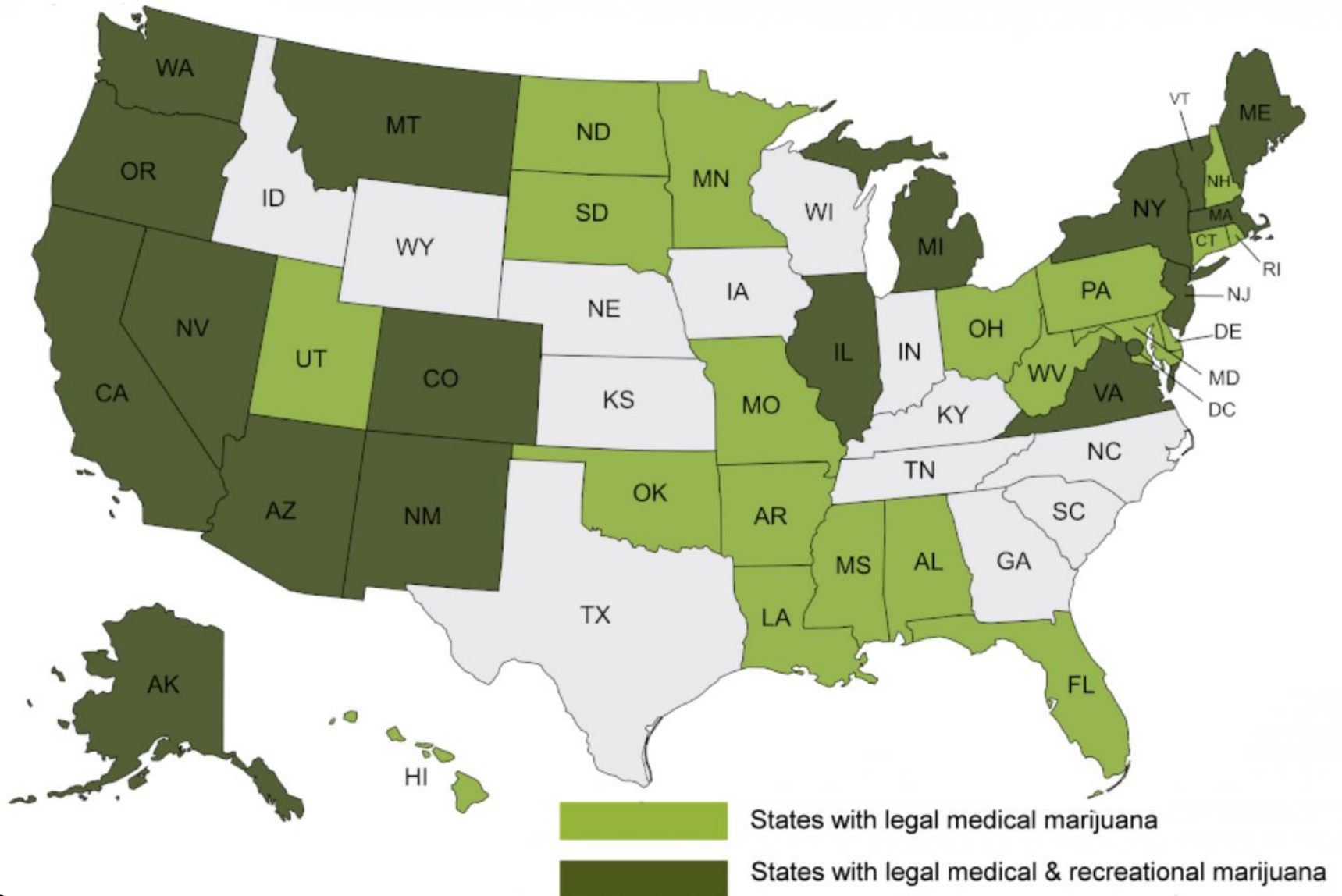


# Recreational cannabis laws and road safety

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# Cannabis laws in the United States



## Marijuana playing larger role in fatal crashes

## With marijuana legalized in Washington, Colorado, police worry about stoned drivers on the road

Officials in states where pot became legal this month are trying to figure out if there will be an increase in drugged driving.

THE ASSOCIATED PRESS / Thursday, November 15, 2012, 7:33 AM

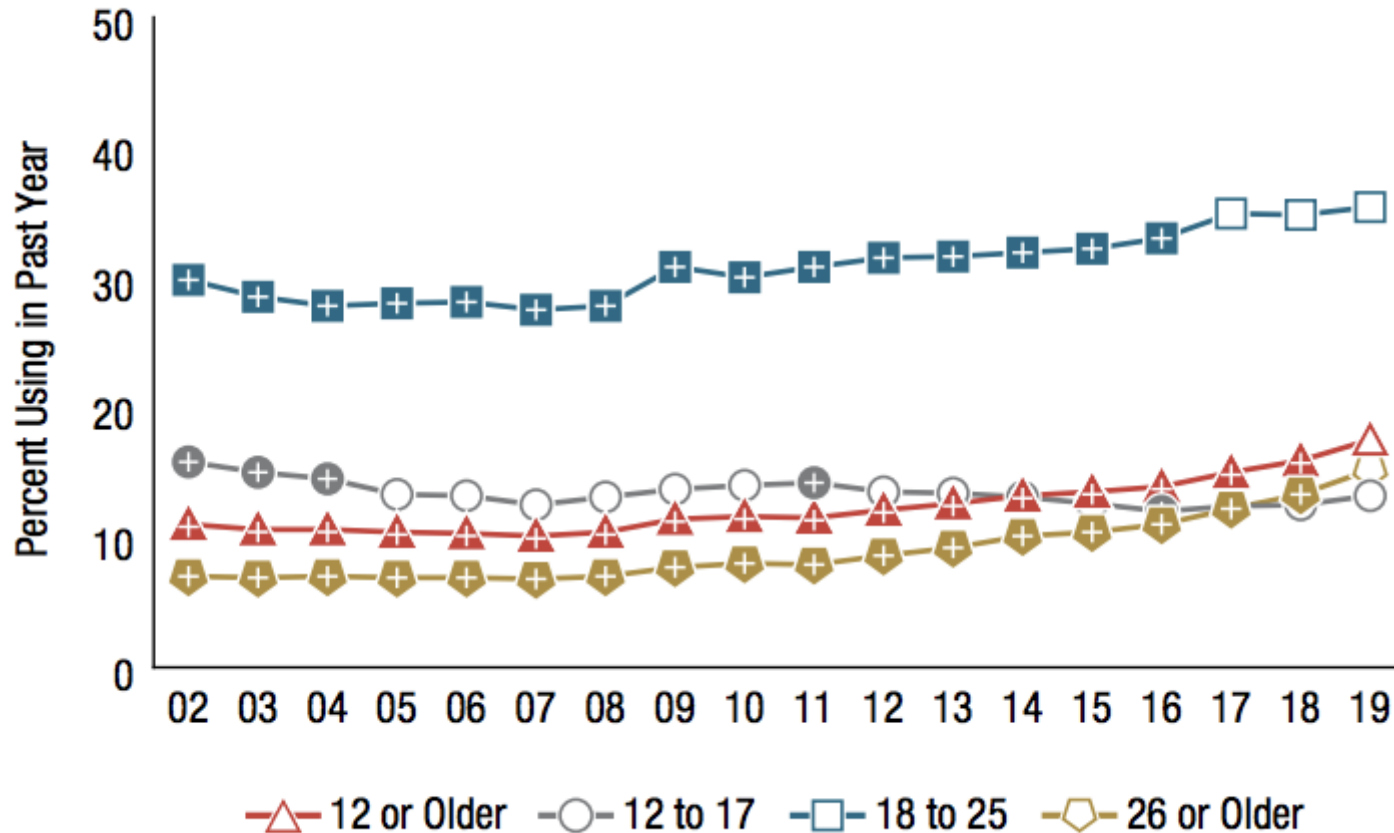
AAA



## Study finds 100 percent increase in fatal pot-related crashes in Colorado



## Past-year cannabis use among people age 12 or older



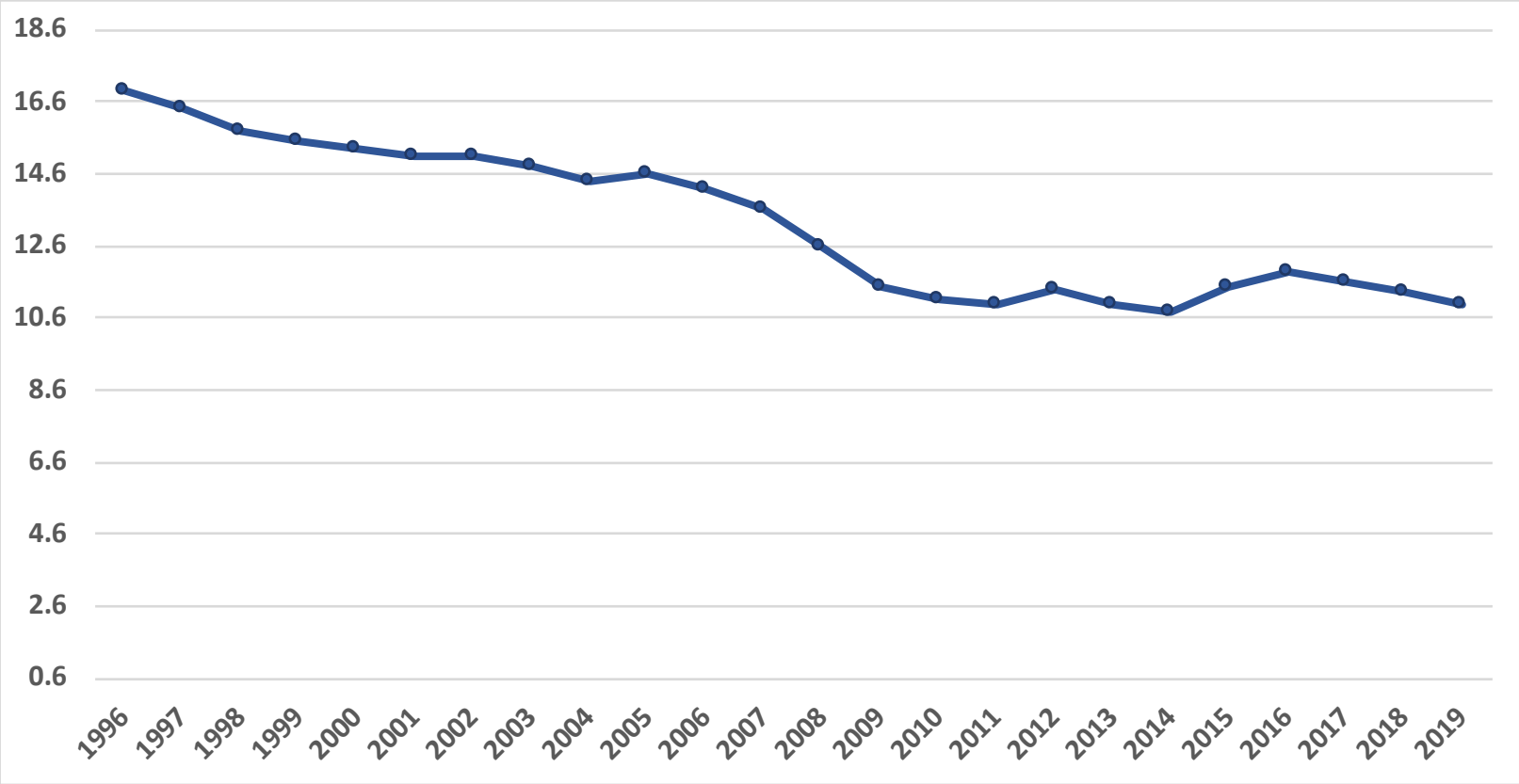
**The prevalence of daily or near daily cannabis use more than doubled:**

2002: 1.9% (3.9 million)

2017: 4.2% (10.3 million)

(Compton et al., 2019. doi:10.1016/j.drugalcdep.2019.05.008.)

# Traffic fatalities per billion miles traveled United States





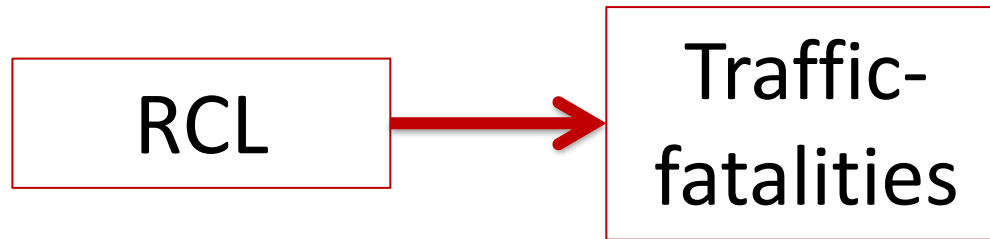
## Cannabis use can reduced driving performance:

1. Increasing reaction times
2. Decreasing visual search
3. Cannabis + alcohol = greater levels of impairment





# Recreational cannabis laws (RCL)

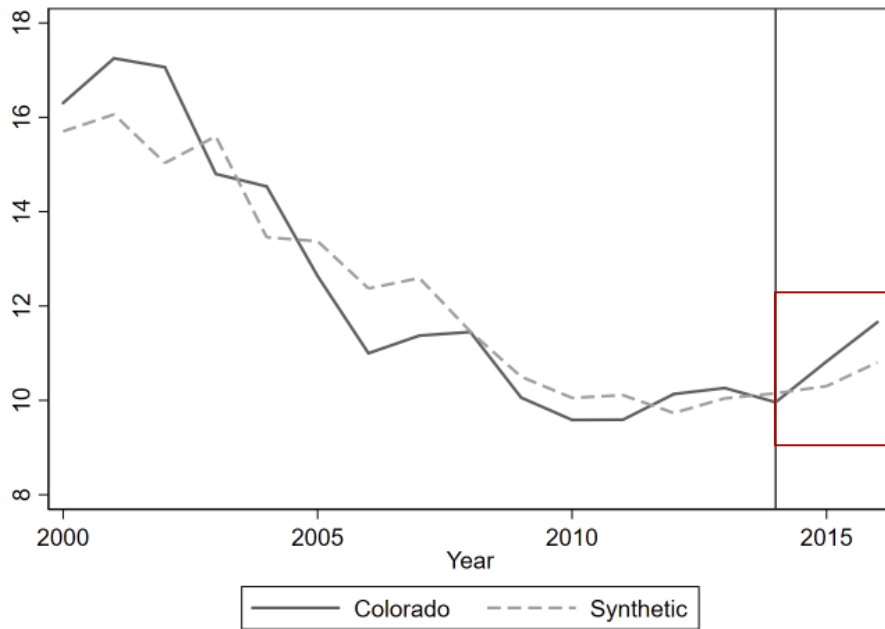


# Recreational cannabis laws (RCL)

Hansen et al 2018. *Econ Inq.* 2020; 58(2):547-568. doi:10.1111/ecin.12751

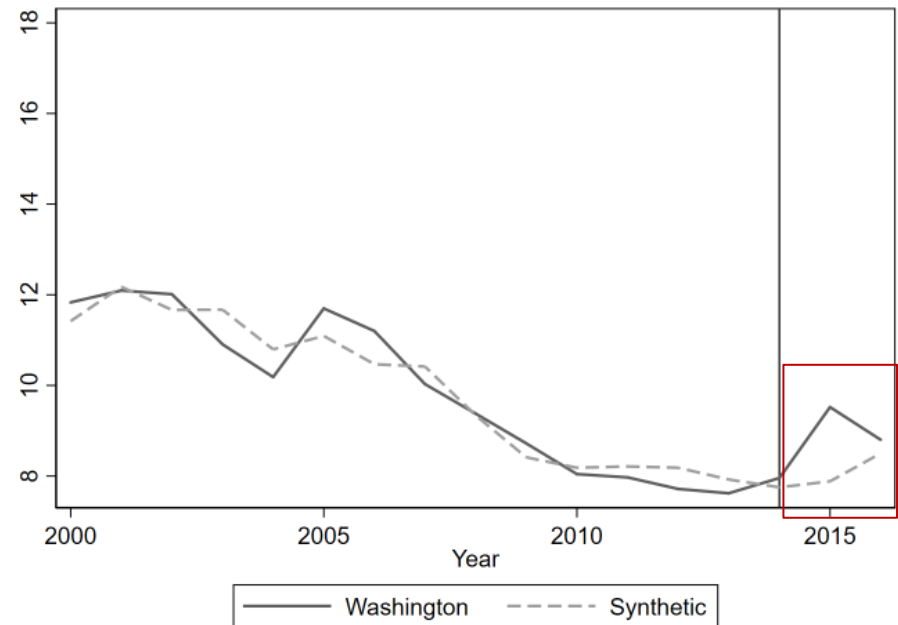
## Colorado

(b) Total Fatalities per billion VMT



## Washington

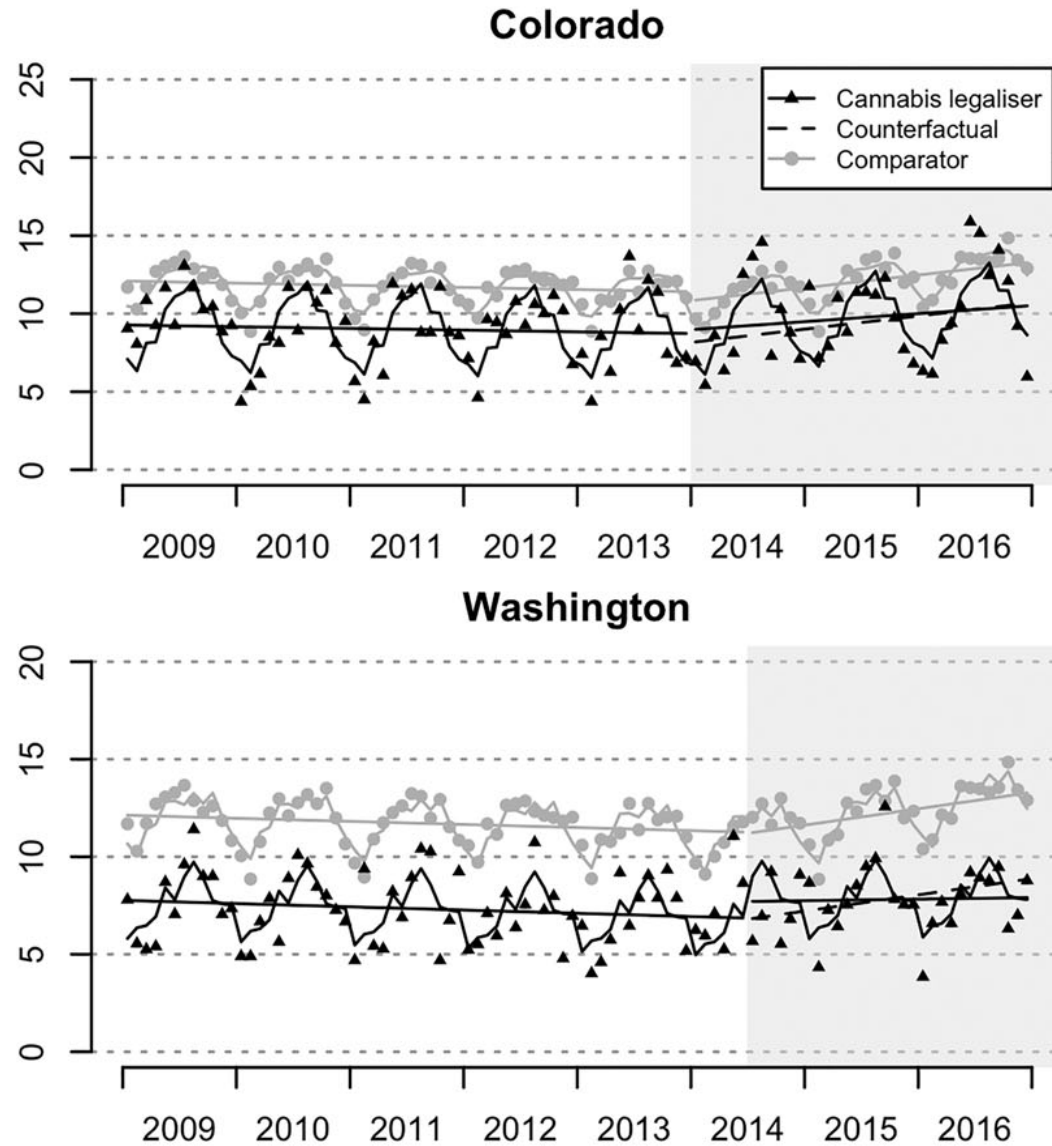
(b) Total Fatalities per billion VMT



# Recreational cannabis laws (RCL)

Lane and Hall, 2019;

Addiction. 114(5): 847-856.  
doi:10.1111/add.14536



# Association of Recreational Cannabis Laws in Colorado and Washington State With Changes in Traffic Fatalities, 2005-2017

Santaella-Tenorio et al., 2020 JAMA Intern Med. doi:10.1001/jamainternmed.2020.1757



**Outcome:** Traffic fatalities (FARS-Fatality Analysis Reporting System) 2005-2017



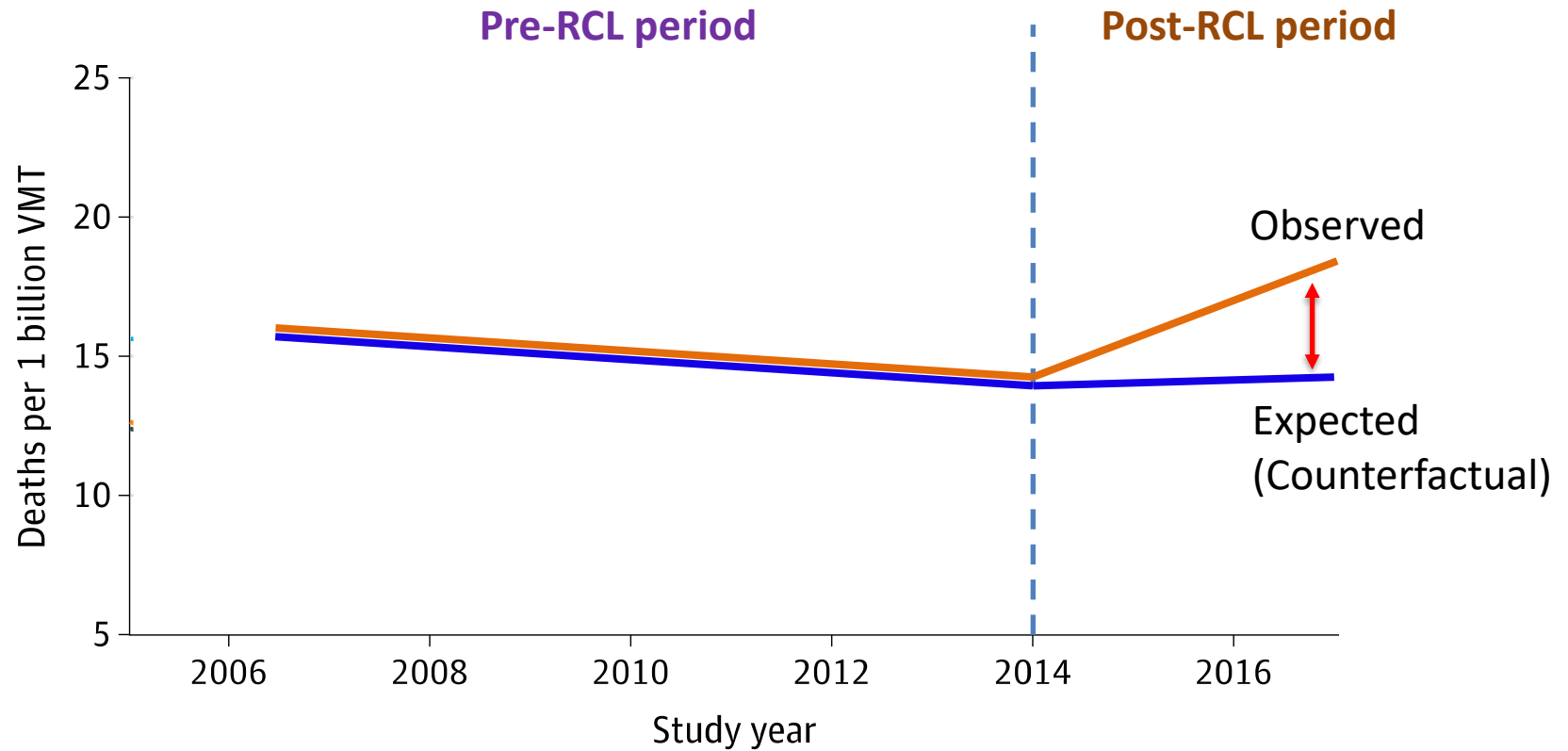
**Exposure:** Implementation of RCL (2014 both states)

# Methods

**Method:** Synthetic control approach (Abadie et al., 2010)

Quasi-experimental design to compare observed and expected traffic fatality rates for exposed states

# Synthetic control approach



# Methods

Variables used to identify synthetic controls:

% Unemployment

Median income

Seat belt laws

Speed limit 70+

Graduate license

Ban text-driving adult

Ban text-driving adolescents

Highway expenditures

VMT per driver

Alcohol sales

Drug per se laws

Medical cannabis laws

Decriminalization cannabis laws

Rate traffic fatalities in 2005

Rate traffic fatalities in 2009

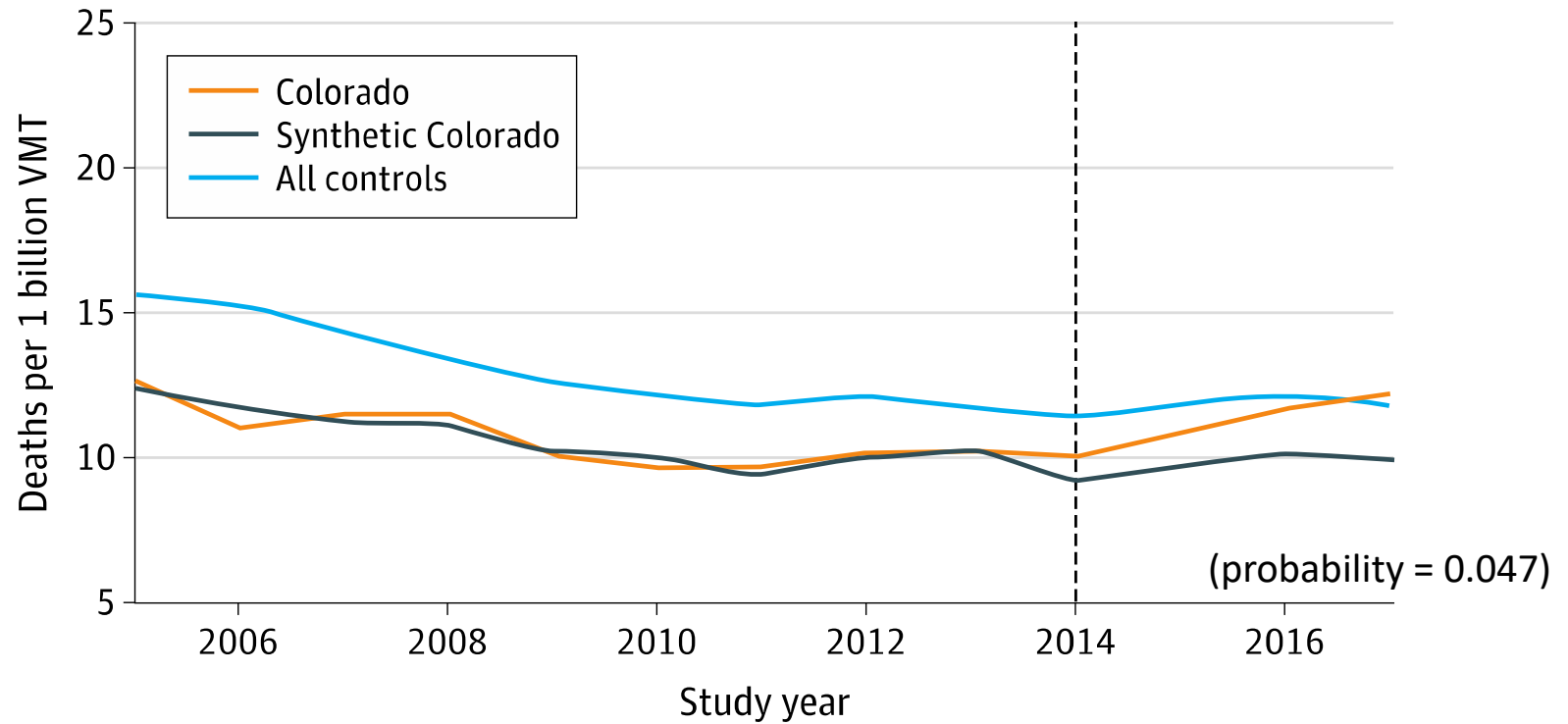
Rate traffic fatalities in 2013

Permutation based test: Uncertainty of effect estimates

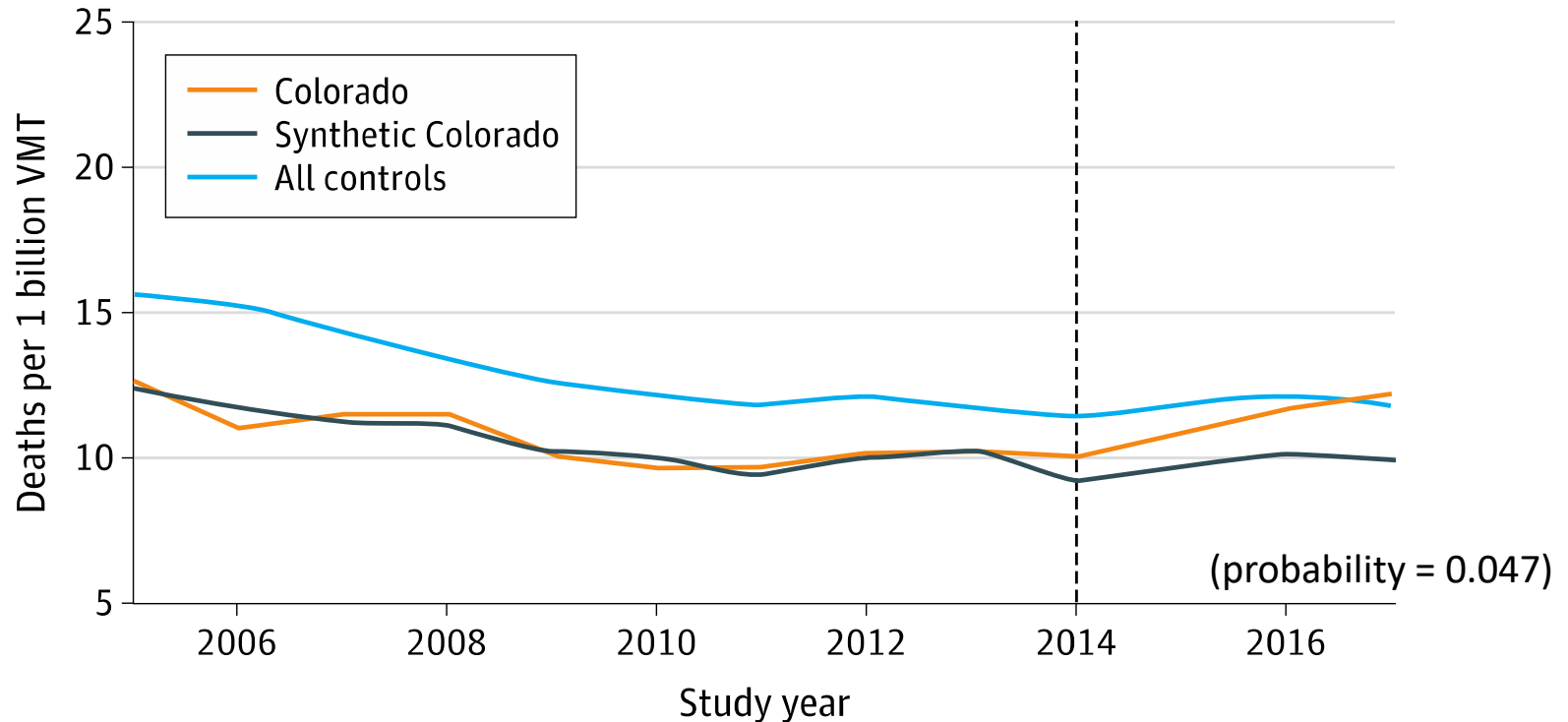


# Results

# Colorado



# Colorado



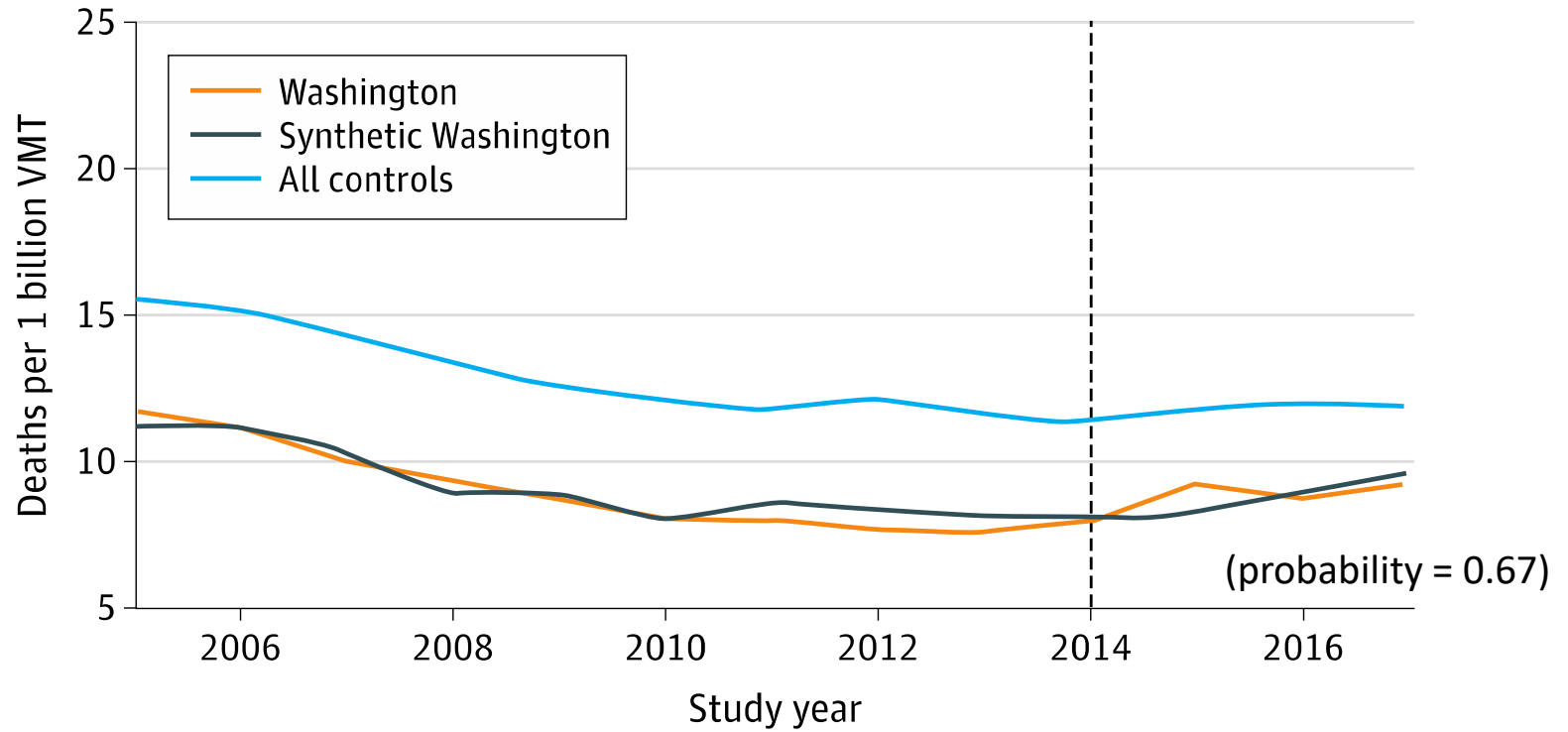
2014: 37 excess deaths of 488 fatalities (7.6%)

2015: 63 of 547 fatalities (11.5%)

2016: 78 of 608 fatalities (12.8%)

2017: 123 of 648 fatalities (19%)

# Washington State



# Discussion

## Heterogenous effects of RCL on traffic fatalities

RCLs differ in many ways: including purchasing limits, sales taxes, ability to grow cannabis at home

### Retail store density (2018):

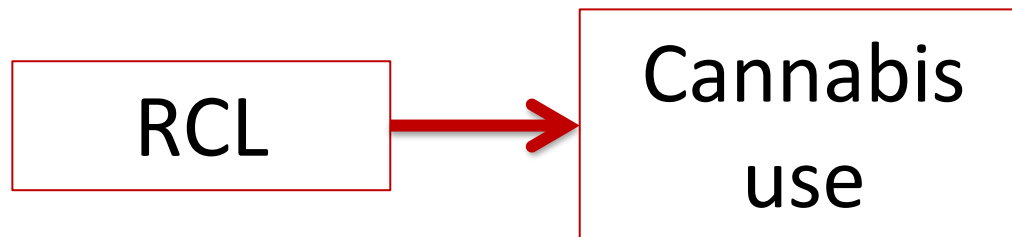
Colorado: 23.3 per 100,000 adults

Washington State: 7.4 in per 100,000 adults



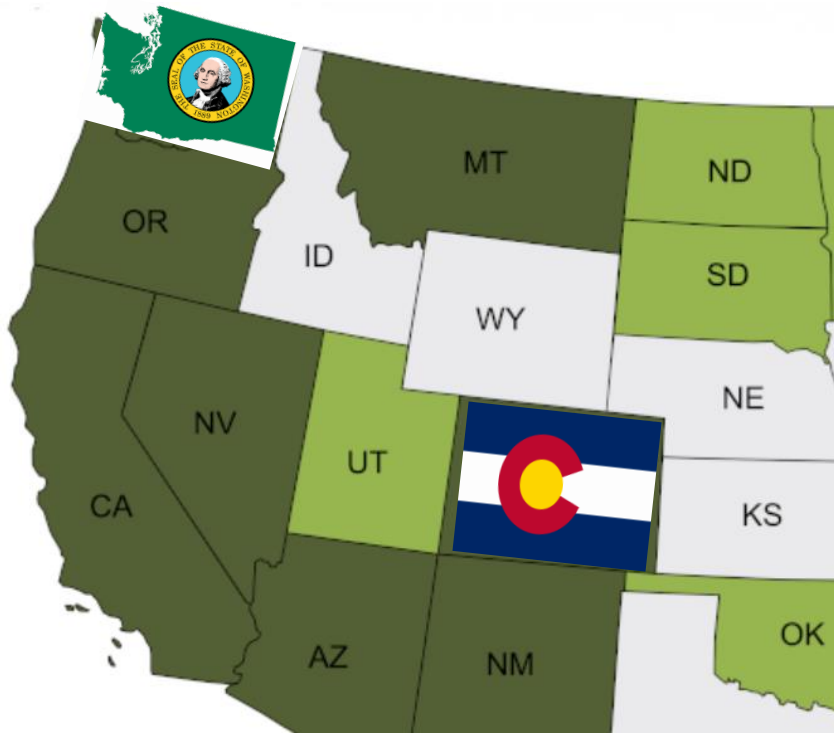
## Prevalence past-month cannabis use (NSDUH data):

- **Colorado 2012 to 2015:**
  - Ages 18-25: **6%** increase
  - Ages 26 or older: **41%** increase
- **Washington state 2012 to 2015:**
  - Ages 18-25: **14%** reduction
  - Ages 26 or older: **15%** reduction





## Cannabis tourism

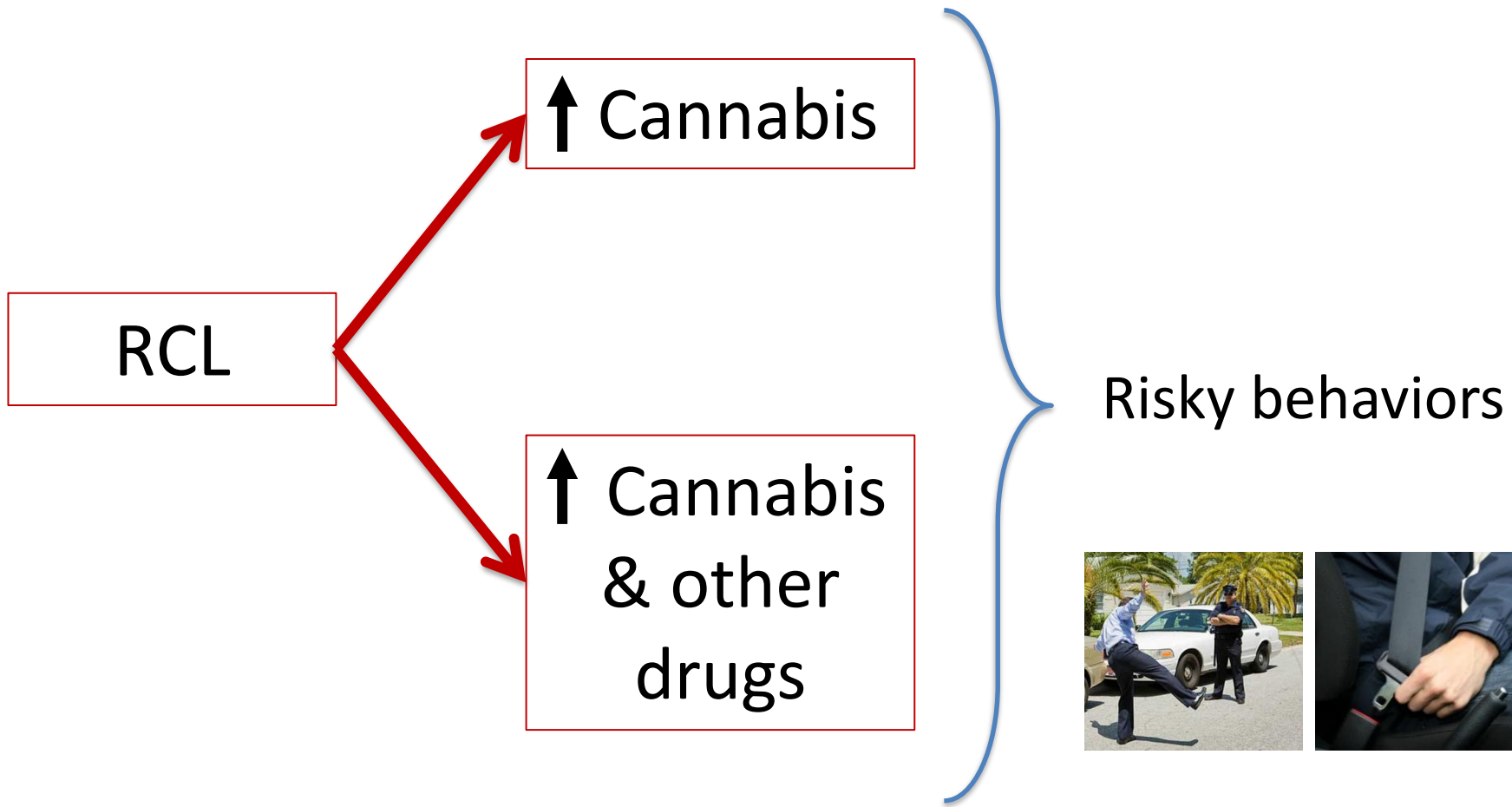


**Colorado:** Increases in cannabis-related ER visits among out-of-state residents

(Kim et al., 2016. N Engl J Med.2016;374(8):797-798 doi:10.1056/NEJMc1515009)

## Our findings are consistent with increases in:

- Cannabis-related traffic deaths (Lee et al., 2018)
- % injured patients with positive test results for cannabis (Chung et al., 2019)



# Conclusions

- Adverse unintended effects of RCLs can be heterogeneous and may depend on variations in implementation of these laws
- These findings suggest the need for policies, public health programs, and enforcement strategies that will prevent unintended consequences of cannabis legalization

# Acknowledgements

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