

Evidence-based Solutions for Safe Mobility

Safe System Speaker Series

November 13, 2024

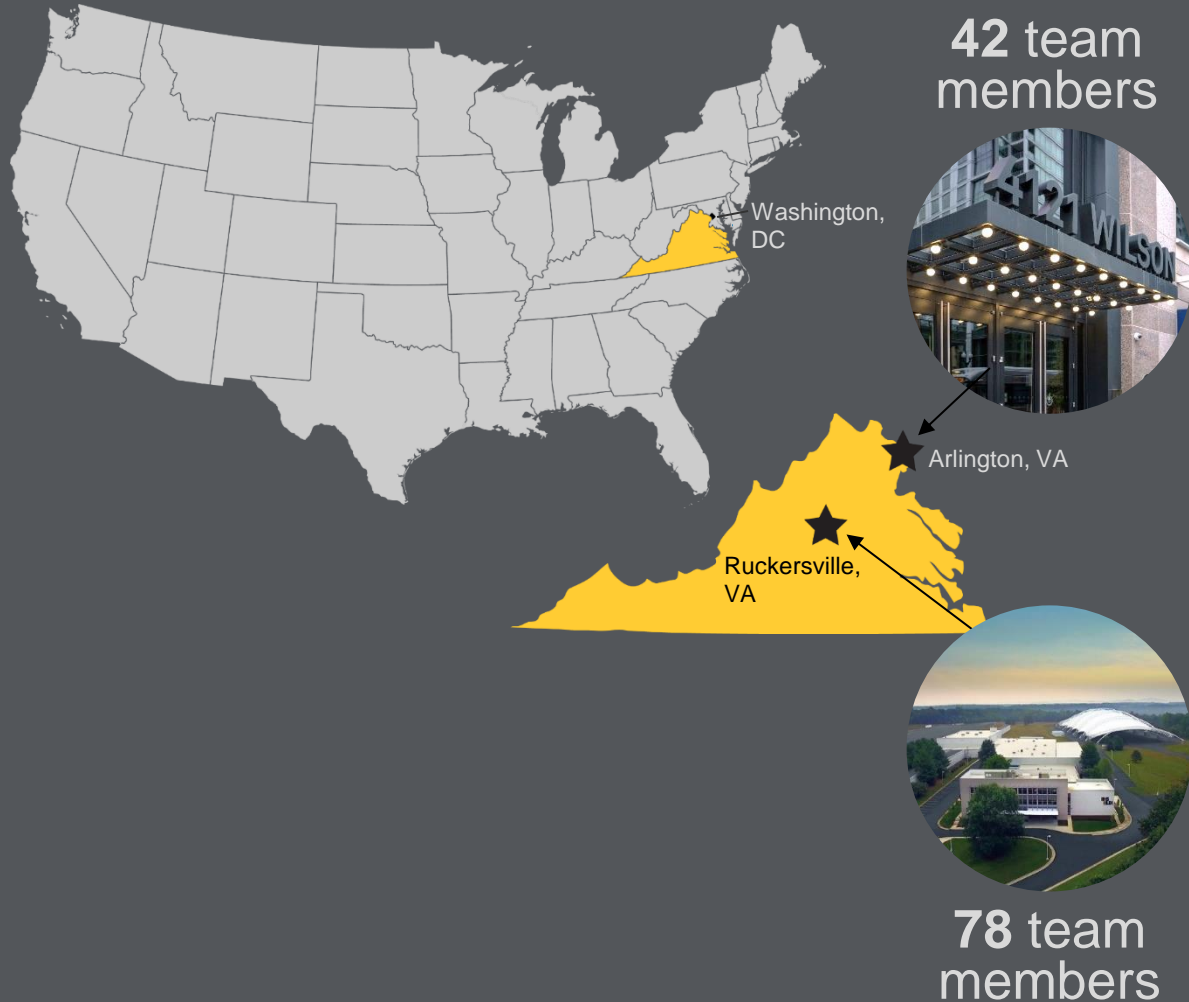


Jessica Cicchino

Senior Vice President, Research, IIHS



120 individuals dedicated
to improving road safety



Saving lives.
Preventing harm.

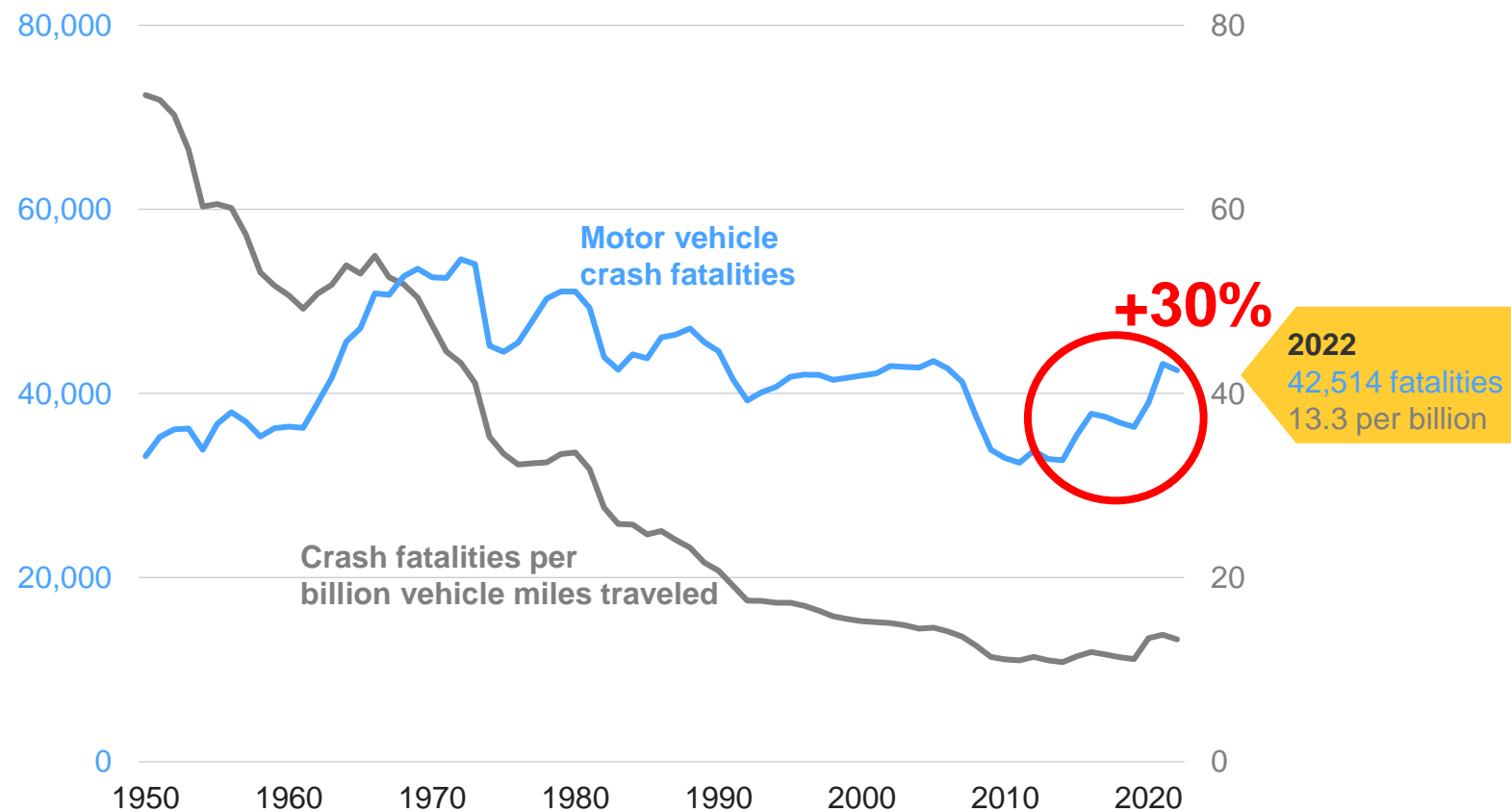
IIHS-HLDI mission:

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

Motor vehicle crash fatality rates have declined significantly in the U.S. during the past 50+ years, but...

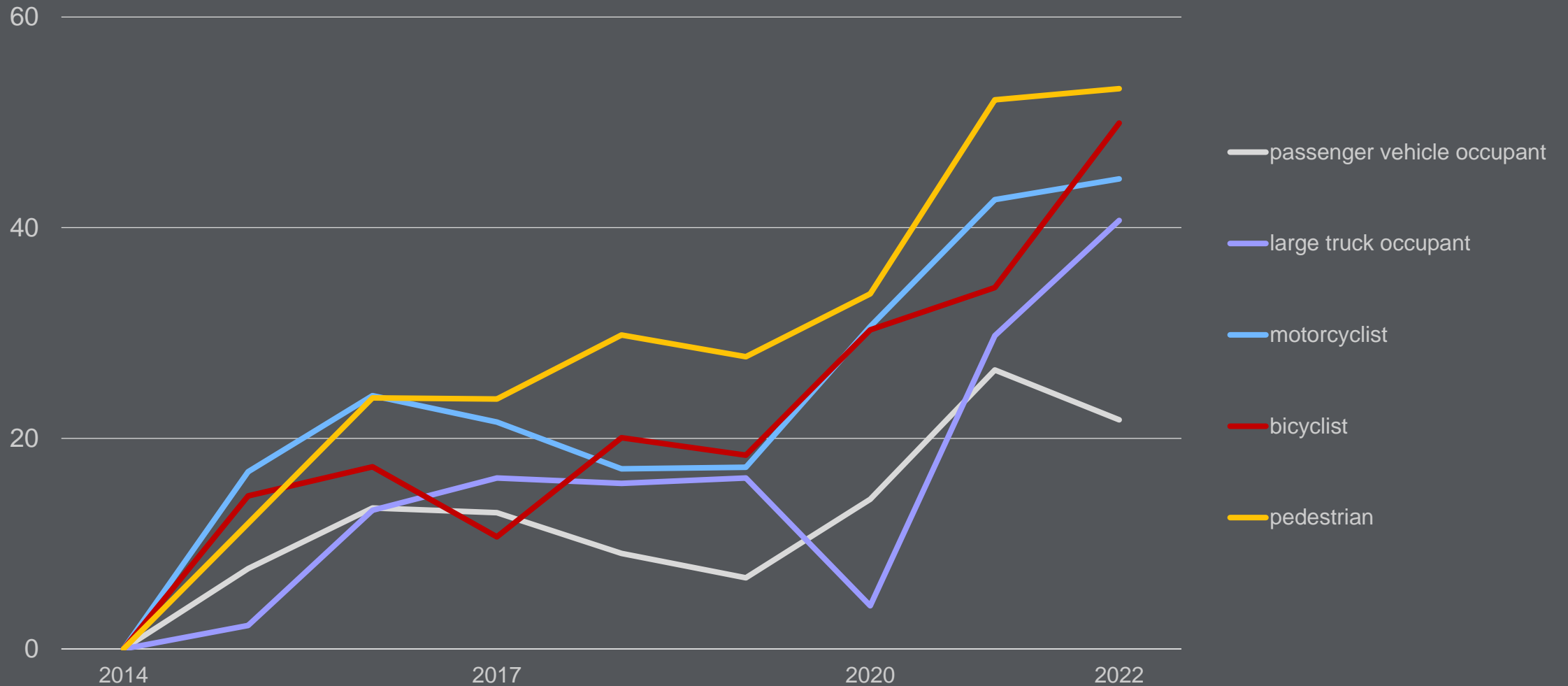
U.S. motor vehicle crash deaths

1950-2022



Percent change in fatalities, vs 2014, by road user type

2014-22

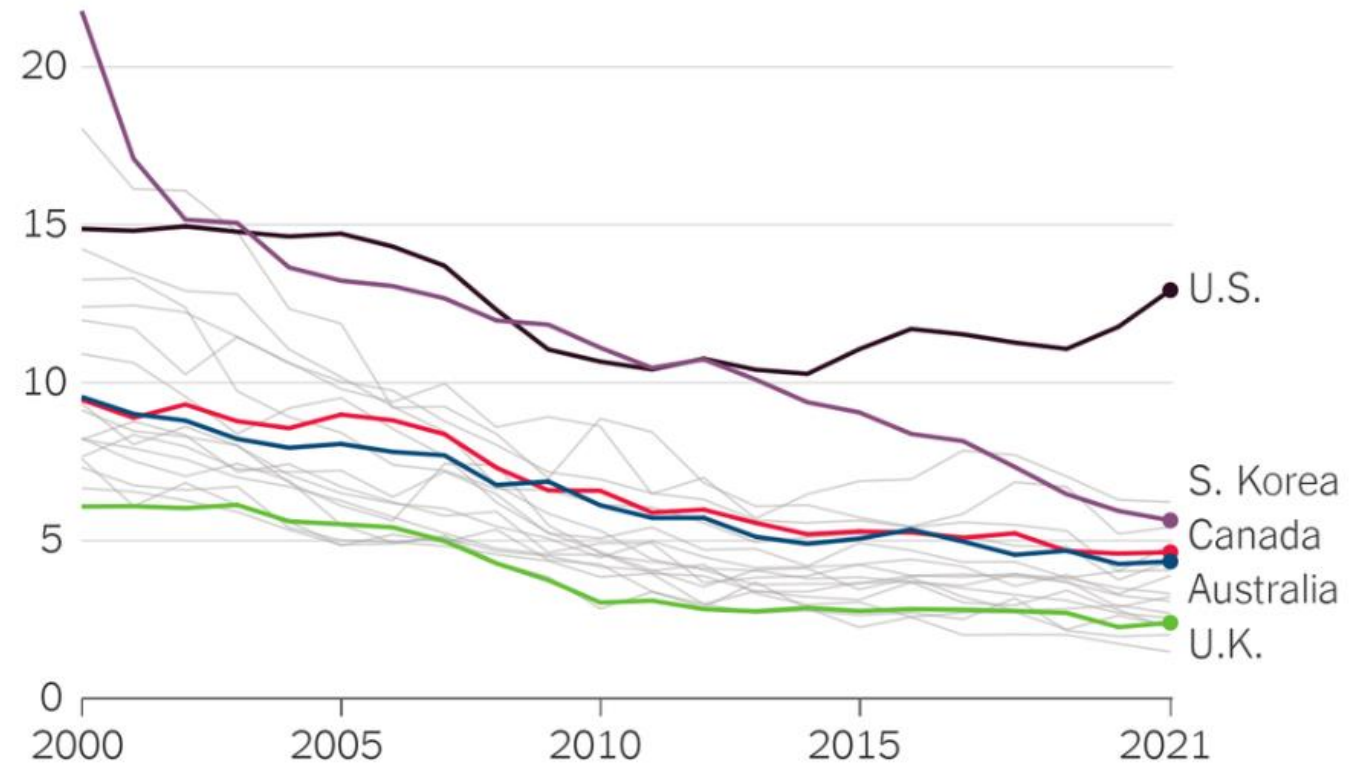


U.S. fatality rate is
2.3 times higher than
the average of the
next 28 high-income
countries

Source: CDC, 2022

Vehicle deaths per million residents

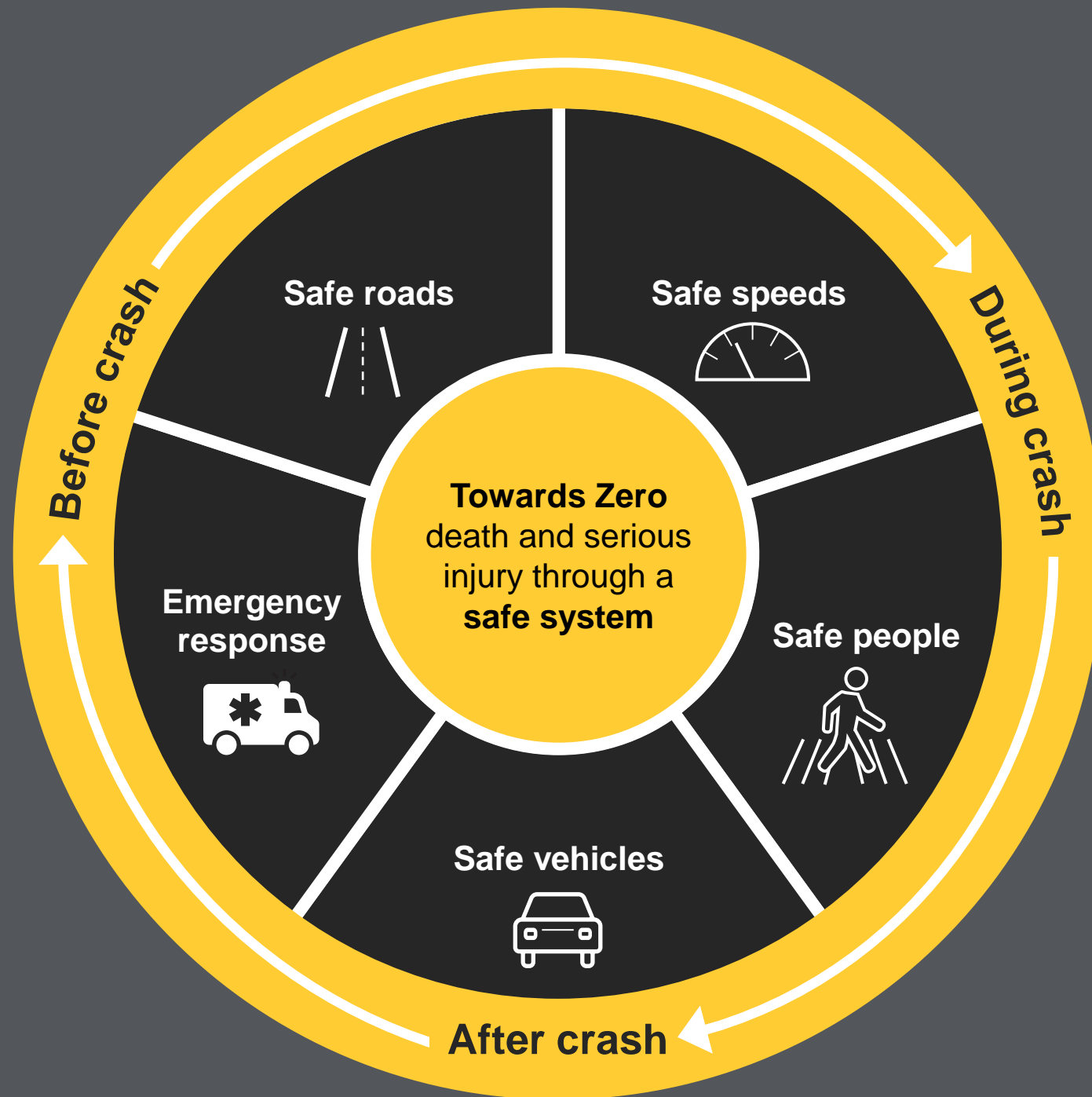
20 rich countries



By The New York Times | Source: OECD

Safe System – a proven approach

- ▶ Globally applied for decades
- ▶ Adopted by IIHS in 2018
- ▶ Guiding paradigm in 2022 USDOT National Roadway Safety Strategy



Speed





12,151 DEATHS

29%

of all fatalities in 2022
were speed related



Death and injury
reductions for

G vs. **P**

ratings in IIHS
moderate overlap
front tests

Fatality risk in
head-on crashes
involving like vehicles is

46%
LOWER

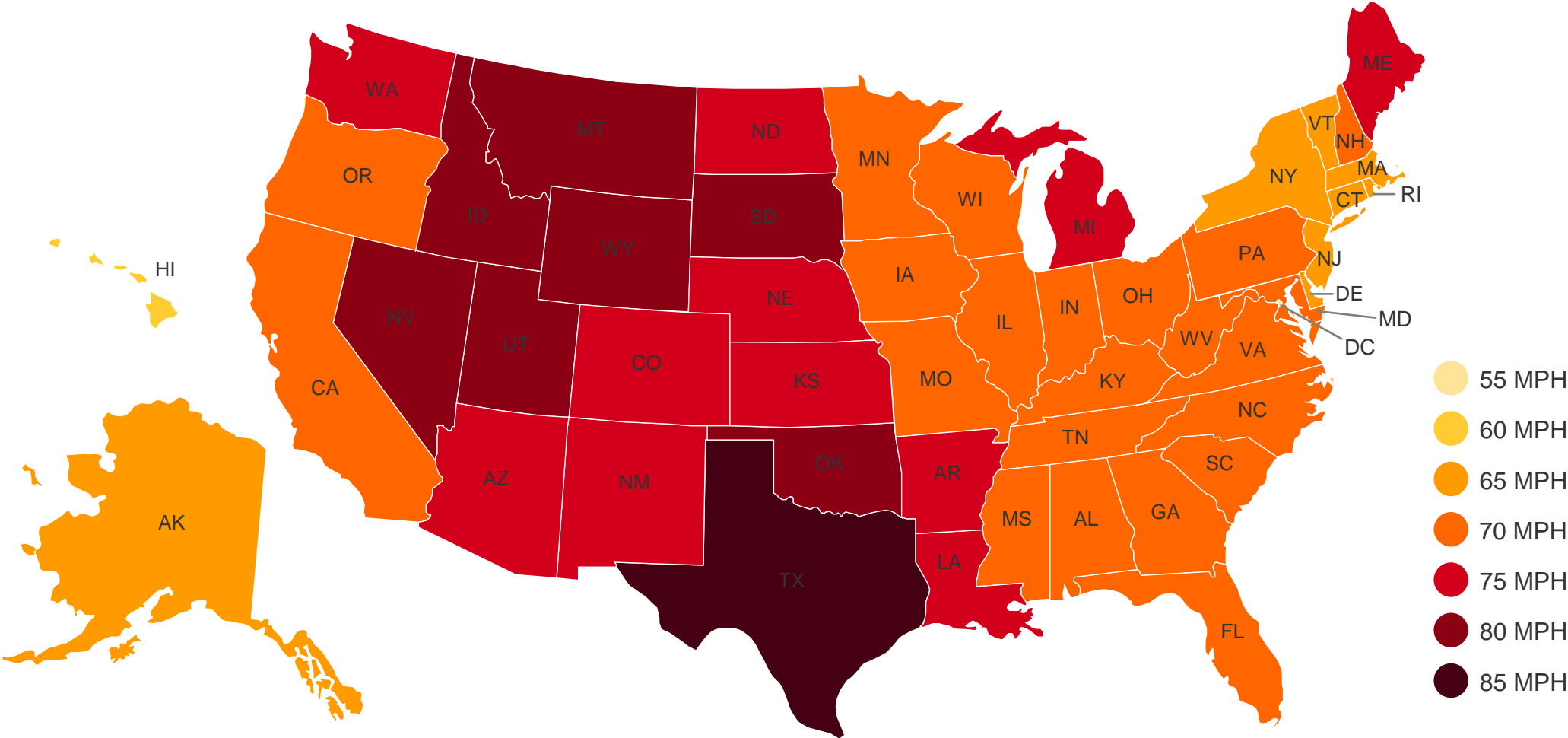




40 mph

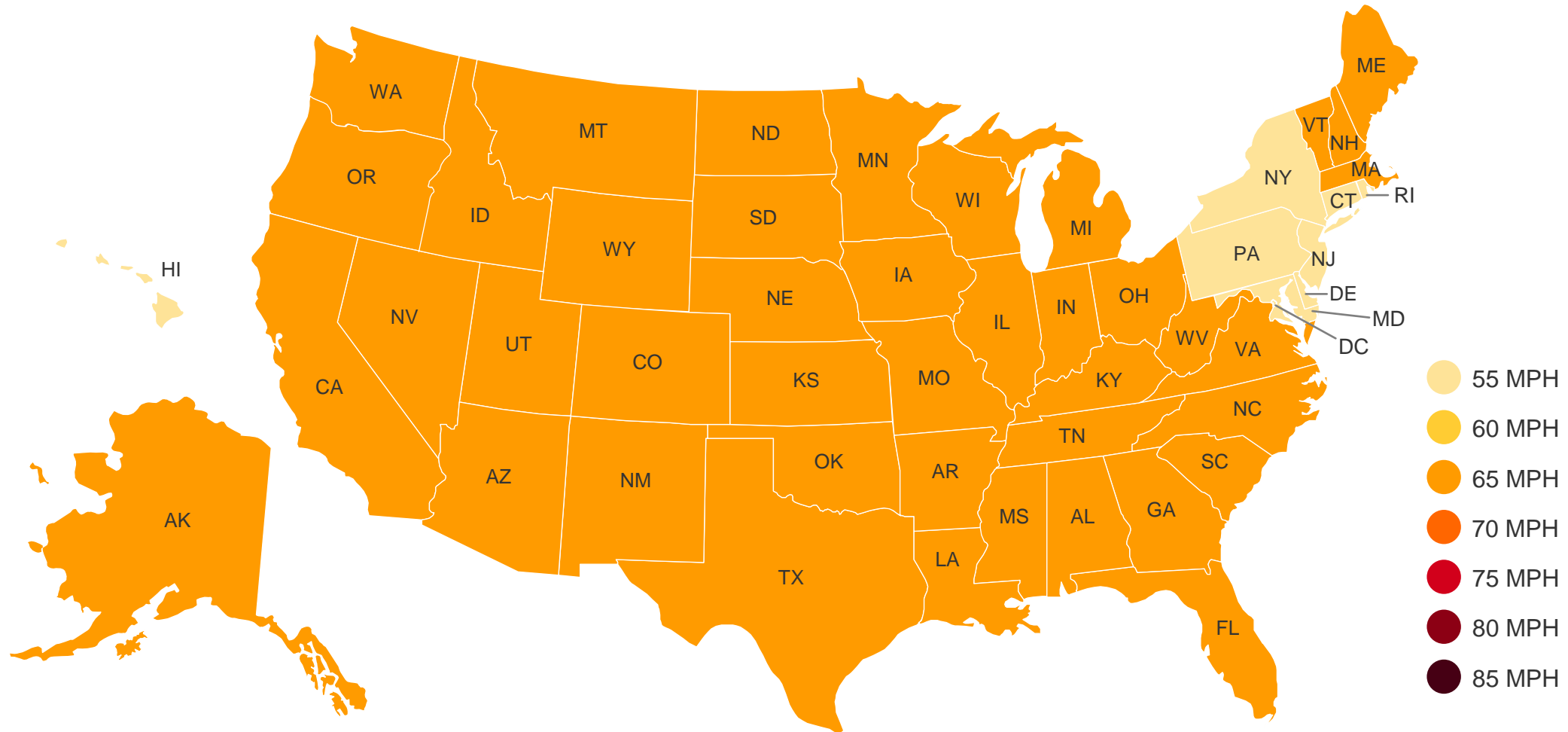
U.S. maximum speed limits

2024



U.S. maximum speed limits

1993





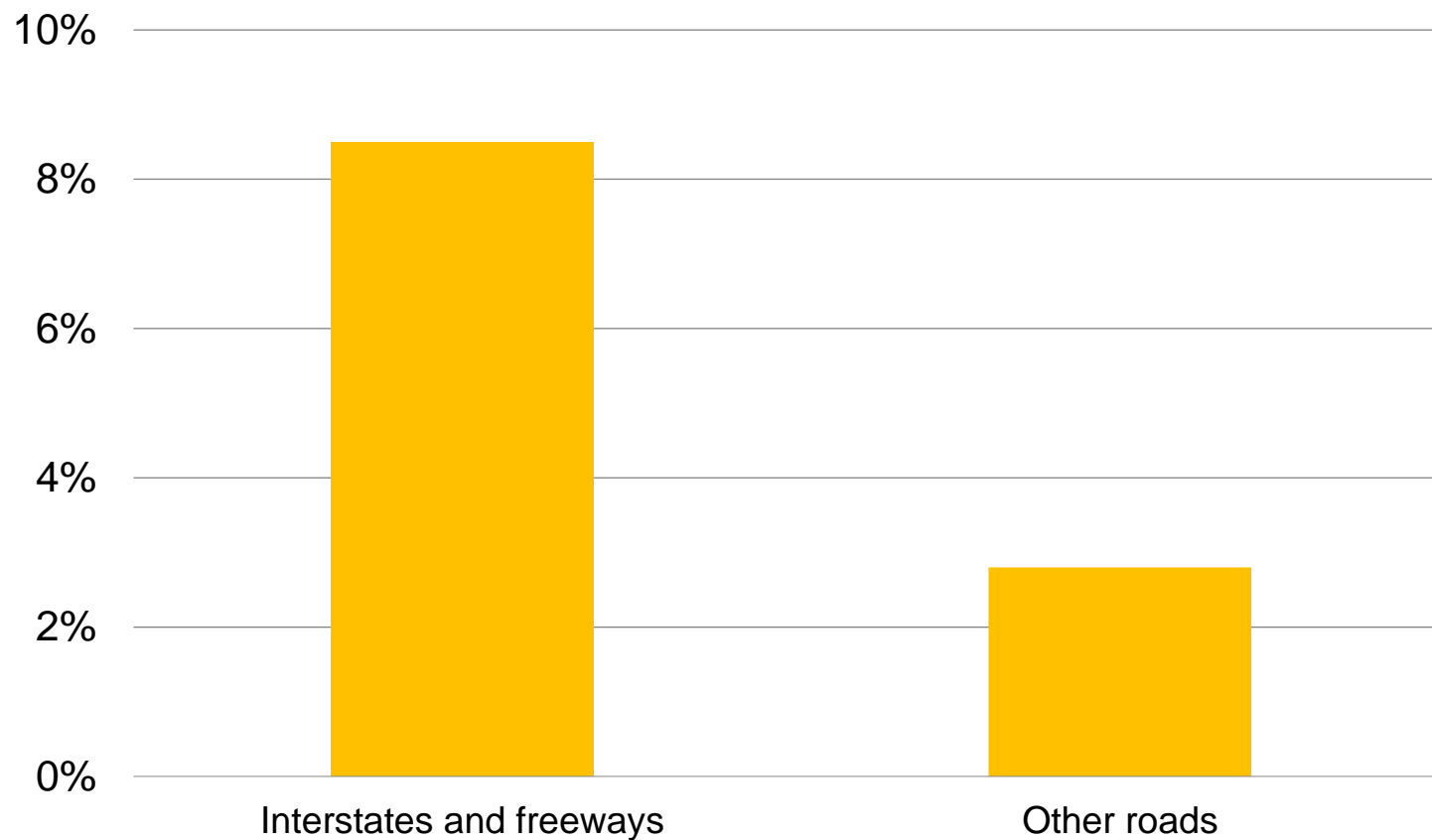
Raising speed limits leads to more deaths

People often drive faster than the speed limit, and if the limit is raised, they go faster still.

Research shows that when speed limits are raised, speeds go up, as do fatal crashes.

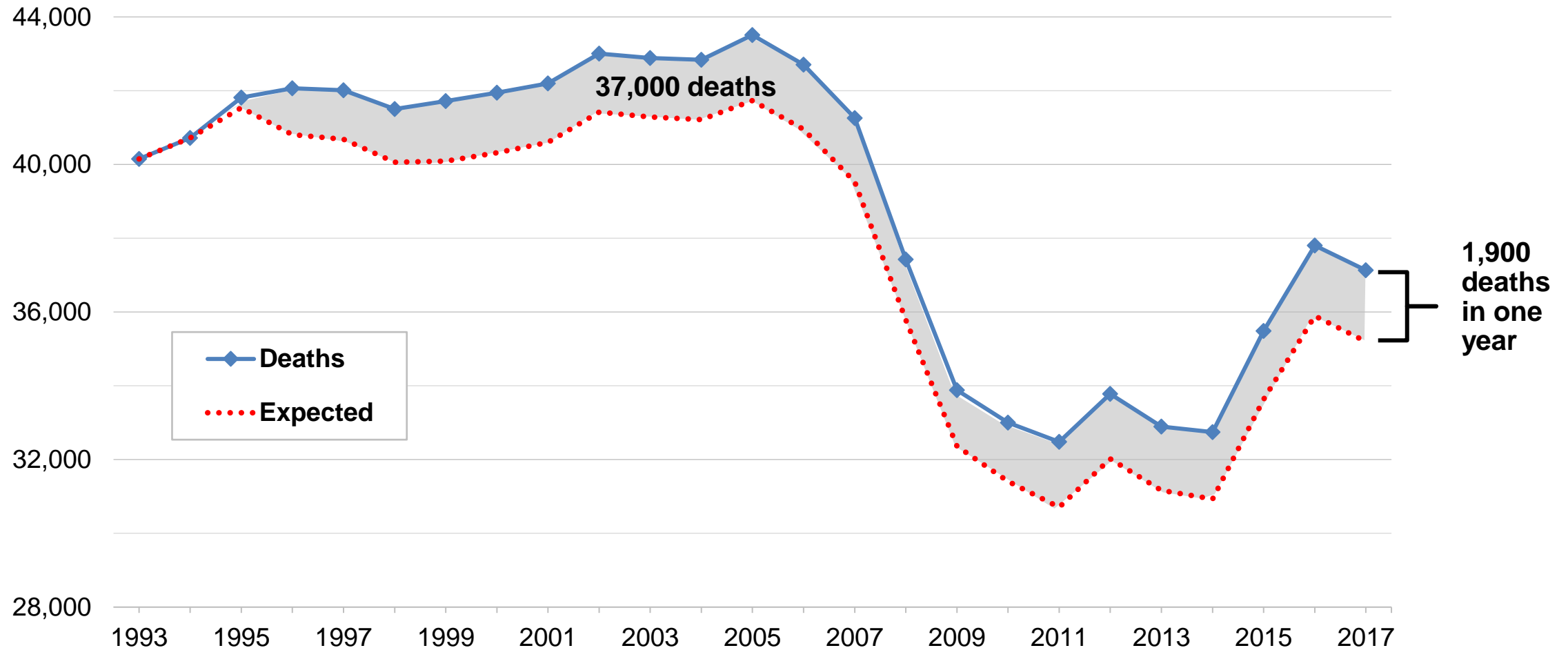
Fatality risk increases with higher speed limits

Increase in fatality rates per 5 mph increase in maximum speed limit



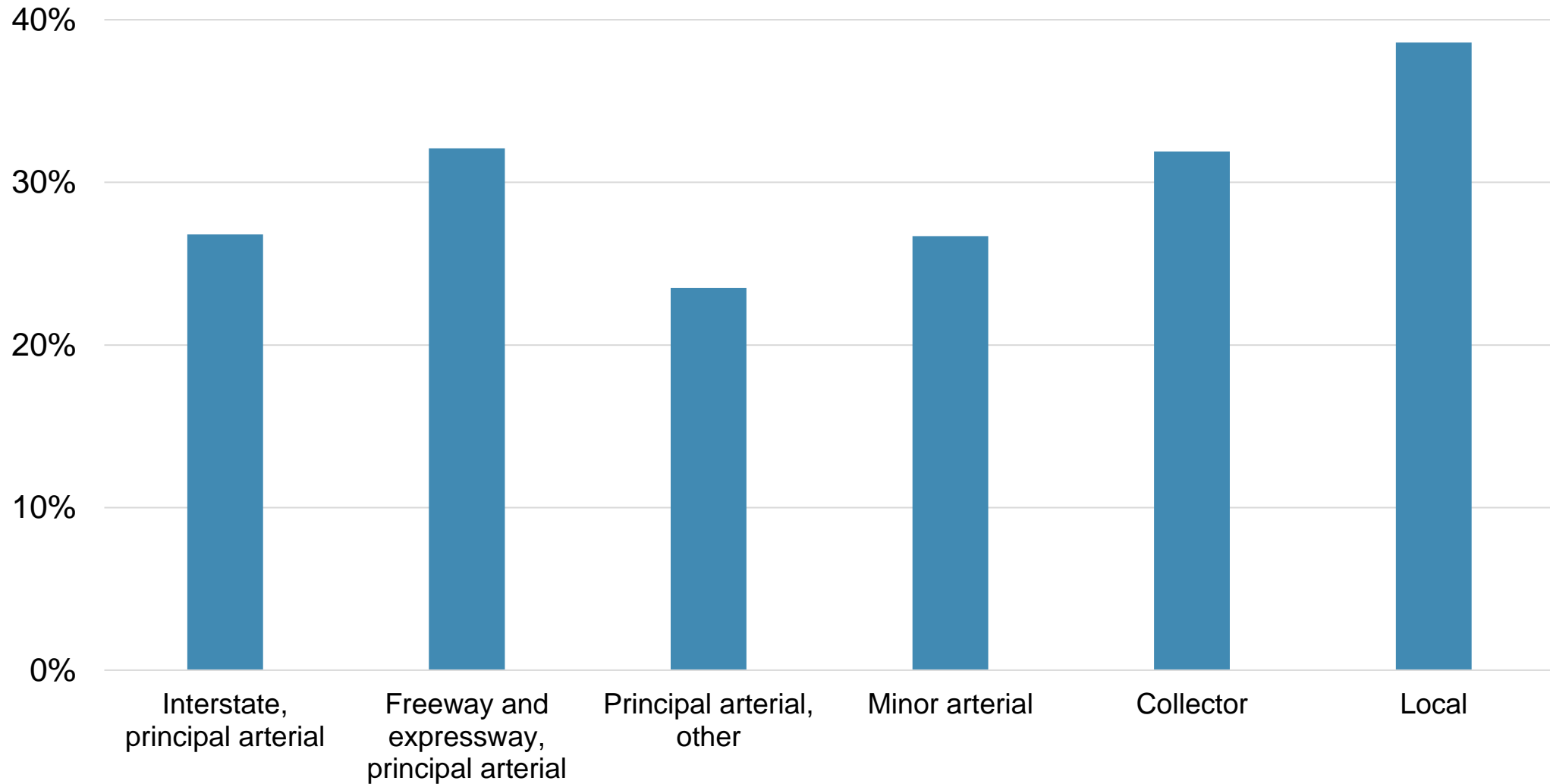
Increases in maximum speed limits cost 37,000 lives in 24 years

Deaths and expected deaths if maximum speed limits had not increased



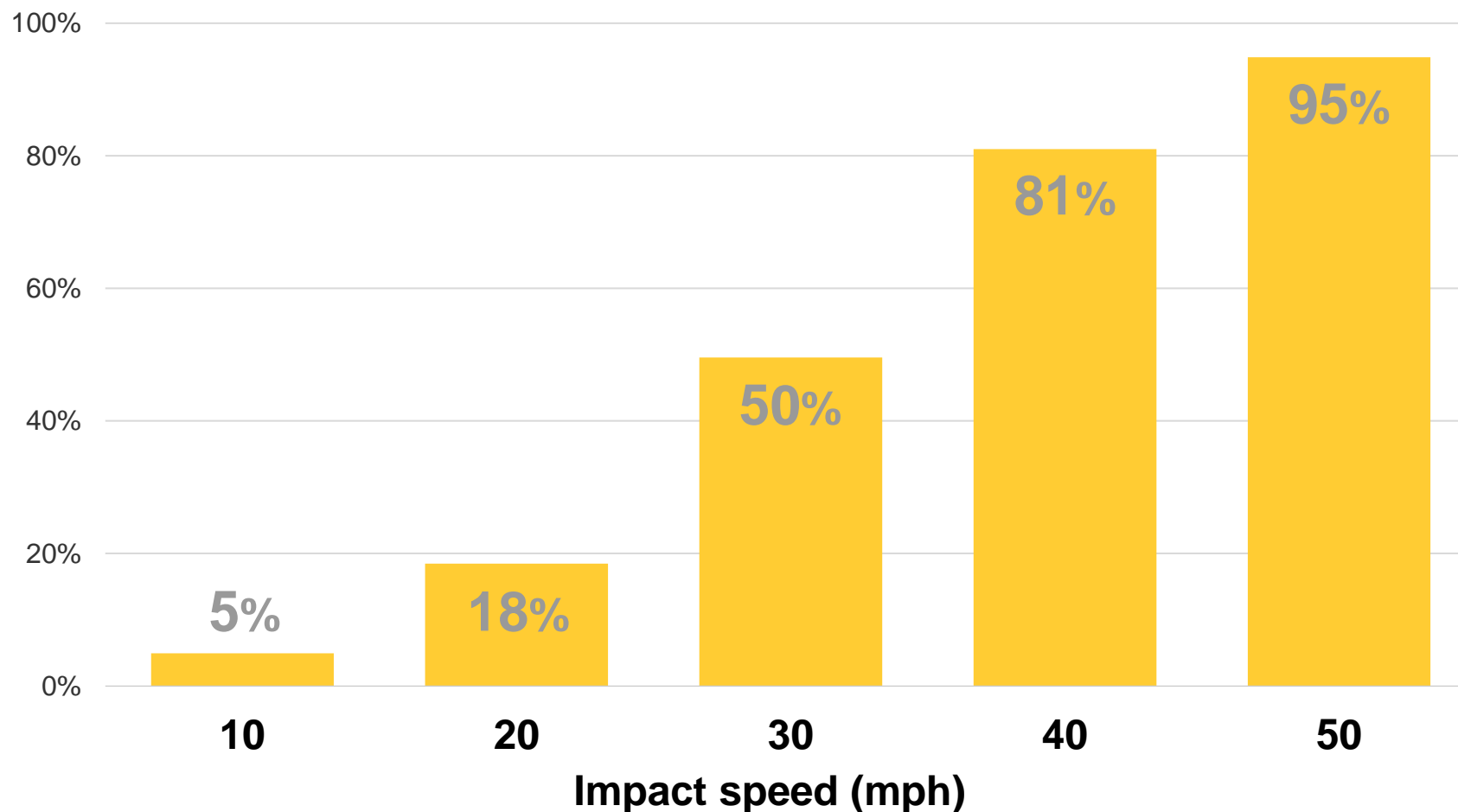
Speed-related crashes occur on all types of roads

Percent of fatalities that were speeding-related by road class, 2022



Speed affects more than just the vehicle occupants

Risk of severe injury to a struck pedestrian by impact speed
Monfort, 2024



Default speed limit in Fayetteville changes to 20 mph on Nov. 6

October 23, 2021

Speed limits to be reduced
on 177 miles of L.A. streets

March 7, 2022

‘You are our priority’: Salt Lake begins
installing new 20 mph speed limit signs

July 27, 2022

A growing list of cities have lowered speed limits

D.C. cuts speed limit to 25 mph in
major routes to curb fatal crashes

September 18, 2022

Hoboken’s 20 mph speed limit
takes effect this week

September 14, 2022

20 mph speed limits coming to many Falls Church residential streets

October 18, 2023

Speeding fell after default limit was lowered in Boston



Reduction in odds of speeding

**Exceeding
25 mph**

↓3%

**Exceeding
30 mph**

↓8%

**Exceeding
35 mph**

↓29%

Odds of a crash involving injury declined in Seattle



Reduction in odds of a crash involving injury on arterials

Downtown

↓20%

**Outside
downtown**

↓11%

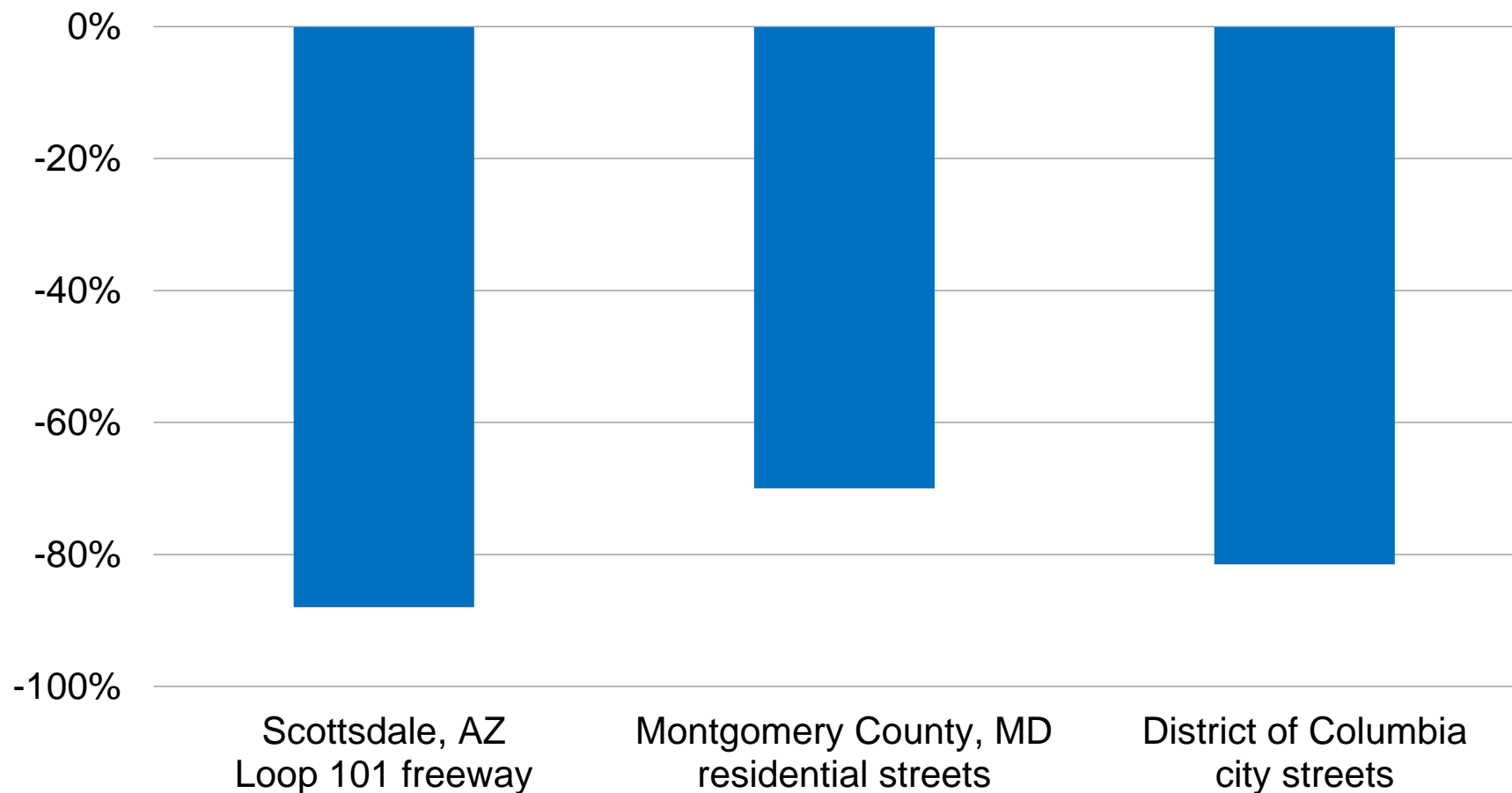
Speed safety cameras

- ▶ Changes in legislation
- ▶ Smart implementation
- ▶ Community support



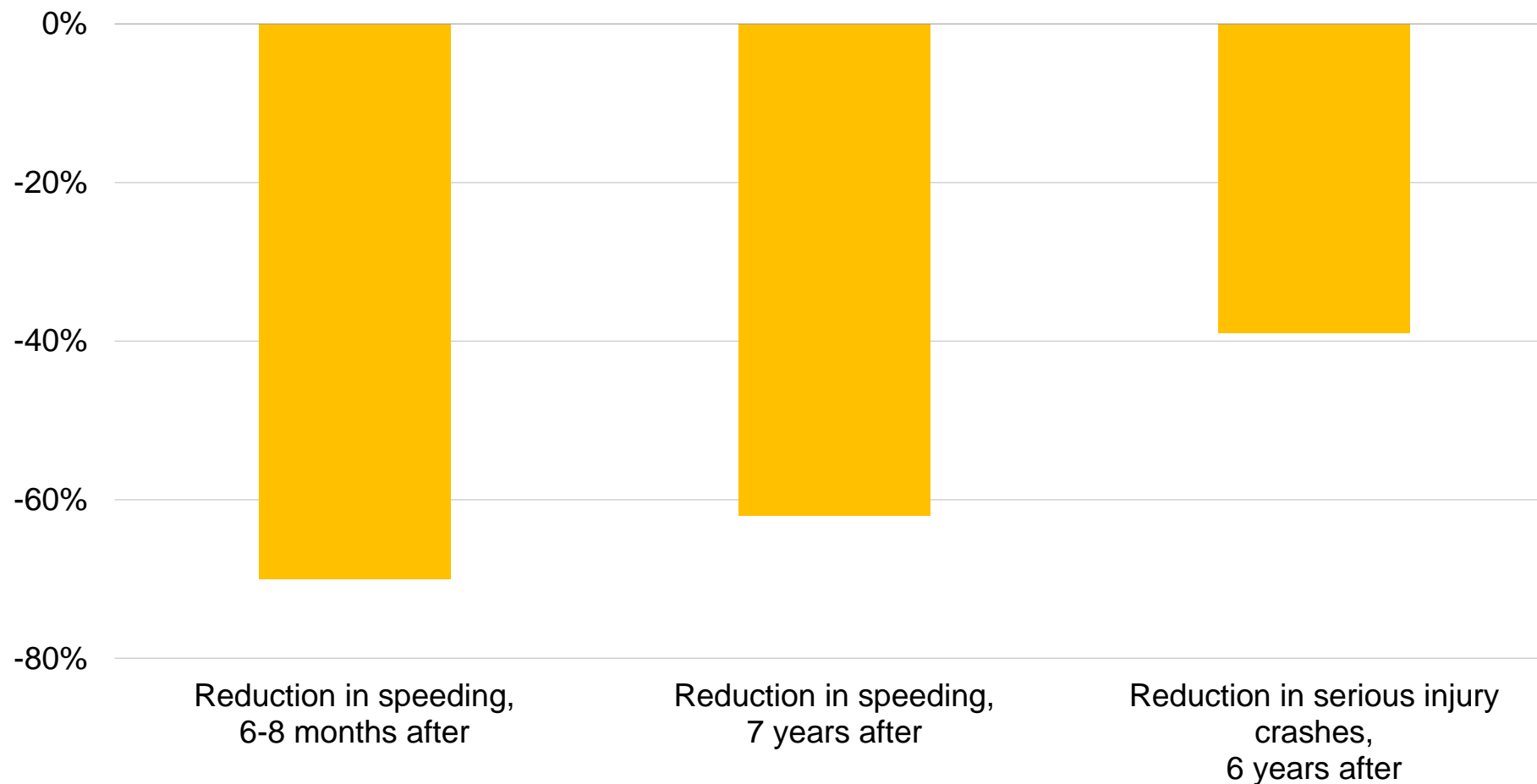
Reductions in proportion of vehicles exceeding speed limit by more than 10 mph

6 to 8 months after speed safety camera enforcement



Reductions in speeding and serious injury crashes associated with speed safety cameras

Montgomery County, Maryland



Automated enforcement program checklist

Outlines best practices for establishing successful red light and speed safety camera programs with broad public support.



ADVOCATES
FOR HIGHWAY
& AUTO SAFETY



AUTOMATED ENFORCEMENT PROGRAM CHECKLIST

For red light cameras and automated speed enforcement

Automated enforcement is an effective tool to make roads safer. Research shows that red light cameras reduce violations and injury crashes, especially the violent front-into-side crashes most associated with red light running. Speed cameras have been shown to reduce vehicle speeds, crashes, injuries and fatalities. Both types of programs should be designed, implemented and administered properly. Poorly run programs are less likely to be durable and may undermine support for automated enforcement generally.

Speed and red light camera programs augment traditional enforcement to improve traffic safety by deterring dangerous driving behaviors. Automated enforcement does not require traffic stops, and well-designed programs can improve safety for all road users in a neutral manner.

Successful programs are transparent and have a strong public information component. Communities should take into account racial and economic equity when making decisions about camera placement and fines. Automated enforcement programs should be data-driven and should prioritize safety, not revenue. In fact, communities should expect that revenue will decline over time as fewer drivers run red lights or violate speed limits.

This checklist assumes your community is already legally authorized to help you follow best practices. The goal is to operate a successful program that reduces crashes and prevents deaths and injuries while maintaining strong public support. Automated enforcement can be integrated into broader efforts to discourage unsafe driving that include optimizing speed limits for safety and improving roadway design.

FIRST STEPS

- ☐ Identify problem intersections and roadways.
 - Assess violation and crash data.
 - Conduct field observations.
 - Collect resident and roadway user input.
- ☐ Consider what role automated enforcement should play as part of a comprehensive traffic safety strategy.
- ☐ Make any engineering or signage changes needed to improve drivers' compliance with the law.
 - Ensure the road geometry conforms with guidelines from the American Association of State Highway and Transportation Officials, National Association of City Transportation Officials guidance or state road design manuals, as appropriate.
 - Remove sightline obstructions of signals and signage.

For red light cameras:

- Ensure that yellow light timing conforms to the Manual on Uniform Traffic Control Devices and Institute of Transportation Engineers guidelines.

For automated speed enforcement:

- Ensure the speed limit is appropriate and accounts for all road users. Follow guidance and use tools from the Federal Highway Administration, Institute of Transportation Engineers, and the National Association of City Transportation Officials.
- Ensure the speed limit is appropriate for special conditions, such as work zones and school zones.
- Assess whether engineering changes could be made to promote compliance with the speed limit.
- Ensure adequate posting of speed limits.

- ☐ Establish an advisory committee comprised of stakeholders.
- Consider including law enforcement, transportation department employees, victim advocates, equity and civil rights advocates, school officials, community residents, first responders, health officials and the courts.
- Outline the committee's role. This may include developing guiding principles related to safety, equity, and transparency, as well as other aspects of the program.
- Ensure committee meetings are open to the public and deliberations are transparent.
- ☐ Meet with the media, including newspaper editorial boards, to build support and educate the public.

IMPLEMENTATION

- ☐ Hold a kickoff event with advisory committee members. Introduce a well-developed and sustained public education campaign focused on improving safety by changing driver attitudes and behavior.
- ☐ Connect the program to overall roadway safety in the community and identify the goal of zero tickets resulting from changes in driver behaviors.
- ☐ Install prominent warning signs.
- ☐ Start with a probationary period during which only warnings are issued.
- ☐ Follow current guidance from the U.S. Department of Transportation for implementation and operation of automated enforcement devices.
- ☐ Allow for due process. Minimize the number of days between the violation and citation issuance.

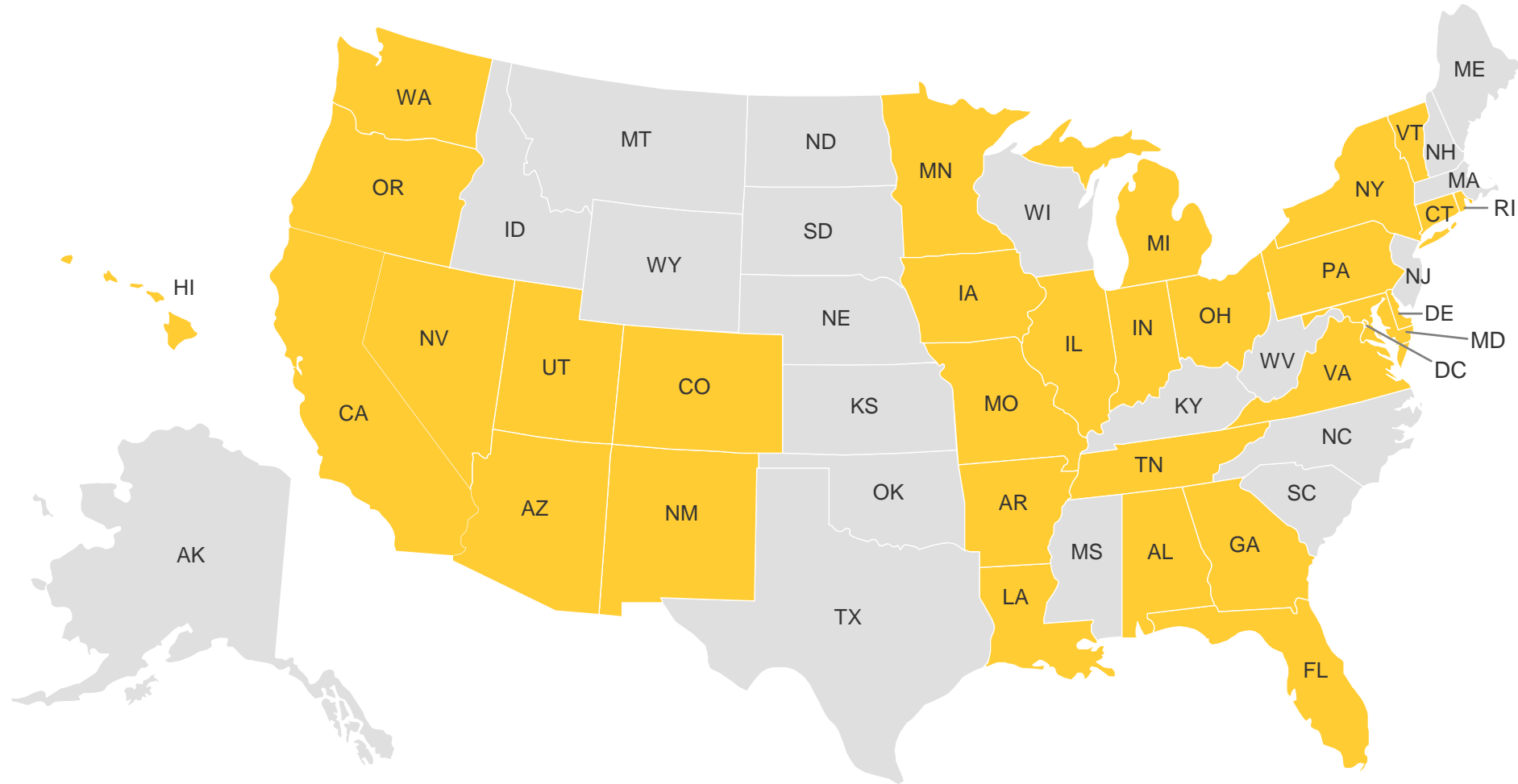
LONG TERM

- ☐ Publicize changes, including new camera locations. Reevaluate the probationary period before ticketing begins at new locations.
- ☐ Monitor program operation and publicize results. Undertake periodic reviews and ensure racial, economic and other equity issues and public concerns are addressed.
- ☐ Require regular field reviews. Verify monthly camera calibration and synchronization with signals.
- ☐ Require regular evaluations of the traffic safety benefits of the program by collecting crash and infraction data. Before-and-after include control intersections and roadways that are not subject to spillover effects.
- ☐ Regularly meet with the advisory committee and media to review program status and sustain public support.
- ☐ Continue to improve programs based on new and updated guidance and best practices and look for opportunities to expand automated enforcement use.
- ☐ Consider other changes, including roadway design improvements, in order to reduce opportunities for unsafe driving.

AAA - Advocates for Highway Safety - Governors Highway Safety Association
IHSA - Illinois Highway Safety Association
NSC - National Safety Council
May 2021

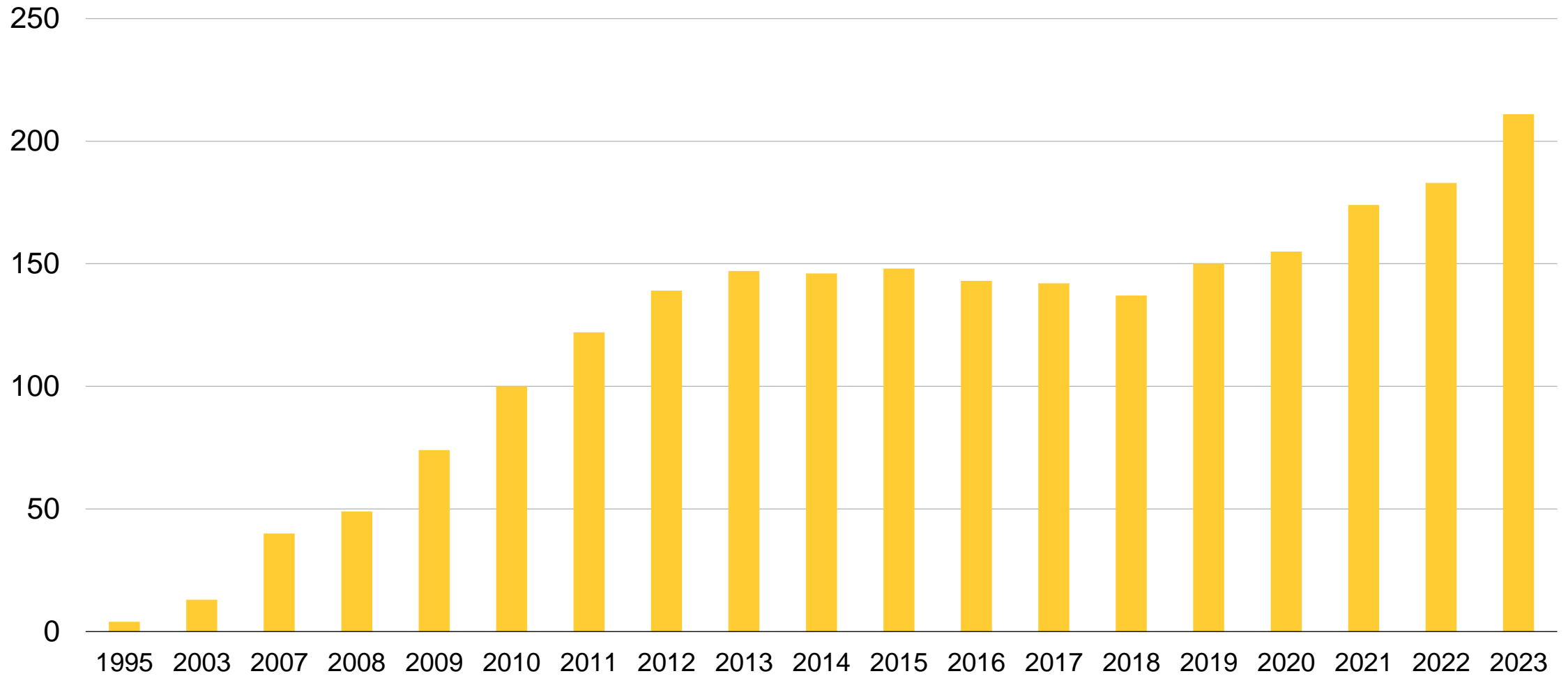
30 states + DC permit speed safety cameras

November 2024



U.S. communities with speed safety cameras

1995 to 2023





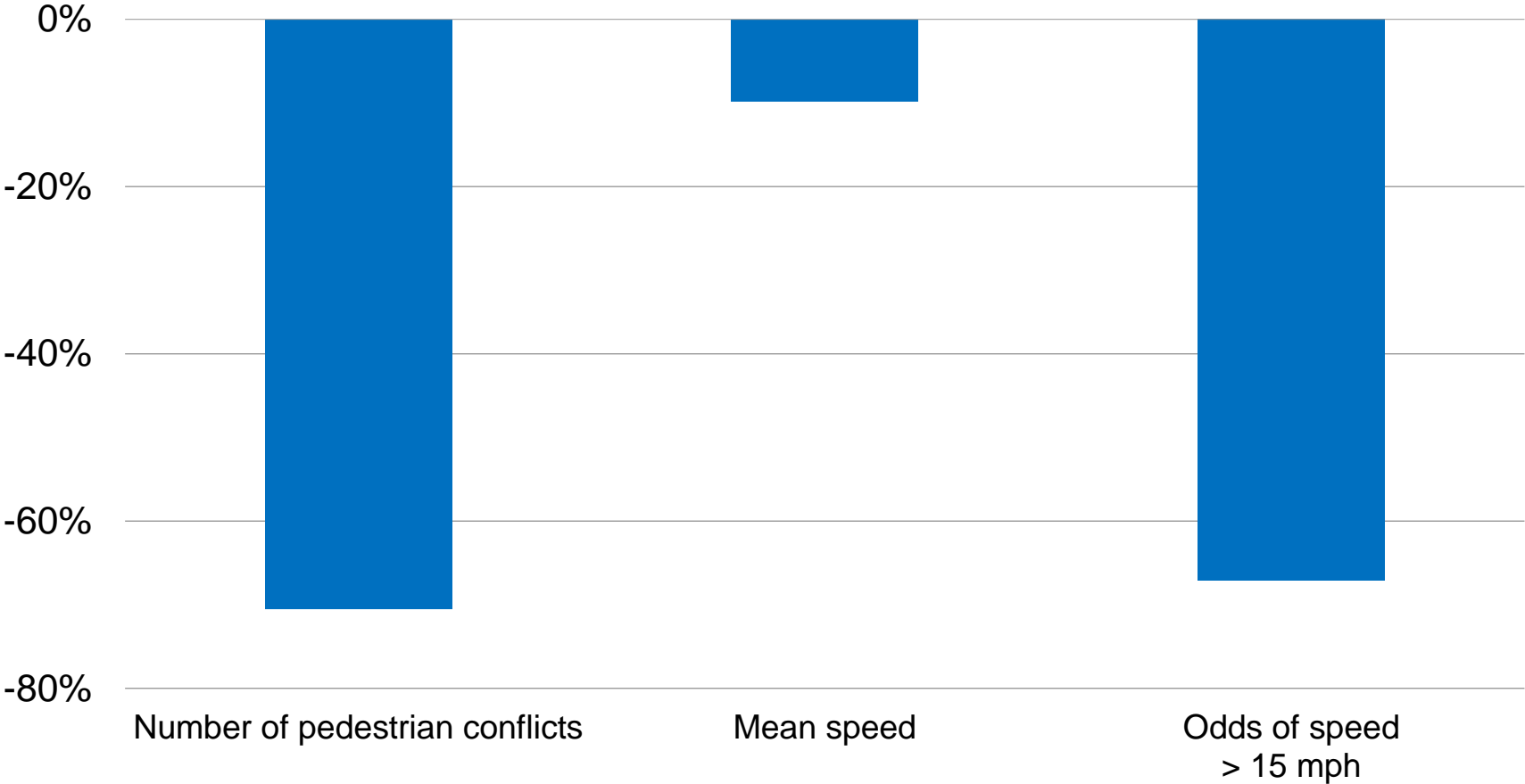
Left-turn
traffic-calming
treatments

Left-turn traffic-calming treatment



Left-turn traffic-calming treatments reduce pedestrian conflicts and speeds

Washington, D.C.



Other variations

Focus is on lowering turn speed



New York City



Denver, CO

Intelligent Speed Assist (ISA) basics

- ▶ Camera and/or GPS sensors detect speed limits in real time
- ▶ Intervenes when vehicle exceeds limit

Warning

Supportive accelerator pedal

Intelligent speed limiter

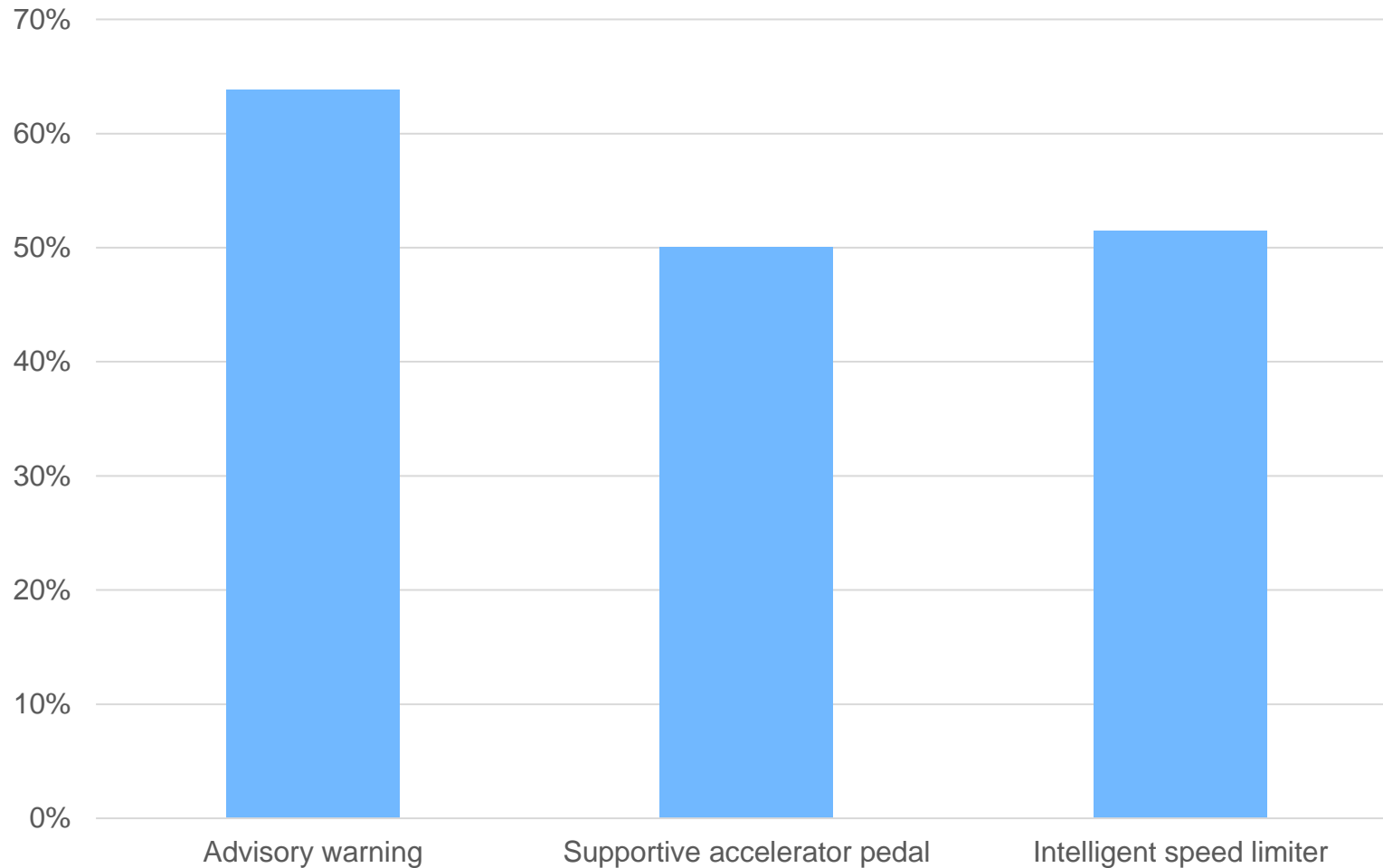


Advisory speed warning implemented by Mazda



ISA is more acceptable than you'd think

Percent of U.S. drivers who found ISA acceptable in 2024 survey



**States and cities
are considering
legislation
to mandate ISA**

Planetizen

California Bill Requiring Speeding Warnings Heads to Governor's Desk

The law would require all vehicle models 2030 and later to include technology that warns drivers when they exceed the speed limit.

September 3, 2024

Streets Blog USA

D.C. to Dangerous Drivers: We Will Slow You Down!

Dangerous drivers would be forced to slow down thanks to in-car technology under first-in-the-nation bill that just passed in the Washington, D.C. City Council.

February 8, 2024

Spectrum News

Lawmakers propose 'speed limiters' for repeat offenders in New York

Repeat speeders in New York would be required to install technology, or "speed limiters," in their vehicles under legislation introduced Tuesday by two state lawmakers.

August 1, 2023

New York City Intelligent Speed Assistance Pilot Evaluation

Analysis and Findings

U.S. DOT Volpe Center: Sarah Yahoodik, PhD, Alexander K Epstein, PhD, Alyssa Brodeur, Juwon Drake
NYC DCAS: Tomomi Landsman



Image: <https://vpsc.wu/intelligent-speed-assistance-specifications-officially-published/>

October 2024

DOT-VNTSC-NYC-24-02

Prepared for:
Department of Citywide Administrative Services
City of New York

NYC DCAS
Citywide Administrative Services

City fleets are using ISA

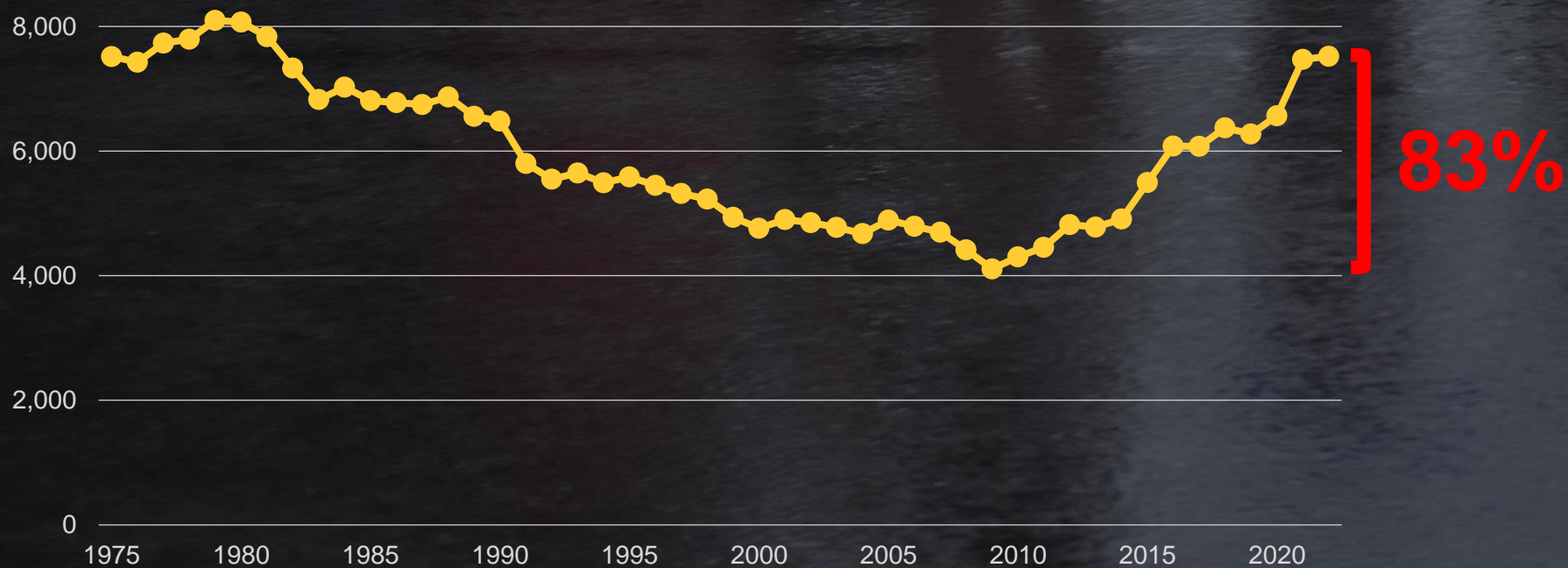
In New York City, time traveling >11 mph over the speed limit was **reduced by 64%** in city vehicles with ISA.

Pedestrian safety



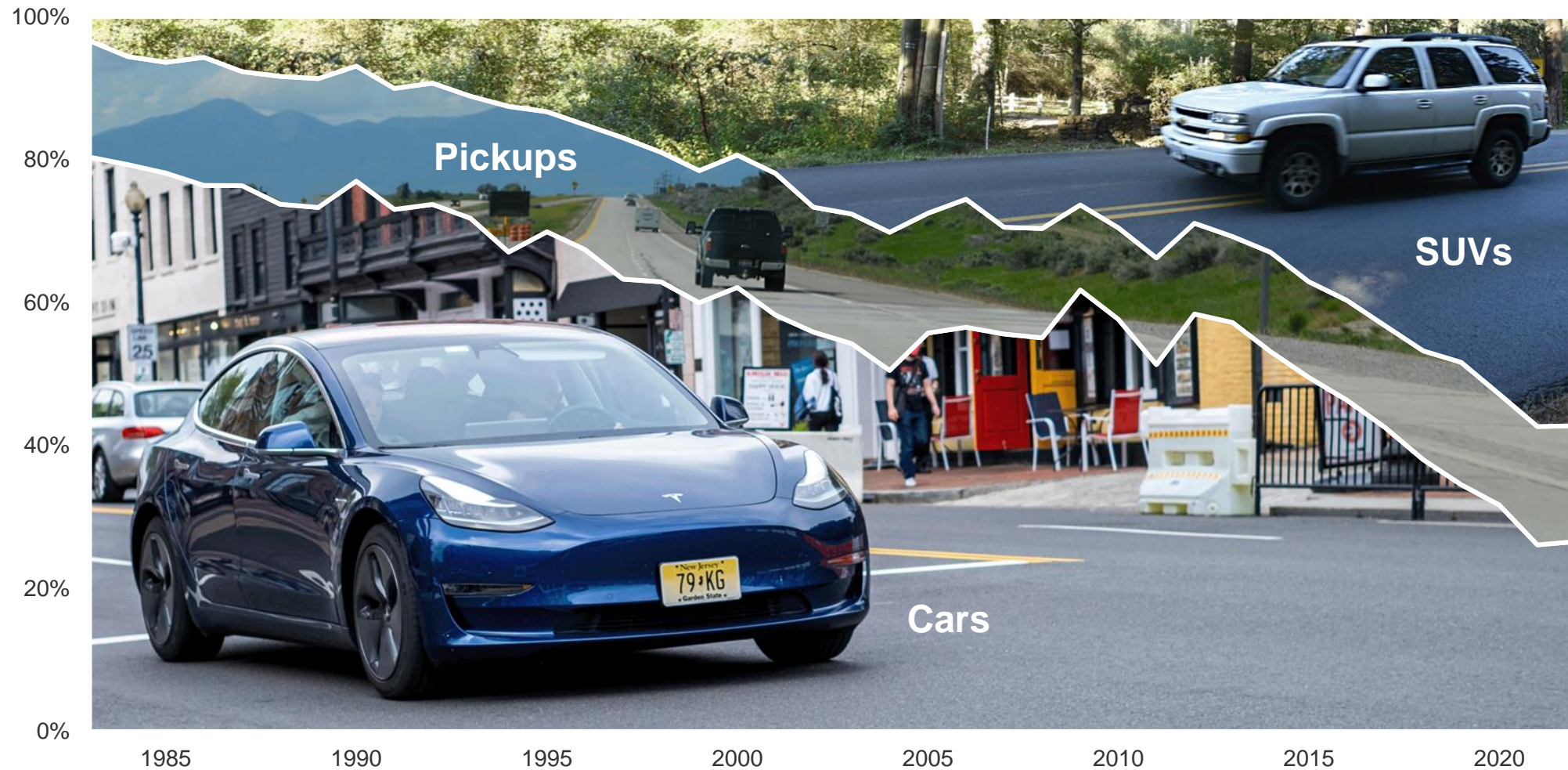
U.S. pedestrian fatalities

1975-2022



Distribution of vehicles by type

1983-2022 model years

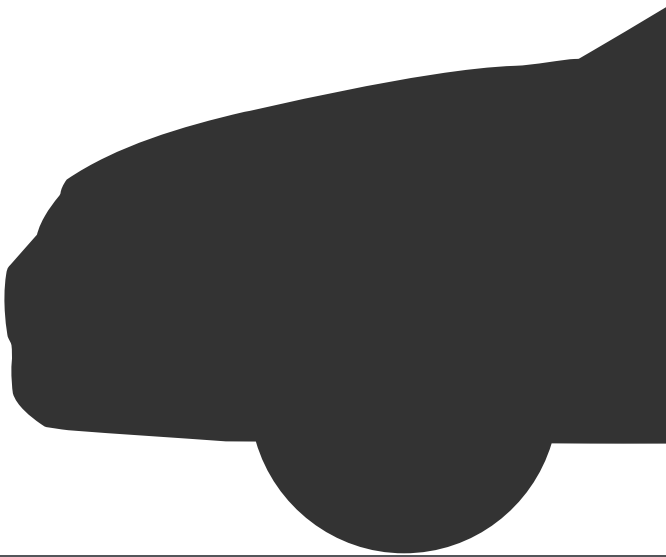


Tall, blocky vehicles put pedestrians at risk

Risk of pedestrian death in a crash, from database of nearly 18,000 crashes

BASELINE: low/sloped

$\leq 30''$



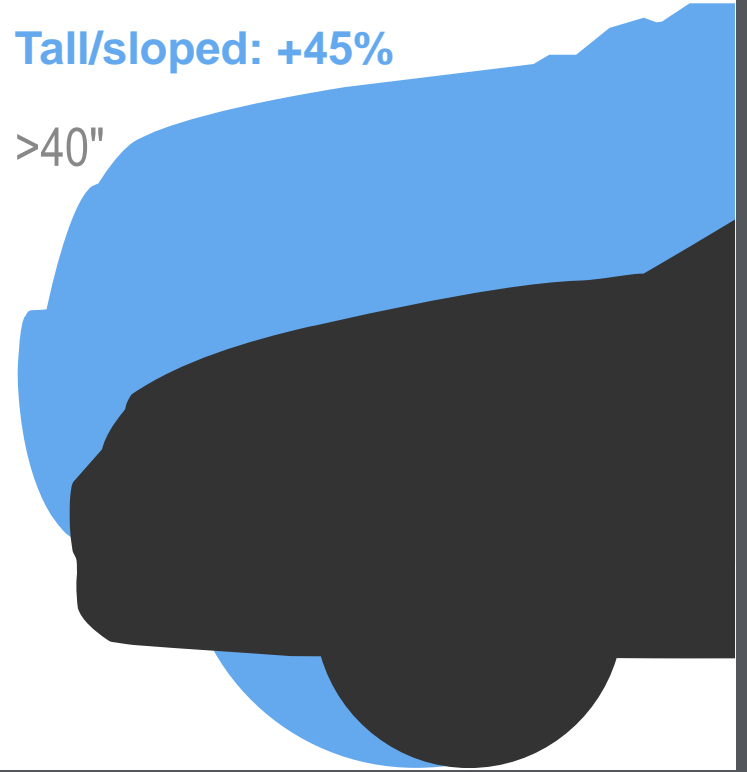
Tall/blunt: +44%

$>40''$



Tall/sloped: +45%

$>40''$



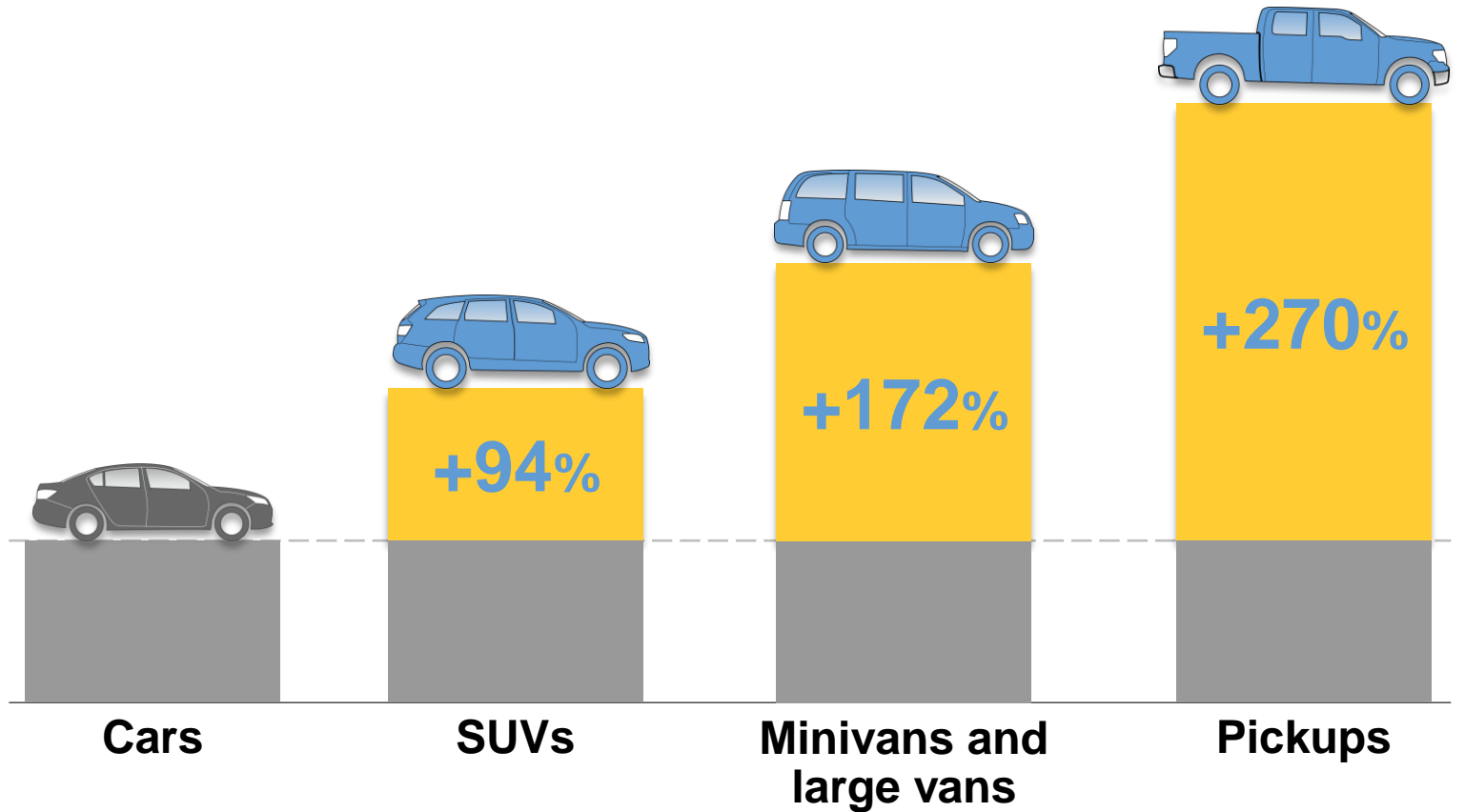




Odds a vehicle was
turning left vs. going straight in
a fatal pedestrian intersection crash

Relative to cars

Visibility in larger
vehicles may increase
left turn crash risk

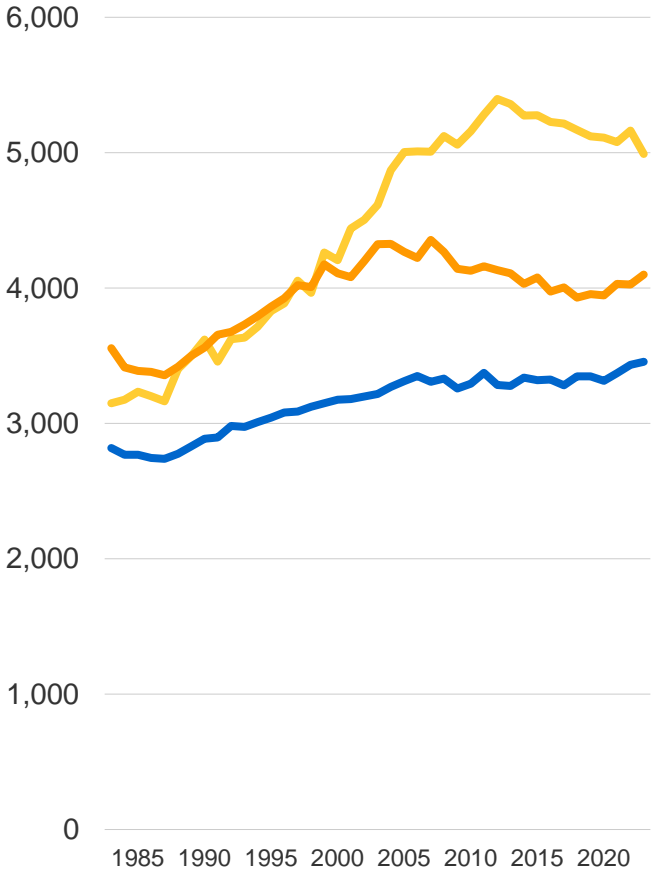


Changes in vehicle specs

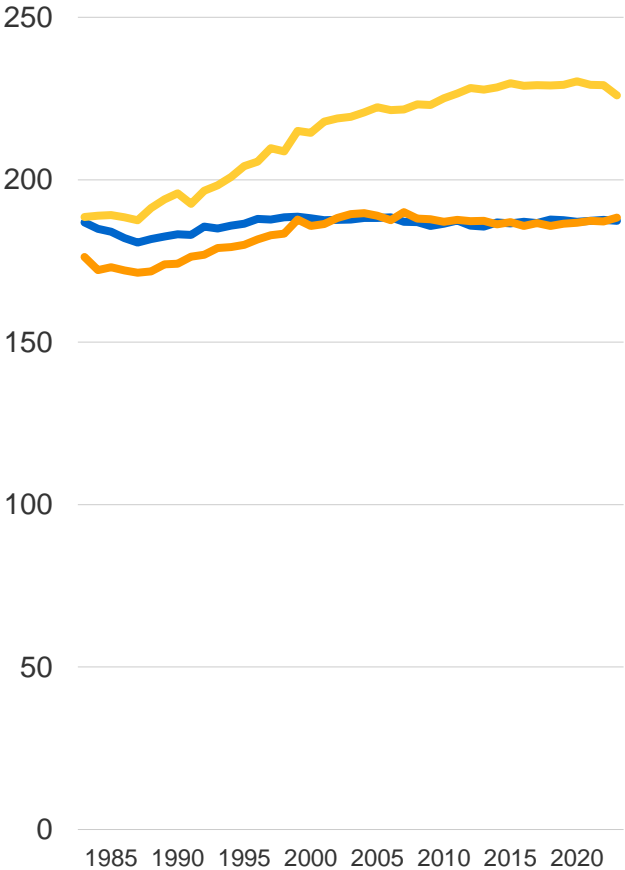
1983-2023 model years

Cars SUVs Pickups

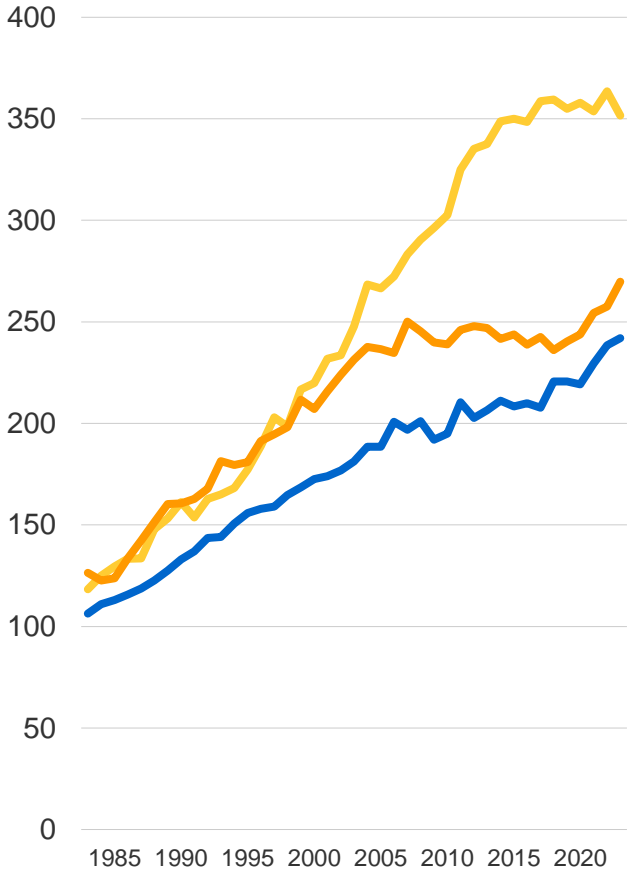
Average curb weight in pounds



Average length in inches

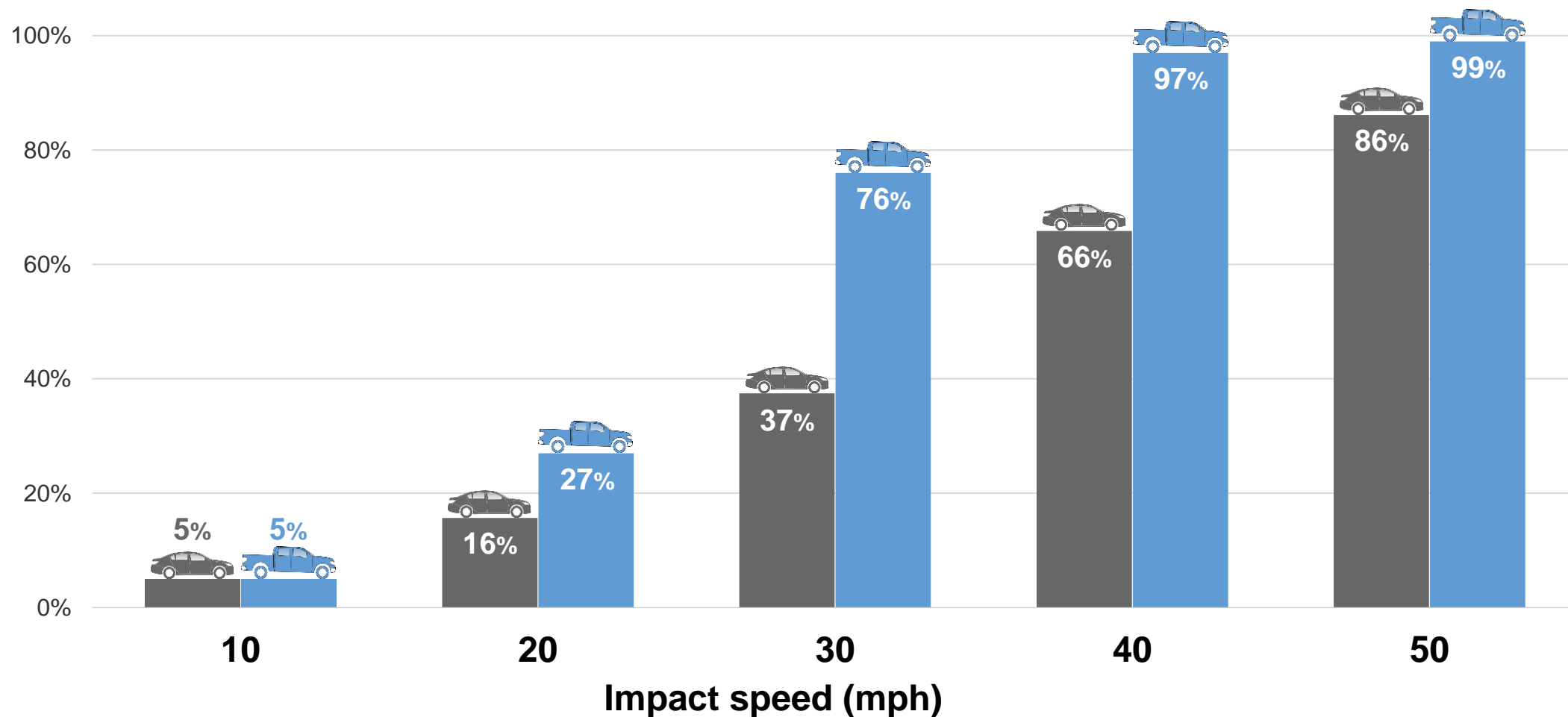


Average horsepower



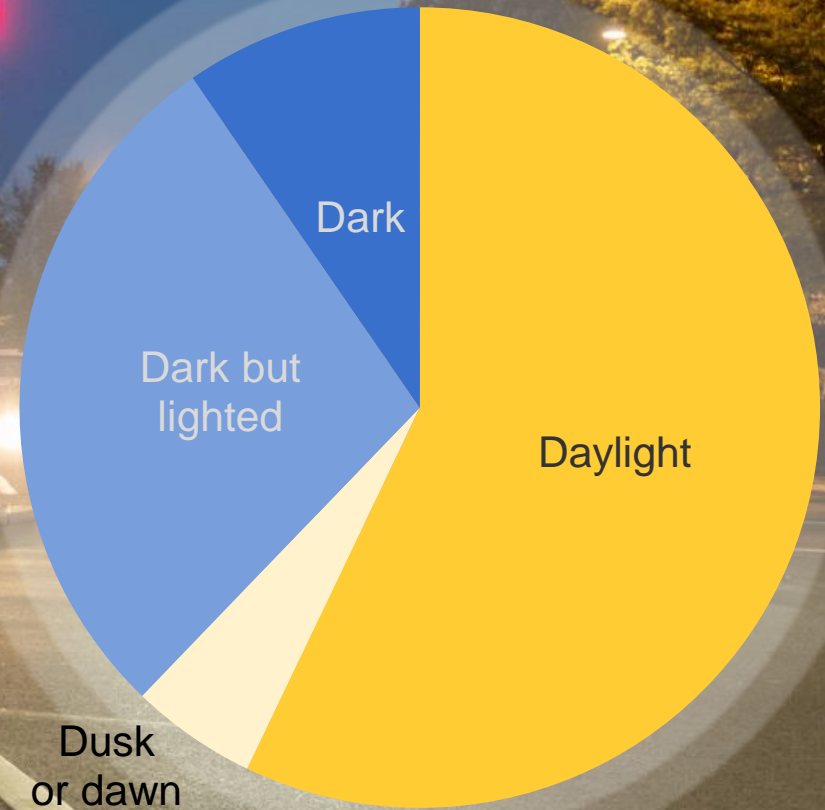
Risk of severe injury to a struck pedestrian by impact speed for median car and median pickup

Monfort, 2024

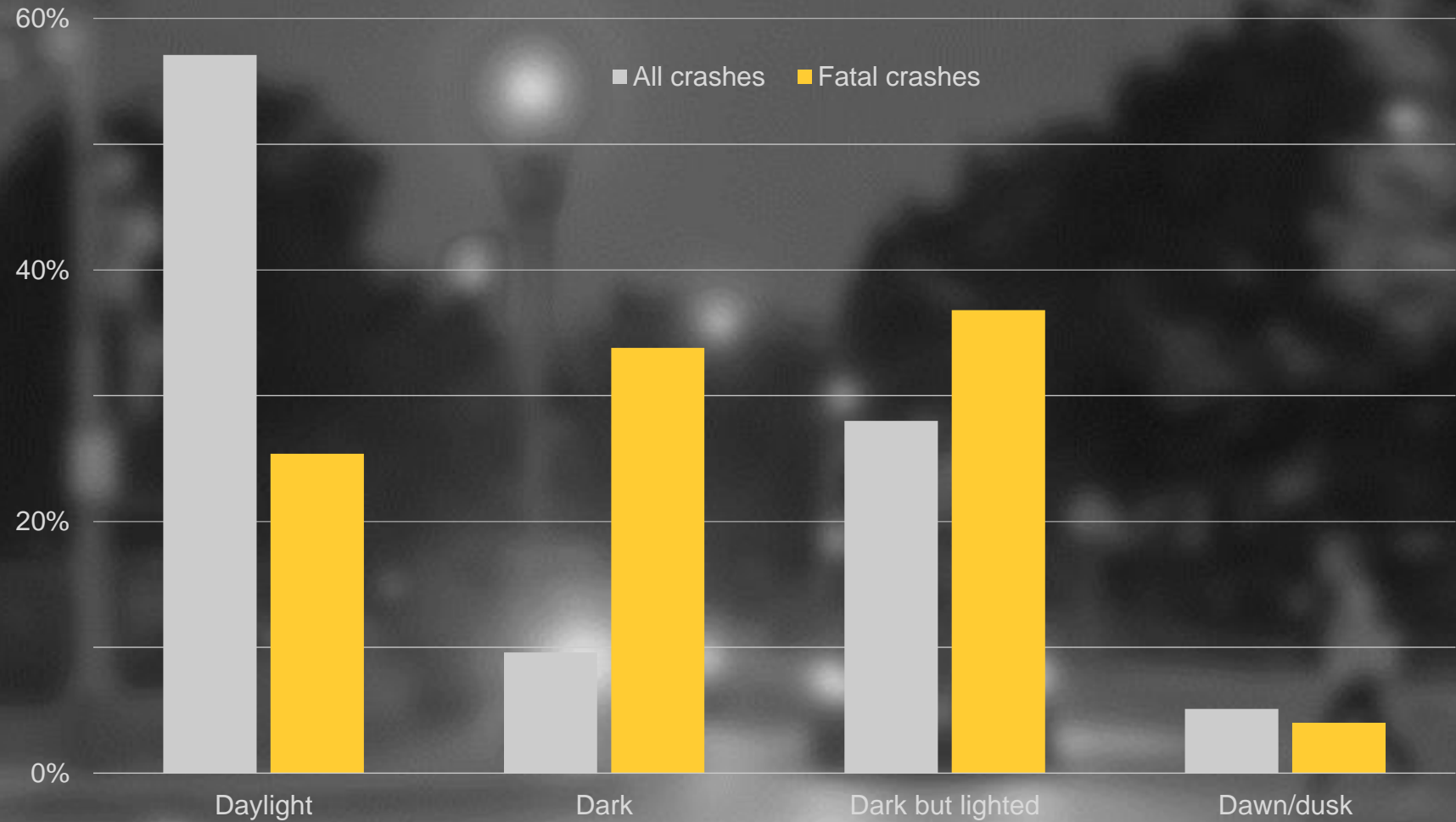




All pedestrian crashes by light condition



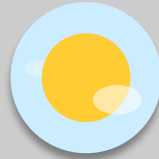
Percent of pedestrian crashes and fatalities by light condition



Effect of pedestrian crash prevention systems on pedestrian crash risk

Systems worked in daylight and when street lighting was present, but not in the dark

Daylight



-32%

Dark and lighted,
dawn, dusk



-33%

Dark
and unlighted



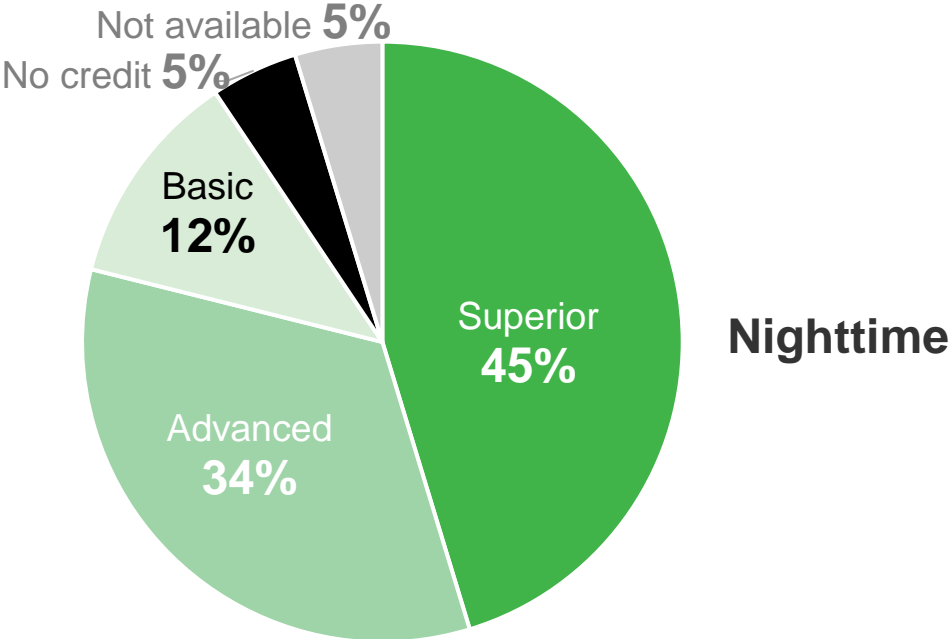
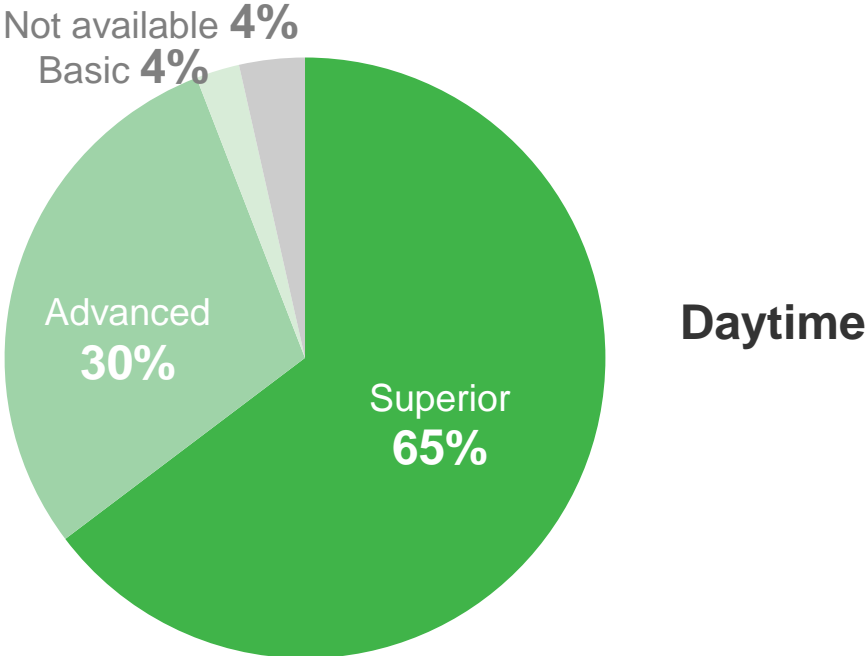
No reduction

Toyota Tacoma



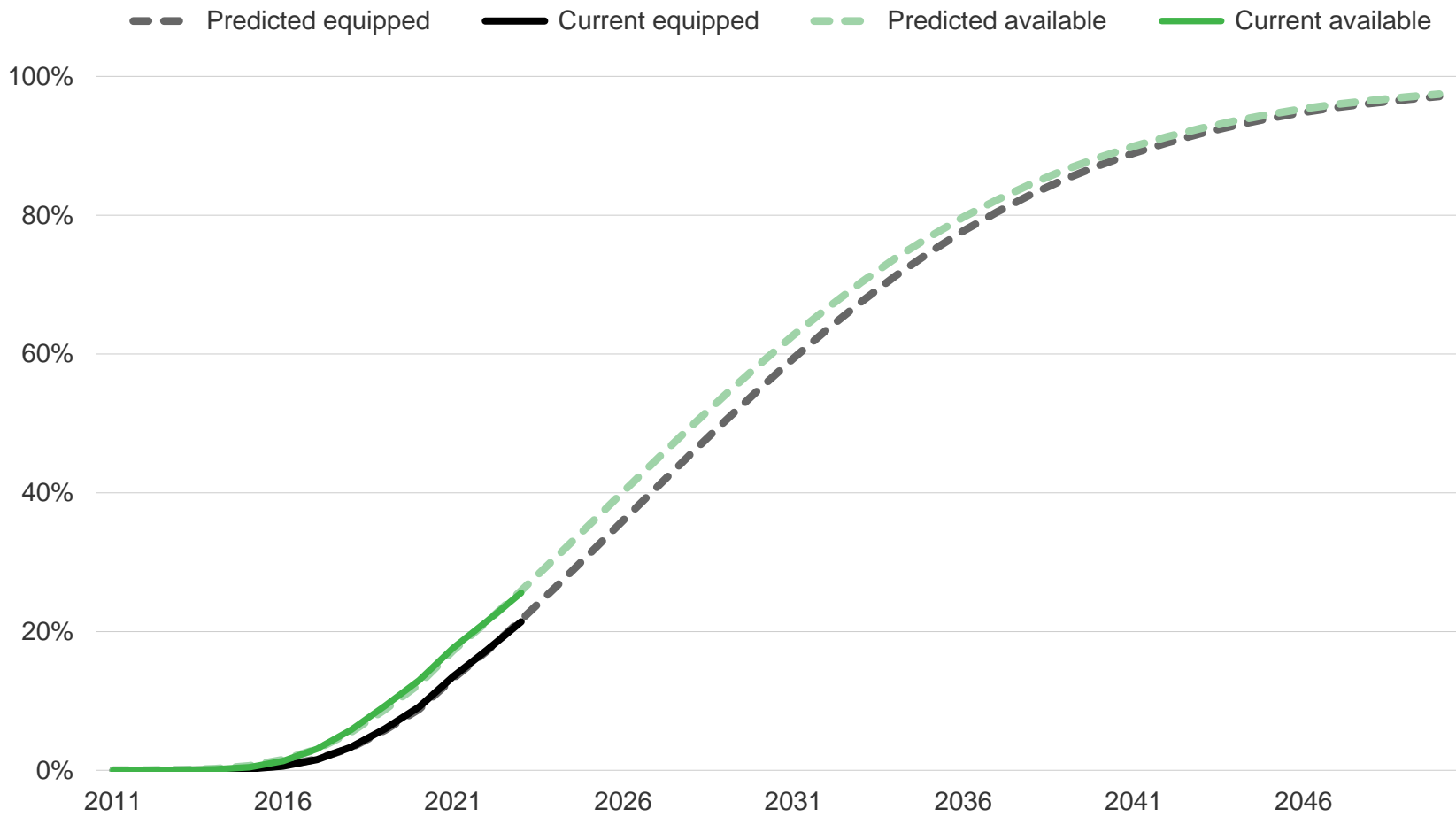


Pedestrian AEB ratings for 2024 models



Predicted percentage of registered vehicles: front automatic emergency braking with pedestrian detection

By calendar year



Drivers more likely to yield with crosswalk illuminators on



Drivers more likely to yield with crosswalk illuminators and RRFBs on

BASELINE: with existing street lighting and RRFBs off



Illuminators on continuously: 6.3x

Illuminators triggered by pedestrian: 5.9x



RRFBs alone: 5.9x



RRFBs + triggered illuminators: 13.1x





RRFBs reduce pedestrian crashes 47%

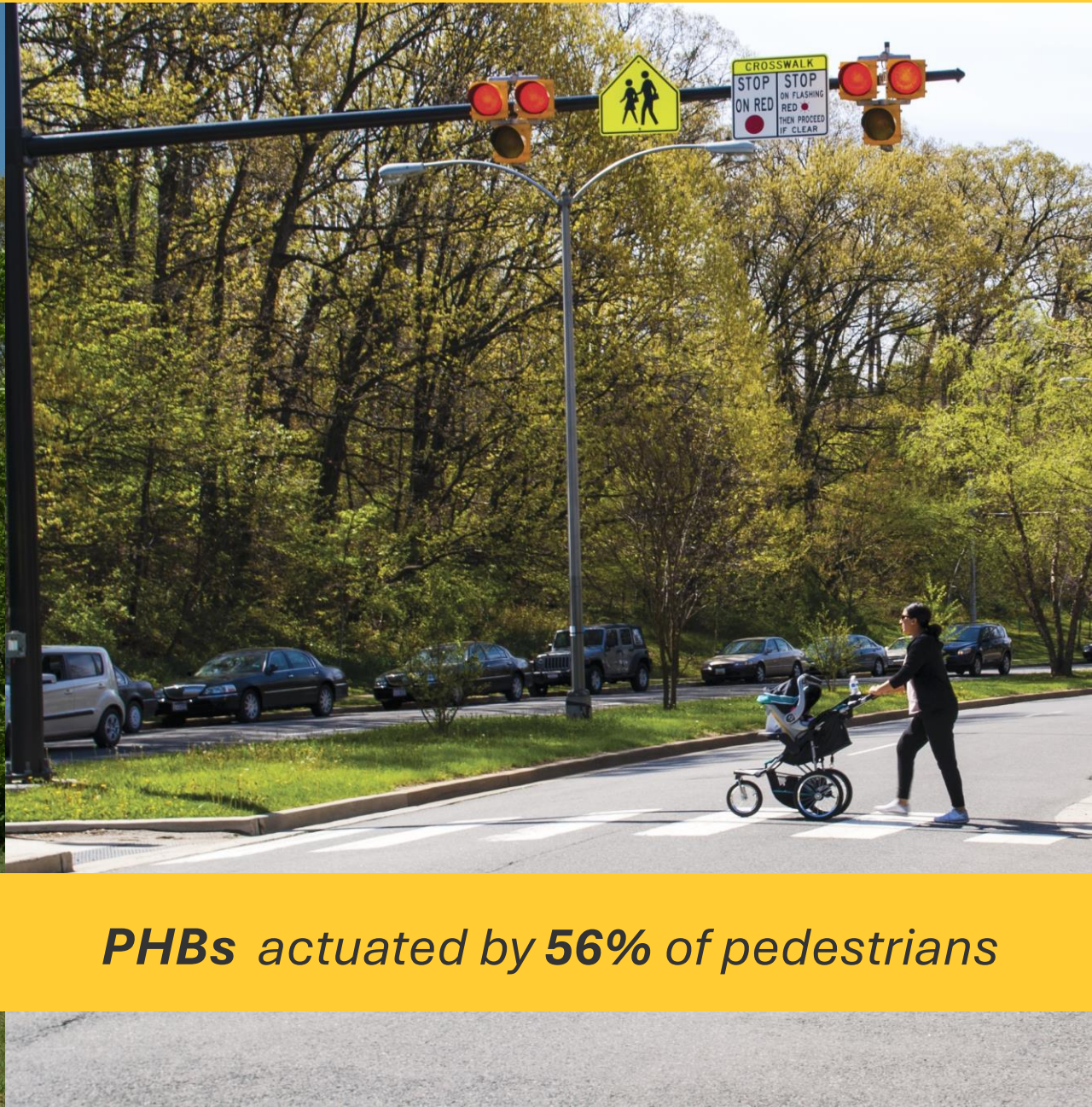


PHBs reduce pedestrian crashes 55%

IIHS study in North Carolina



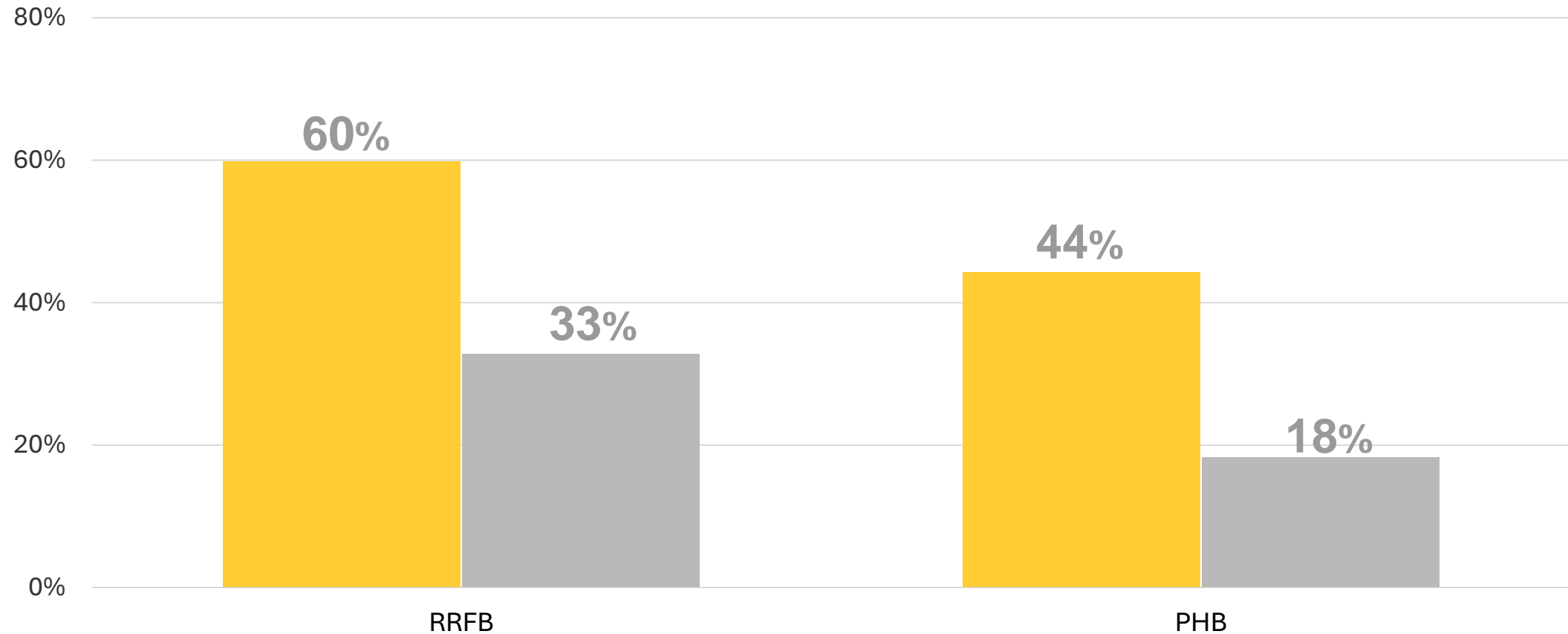
RRFBs actuated by 80% of pedestrians



PHBs actuated by 56% of pedestrians

Yielding rates when traffic control devices are **actuated** and **not actuated**

IIHS study in North Carolina





Factors that increased odds of actuation

- ▶ Device

- ↑ 141% at RRFBs compared with PHBs

- ▶ Geometry

- ↑ between 149% and 776% at wider crossings + median or refuge island

- ↓ 73% when the sidewalk is missing on the far side of the crossing

- ▶ Context

- ↑ at school zones and midblock locations

- ↑ during periods with more traffic and for larger groups of pedestrians



Factors that increased odds of driver yielding

- ▶ Device actuation

- ↑ up to 1780% at PHBs and up to 750% for RRFBs when actuated

- ▶ Pedestrian refuge island

- ↑ 240% when refuge island present, given the device is actuated

- ▶ Context

- ↑ at school zones

- ↑ at lower AADT locations and during periods of lower traffic

- ↑ for larger groups of pedestrians

City of Bellevue Safe Streets and Roads for All grant

Awarded over \$2.7 million for planning and demonstration projects



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ihs.org

June 20, 2023

The Honorable Pete Buttigieg
Secretary of Transportation
1200 New Jersey Ave SE
Washington, DC 20590

**BELLEVUE SAFE ACCESS
FOR EVERYONE**

Multijurisdictional Applicants



Financial Contributors



SS4A IMPLEMENTATION GRANT PROPOSAL - 2023



July 2023

Bellevue – Safe Access for
SS4A grant program Safe Streets and Roads

To express our support and financial commitment to the "B-SAFE" grant proposal for Safe Streets and Roads for All (SS4A) program. In total, we are contributing \$238,000, including \$123,000 in in-kind staff demonstration and implementation projects: \$55,000 total contribution), D-2 Adaptive Intersection (contribution), and the evaluation of the Bike Lane Design (IMP-2). This financial contribution is used for three proposals.

Bellevue as a living lab that allows us to design to protect vulnerable road users. Organization with a long history of identifying and safer roads. Our evaluation efforts will be a process spanning highway safety and design, pedestrian topics, and technical assistance for demonstration projects. Dr. Avelar has performed traffic control devices in multiple projects for the Department of Transportation (Avelar, B., Fitzpatrick, Brewer, & Avelar, 2014). Efforts of constructing bicycle lanes in the urban environment played a significant role in a similar bicycle lanes (Dixon, Avelar, & Mousavi,

of vehicle conflicts with pedestrians and the Advanced Mobility Analytics Group. Demonstration is to examine how conflicts are to determine potential thresholds at which time, this study will observe and analyze eight intersections for two weeks. The goal and vehicle volume thresholds at which to pedestrian safety. For the second phase, the city

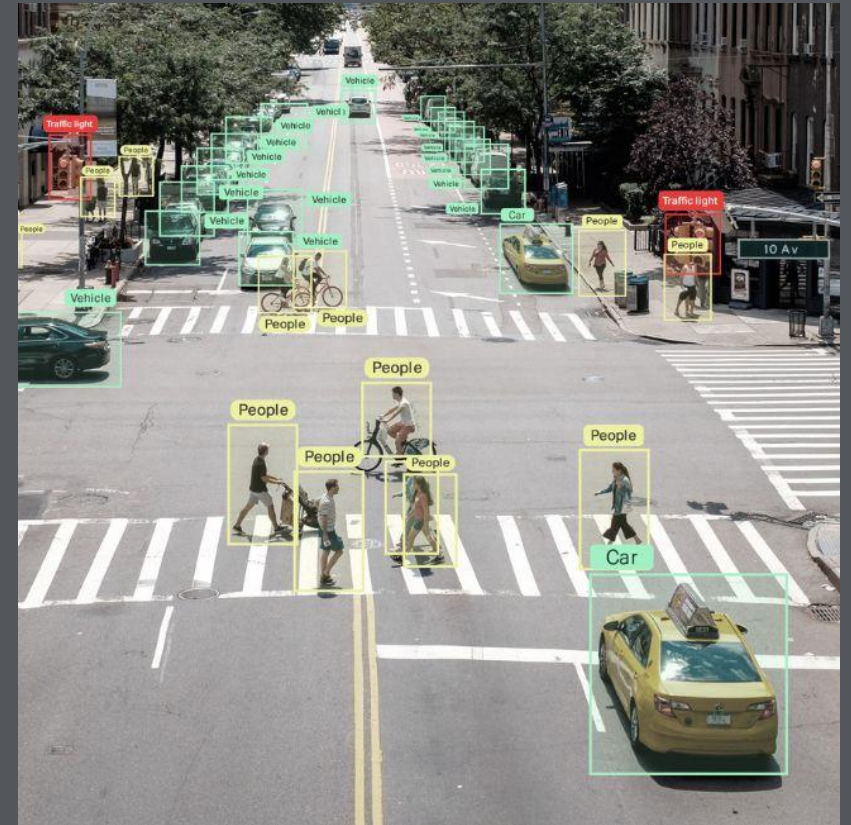
D-1 protected turn phasing for pedestrians demonstration

- ▶ Develop guidance to deploy protected turn phasing at intersections to enhance pedestrian safety
- ▶ Phase 1: examine how vehicle-pedestrian conflicts vary with pedestrian and traffic volumes
- ▶ Phase 2: implement modifications to signal timing and study the effects



D-2 adaptive pedestrian signal control demonstration

- ▶ Evaluation of AI-based signal control that manages "Walk" periods based on pedestrian demand
- ▶ Two intersections will be treated with the technology and four intersections will be controls
- ▶ Outcome measures include:
 - Vehicle-pedestrian conflicts
 - Proportions of crossings/conflicts out of walk phase
 - Average signal cycle lengths

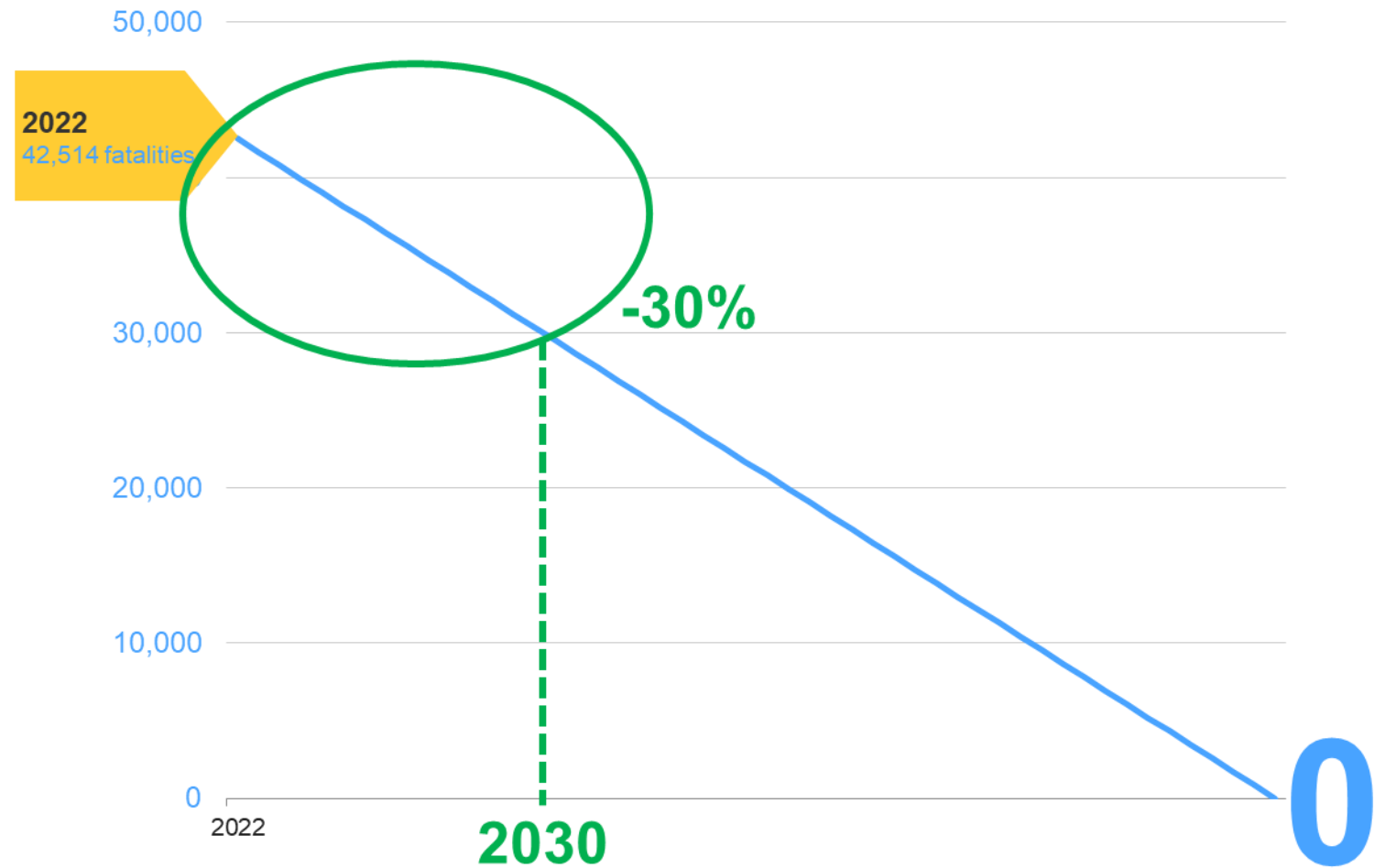


3
X
3

*Reduce roadway fatalities
30% by 2030*

Change the trajectory

Accelerate progress toward zero deaths



30↓X30→

Reduce roadway fatalities 30% by 2030

Take effective actions based on the **Safe System** approach
Create a path to **sustainable road safety**



Insurance Institute for Highway Safety
Highway Loss Data Institute

iihs.org



/iihs.org



@IIHS_autosafety



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IIHS



/company/iihs-hldi



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THANK YOU



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