

- After alcohol, marijuana most common drug
 - Of drivers with drug test results in 2014, 14 percent had positive marijuana test
- However, drug test results available for only about 39 percent of drivers, and no means to estimate missing drug results
- Drug testing varies widely across jurisdictions
 - who is tested, types of drugs tested, specimens (blood, urine, saliva), thresholds for positive test, test protocols
- Presence but not amount of drug available; positive test does not necessarily indicate impairment
- Therefore, impossible to derive reliable estimate of prevalence of marijuana use that is comparable to roadside survey information



Effects of marijuana on driving performance and crash risk

Effects of marijuana on driving performance

- Using marijuana just prior to driving increased driver reaction times and impaired distance estimation and lane-keeping in simulator and on-road studies
- Higher doses generally related to greater impairments
- Federal studies found that unlike alcohol-impairment, drivers under the influence of marijuana tend to compensate for their impairment
 - Adverse effects on driving performance “appear relatively small”
 - Recent study found that low-dose alcohol led to increased speeds whereas THC led to slower speeds and increased following distance, and THC mitigated drivers’ tendency to drive faster with alcohol
- Other research found that drivers dosed with marijuana may not fully compensate for their deficits, especially at higher doses

Prior research on marijuana's effects on crash risk

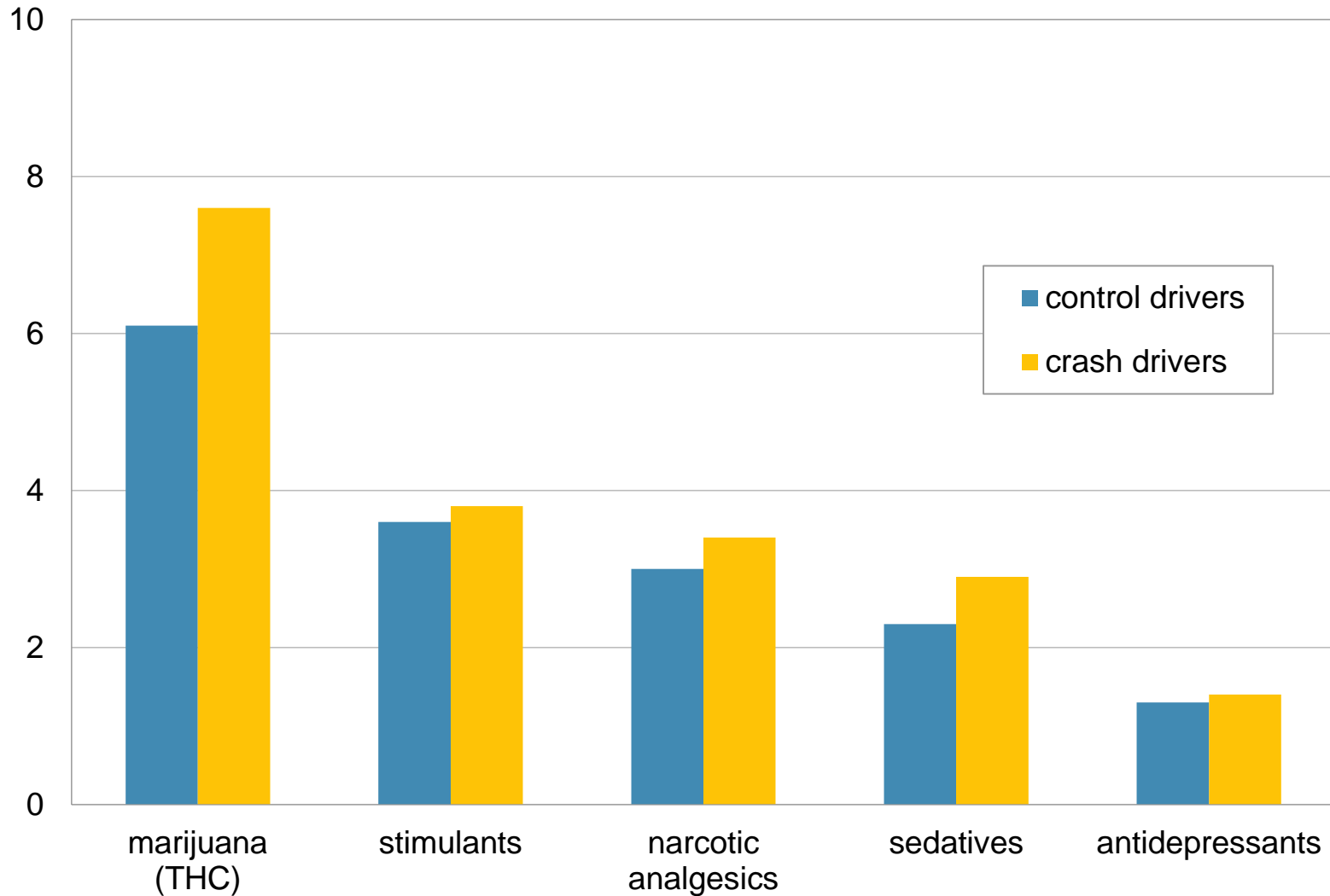
- Studies using a variety of methods have found conflicting results
 - Some studies found using marijuana could more than double crash risk, while others found a minimal or no effect
- Challenges in prior research
 - Marijuana often used with alcohol
 - Some studies relied on drivers' self-reported marijuana use
 - Some studies relied on urine tests, which can detect marijuana used several days prior
 - Difficult to find adequate control group of non-crash-involved drivers or other mechanism to account for confounding factors like driver age and gender or other lifestyle factors, bias in which drivers are tested after crashes, etc.

New drug and alcohol crash risk study

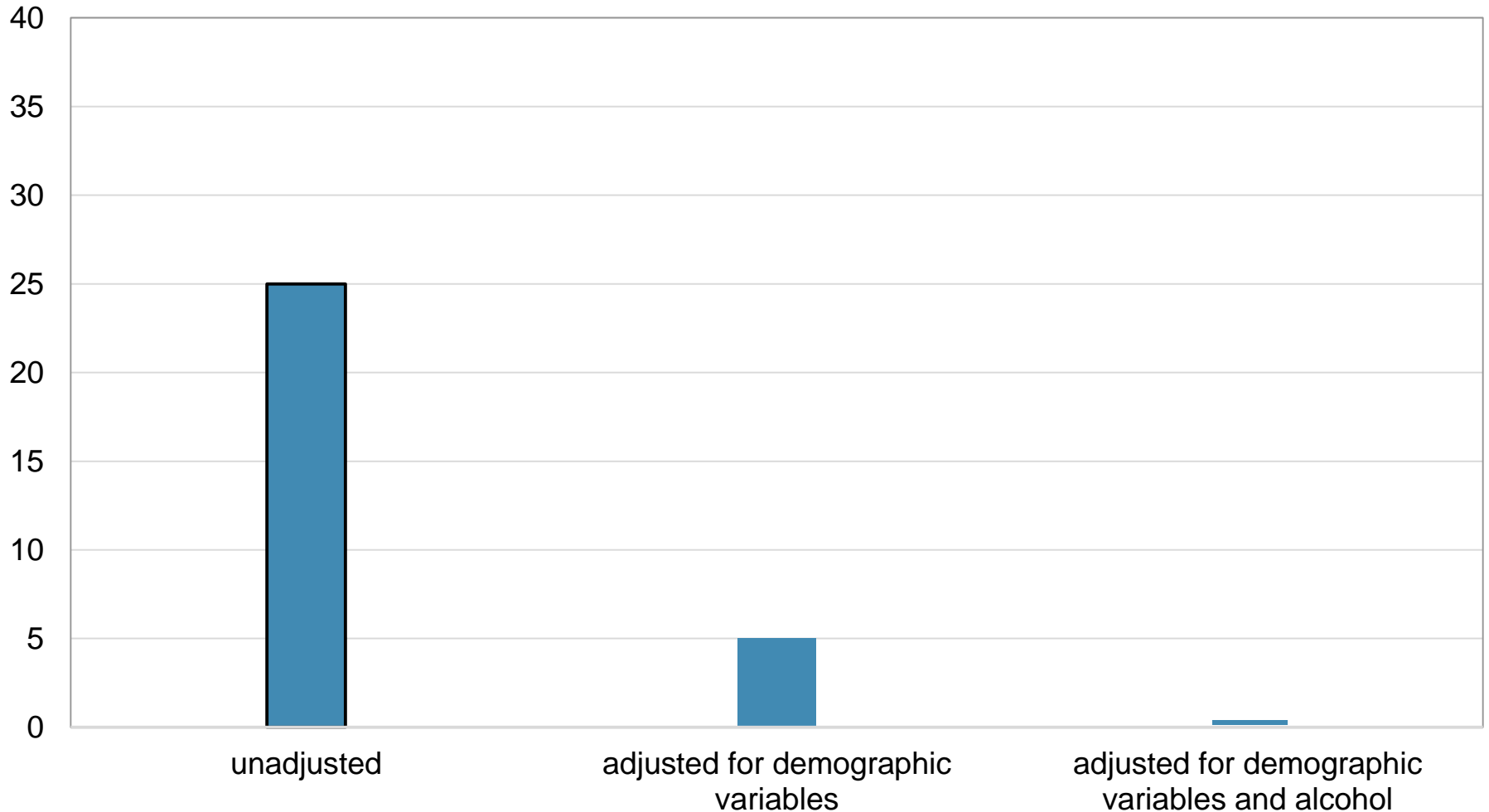
National Highway Traffic Safety Administration, 2015

- Presence of alcohol and drugs among 3,095 crash-involved drivers compared with presence among 6,190 non-crash-involved drivers in Virginia Beach, Va.
- Two control drivers randomly selected from traffic stream one week after crash at the same time of day, location, and direction of travel as crash-involved drivers
- Data collection
 - Breath test for alcohol
 - Saliva test for over-the-counter, prescription, and illegal drugs

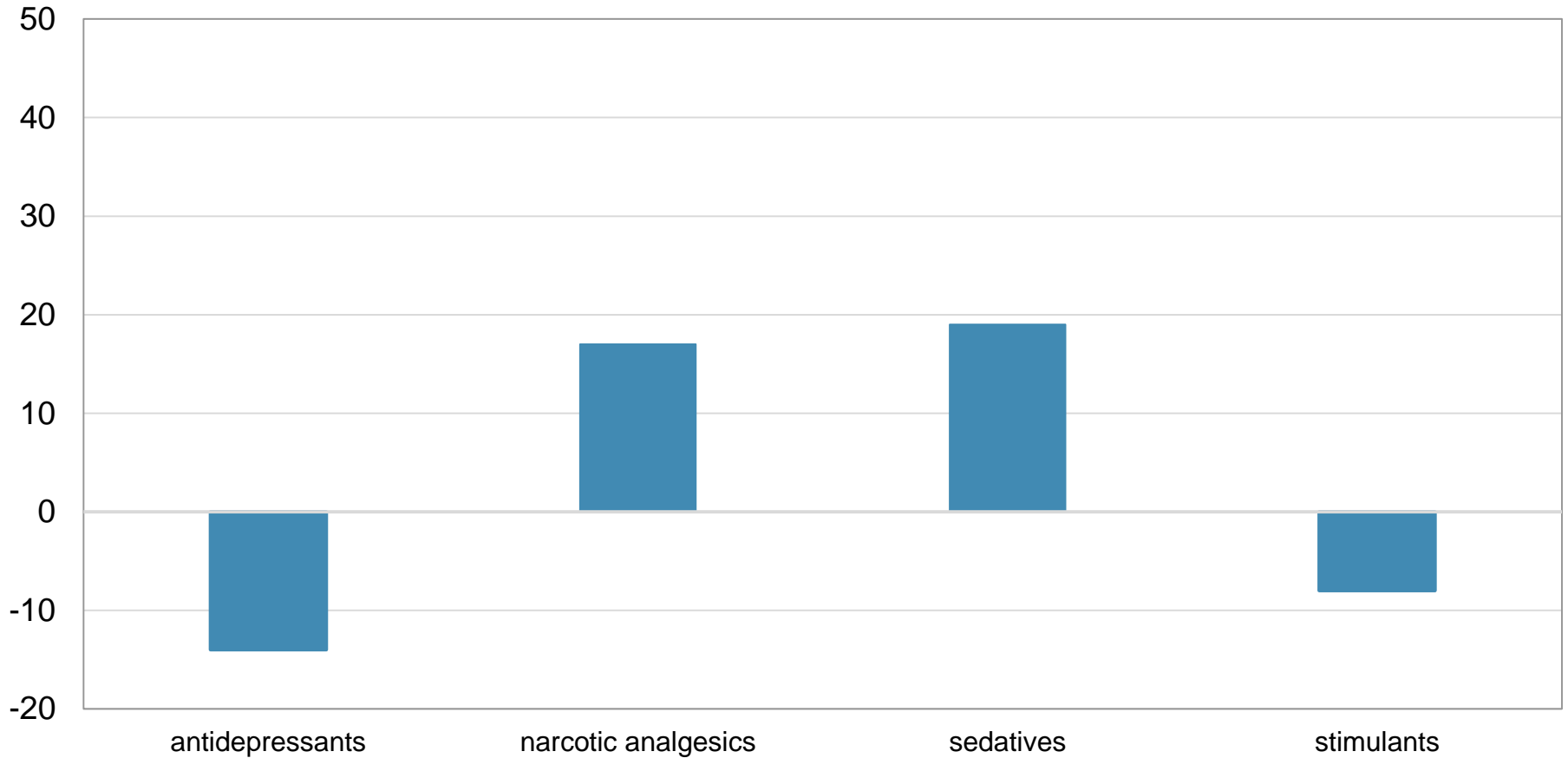
Percent of control and crash drivers who were drug positive by drug class



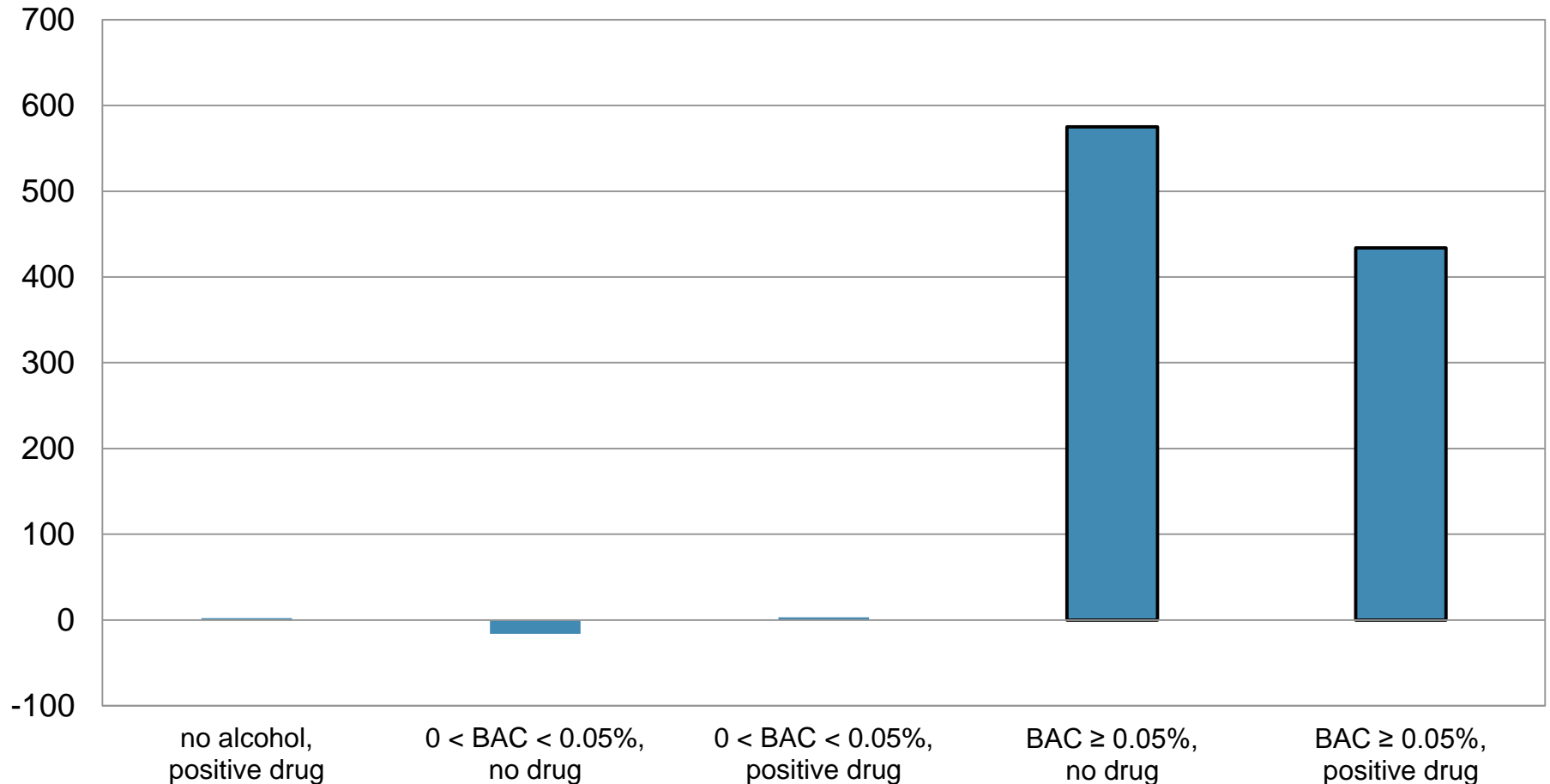
Percent change in crash risk associated with marijuana (THC)



Percent change in crash risk associated with other drugs, adjusted for driver demographic variables and alcohol



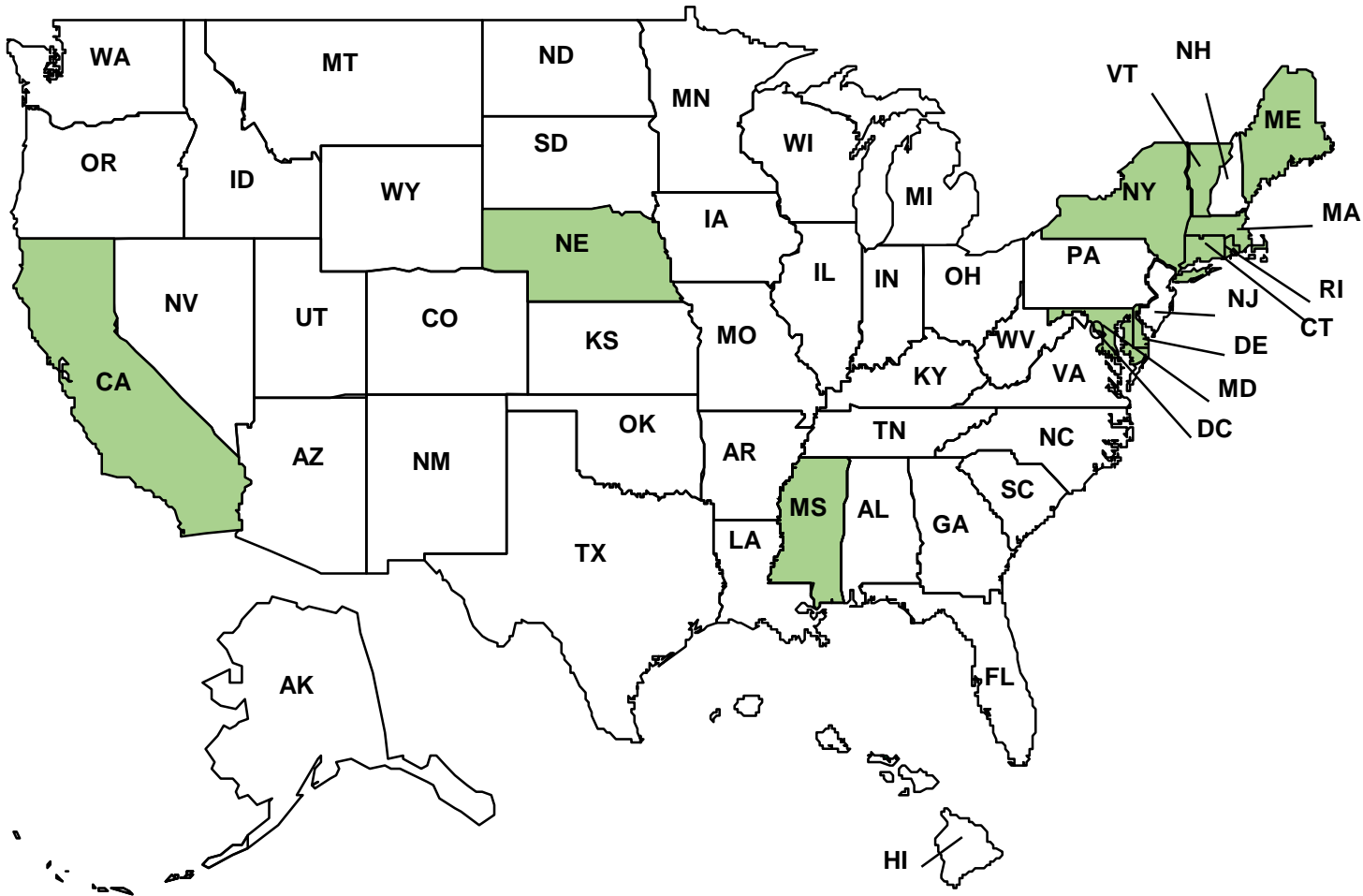
Percent change in crash risk associated with alcohol and drugs, adjusted for demographic variables



State marijuana laws

Laws decriminalizing marijuana use

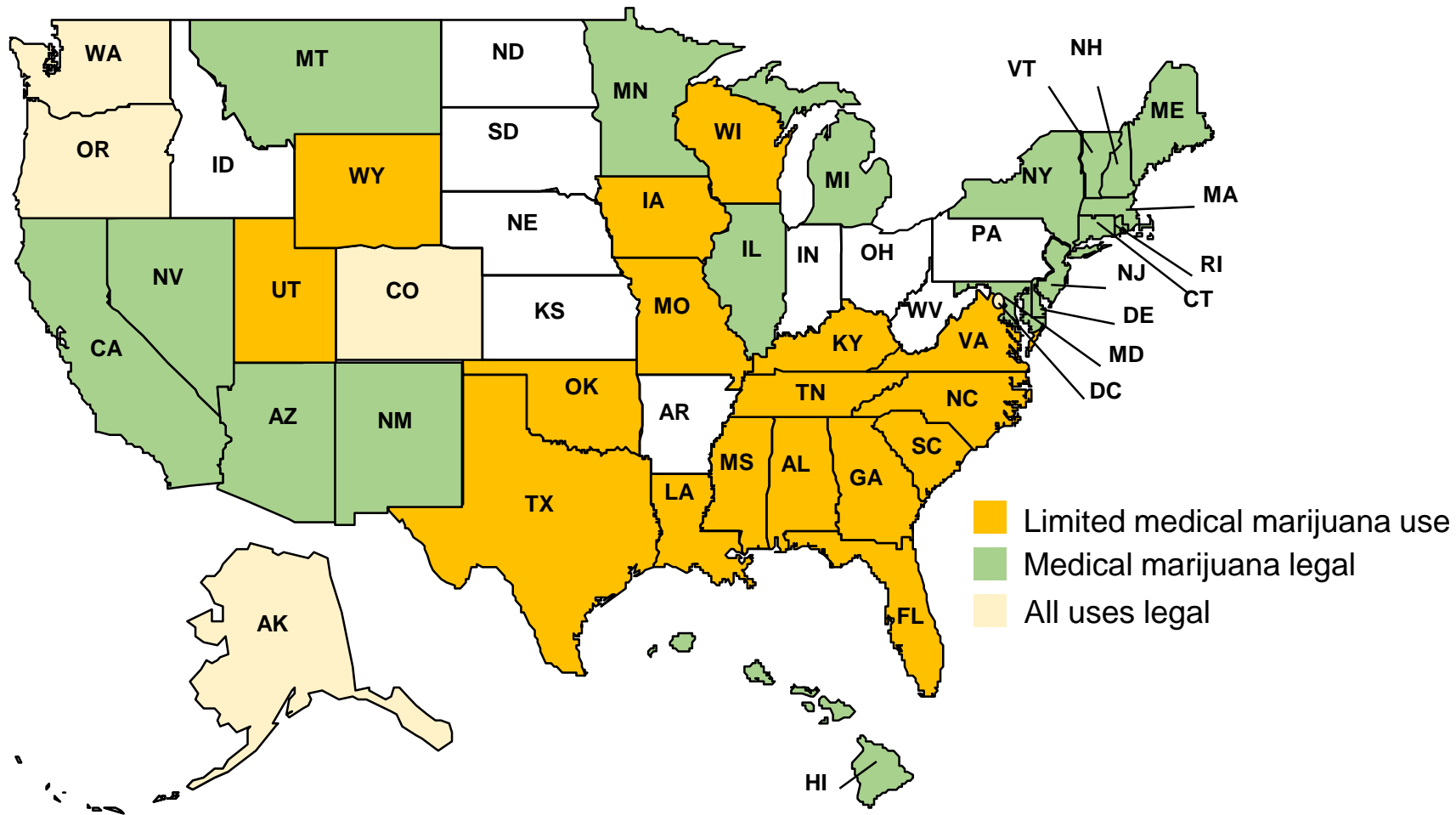
March 2016



Source: National Conference of State Legislature

Laws legalizing some uses of marijuana

March 2016



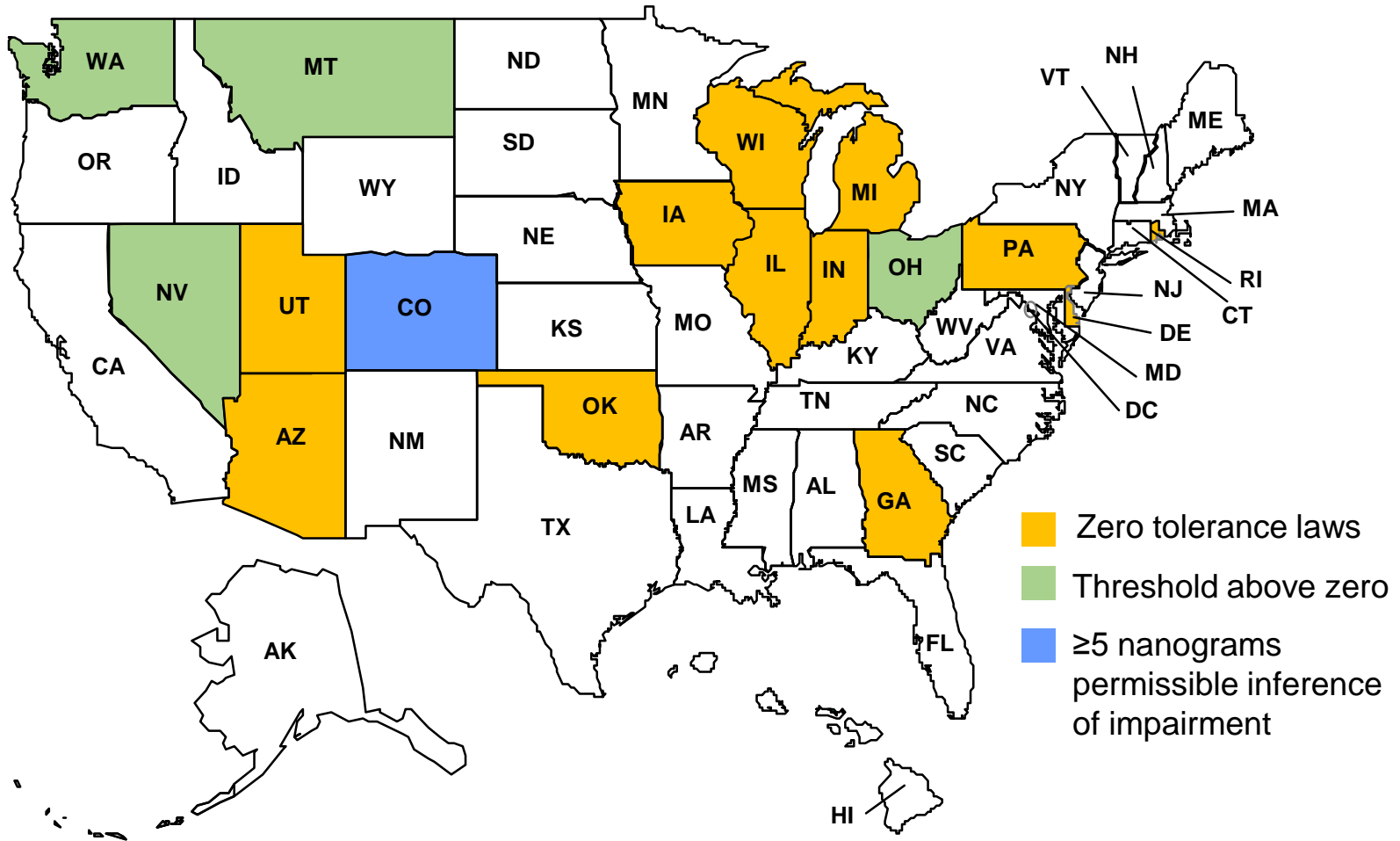
Source: National Conference of State Legislature

Overview of drugged driving laws

- Every state prohibits driving under the influence of drugs (DUID)
- Definition of prohibited drugs varies, e.g., intoxicating substances, any controlled substance, any drug
- As with alcohol, drug testing occurs after arrest, after police officer establishes probable cause based on behavioral signs of impairment
- Laws specify whether to test with blood, urine, or saliva, or some combination
- States vary as to whether they test only for the psychoactive ingredient or also test for the metabolites
- In states with *per se* laws, it is a crime to drive with the presence of marijuana at or above the specified amount
- In states without *per se* laws, proof of impairment is based on evidence about test results and behavior indicating impairment

Per se laws for driving while impaired by marijuana

March 2016



Source: National Conference of State Legislature

Conclusions

- Laboratory studies show link between recent marijuana use and driving skills, especially at high dosages
- Marijuana is increasing in prevalence among drivers, but the strongest study of crash risk to date found no increase in crash risk associated with marijuana use after controlling for relevant covariates
- Crash risk associated with specific amounts of marijuana unknown



Insurance Institute for Highway Safety
Highway Loss Data Institute

More information and links
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