

# Distracted driving: latest data and solutions

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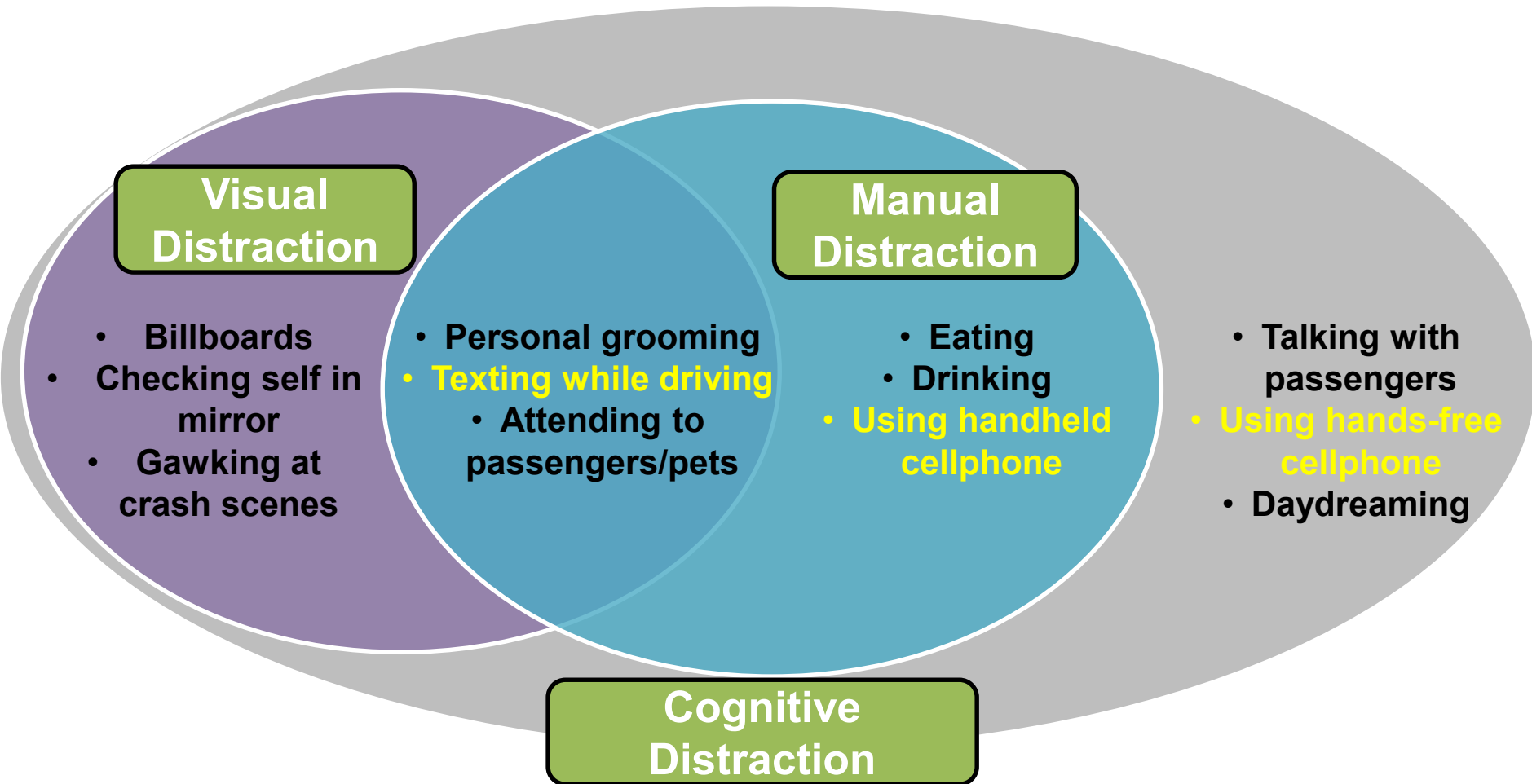
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By KATE SMITH / CBS NEWS / November 1, 2018, 5:51 PM

# School bus stop crashes kill 5 in 3 days, amid "huge problem" with distracted driving

# Domains and forms of distraction





# Outline

## I. Epidemiology

A) US / global epidemic

B) Risk factors / markers

C) Cellphone use and crash risk

## II. Prevention strategies (3 Es)

A) Education

B) Enactment / Enforcement

C) Engineering

# I: Epidemiology

# A) US / global epidemic

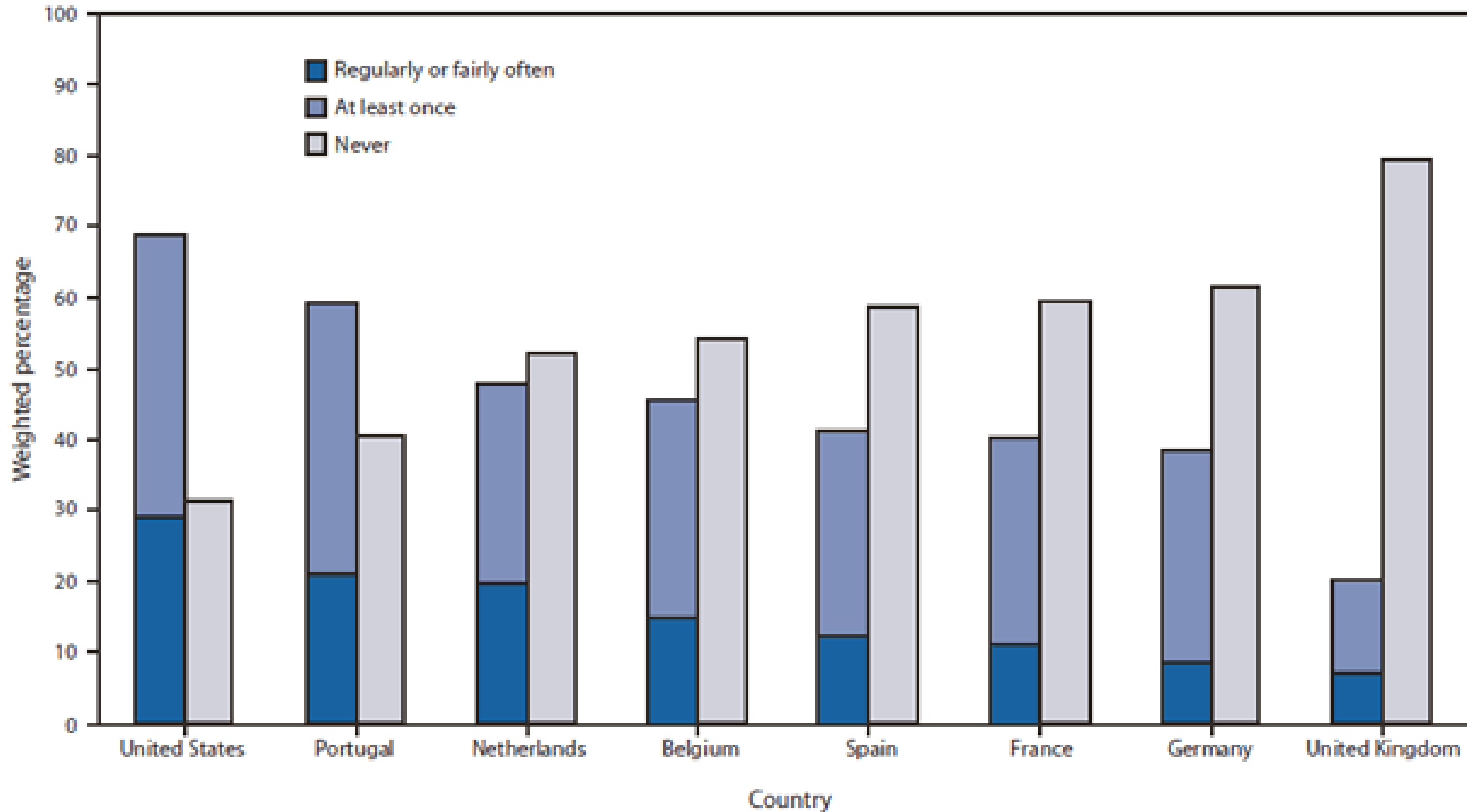


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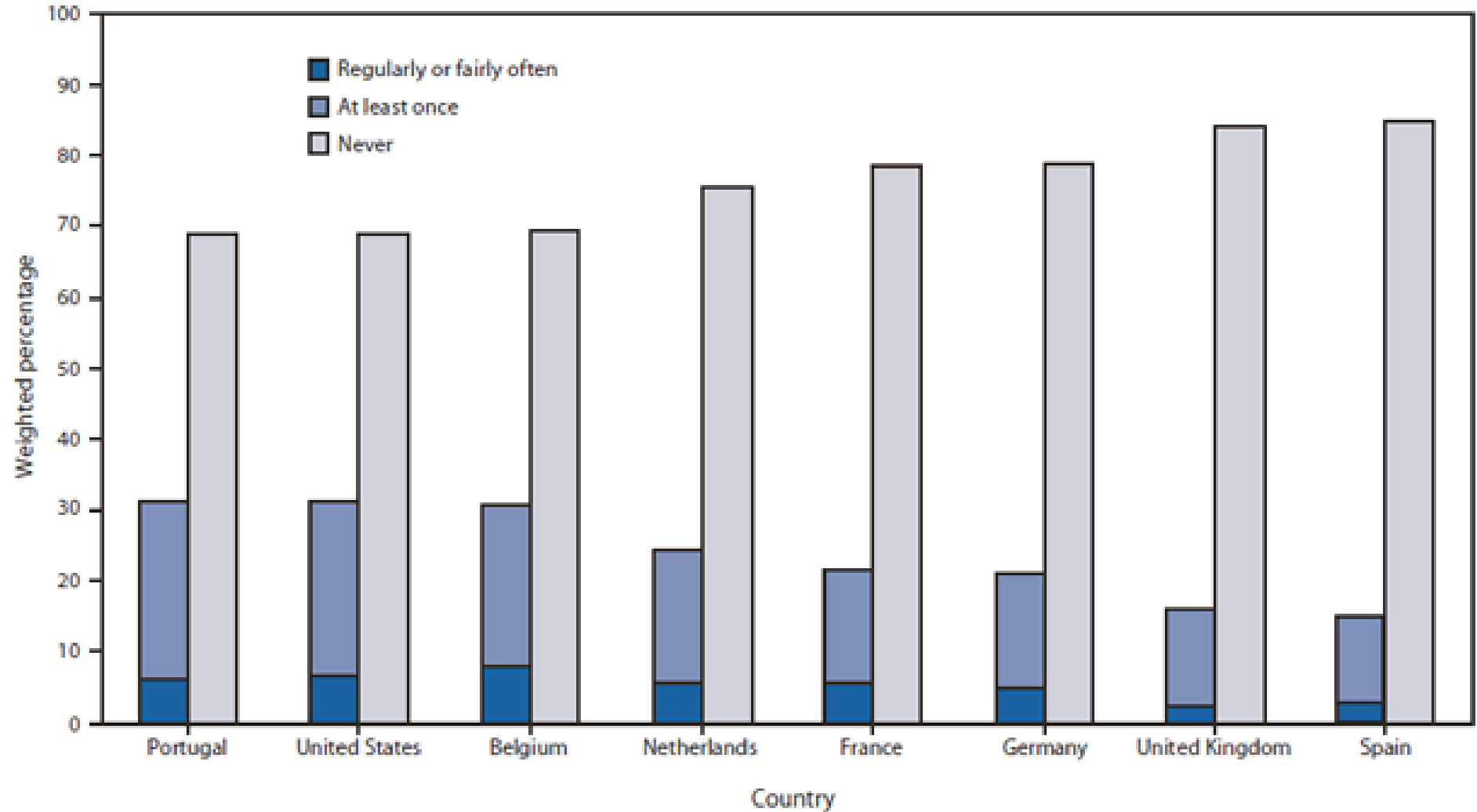


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# Calling while driving, age 18–64 years, by country, 2011

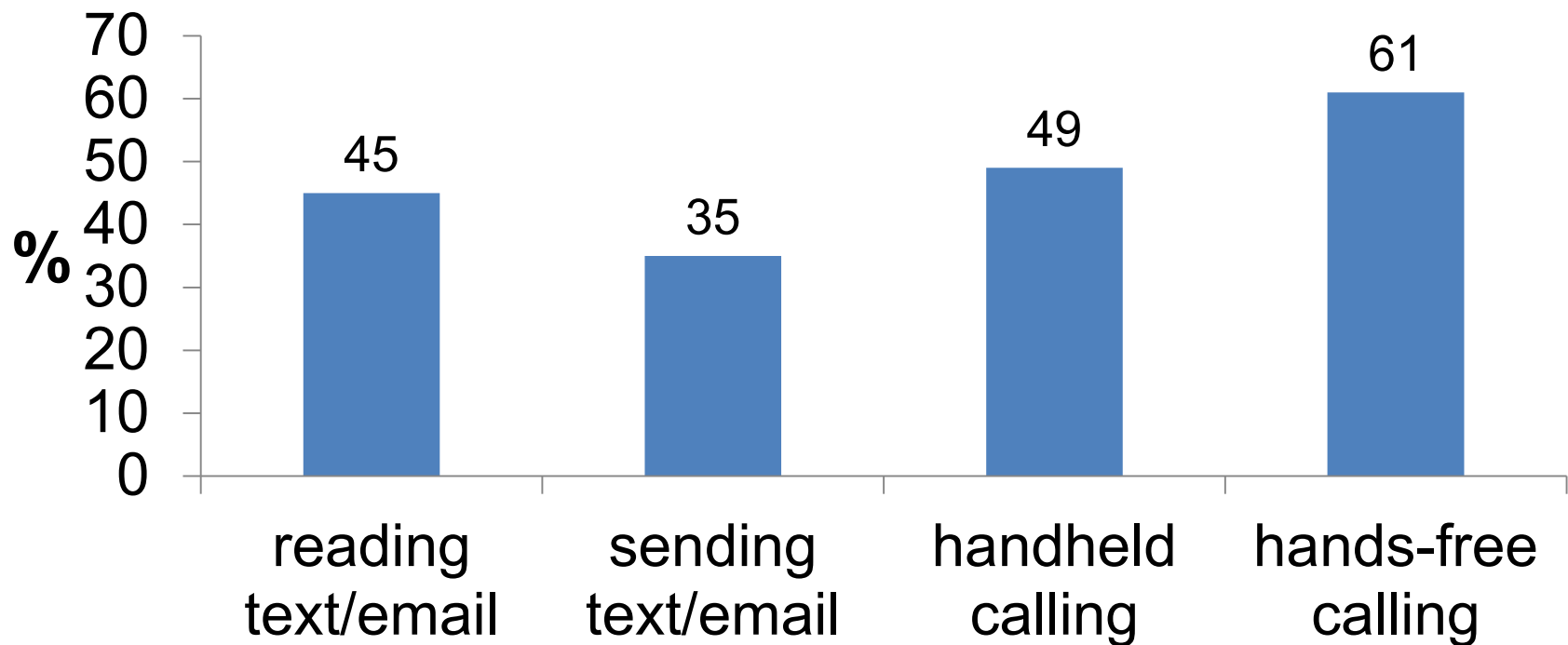


# Texting while driving, age 18–64 years, by country, 2011



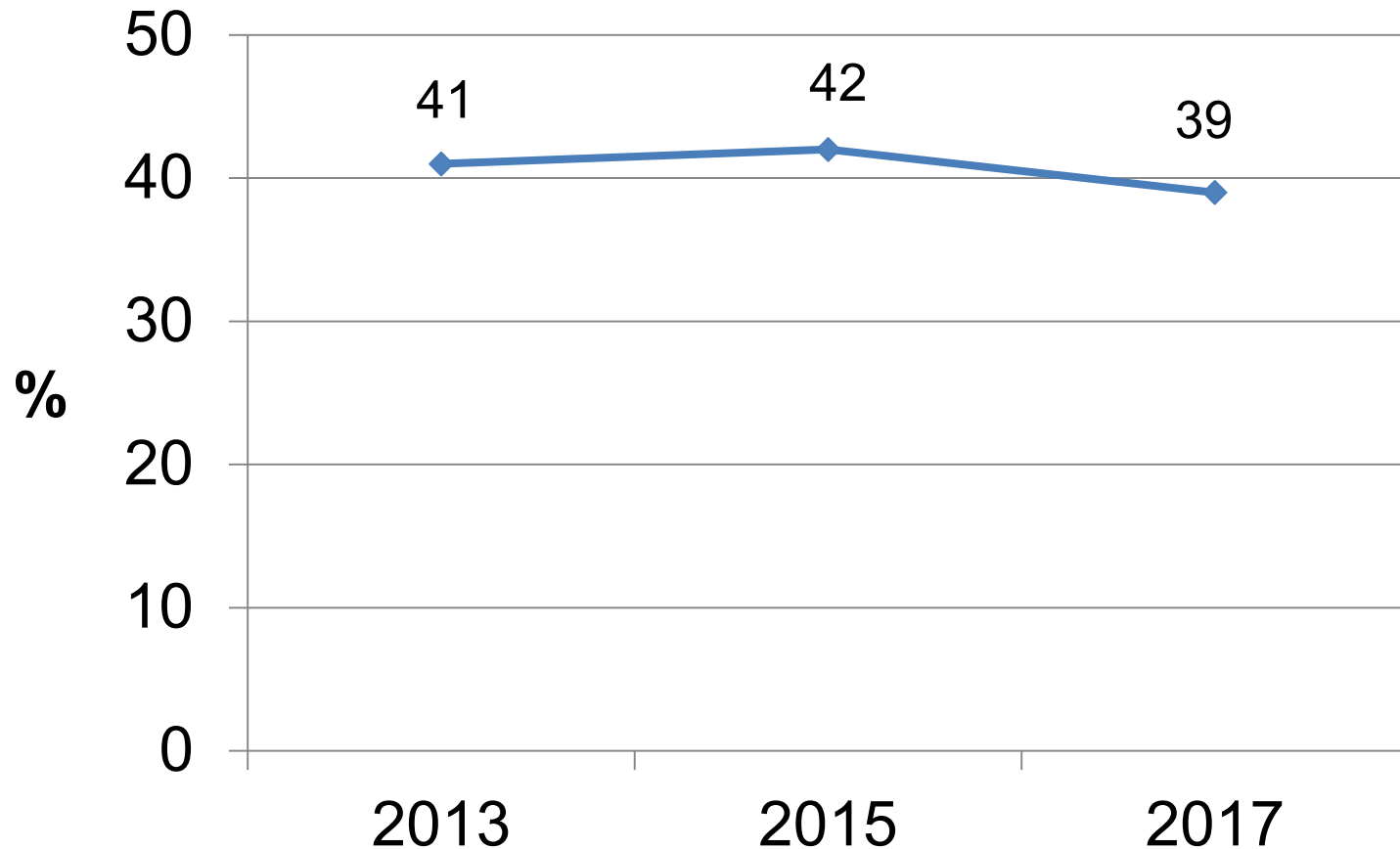


# Prevalence: cellphone use while driving Traffic Safety Culture Index (TSCI) survey United States, 2017

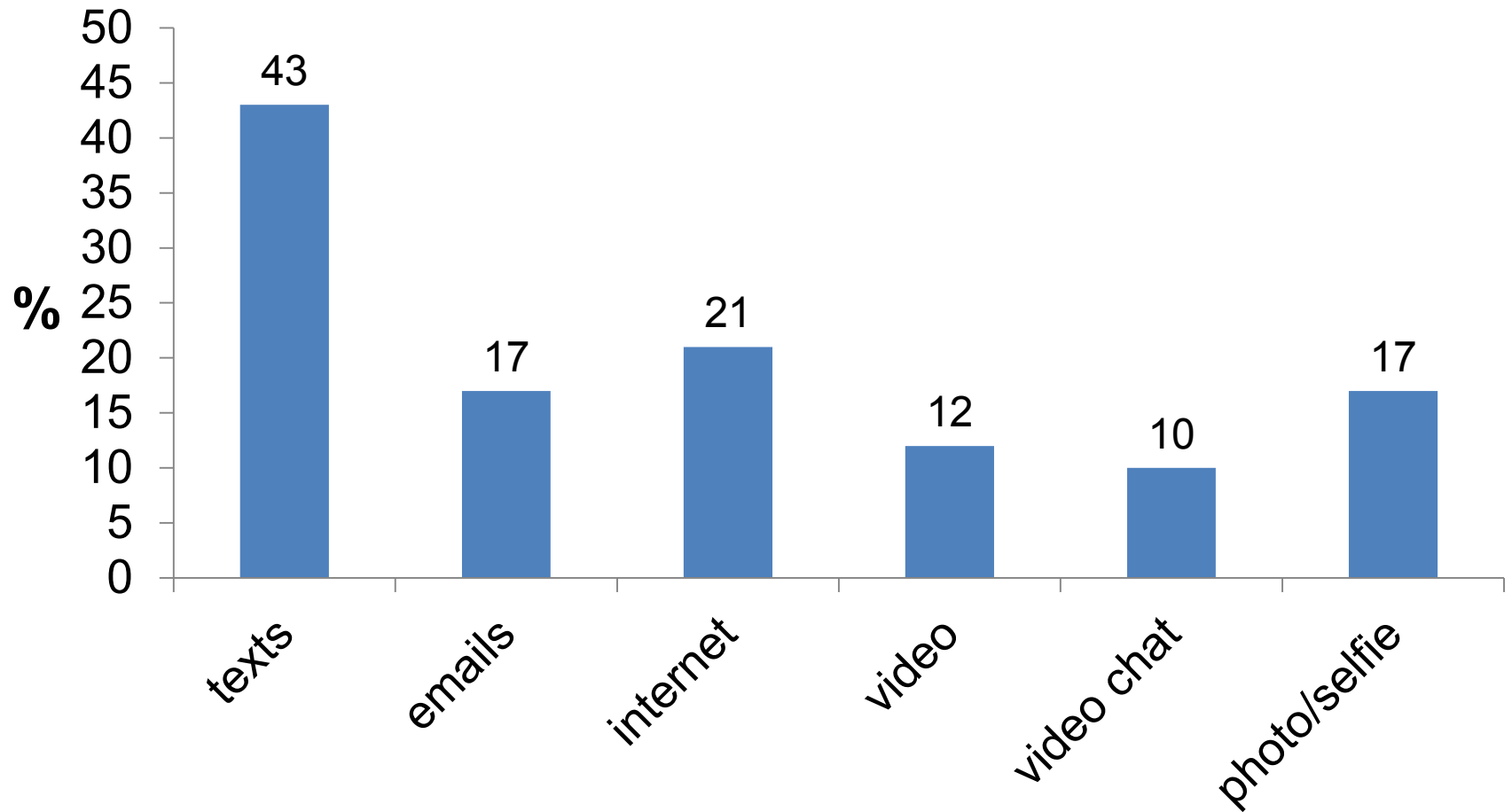


Source: 2017 Traffic Safety Culture Index Survey

# Prevalence: texting while driving National Youth Risk Behavior Survey (YRBS) United States, 2013-2017

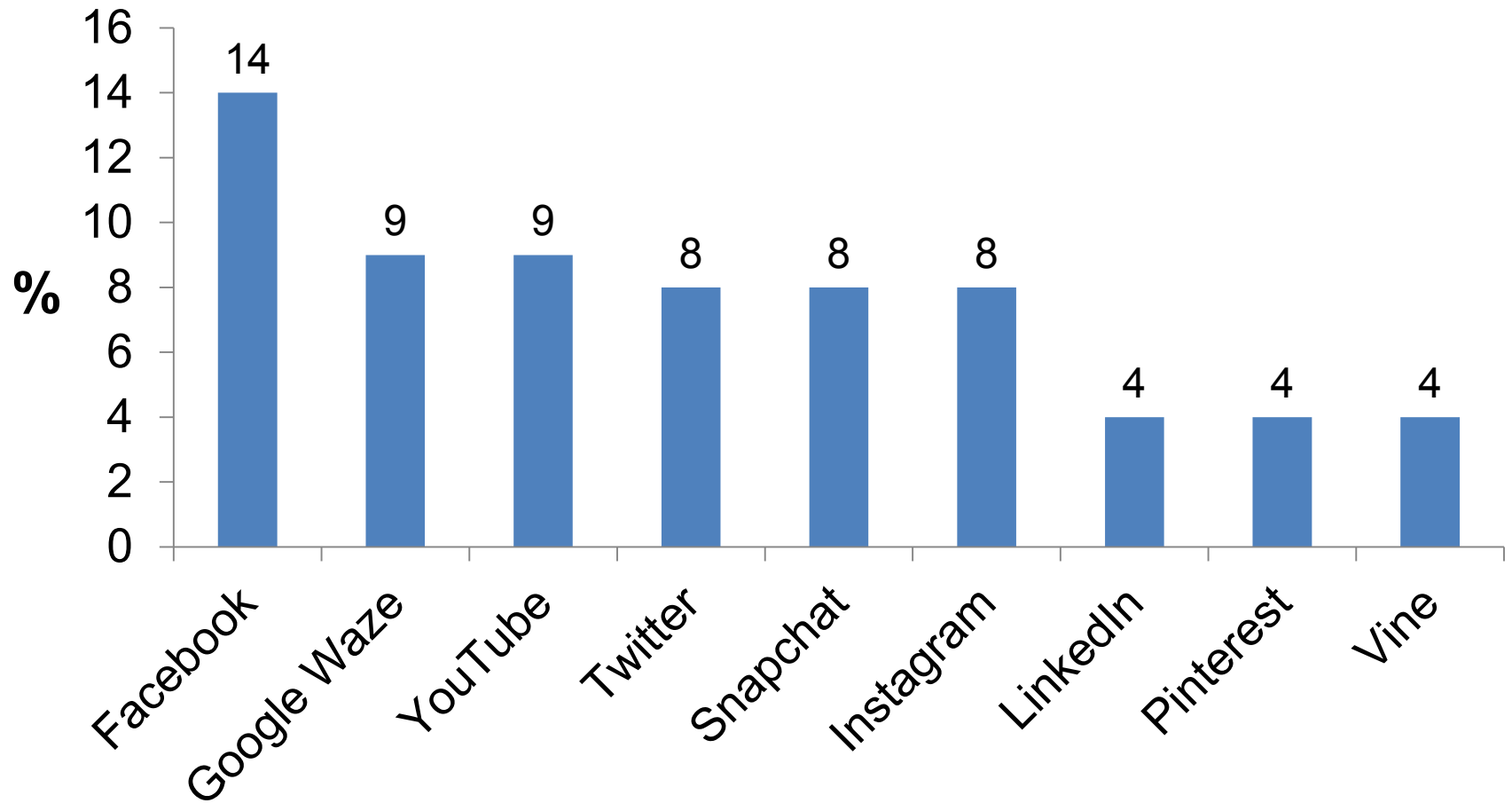


# Cellphone use while driving: various forms United States, 2015



Source: 2015 ATT Survey

# Cellphone use while driving: social platforms United States, 2015



## B) Risk factors / markers



# Risk factors / markers

A. Age ?

# National Occupant Protection Use Survey (NOPUS)

- Roadside observation at stop lights or signs
- Driver cellphone use, occupant restraint use
- 7 am – 6 pm
- 2008 - 2013
- Age: 16+
- 35 states
- N = 263,673

# Youth Risk Behavior Survey (YRBS)

## State Survey

- Self report
- 2015
- High school students: youngest drivers
- 35 states
- 195,263 students
- Response rate  $\geq 60\%$
- *“During the past 30 days, on how many days did you text or e-mail while driving a car or other vehicle?”*



# Difference between roadside-observation and self-report

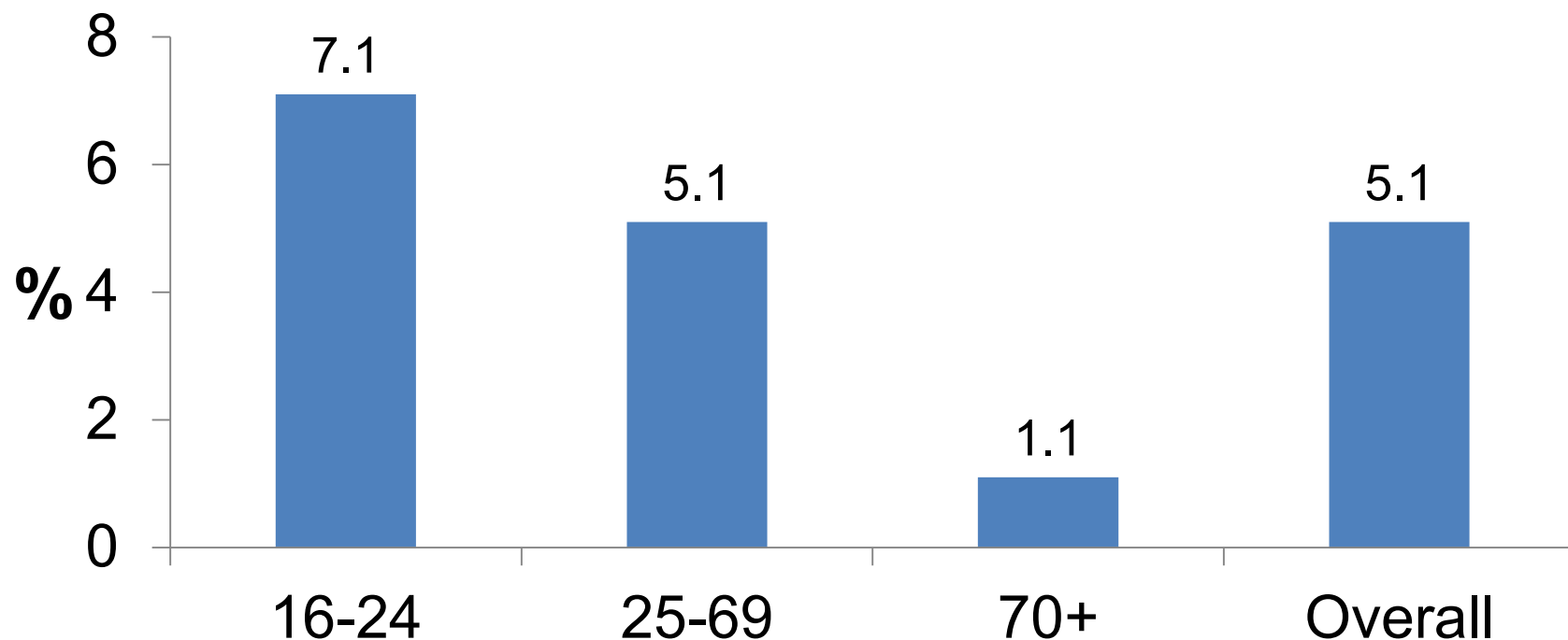
## Roadside-observation: NOPUS

- Point prevalence
- Forms: handheld calls, texting
- Subjective classification: age, race
- Age 16+

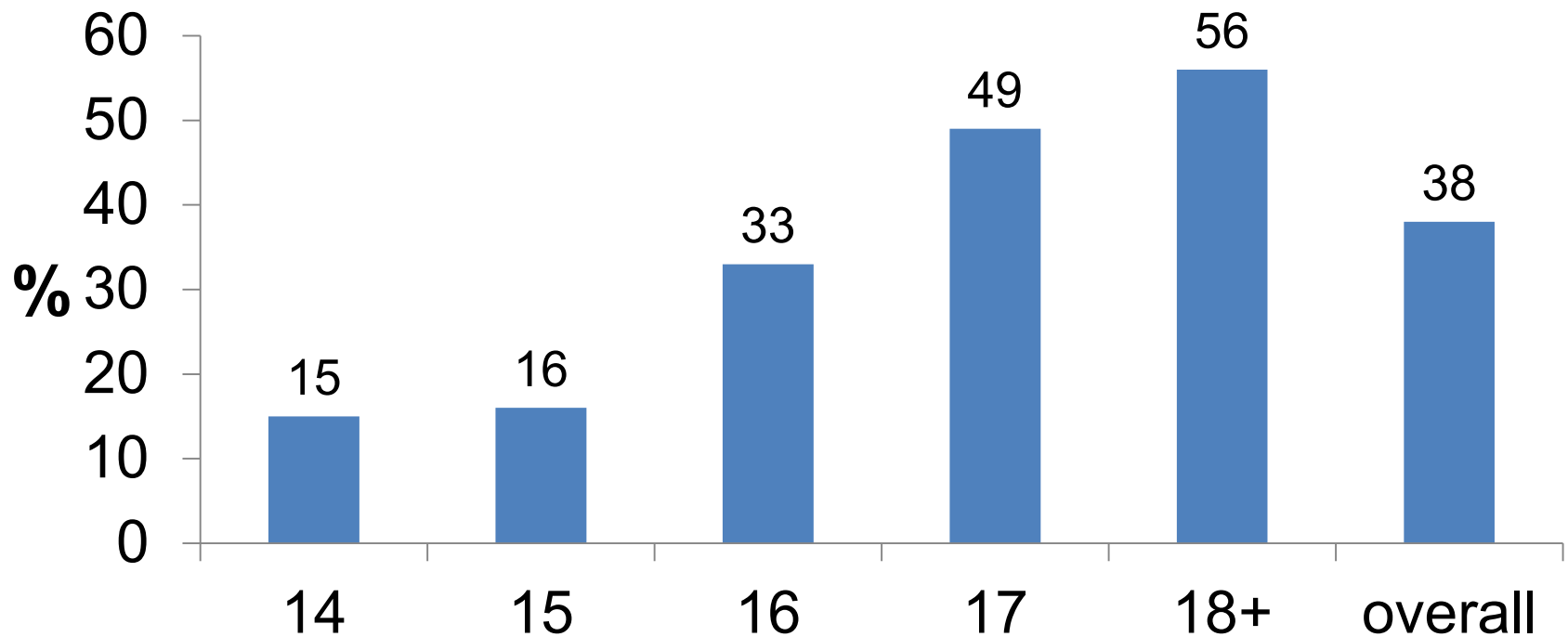
## Self-report: YRBS

- Period prevalence
- Forms: texting
- Social desirability bias
- High school students

# Handheld phone calling at stop lights or signs: overall and by age 2008-2013 NOPUS



# Texting while driving during the past 30 days by age and overall 2015 YRBS, 35 US states

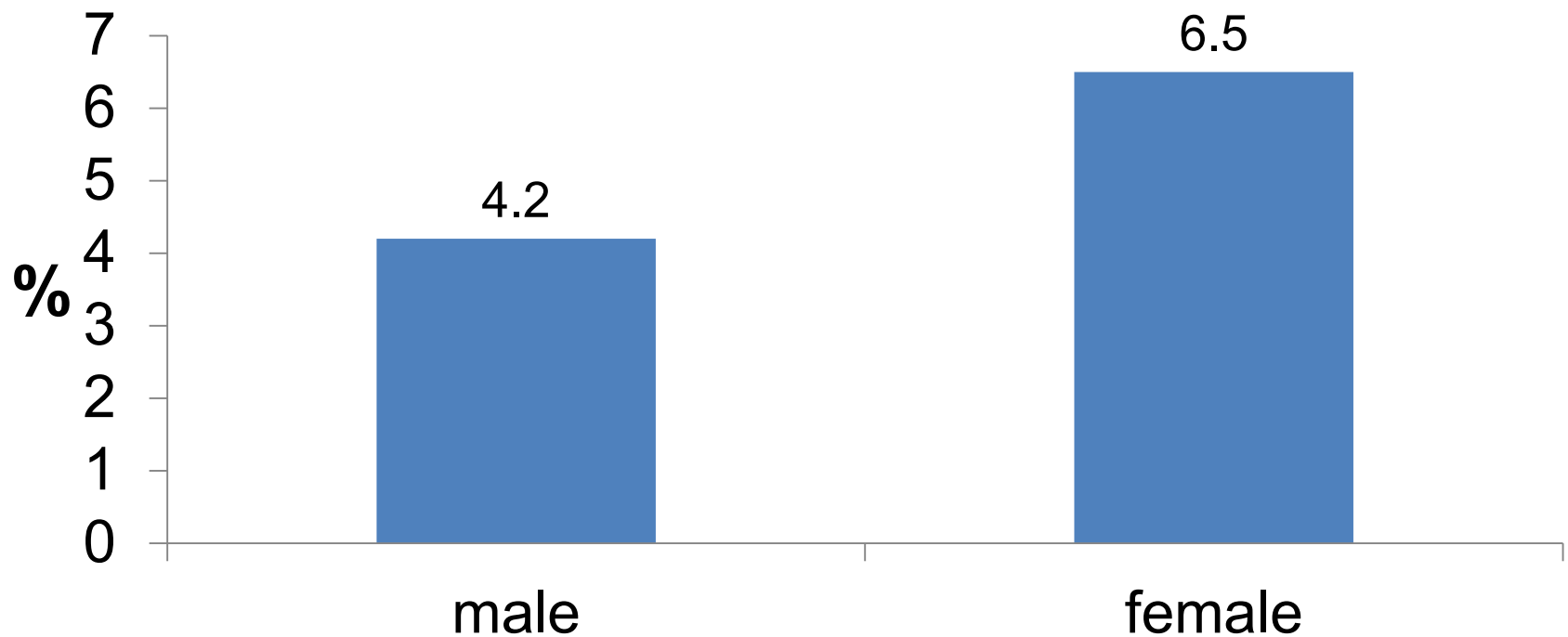


# Risk factors / markers

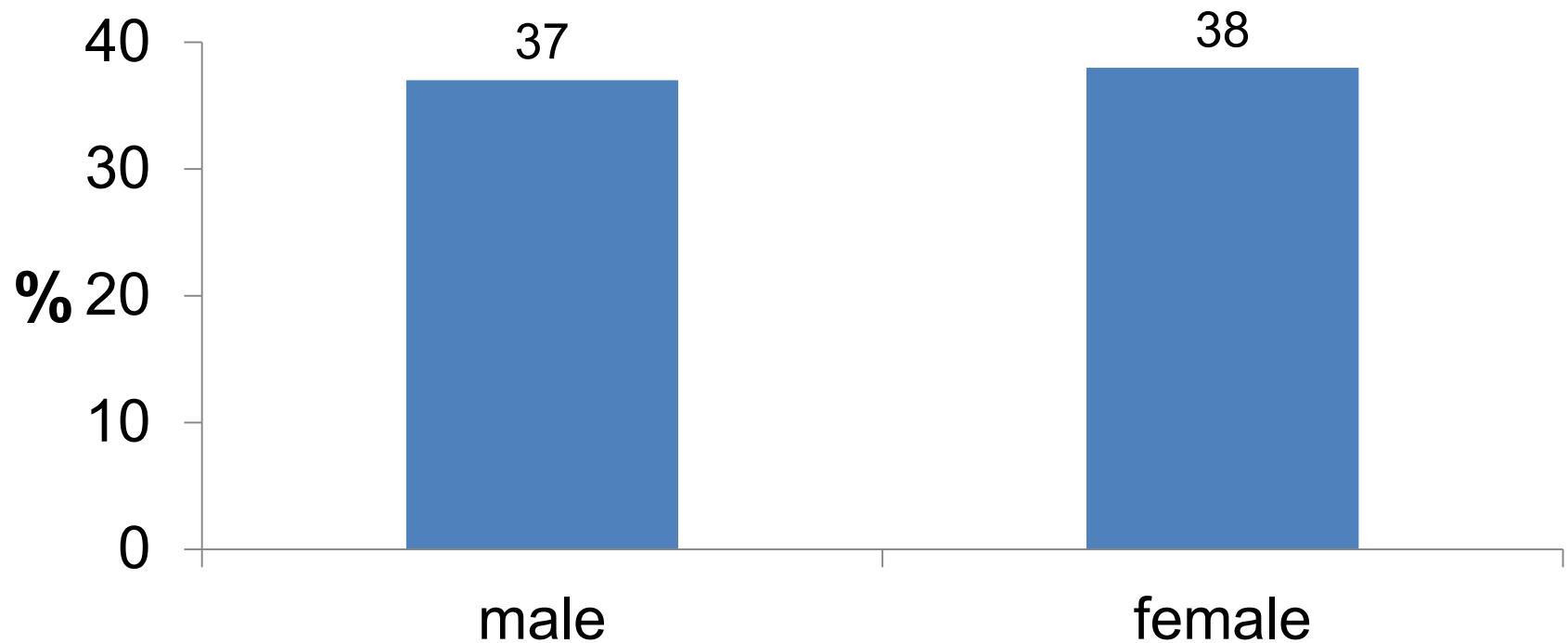
- Age
- Sex ?



# Calling at stop lights or signs by sex 2008-2013 NOPUS



# Texting while driving during the past 30 days by sex 2015 YRBS, 35 US states

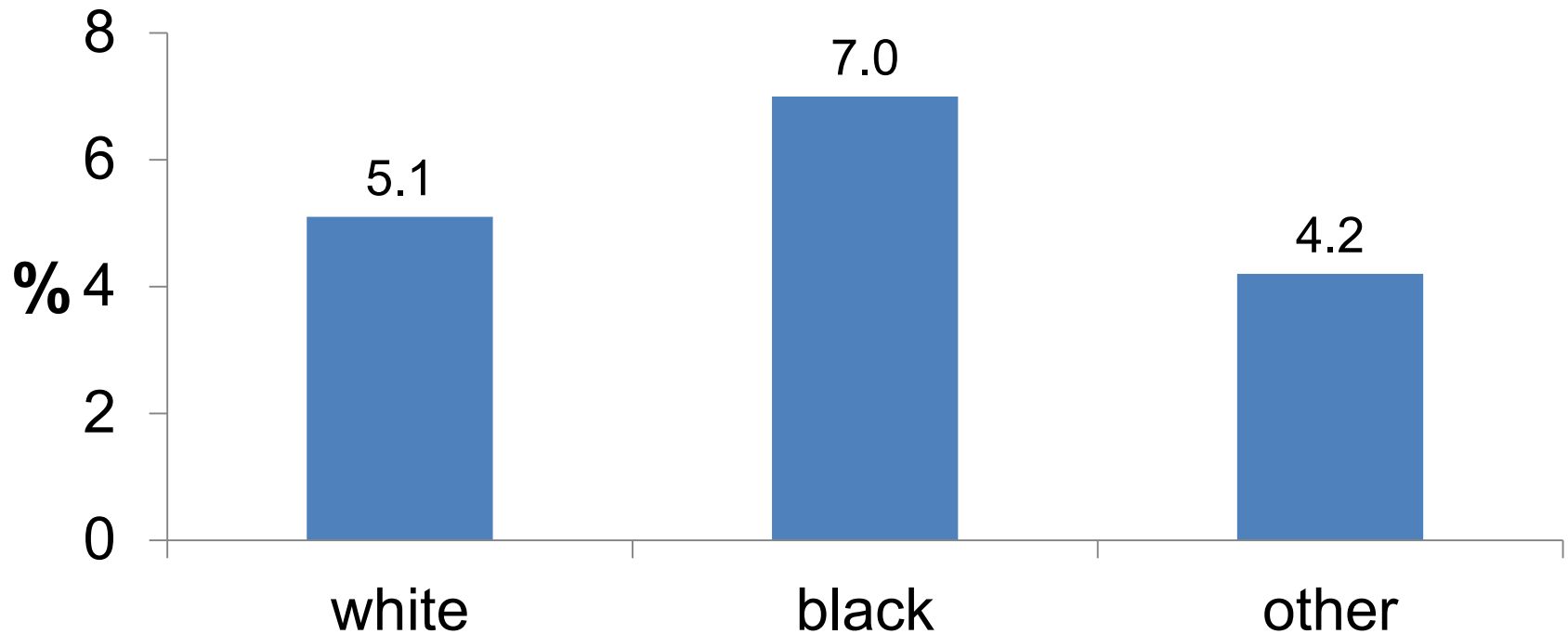


# Risk factors / markers

- Age
- Female ?
- Race ?

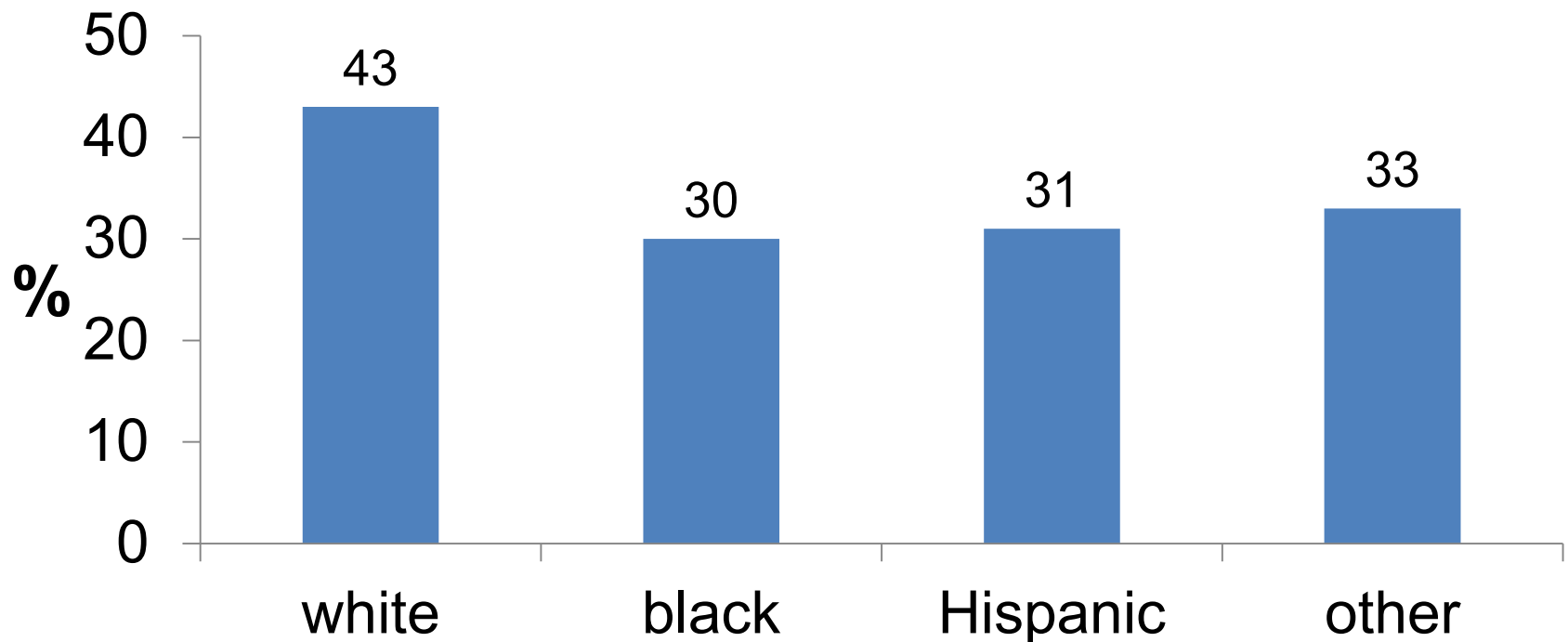


# Calling at stop lights or signs by race 2008-2013 NOPUS





# Texting while driving in the past 30 days by race / ethnicity 2015 YRBS, 35 US states

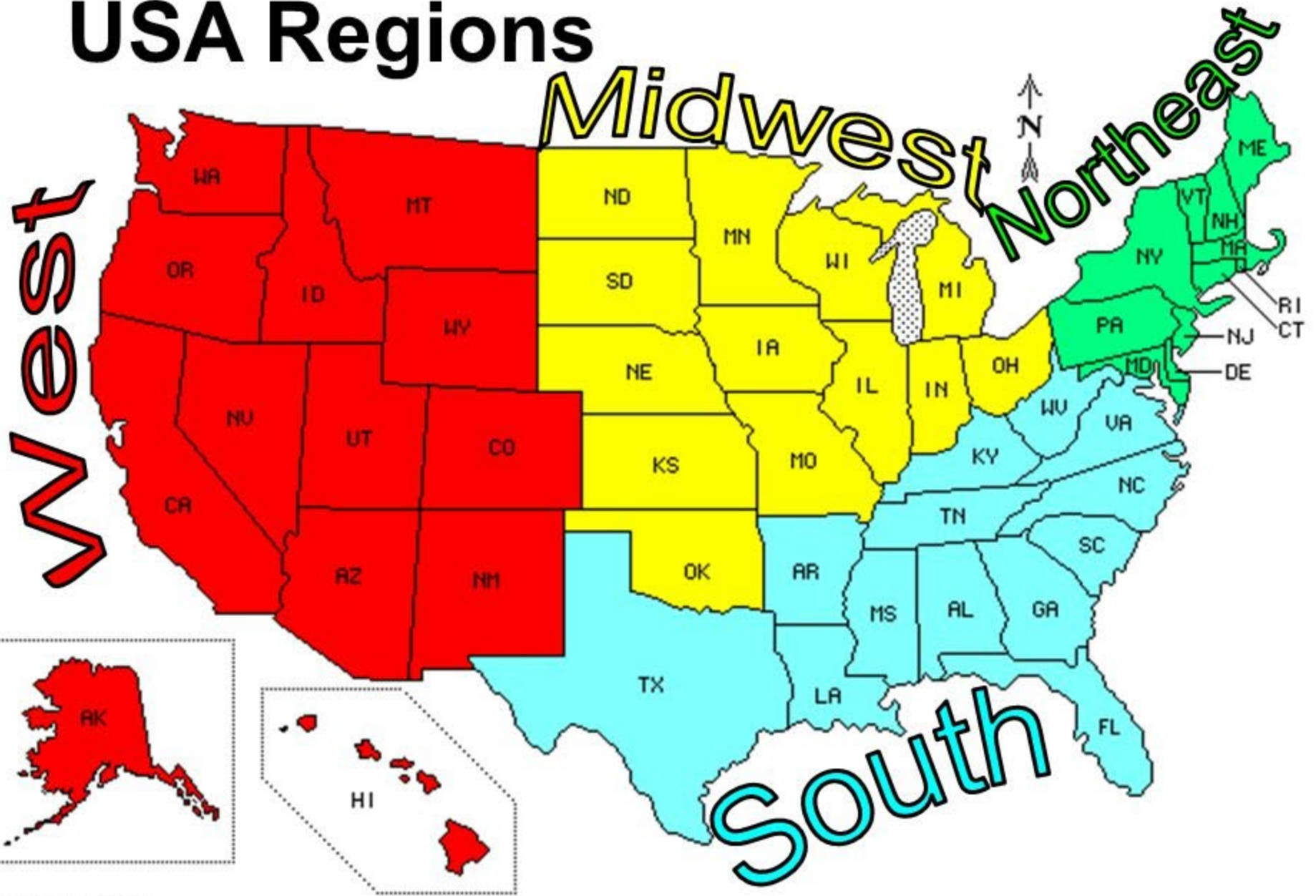


# Risk factors / markers

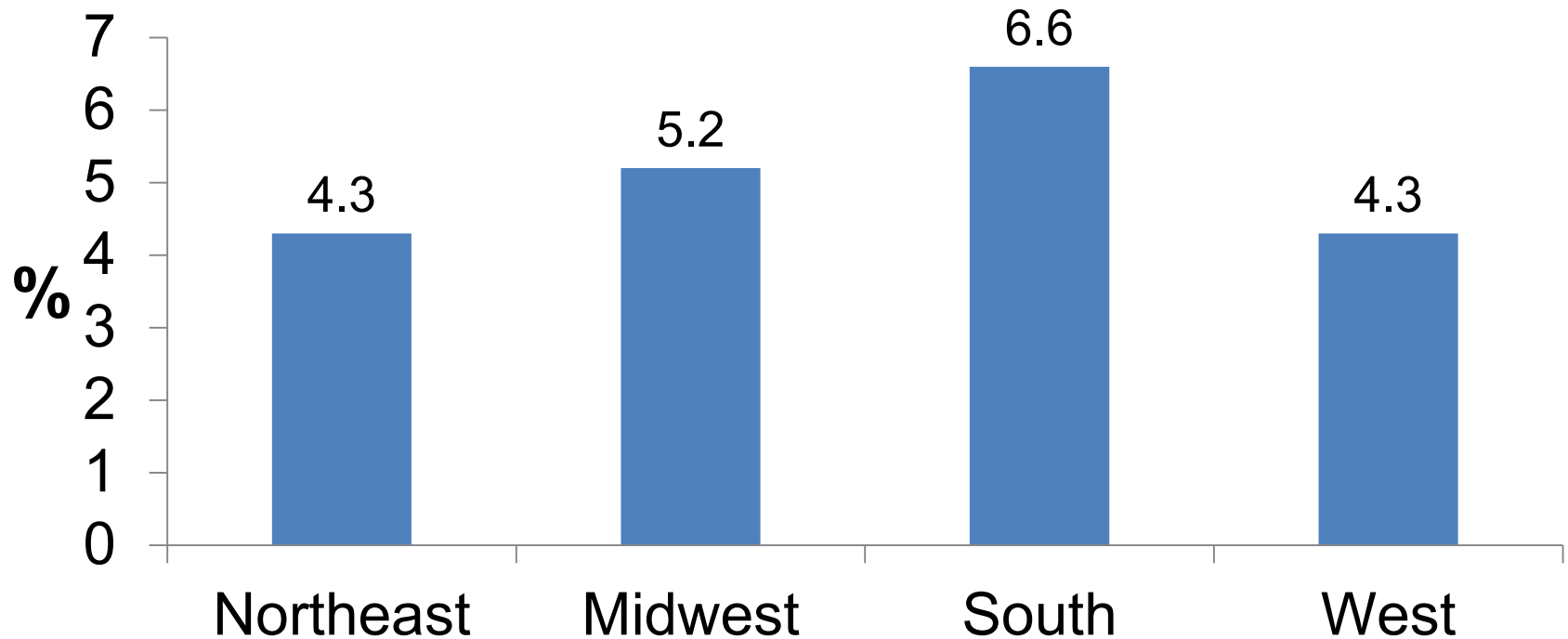
- Age
- Female?
- White?
- Geographic regions
  - State / region ?



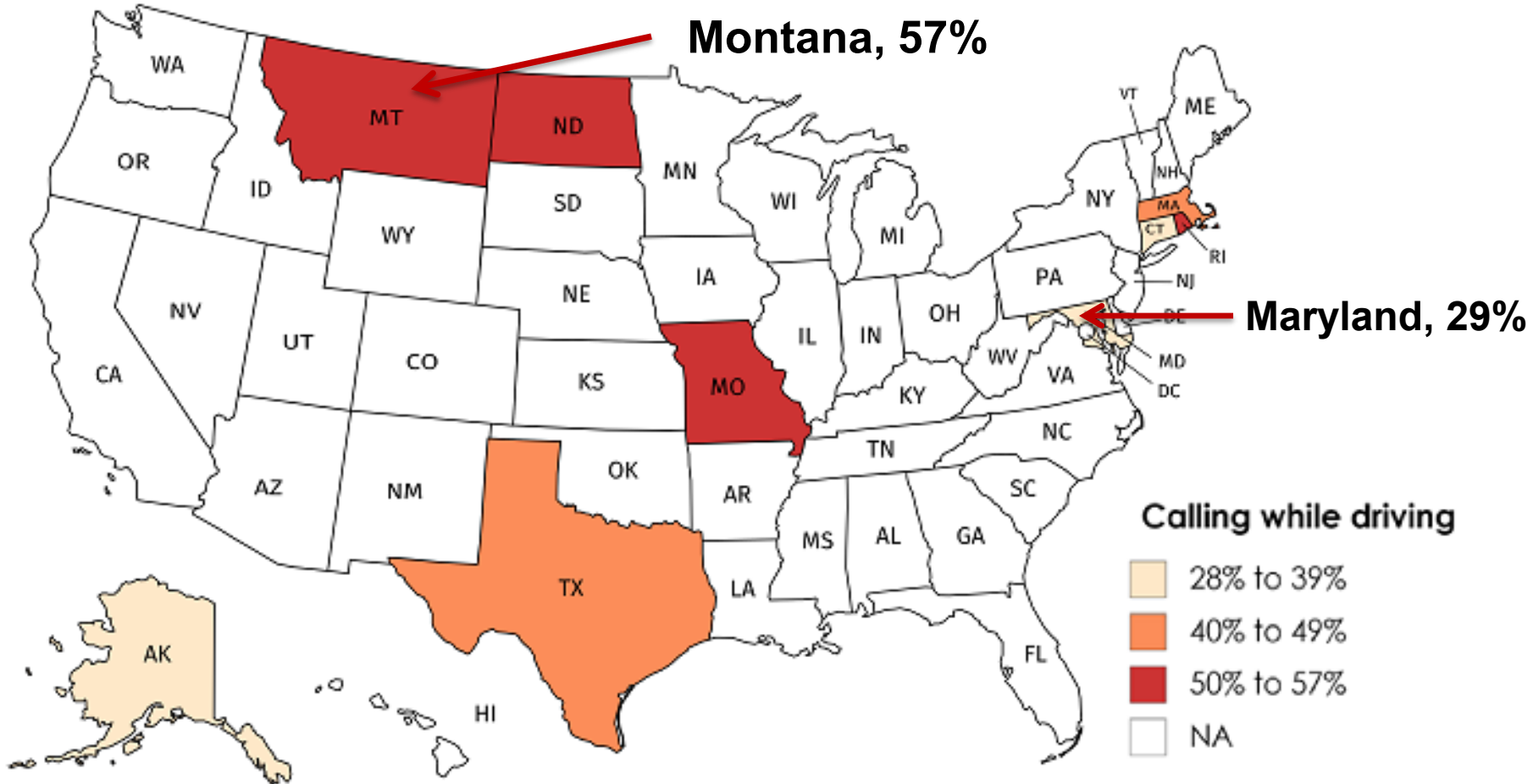
# USA Regions



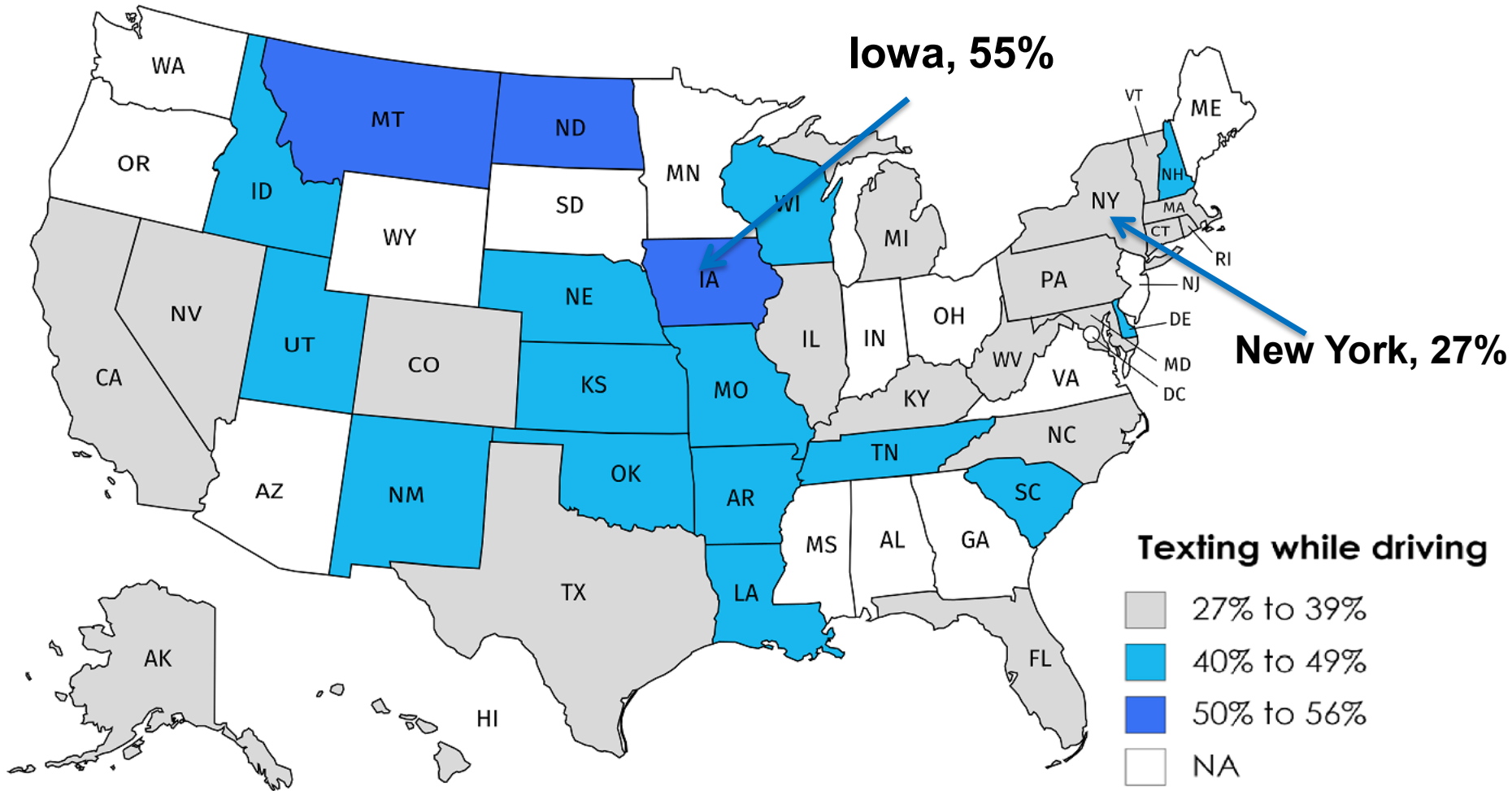
# Calling at stop lights or signs by geographic region 2008-2013 NOPUS



# Calling while driving during the past 30 days by state, 2017 YRBS, 9 US states

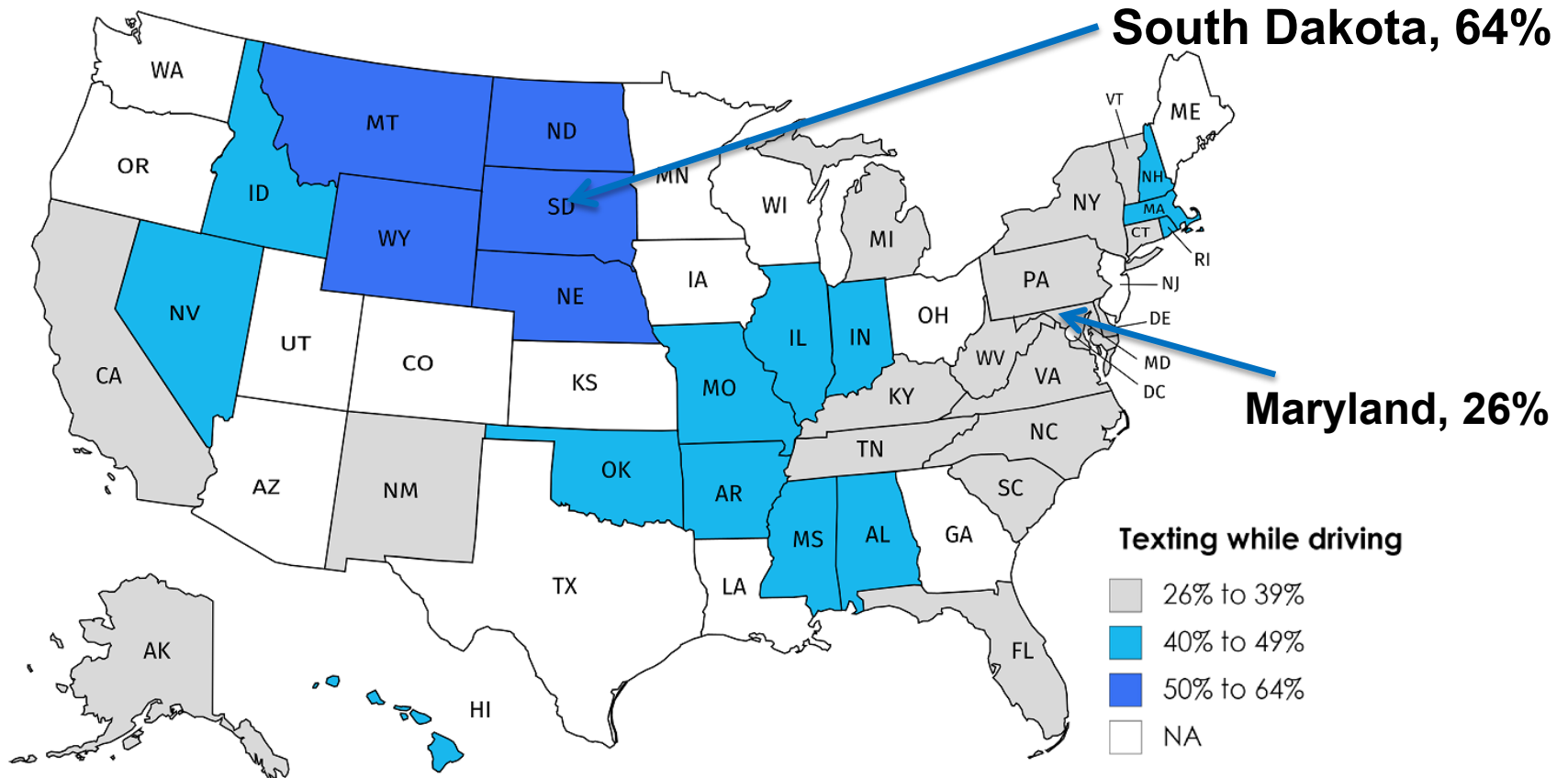


# Texting while driving during the past 30 days by state, 2017 YRBS, 36 US states



# Texting while driving during the past 30 days by state

**2015** YRBS, 35 US states



**Overall texting while driving: 38%**

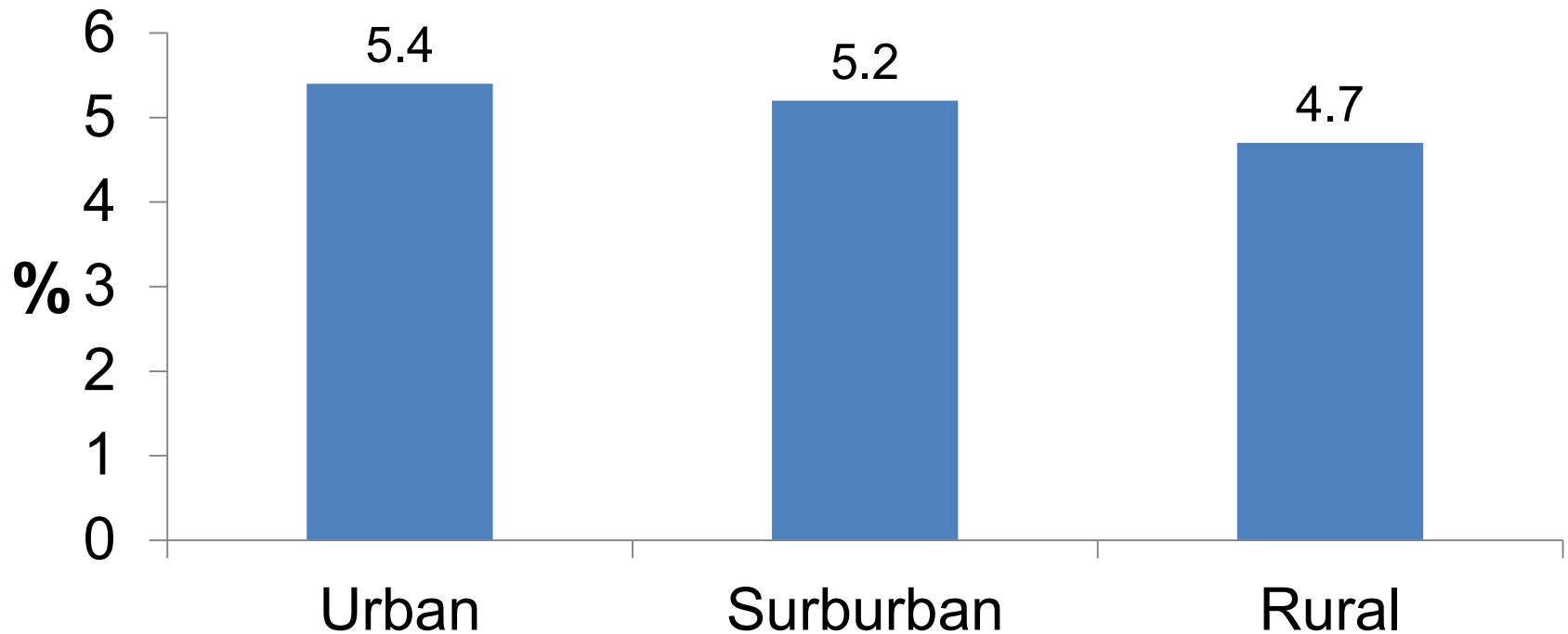
# Risk factors / markers

- Age
- Female ?
- white ?
- Geographic regions
  - State / region
  - Urban ?





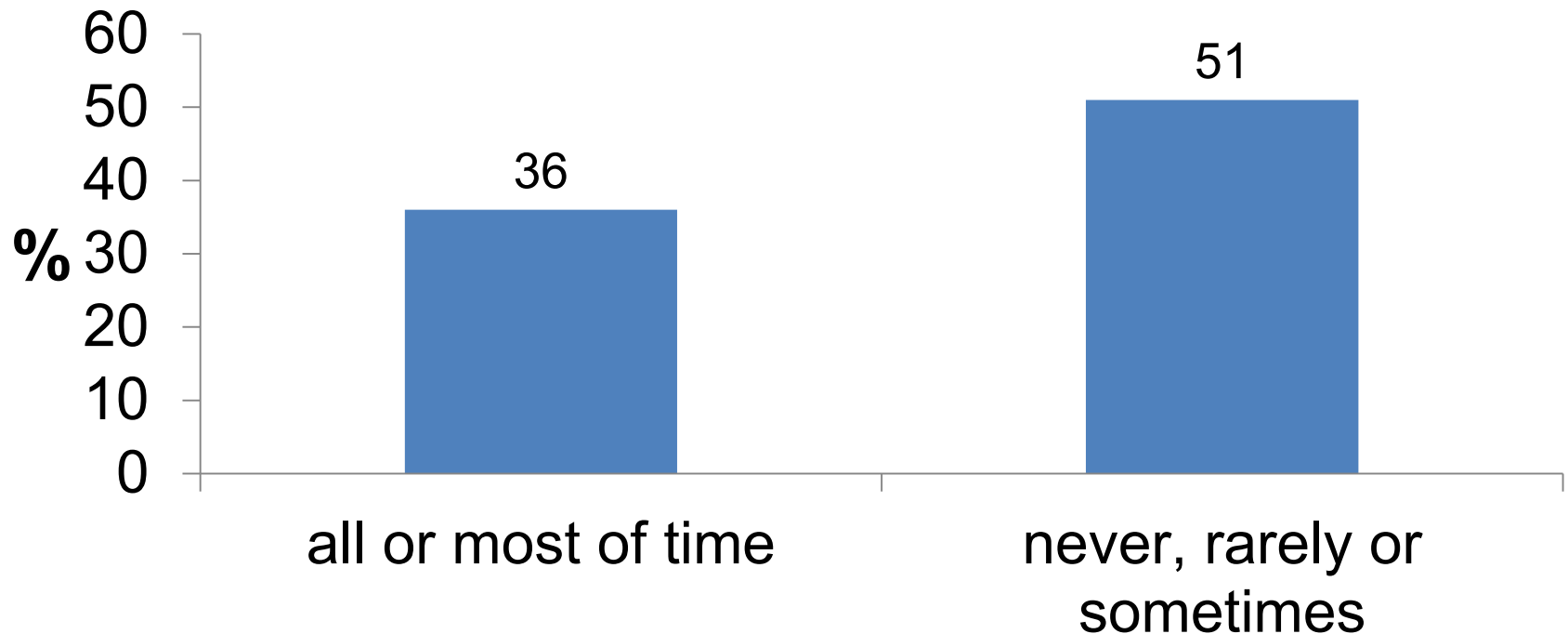
# Calling at stop lights or signs by urban / suburban / rural 2008-2013 NOPUS



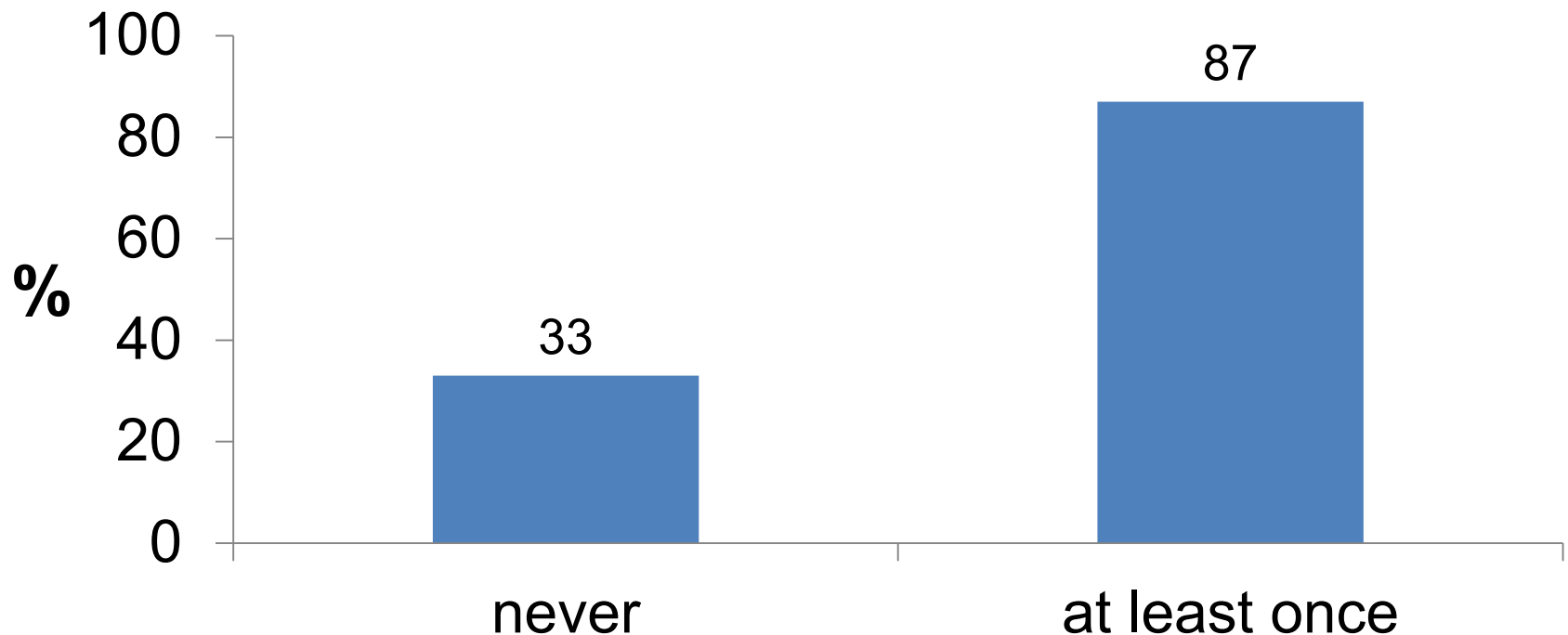
# Risk factors / markers

- Age
- Female ?
- White ?
- Geographic regions
  - State / region
  - Urban
- Risky driving behaviors
  - Seatbelt use
  - Alcohol involvement

# Texting while driving during the past 30 days by seatbelt use 2015 YRBS, 35 US states



# Texting while driving during the past 30 days by alcohol use 2015 YRBS, 35 US states



# Risk factors / markers

- Age
- Female?
- White?
- Geographic regions/locations
  - State / region
  - Urban
- Risky driving behaviors





## C) Cellphone use and crash risk

# Crashes with phone records show increased risk

## The New England Journal of Medicine

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### ASSOCIATION BETWEEN CELLULAR-TELEPHONE CALLS AND MOTOR VEHICLE COLLISIONS

DONALD A. REDELMEIER, M.D., AND ROBERT J. TIBSHIRANI, Ph.D.



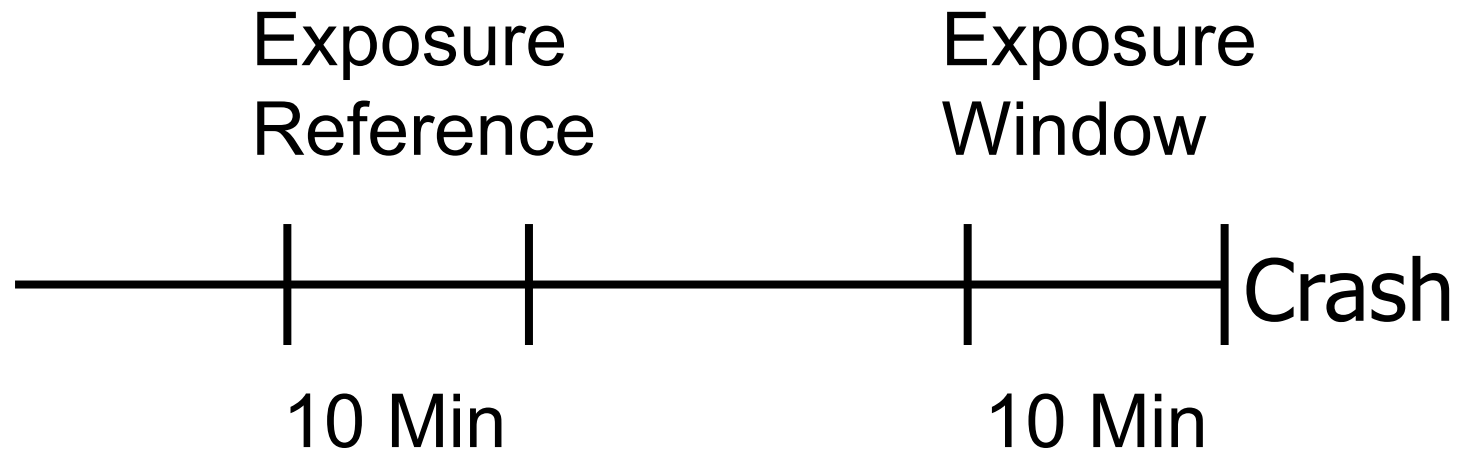
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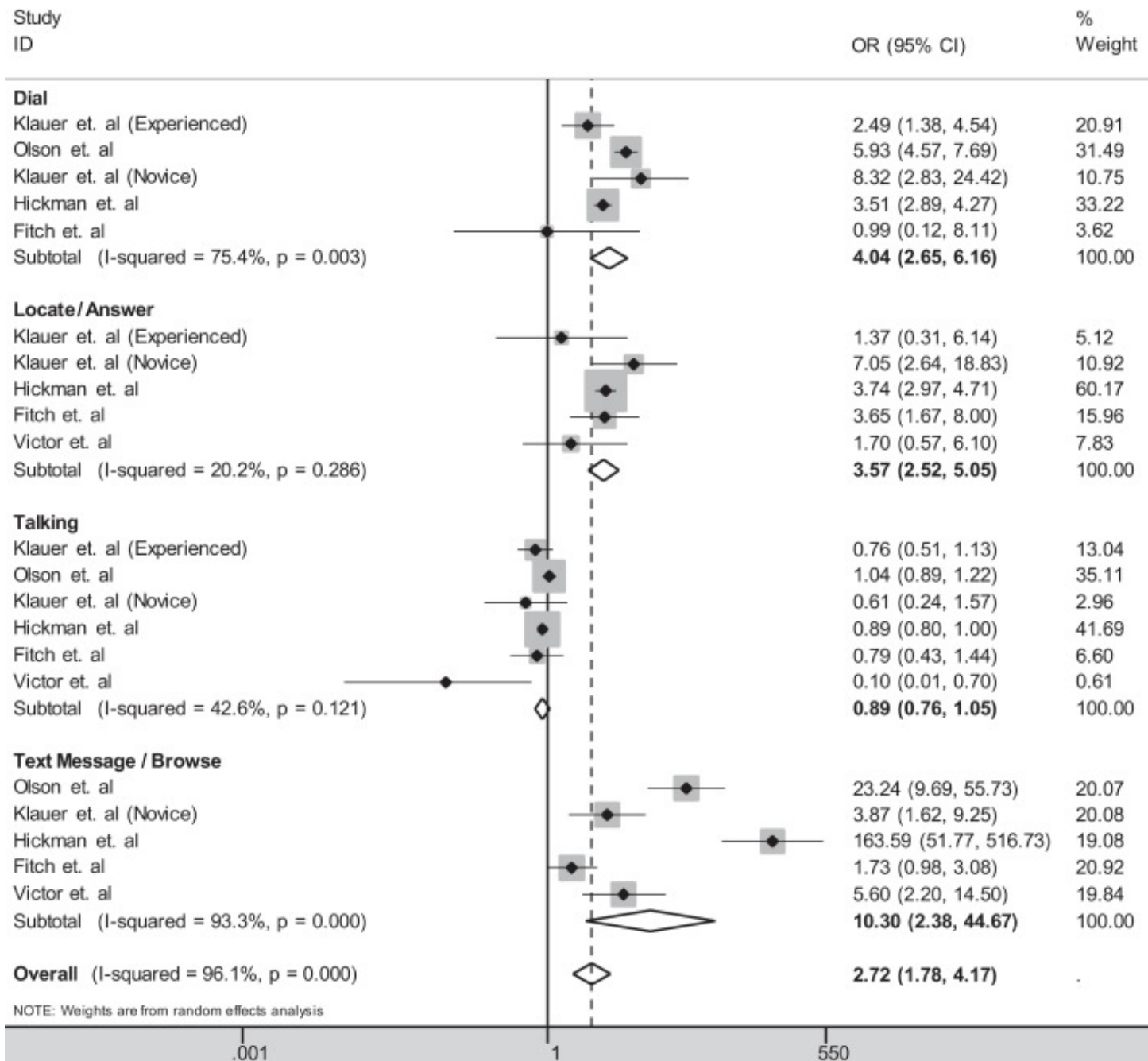
# Case-crossover study

- A design for cause-effect associations with short induction / latency time periods
- Cellphone use  $\longrightarrow$  car crashes





# Safety-critical events and cellphone tasks: meta-analysis



## II: Prevention strategies: 3 Es



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# A) Education

- Physician counselling
- Media campaign

<https://www.youtube.com/watch?v=TSmhZ2OUOtw>

<https://www.preventchildinjury.org/toolkits/distracted-driving>

## B) Enactment / Enforcement

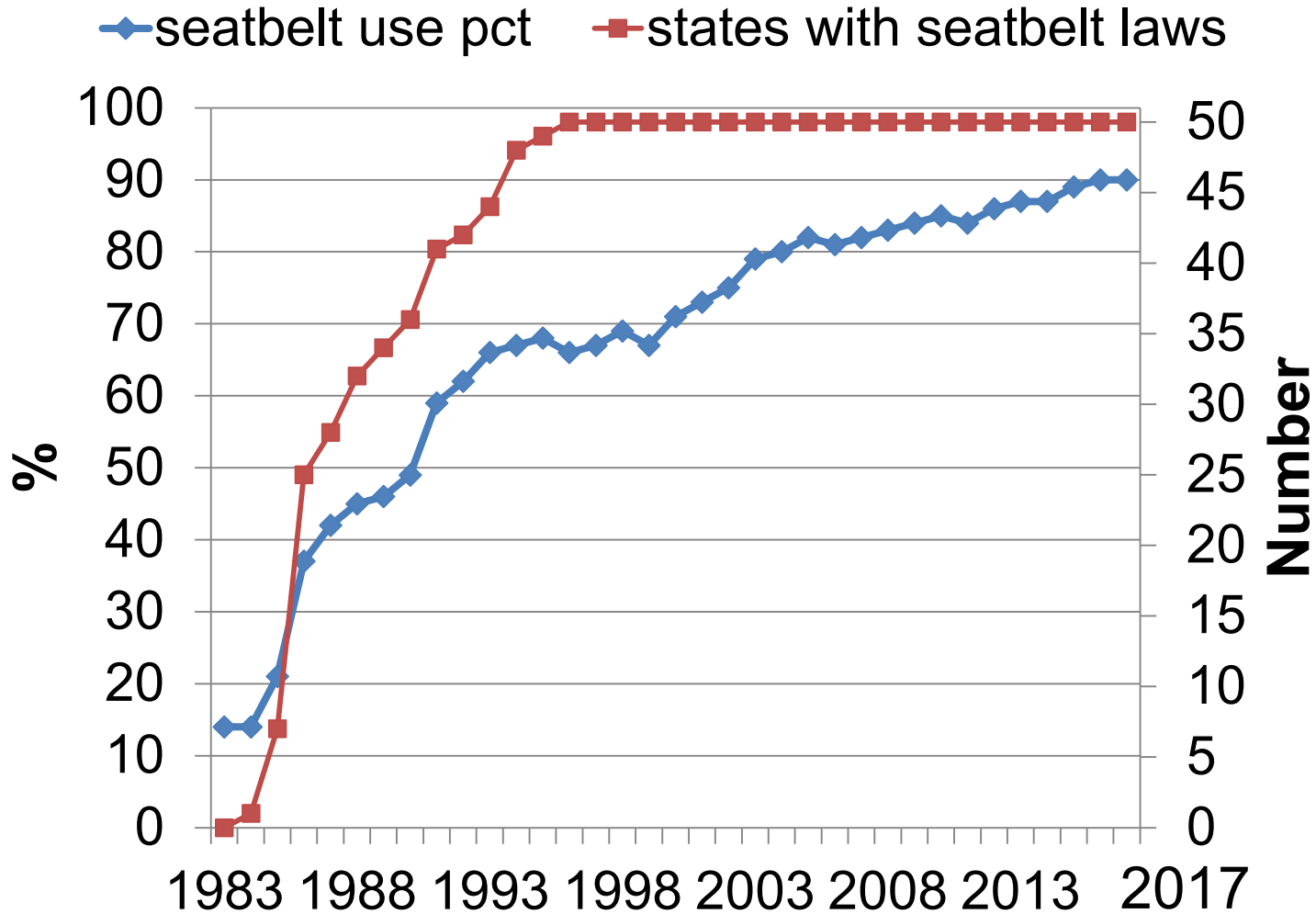


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# Seatbelt use and seatbelt laws



NOPUS

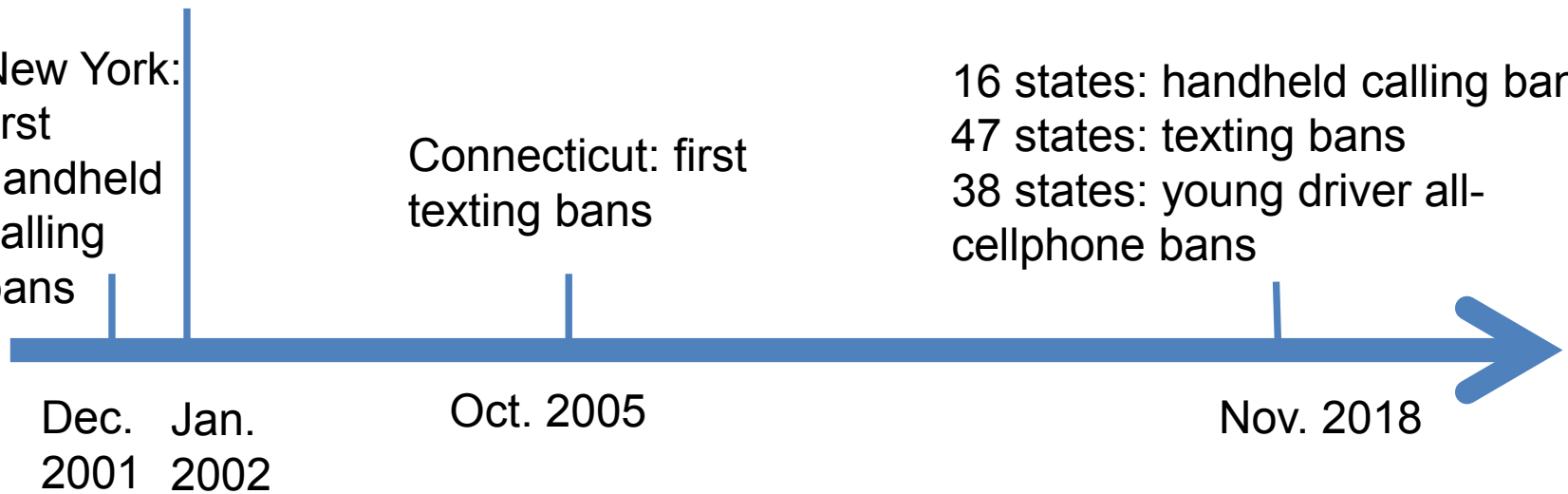
# History of cellphone laws

New Jersey: first young driver all-cellphone bans

New York: first handheld calling bans

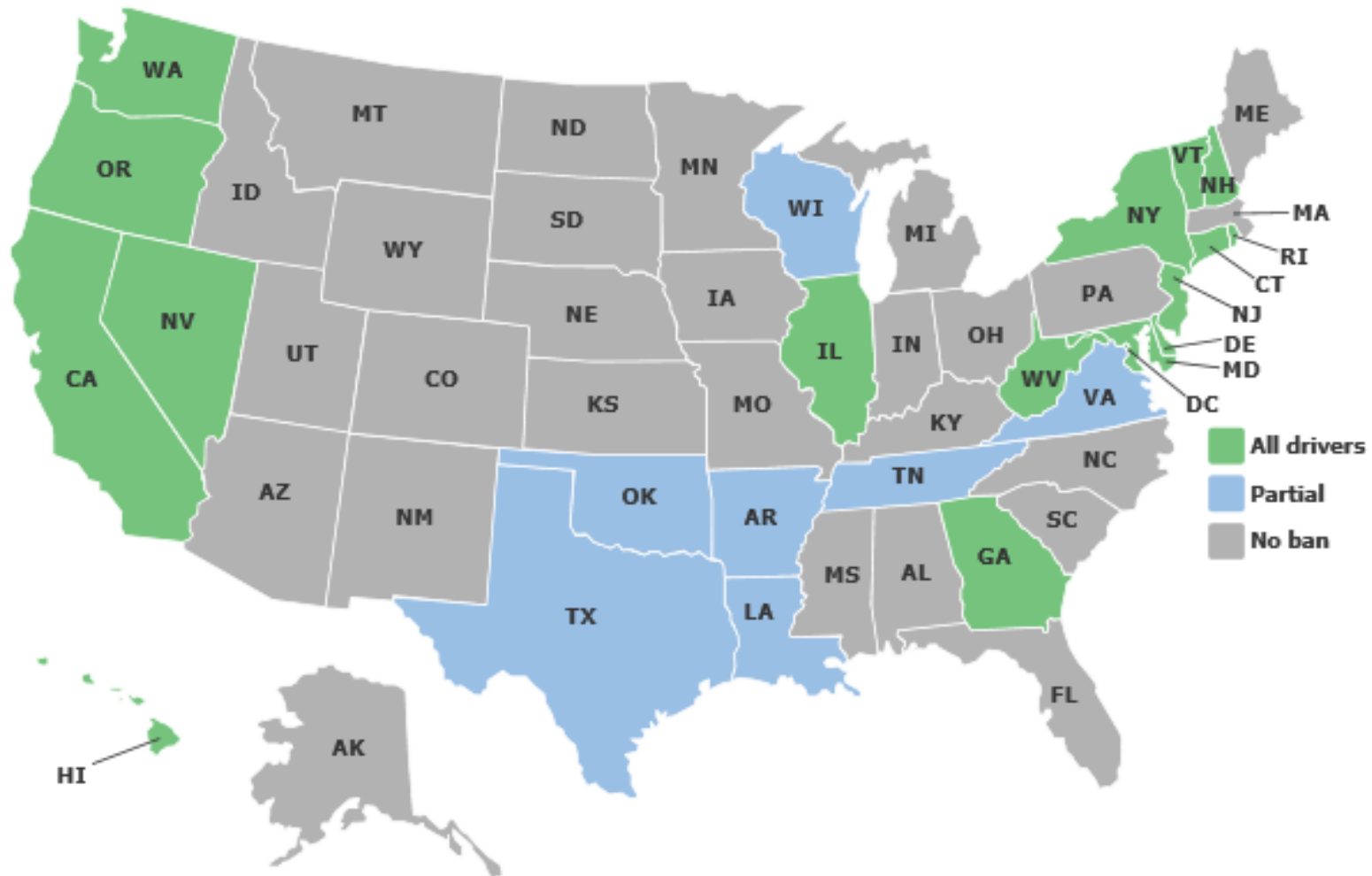
Connecticut: first texting bans

16 states: handheld calling bans  
47 states: texting bans  
38 states: young driver all-cellphone bans



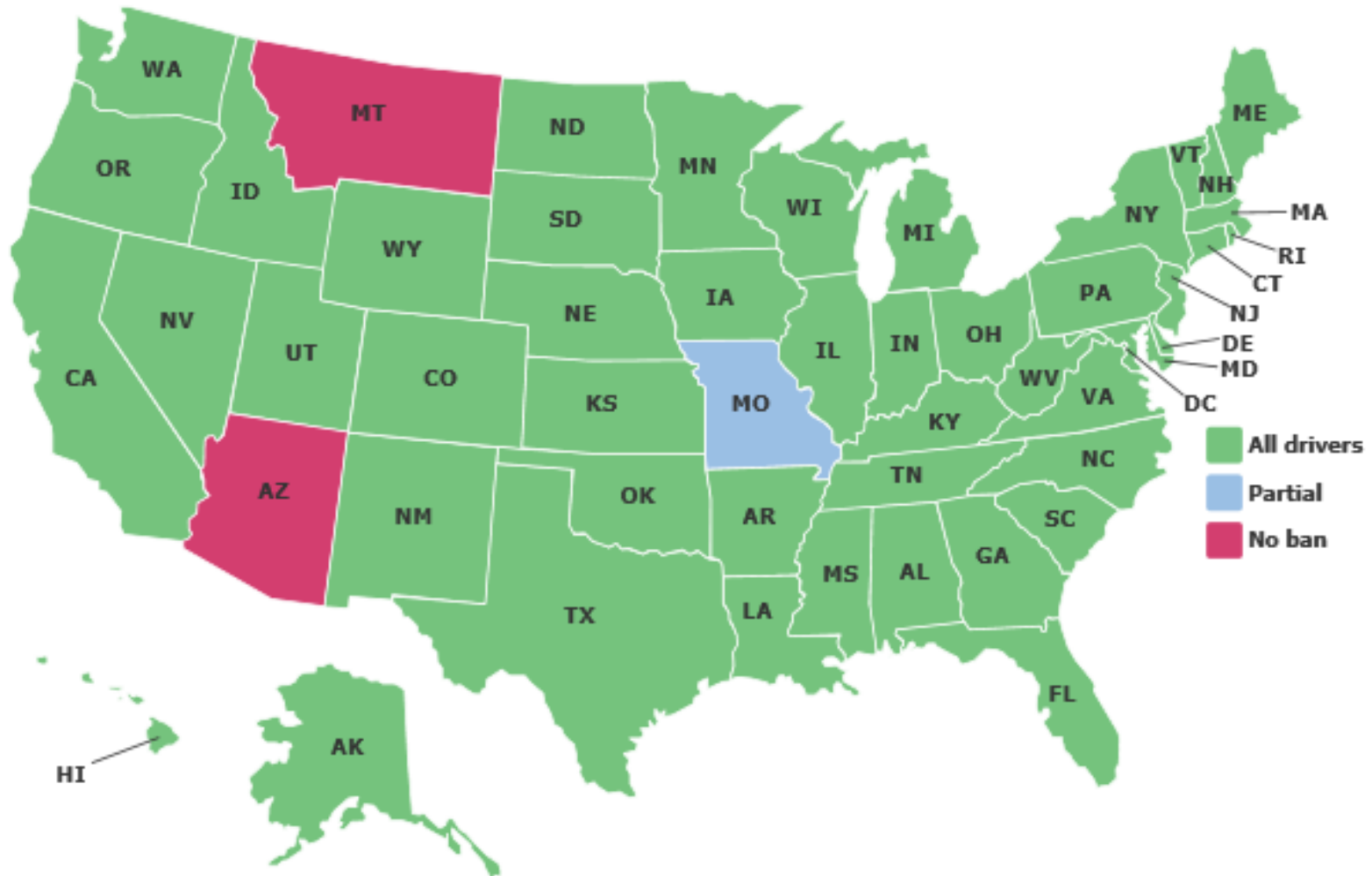
# Handheld phone calling bans

Nov. 2018



# Handheld texting bans

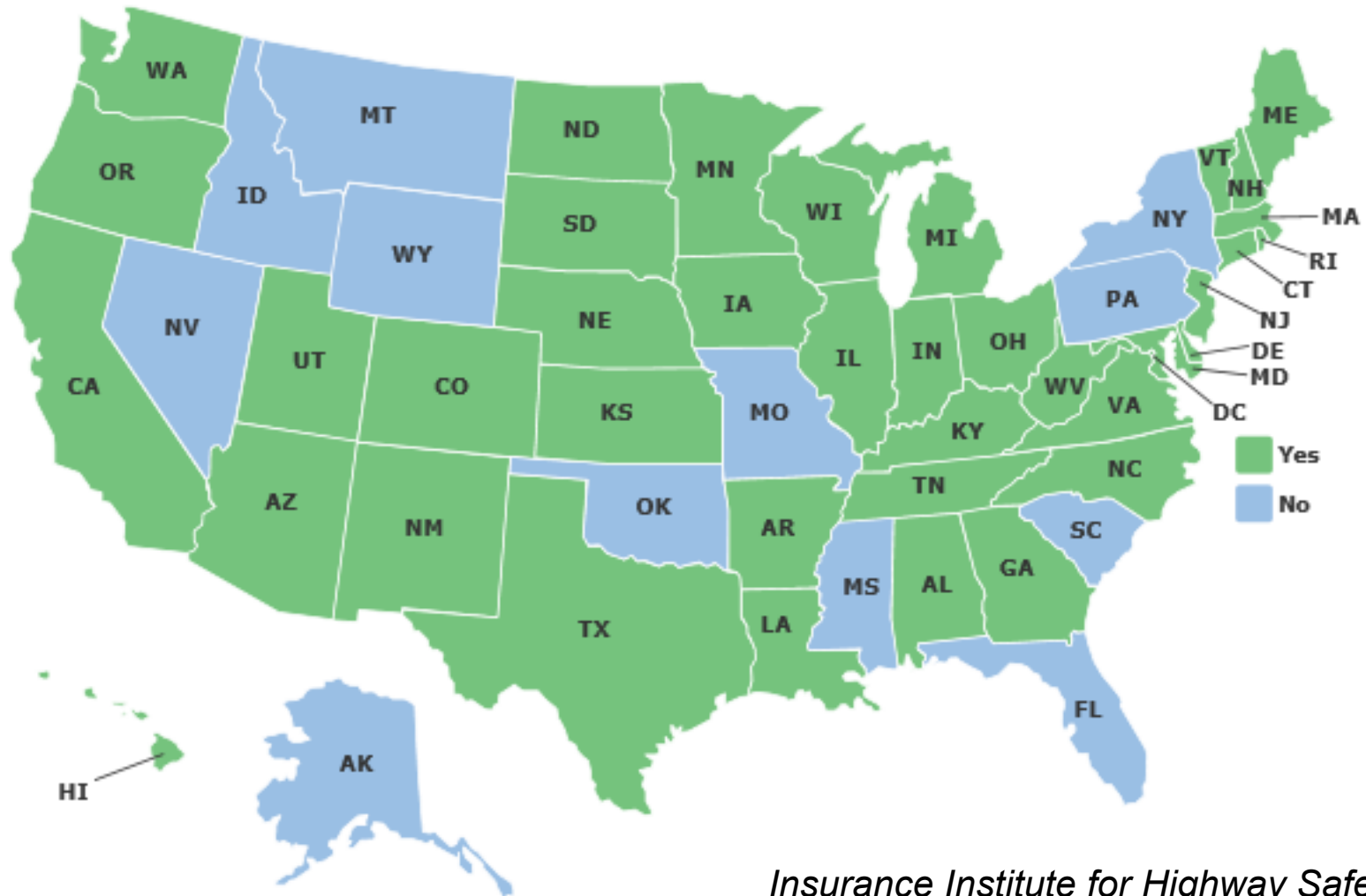
Nov. 2018





# Young driver all-cellphone ban

Nov. 2018



# Handheld phone calls and handheld calling ban 2008-2013 NOPUS, age 16-24

Characteristic	Total N	Pct. of holding phone to ear	Adjusted Odds Ratio (95% Confidence Interval)	
Handheld calling ban				
No	22,133	8.4	1.00	(Referent)
Yes	10,651	3.6	0.42	(0.33, 0.53)

<http://abc6onyourside.com/news/local/local-researchers-encouraging-law-to-ban-handheld-phones-in-ohio>



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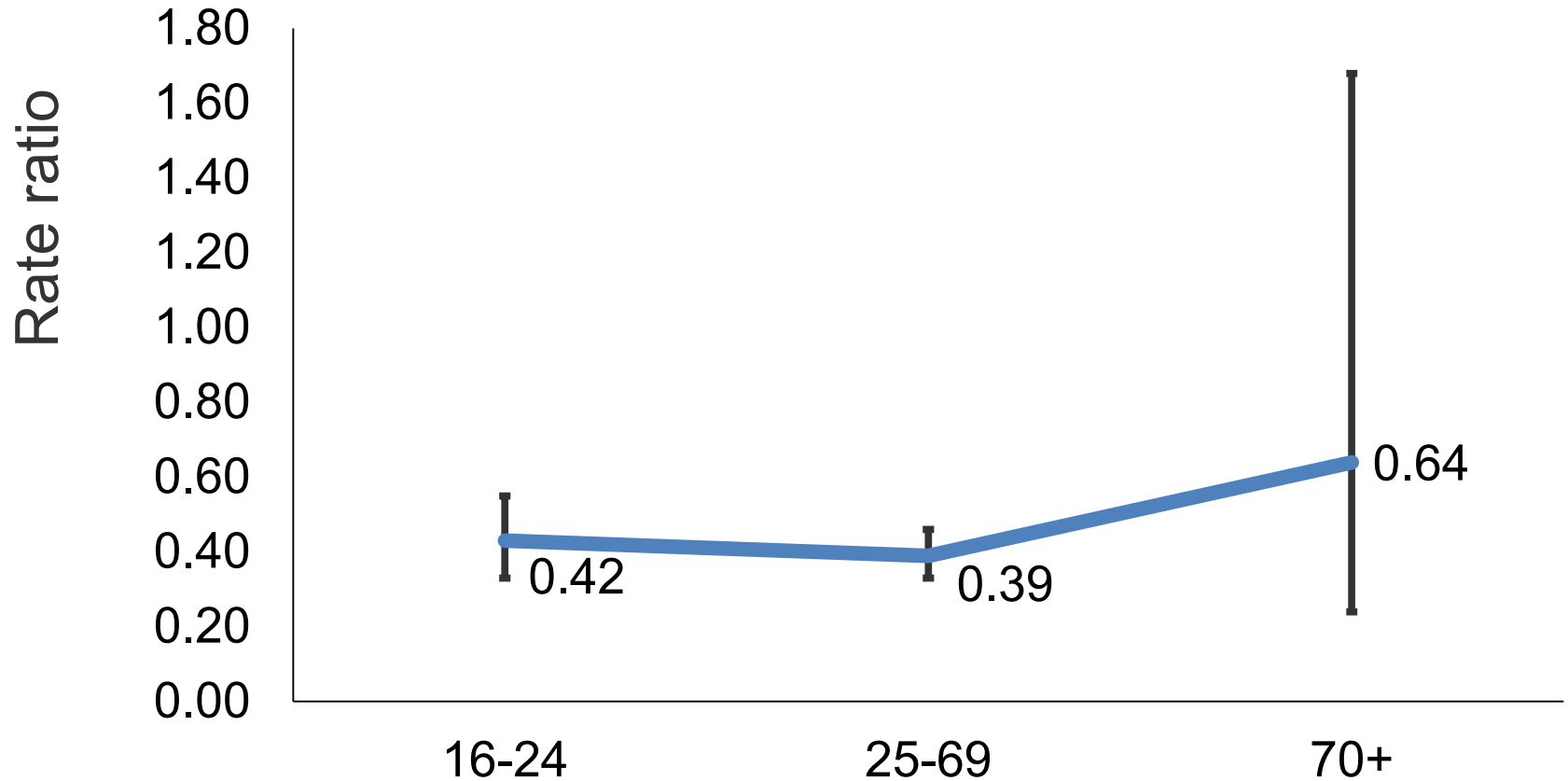


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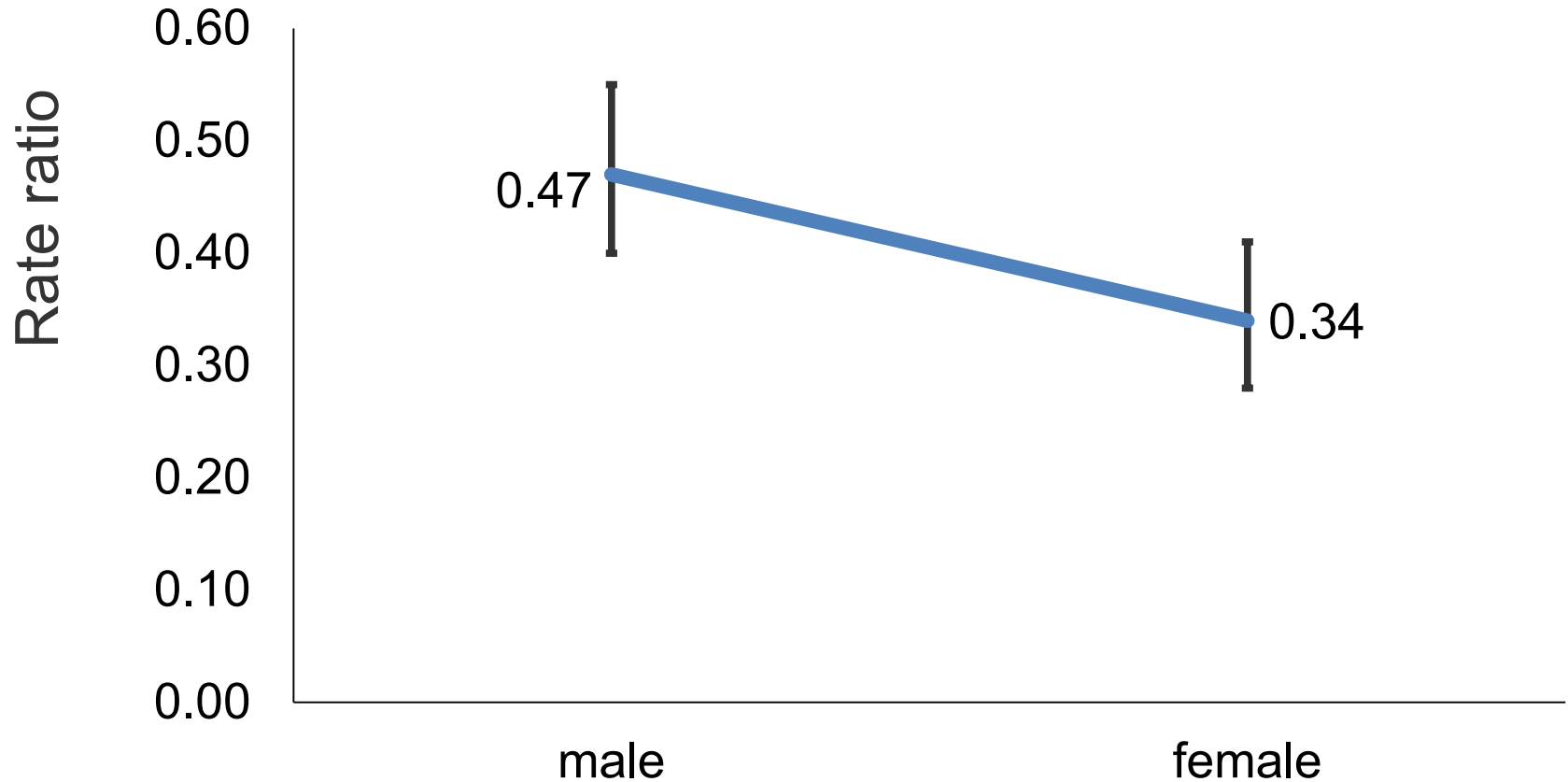
# Effectiveness of handheld calling bans according to age, sex, and regions

- 2008-2013 NOPUS
- Age 16+

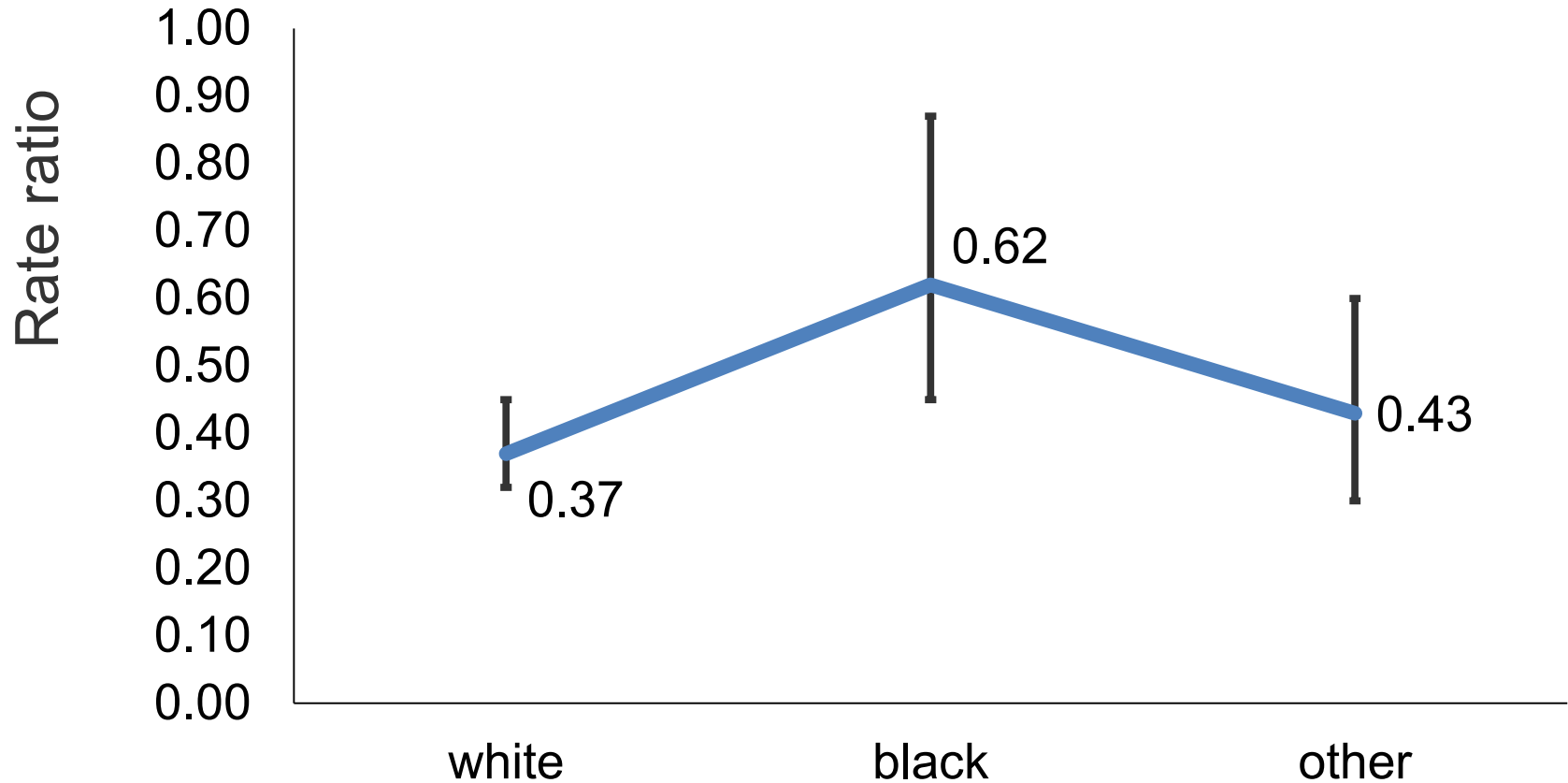
# Adjusted rate ratios by age



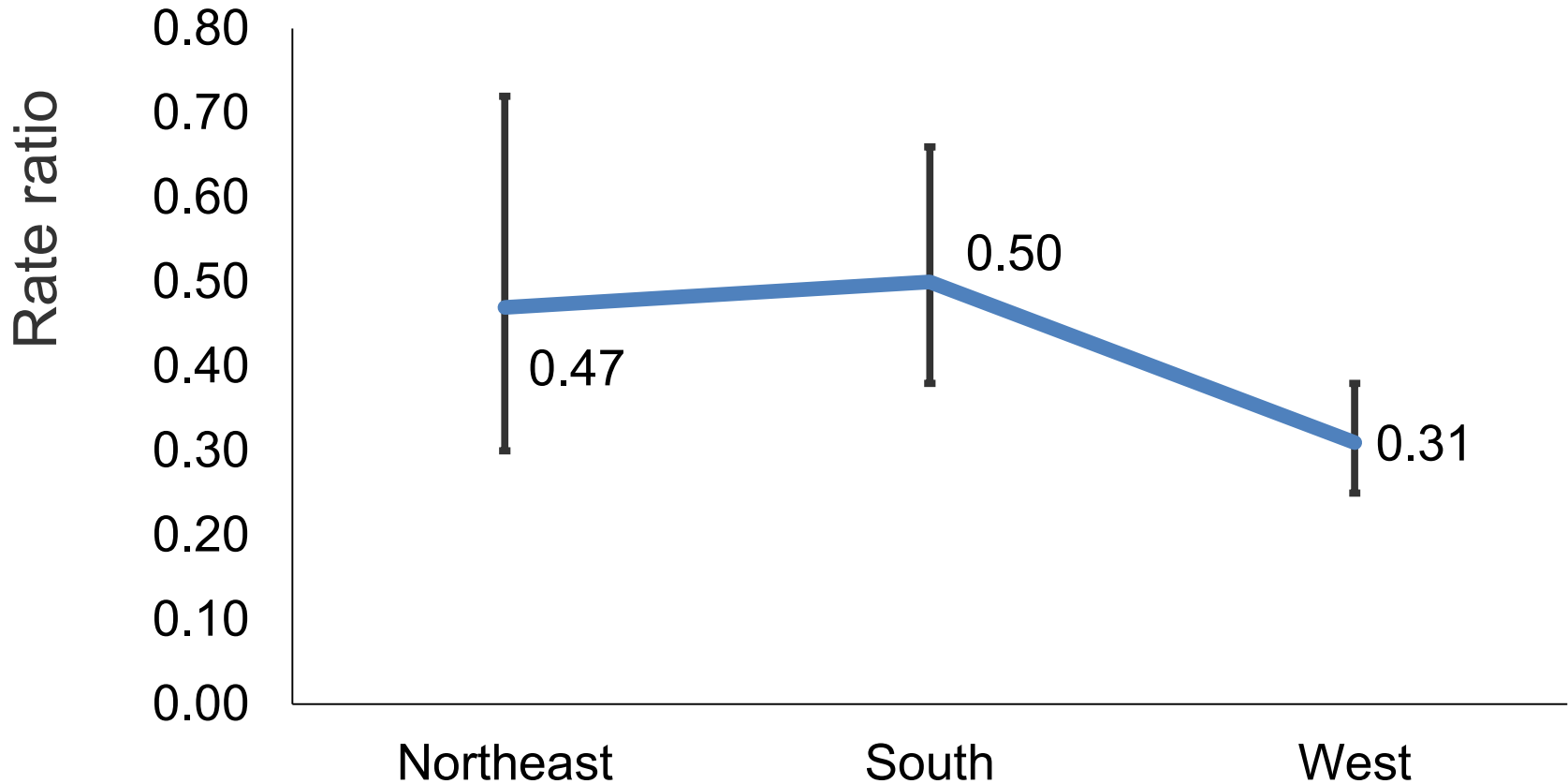
# Adjusted rate ratios by sex



# Adjusted rate ratios by race



# Adjusted rate ratios by geographic region





# Effectiveness of universal handheld calling bans and texting bans

- 2011-2014 Traffic Safety Culture Index
- Age 16-18

# Self-reported cellphone use while driving and cellphone bans

	Adjusted rate ratio (95% CI)	
<b>Handheld calling while driving</b>		
<b>Calling ban</b>	<b>0.45</b>	<b>0.32, 0.63</b>
<b>Texting ban</b>	<b>1.17</b>	<b>0.86, 1.57</b>
<b>Texting while driving</b>		
<b>Calling ban</b>	<b>0.92</b>	<b>0.80, 1.06</b>
<b>Texting ban</b>	<b>0.88</b>	<b>0.71, 1.10</b>

# Cellphone laws and driver fatalities

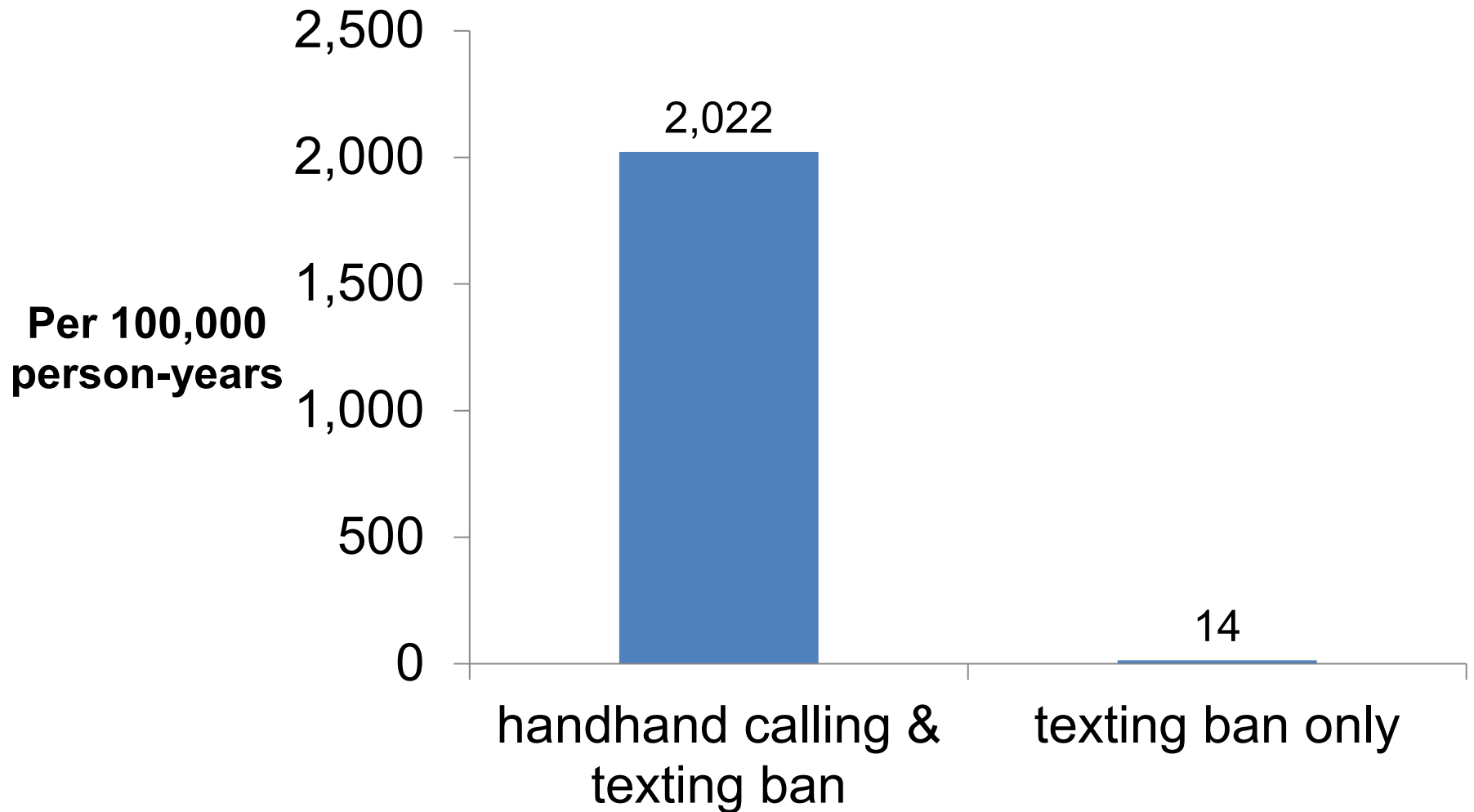
- Fatality Analysis Reporting System (FARS)
- 1999 - 2016
- Age: 18+



# Driver fatalities and cellphone laws

<b>Characteristics</b>	<b>Adjusted rate ratio (95% CI)</b>
Both handheld calling ban and handheld texting ban	0.93 (0.89, 0.97)
Handheld calling ban only	1.00 (0.96, 1.05)
Handheld texting ban only	1.01 (0.98, 1.05)
No ban	Reference

# Cellphone tickets



# C) Engineering: technological intervention

# US DOT: distraction

The guideline features such to a vehicle's which is a sin

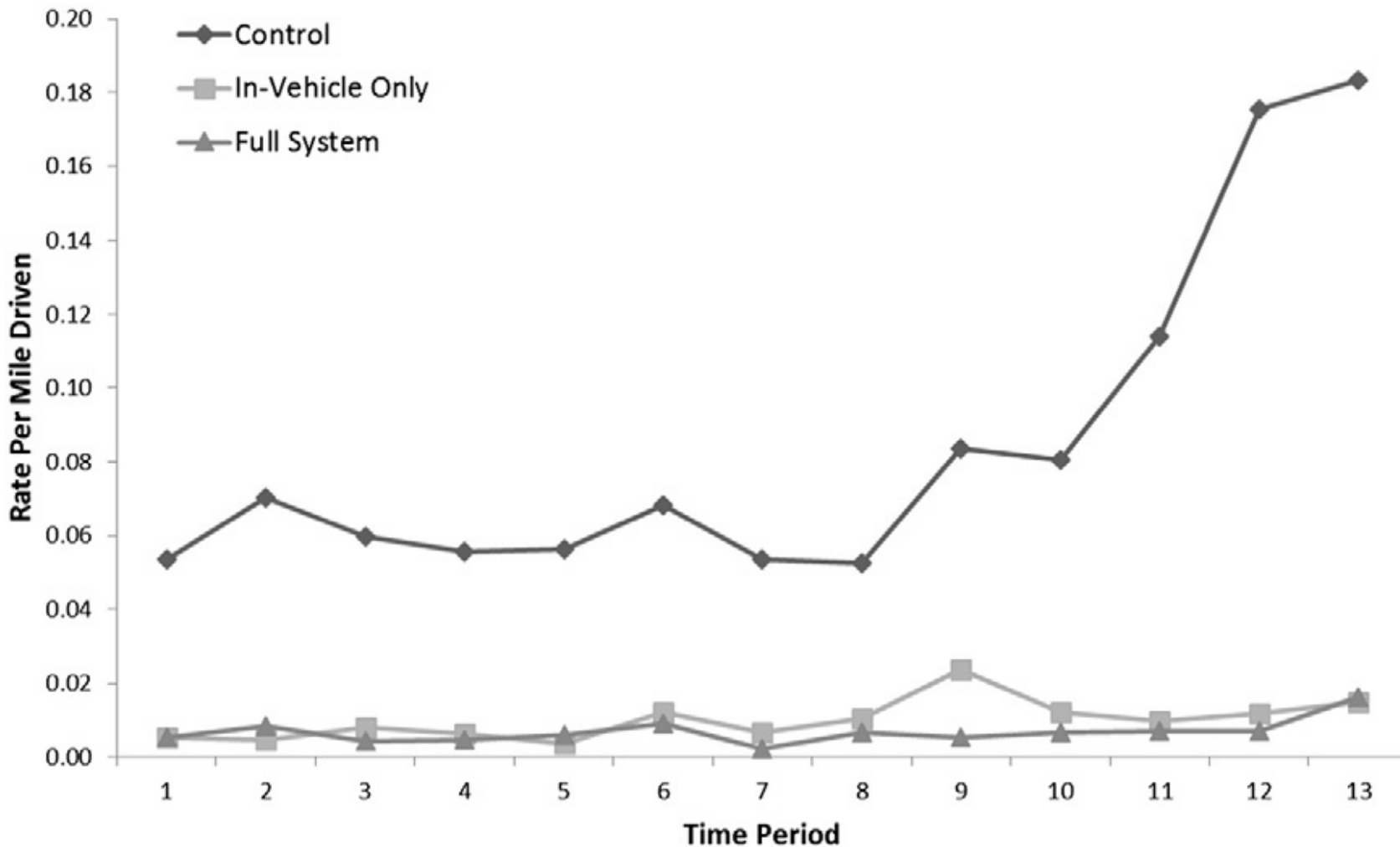


# Address driver mobile devices

urers to implement  
table device is linked  
s well as **Driver Mode**,

# Cellphone blocking app and novice teen drivers

Average rate of texts sent per mile driven by group





# Project: a phone app to reduce cellphone usage among young drivers: a pilot study

Randomized trial of 32 young drivers

- Arms:
  1. app with passenger override and hands-free mode
  2. sham app

Outcomes

- Calling while driving, texting while driving: app
- High-risk driving events: DriveCam

# Summary

- Cellphone use while driving is a US/global epidemic, especially among young drivers
- Prevention strategies
  - Driver behaviors:
    - Handheld calling bans: decrease in driver calls
    - Handheld texting bans: no decreases in driver texting
  - Driver fatalities:
    - Both handheld calling and texting bans
  - Pairing, Driver Mode
  - Phone app for blocking driver phone use

# Acknowledgements

## Collaborators

- Li Li, Caitlin Pope, Sijun Shen, Ann Nwosu, Caitlyn Kemnitzer, Nationwide Children's Hospital
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# Thank you

Questions?

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