

# The evolution of ADAS, automation, and safety

AIRB

January 29, 2026



**Kay Wakeman**  
Director of Insurance Outreach



# Saving lives. Preventing harm.

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## 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.

# Member groups

and IHS and HDI are supported by these Canadian and international associations

Acceptance Insurance  
Acuity Insurance  
AF Group  
Allstate  
Ally Financial, Inc.  
American Family Insurance  
American National  
AmericanAg  
Amica Mutual Insurance  
AmShield Insurance  
Aspire General Insurance Company  
AssuranceAmerica  
Auto Club Enterprises  
Auto Club Group  
Auto-Owners Insurance  
Celina Insurance Group  
CHUBB  
The Cincinnati Insurance Companies  
Clearcover Insurance Company  
Colorado Farm Bureau Insurance Company  
Commonwealth Casualty Company  
Concord Group Insurance  
CONNECT, powered by American Family Insurance  
Co-operators Financial Services Limited

COUNTRY Financial  
CSAA Insurance Group  
**Desjardins Insurance**  
Donegal Insurance Group  
DTRIC Insurance  
Elephant Insurance Company  
Encova Insurance  
Erie Insurance Group  
Farm Bureau Financial Services  
Farm Bureau Insurance Company of Michigan  
Farm Bureau Insurance of Tennessee  
Farm Bureau Mutual Insurance Company of Idaho  
Farmers Insurance Group  
Farmers Mutual of Nebraska  
Florida Farm Bureau Insurance Companies  
Frankenmuth Insurance  
Gainsco Insurance  
GEICO Corporation  
The General Insurance  
Georgia Farm Bureau Mutual Insurance Company  
Goodville Mutual Casualty Company  
Grange Insurance  
The Hanover Insurance Group

The Hartford  
Haulers Insurance Company, Inc.  
Horace Mann Insurance Companies  
Incline  
Indiana Farm Bureau Insurance  
Indiana Farmers Insurance  
Just Insure  
Kemper Corporation  
Kentucky Farm Bureau Mutual Insurance Companies  
Kin Insurance  
Lemonade, Inc.  
Liberty Mutual Insurance  
Louisiana Farm Bureau Insurance Company  
Main Street America Insurance  
MAPFRE Insurance Group  
Mercury Insurance Group  
Mississippi Farm Bureau Casualty Insurance Company  
MMG Insurance  
Mountain West Farm Bureau Mutual Insurance Company  
Munich Reinsurance America, Inc.  
Mutual Benefit Group®  
Mutual of Enumclaw Insurance Company

National General Insurance  
Nationwide  
NJM Insurance Group  
Nodak Insurance Company  
North Carolina Farm Bureau Mutual Insurance Company  
North Star Mutual Insurance Company  
Northern Neck Insurance Company  
NYCM Insurance  
Ohio Mutual Insurance Group  
Openly  
PACIFIC Mutual Insurance Company  
Plymouth Rock Assurance  
Progressive Insurance  
The Responsive Auto Insurance Company  
Rider Insurance  
Rockingham Insurance  
Root Insurance Co  
Rural Mutual Insurance Company  
Safe Auto Insurance Company  
Safeco Insurance®  
Samsung Fire & Marine Insurance Company  
SECURA Insurance  
Selective Insurance

Sentry Insurance  
Shelter Insurance®  
Sompo International  
South Carolina Farm Bureau Mutual Insurance Company®  
Southern Farm Bureau Casualty Insurance Company  
State Auto Insurance Companies  
State Farm Insurance Companies  
Stillwater Insurance Group  
Texas Farm Bureau Insurance  
The Travelers Companies, Inc.  
United Auto  
USAA  
Virginia Farm Bureau Mutual Insurance  
The Wawanesa Mutual Insurance Company  
West Bend Insurance Company  
Westfield

**Funding associations**  
American Property Casualty Insurance Association  
National Association of Mutual Insurance Companies



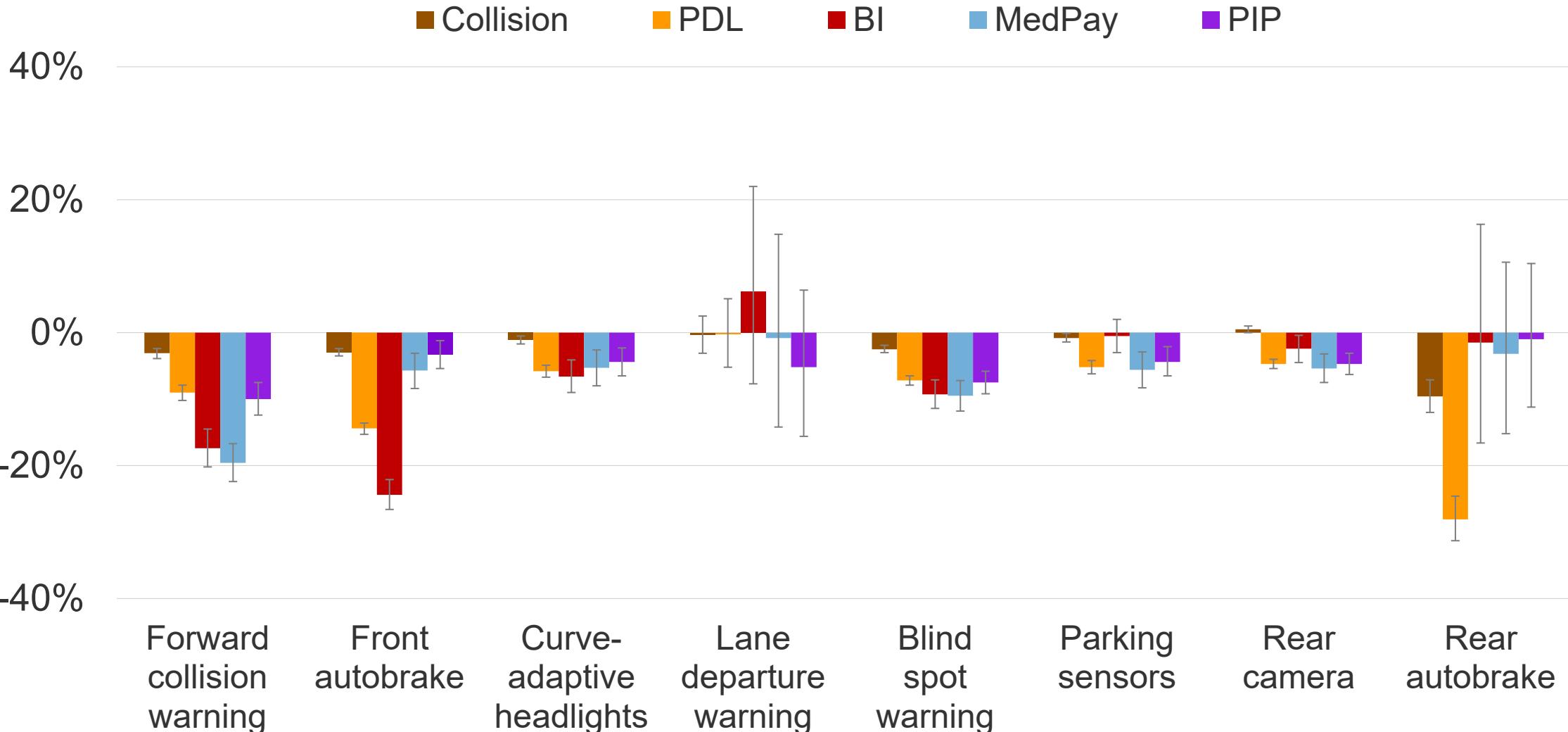
**Co-operators Financial Services Limited**  
**Desjardins Insurance**  
**The Wawanesa Mutual Insurance Company**

# Advanced Driver Assistance Systems – early implementations



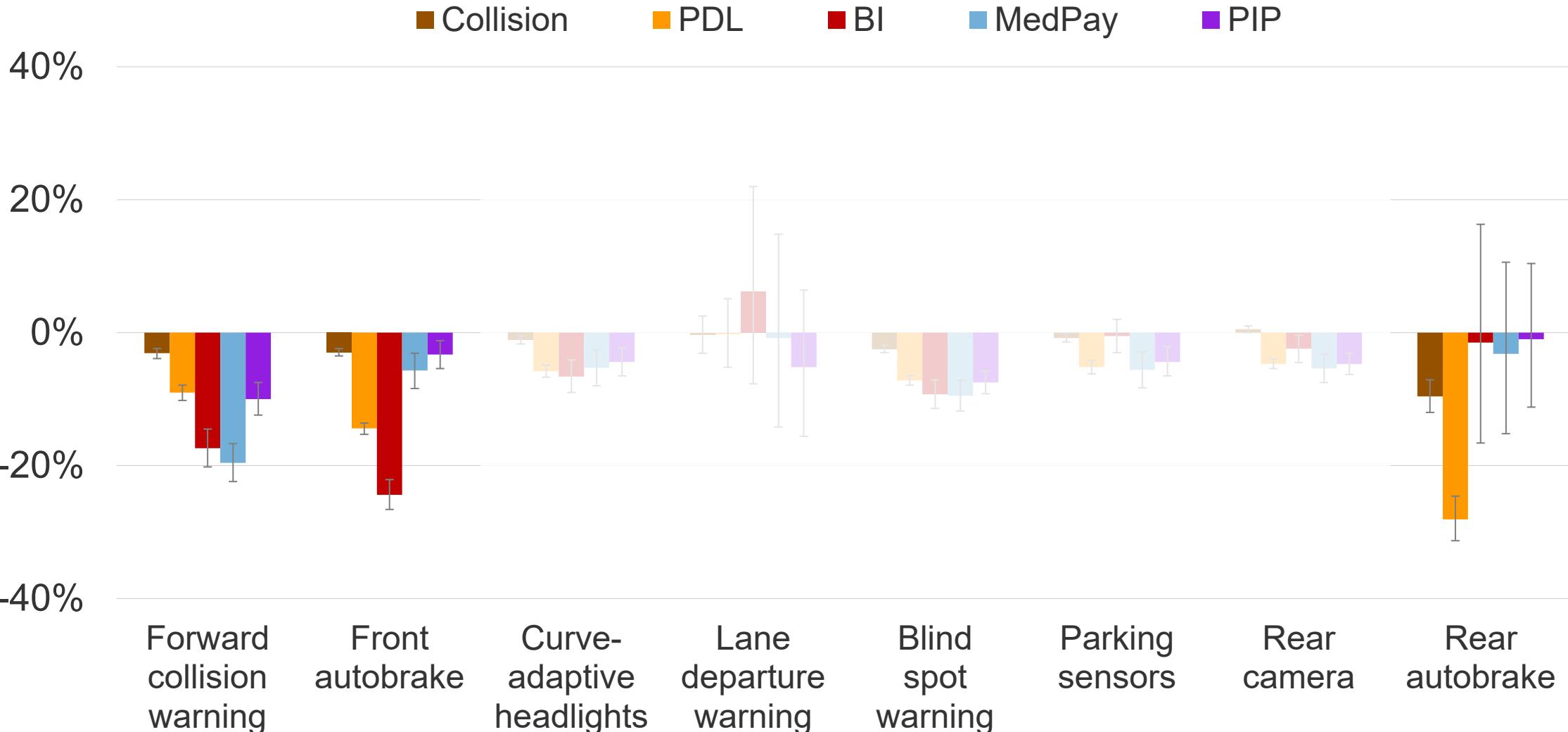
# Summary of technology effects on insurance claim frequency

## Early implementations



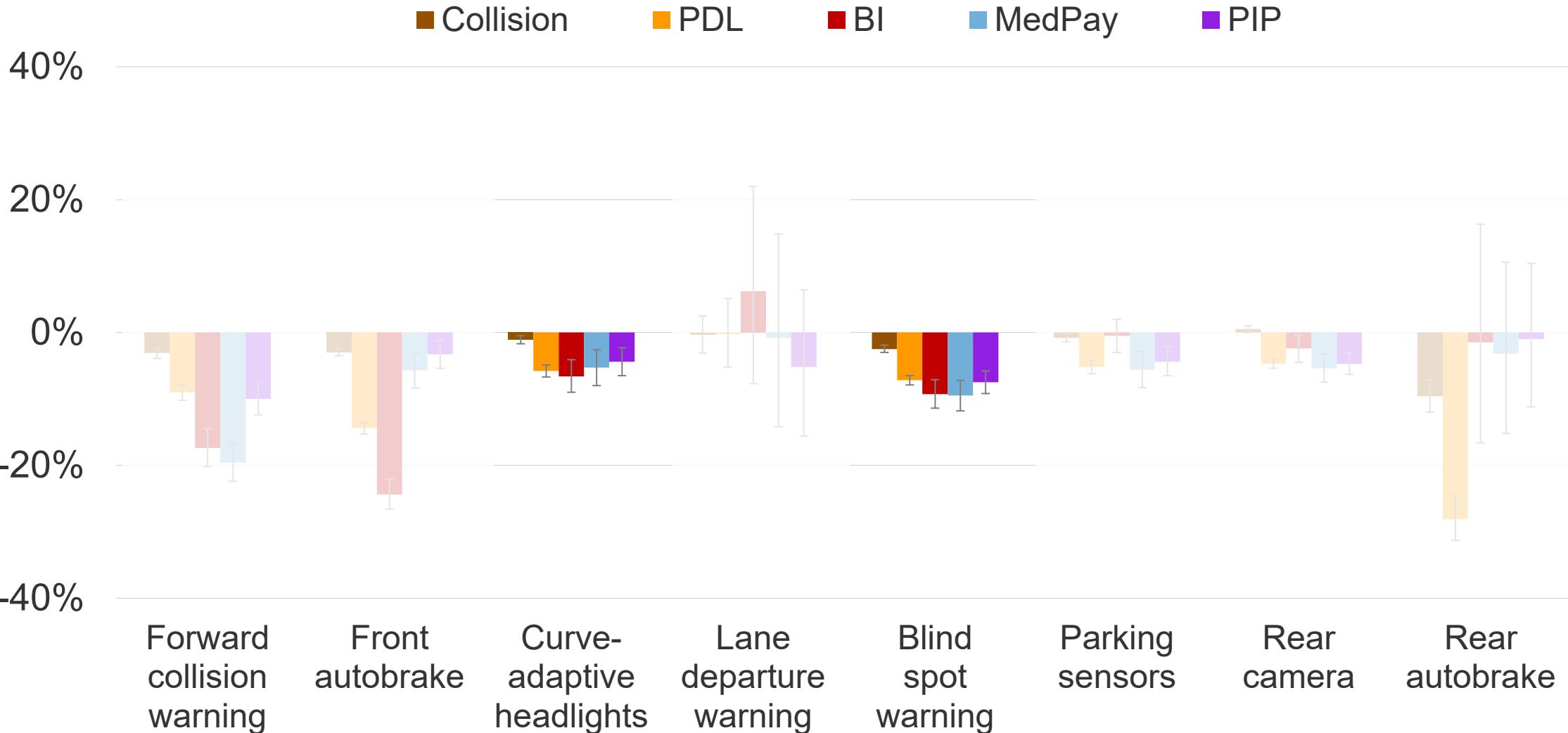
# Summary of technology effects on insurance claim frequency

## Early implementations



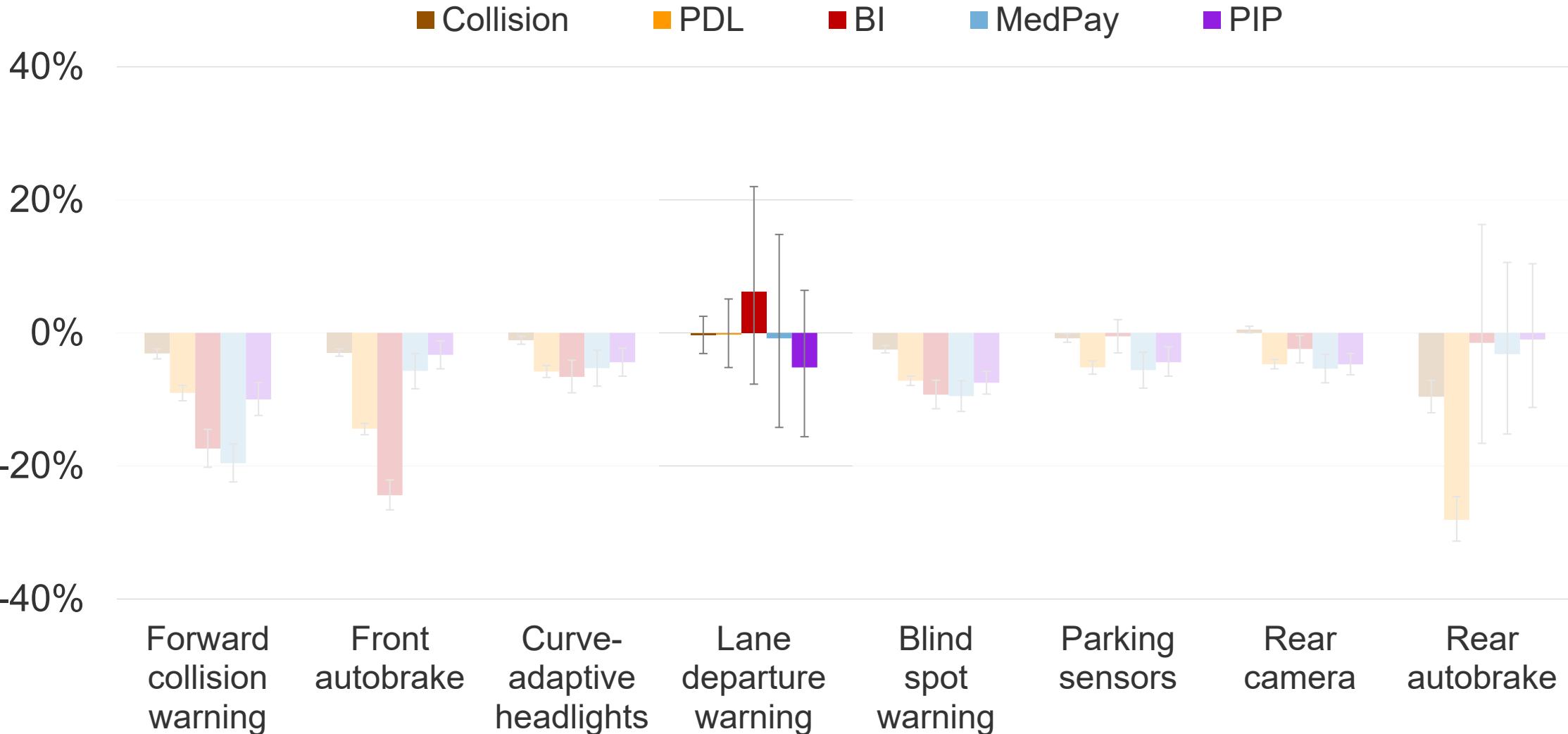
# Summary of technology effects on insurance claim frequency

## Early implementations



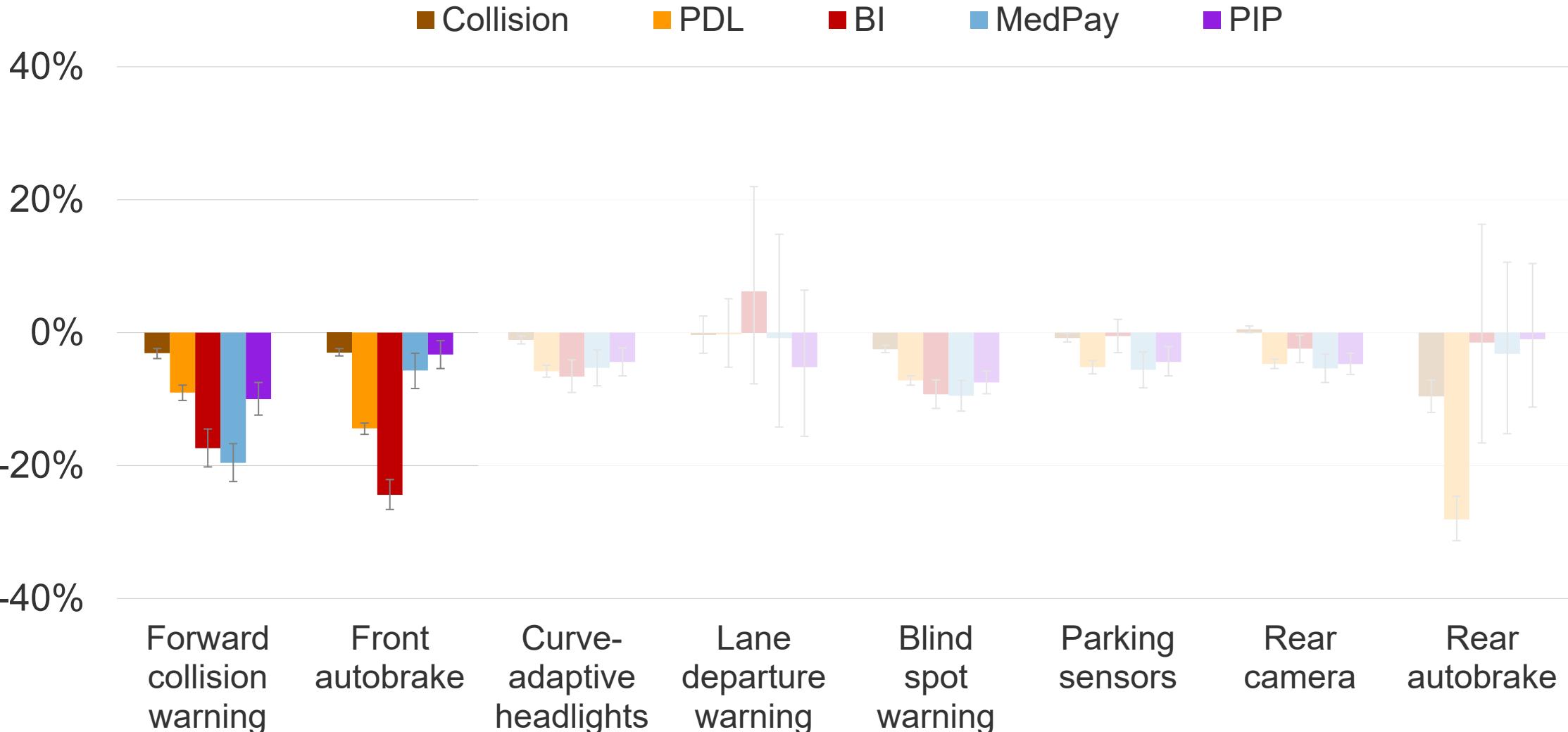
# Summary of technology effects on insurance claim frequency

## Early implementations



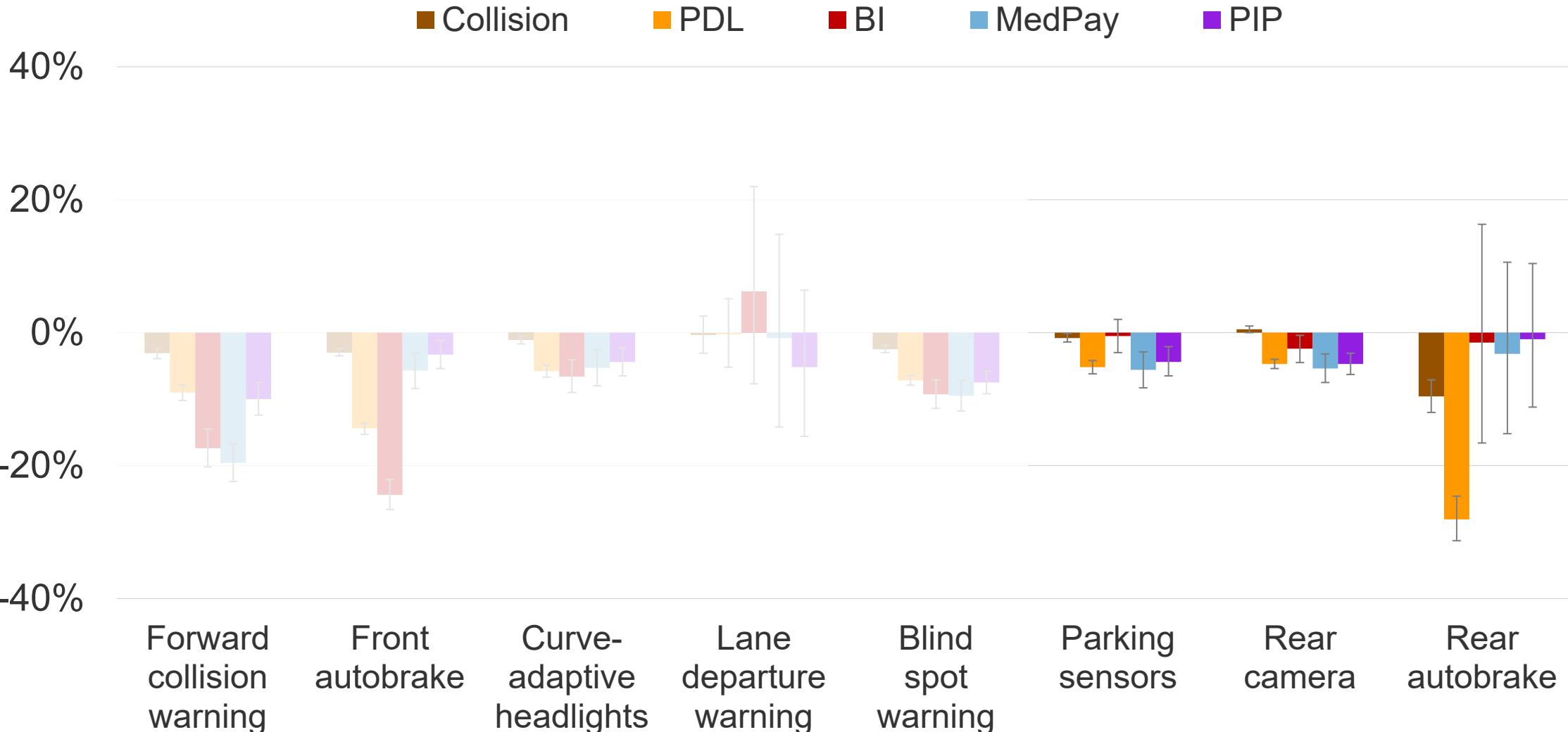
# Summary of technology effects on insurance claim frequency

## Early implementations



# Summary of technology effects on insurance claim frequency

## Early implementations



# Crash reductions with front, lane departure and blind spot technologies

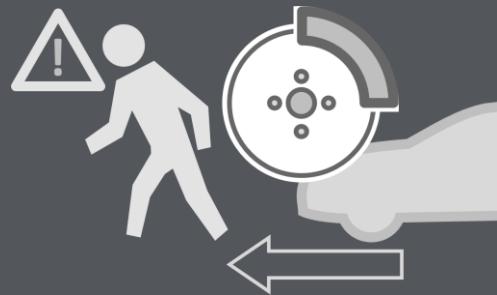
**50%**

With AEB



**27%**

With AEB  
+ pedestrian detection



**11%**

With lane  
departure warning



**14%**

With blind  
spot warning

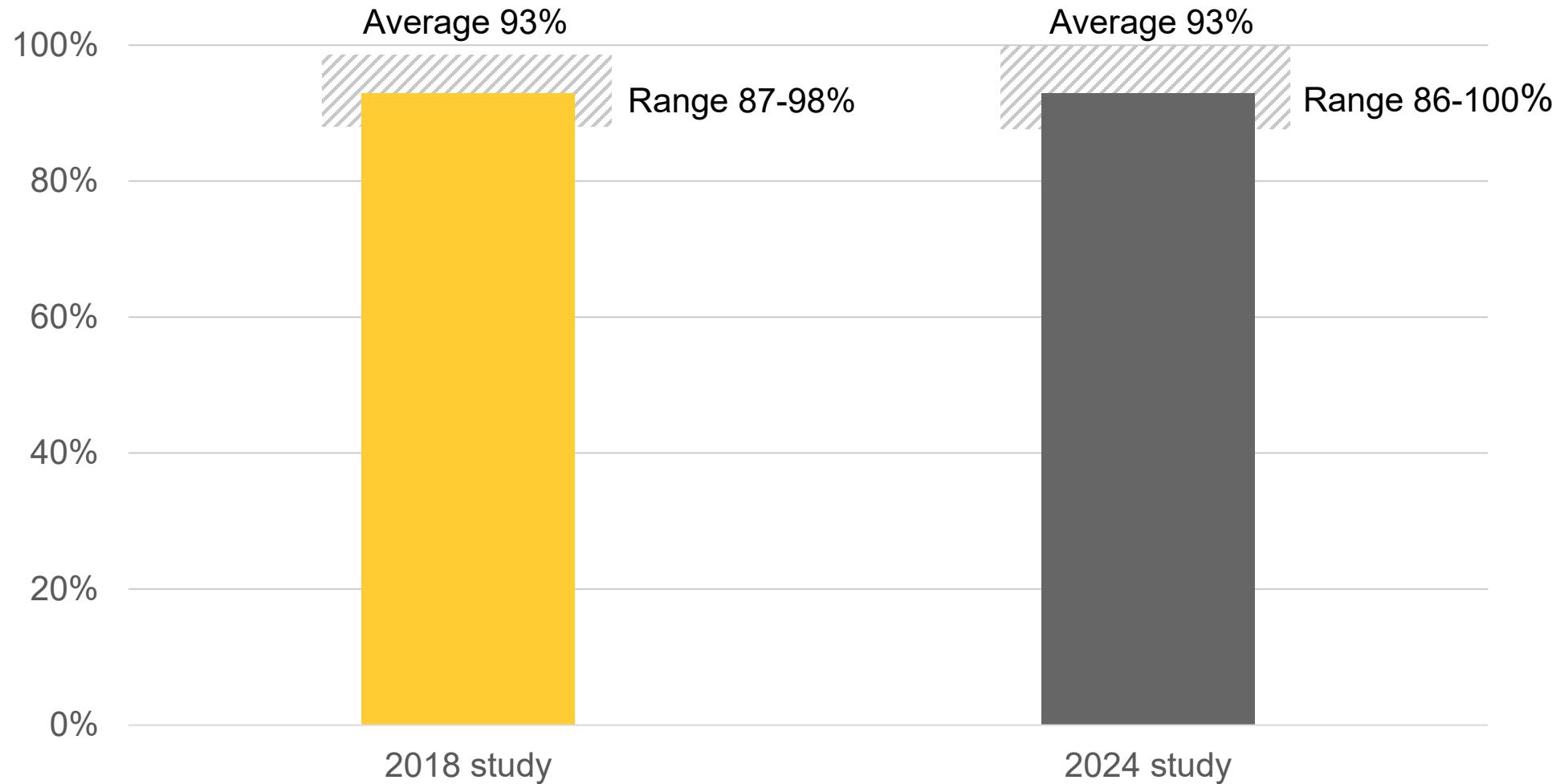


# Usage rates of ADAS systems by drivers



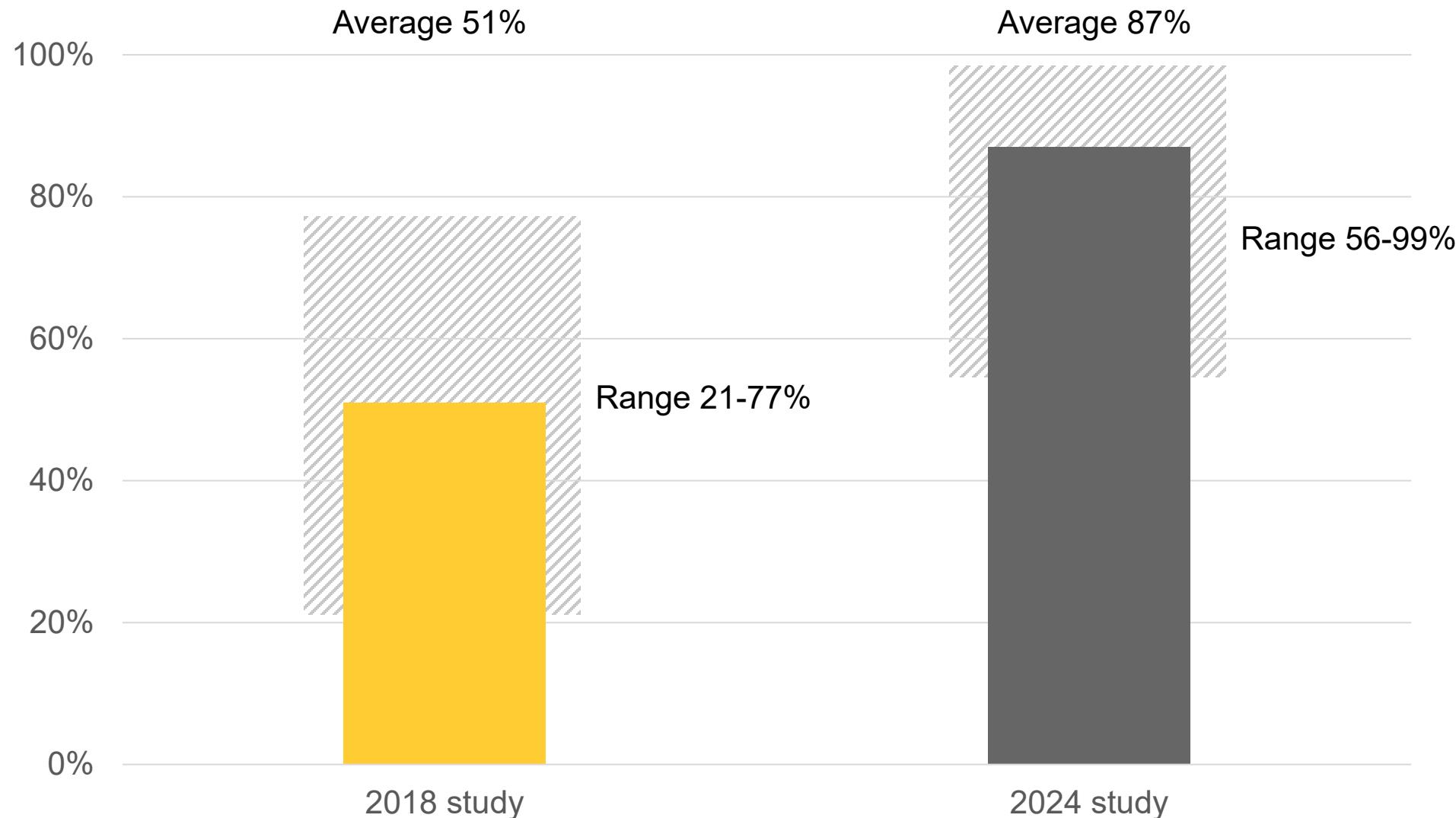
# Dealership observations of front crash prevention system status

Percent with system on — mean values and range



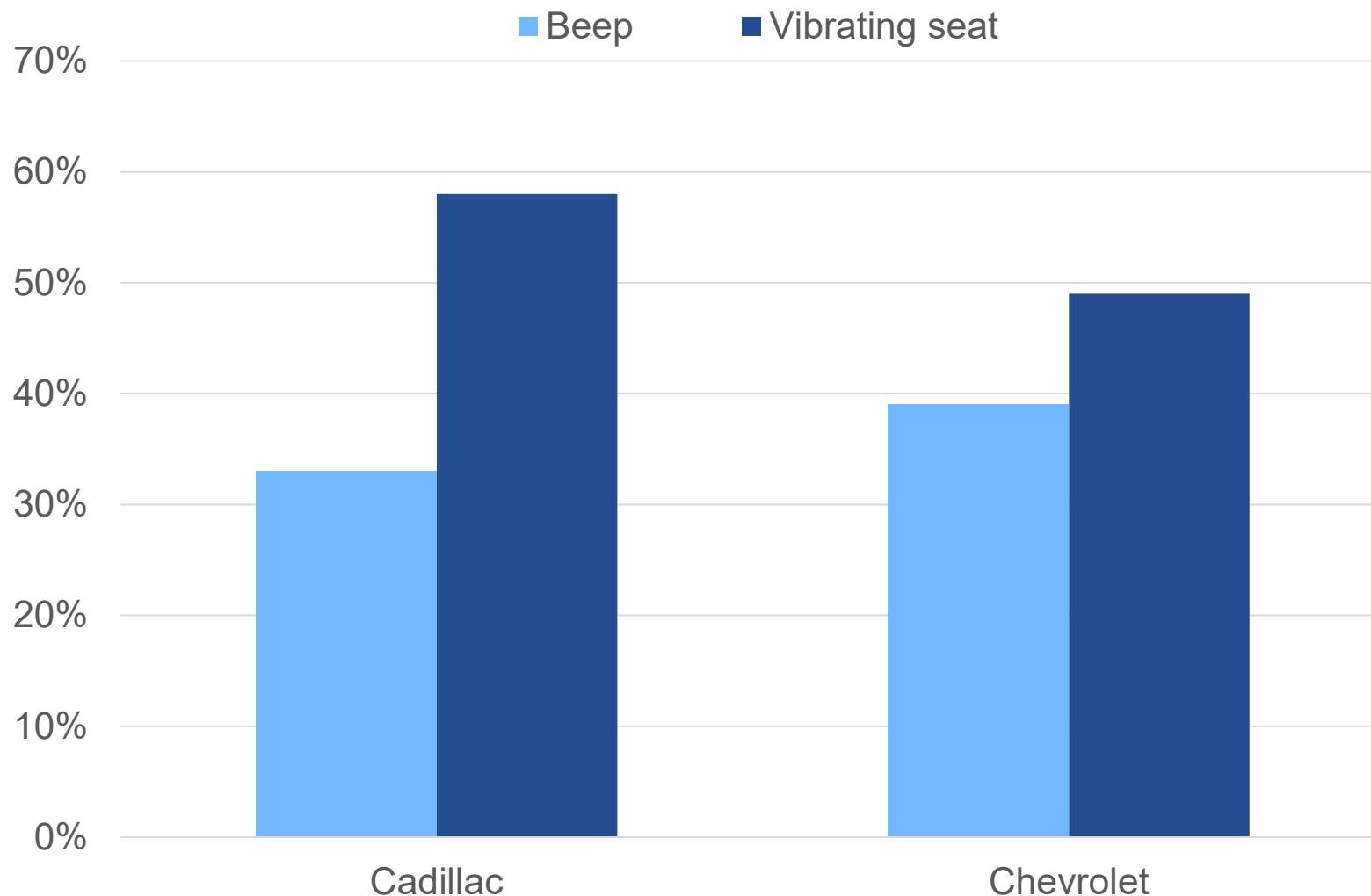
# Dealership observations of lane departure mitigation system status

Percent with system on — mean values and range



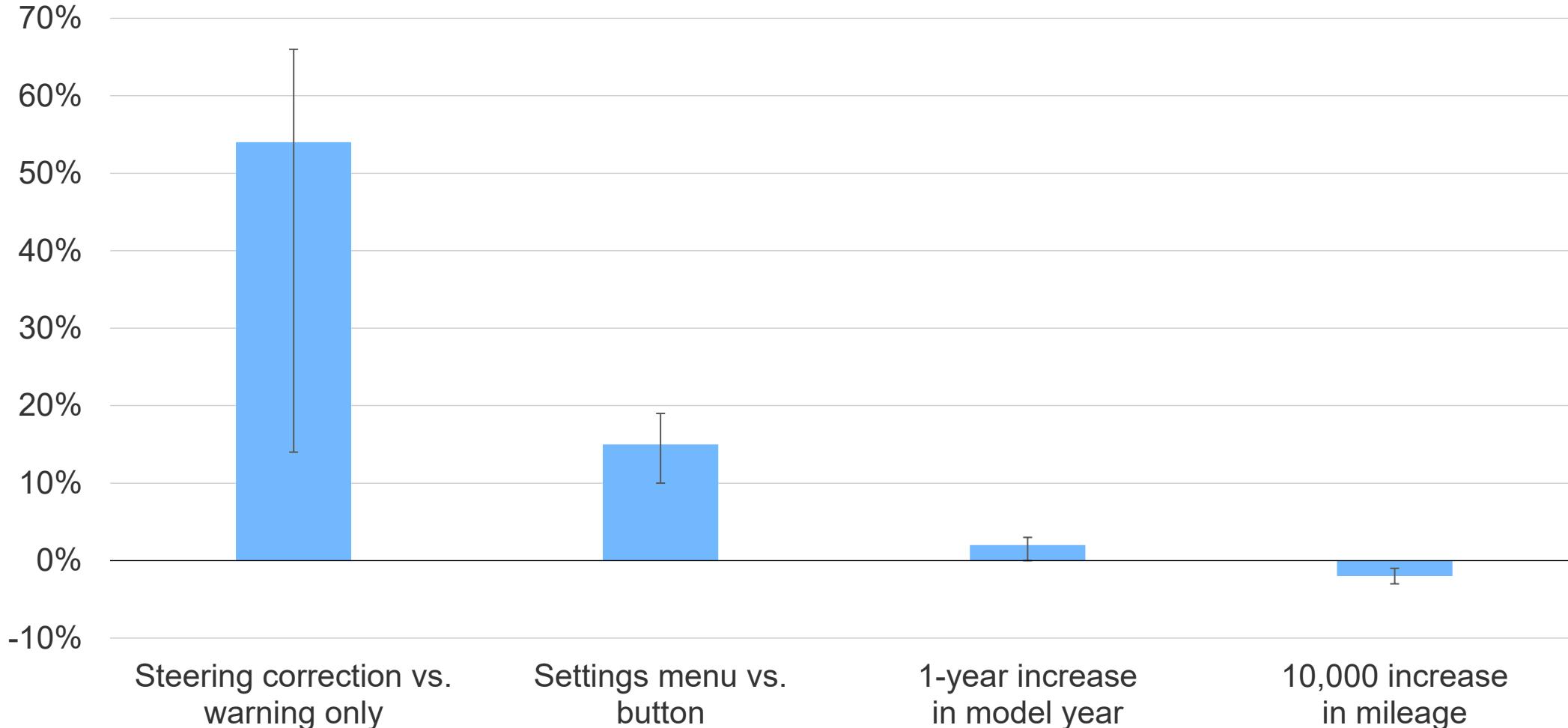
# GM lane departure warning on-off status by warning type

2018 study



# Differences in lane departure mitigation use

Relative likelihood of system use, 2024 study



**Do you turn  
off your lane  
maintenance  
system?**



# Do you turn off your lane maintenance system?

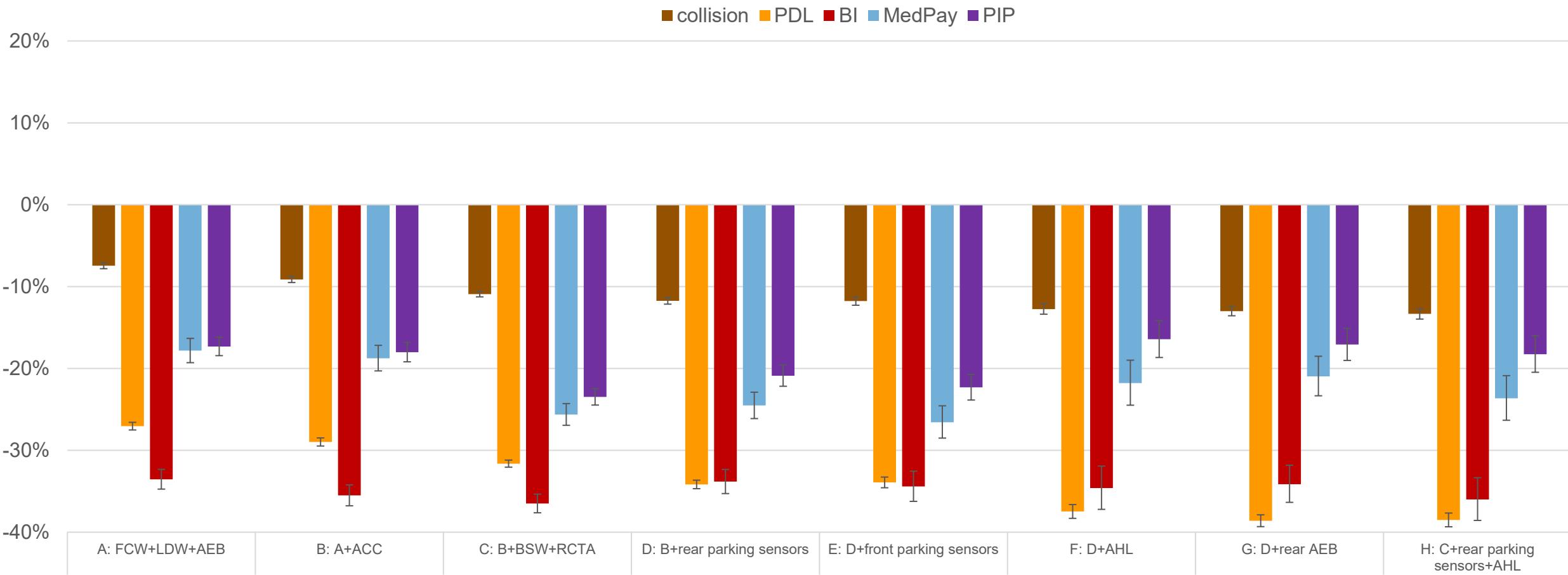
- ▶ A. Yes
- ▶ B. No
- ▶ C. I don't have one

# ADAS bundles (model years 2017-22)



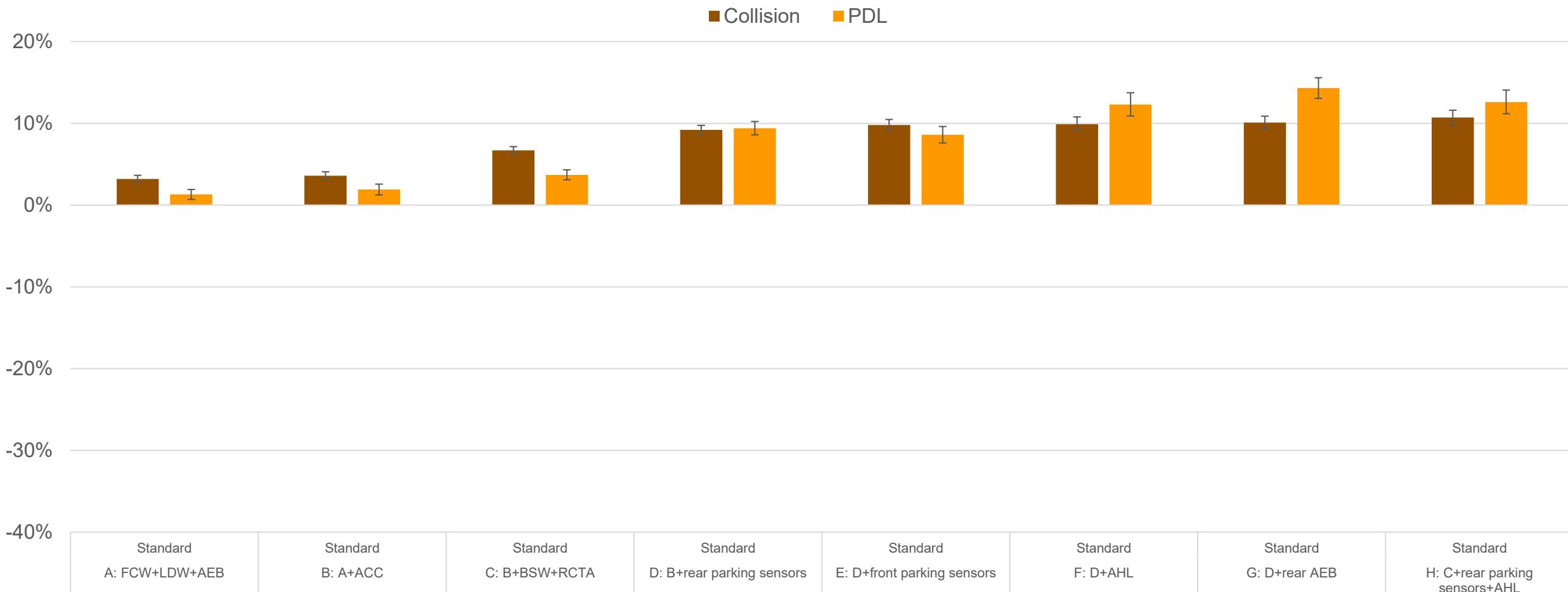
# Estimated changes in claim frequency associated with ADAS bundles

Model years 2017-22



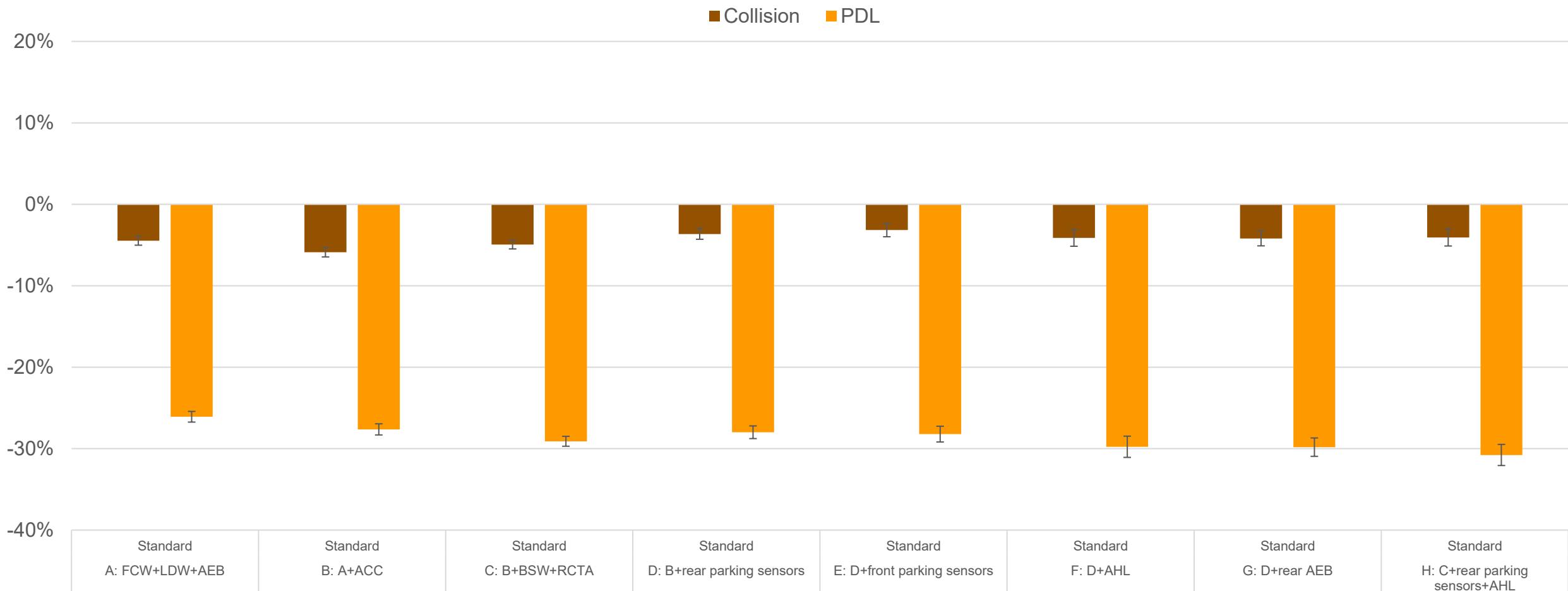
# Estimated changes in physical damage claim severity associated with ADAS bundles

Model years 2017-22



# Estimated changes in physical damage overall losses associated with ADAS bundles

Model years 2017-22

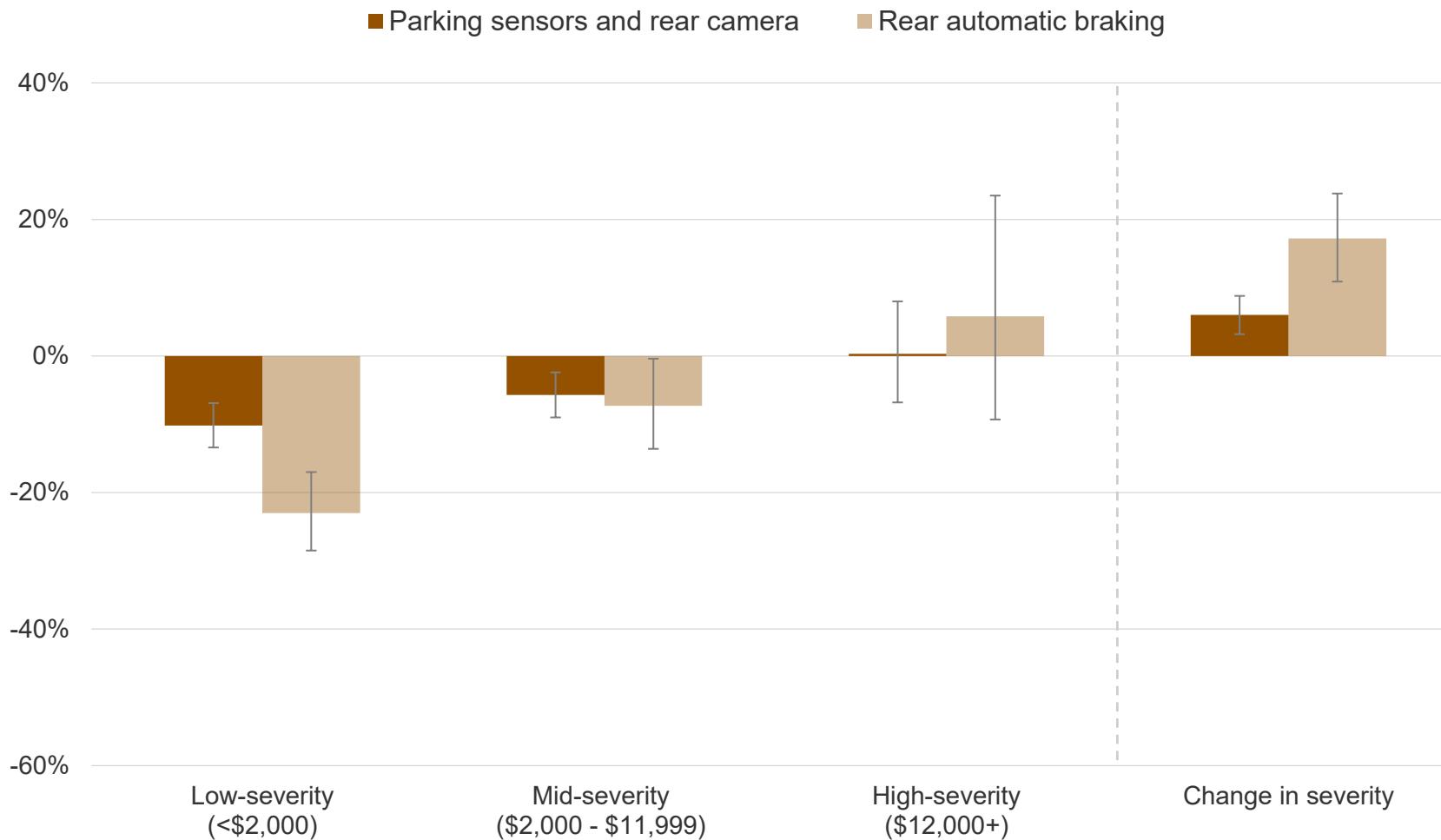


# ADAS and claim severity for collision and PDL



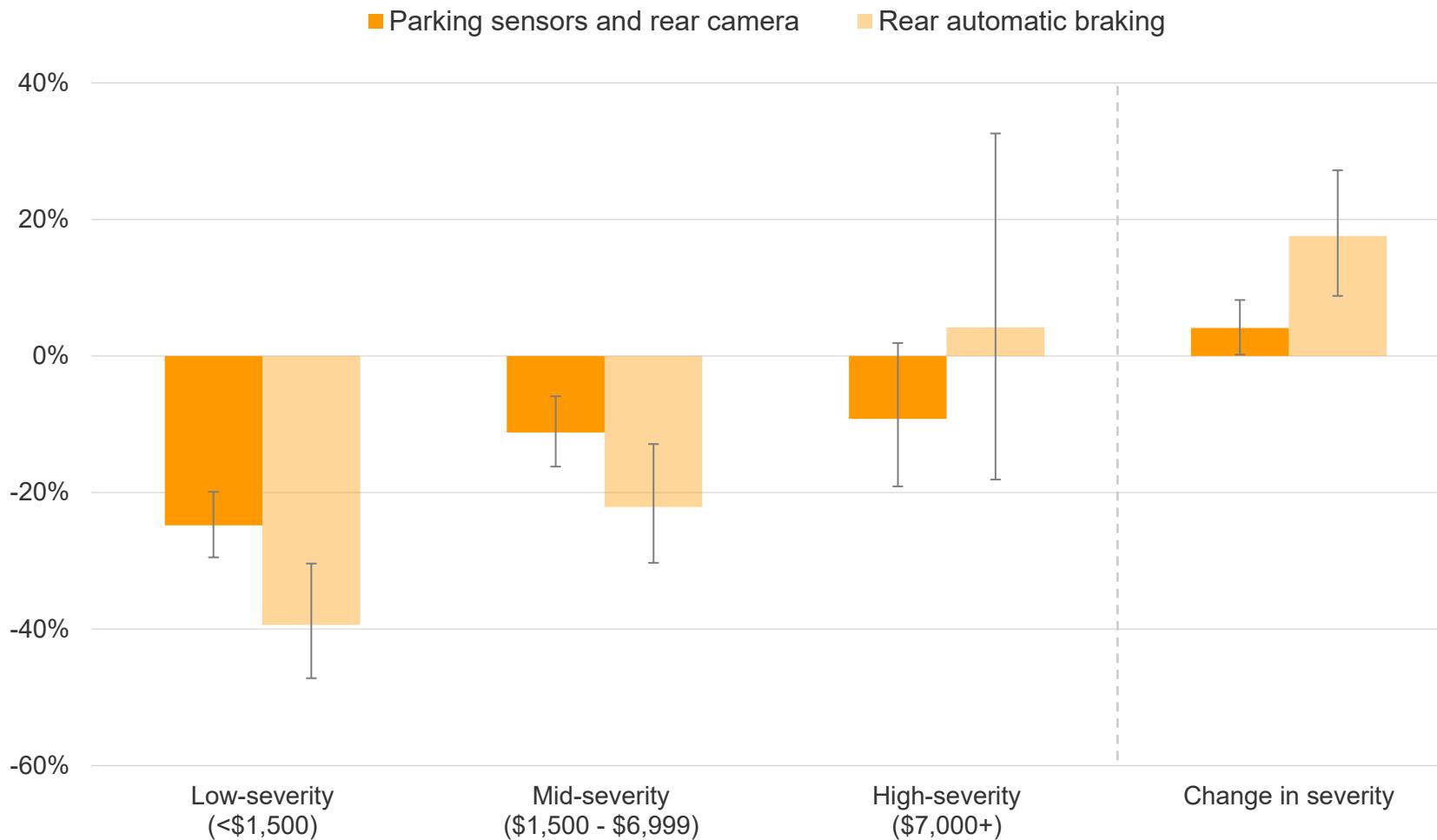
# Changes in collision claim frequency by claim size

## General Motors parking assist systems



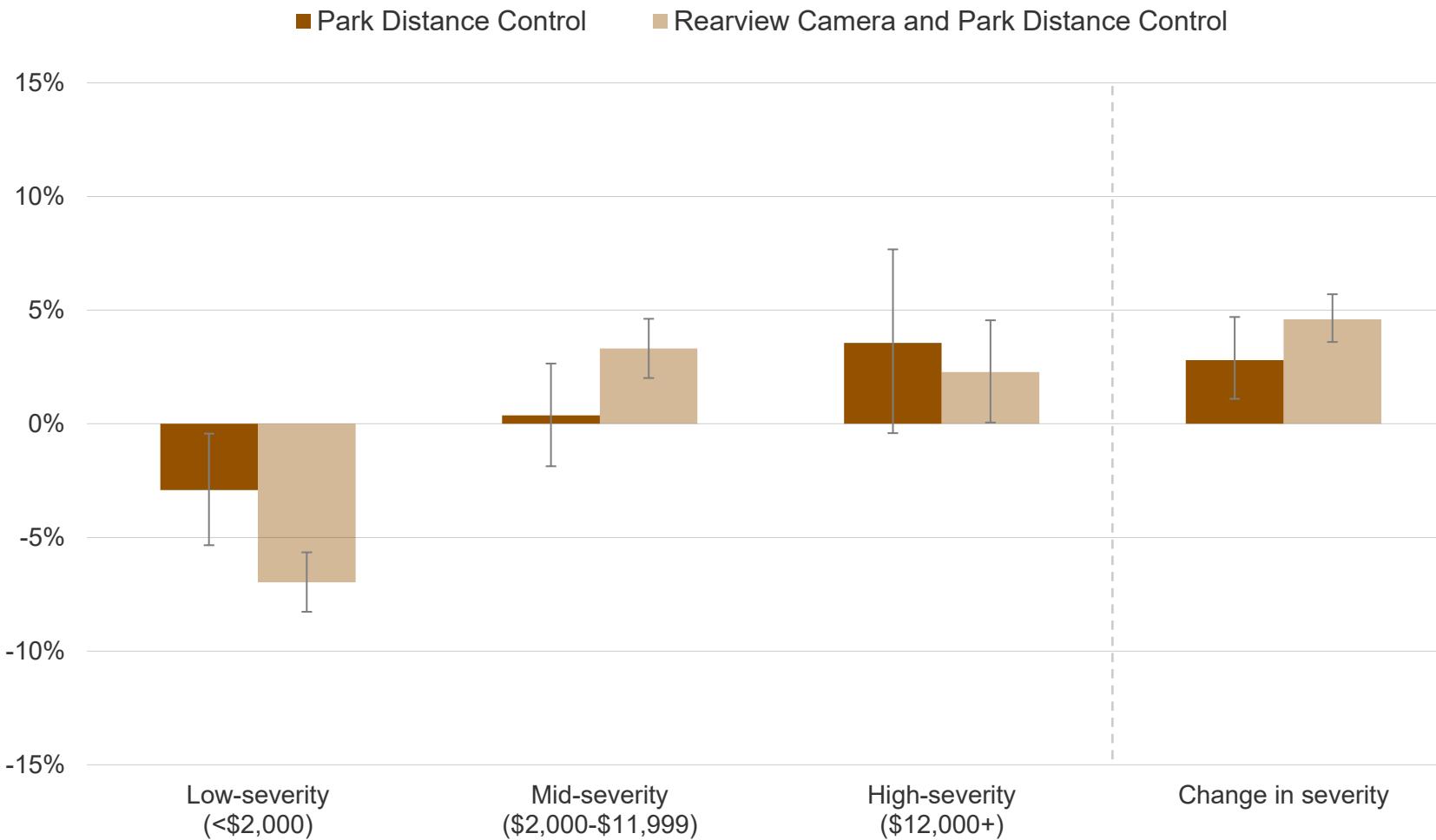
# Changes in PDL claim frequency by claim size

## General Motors parking assist systems



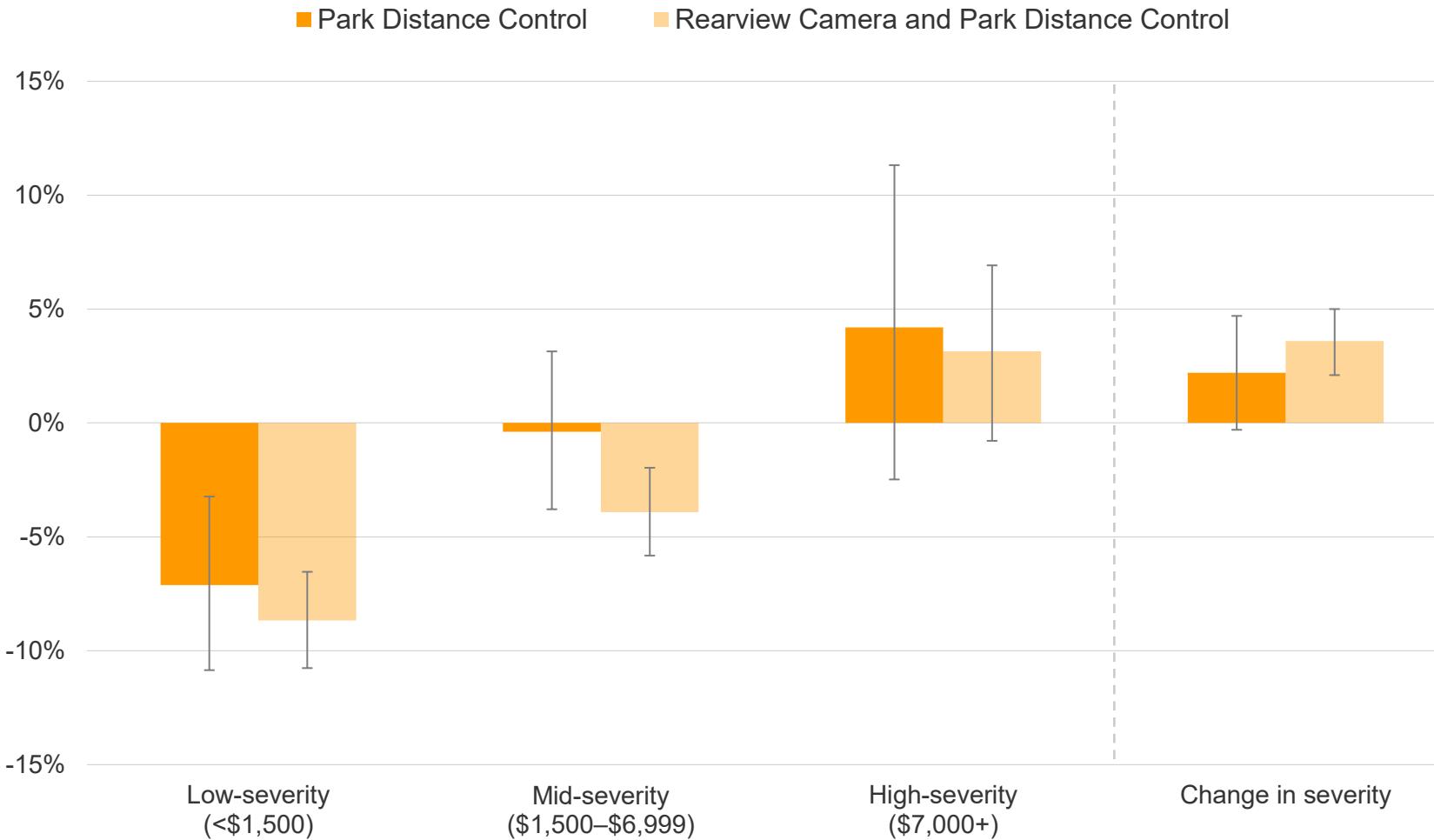
# Changes in collision claim frequency by claim size

## BMW parking assist systems



# Changes in PDL claim frequency by claim size

## BMW parking assist systems

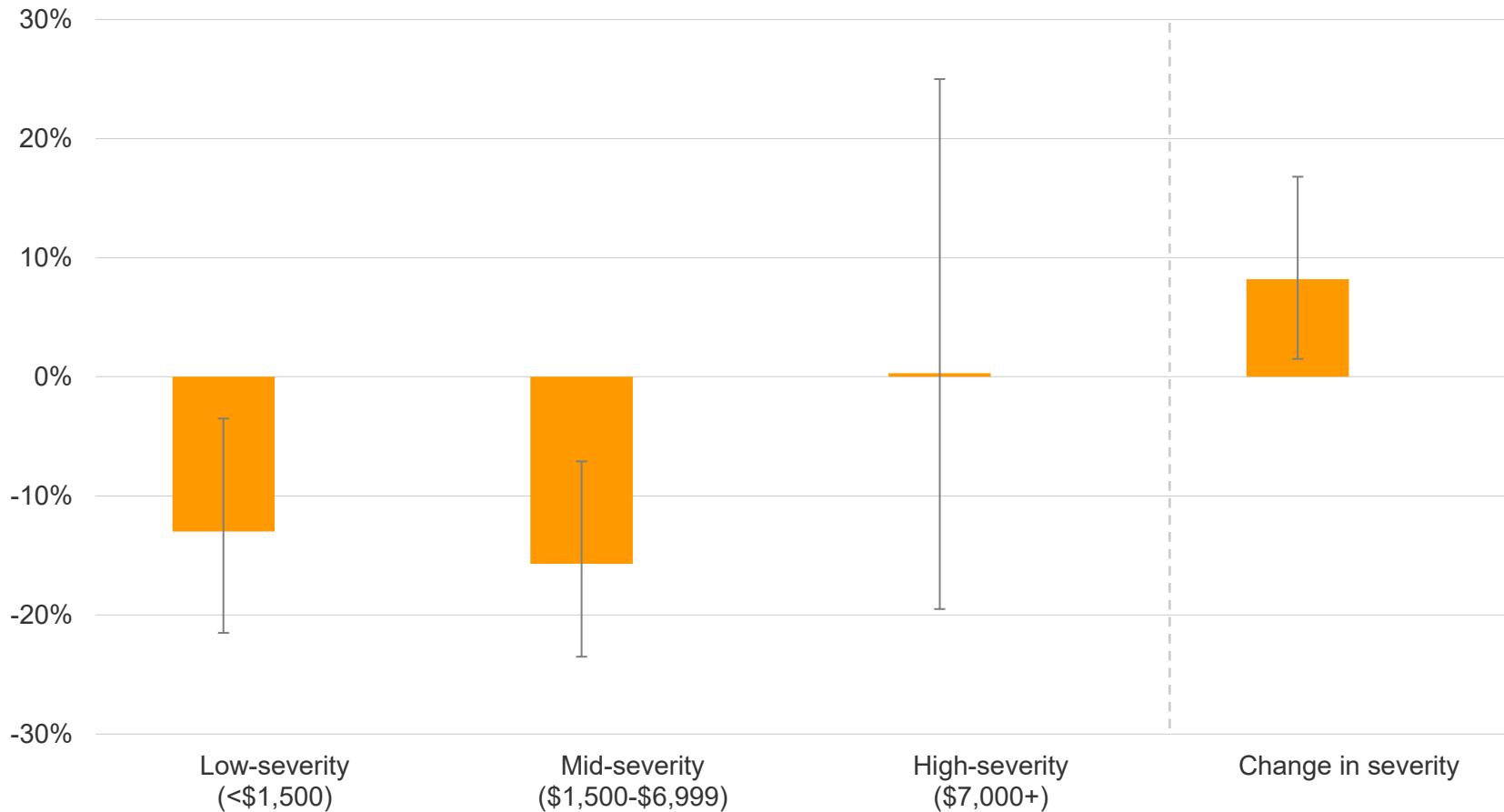


# Operational speed ranges of front crash prevention systems impact on PDL severity



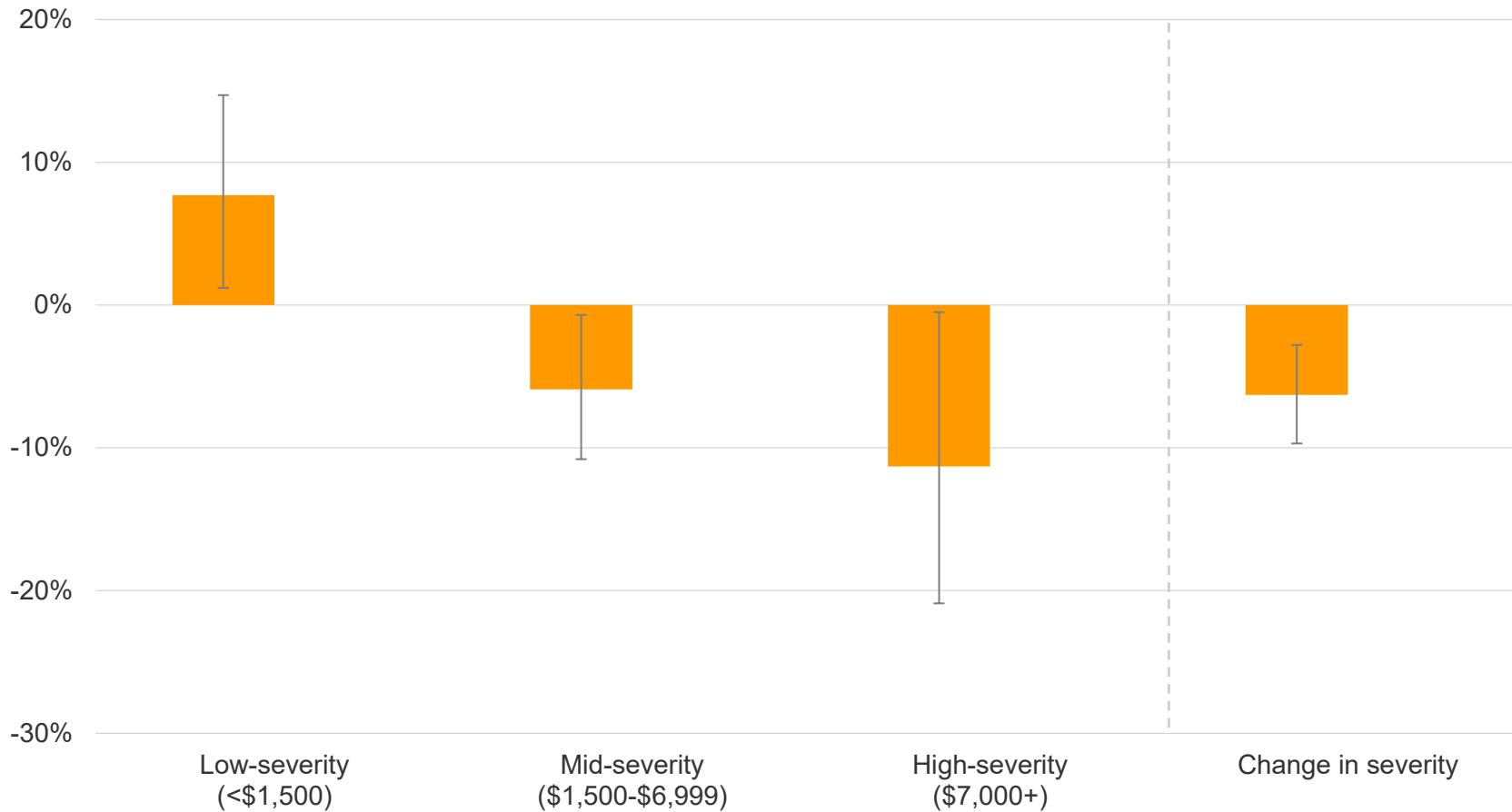
# Changes in PDL claim frequency by claim size

## Mazda's Smart City Brake Support (speeds 2-18 mph)



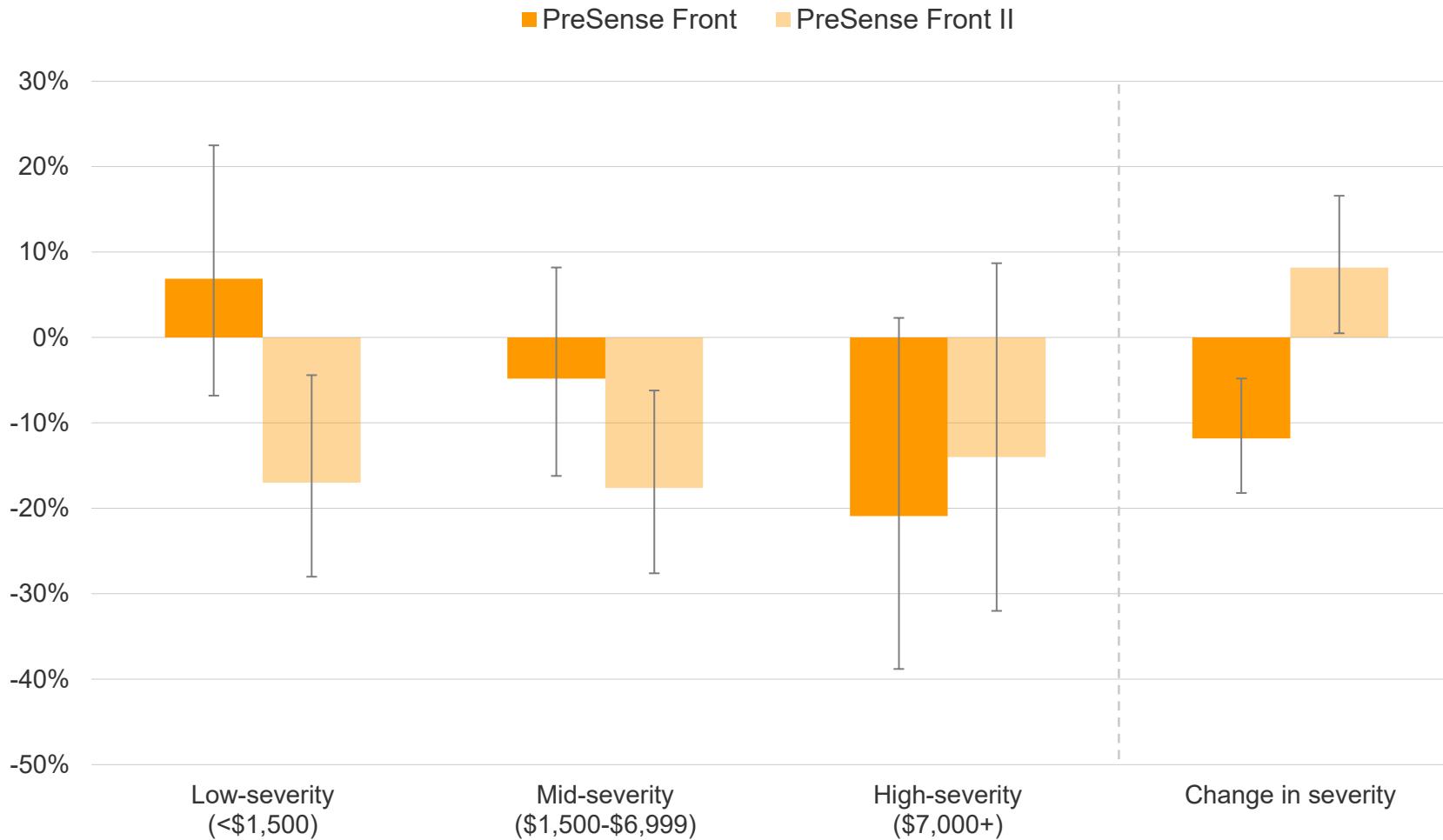
# Change in PDL claim frequency by claim size

General Motors Forward Collision Alert with Lane Departure warning (speeds >25 mph)



# Changes in PDL claim frequency by claim size

Audi's PreSense Front (speeds >19 mph) and PreSense Front II (all speeds)



# Evolution of AEB testing



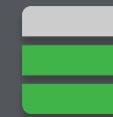
# Original vehicle-to-vehicle front crash prevention tests



**12 mph and 25 mph**



Superior



Advanced



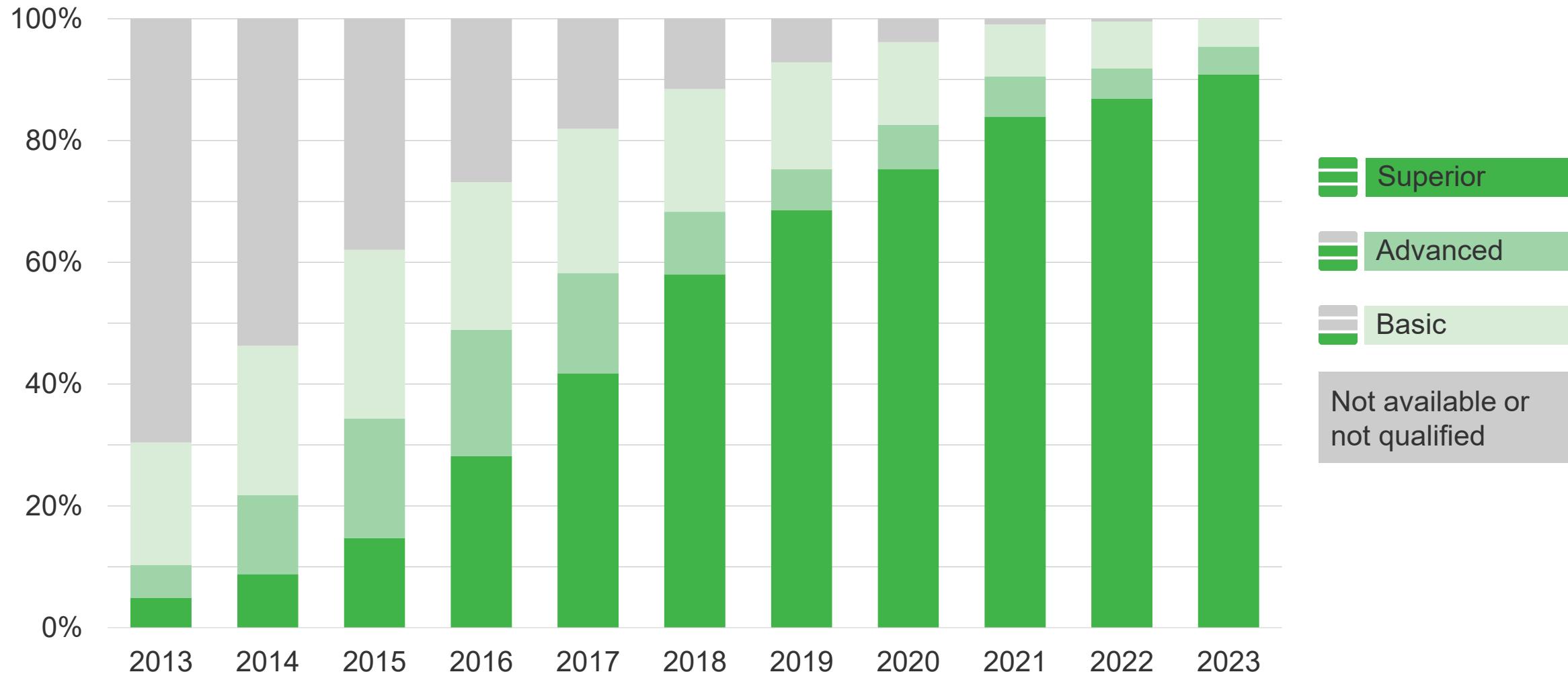
Basic

# Front AEB testing



# Front crash prevention ratings

2013-23 models





## Police-reported rear-end crashes

**59%** occur on **30-45 mph** roads

Medium or heavy trucks struck in  
**32%** of fatal rear-end crashes



Motorcycles struck in  
**11%** of fatal rear-end crashes

# Small SUVs

2023 Chevrolet Equinox



2023 Ford Escape



2023 Honda CR-V



Original vehicle-to-vehicle  
front crash prevention rating

2023 Jeep Compass



2023 Mazda CX-5



2023 Volkswagen Taos



2023 Subaru Forester



2023 Toyota RAV4



2023 Volkswagen Taos

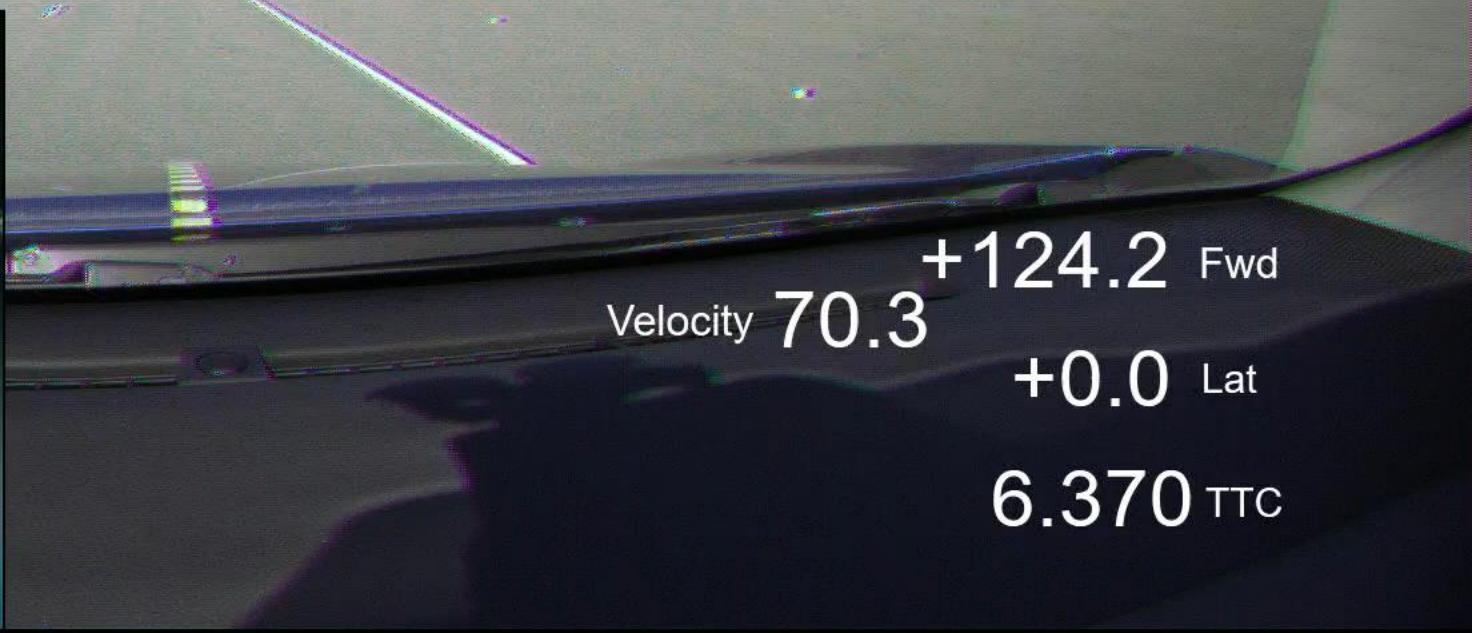


Superior



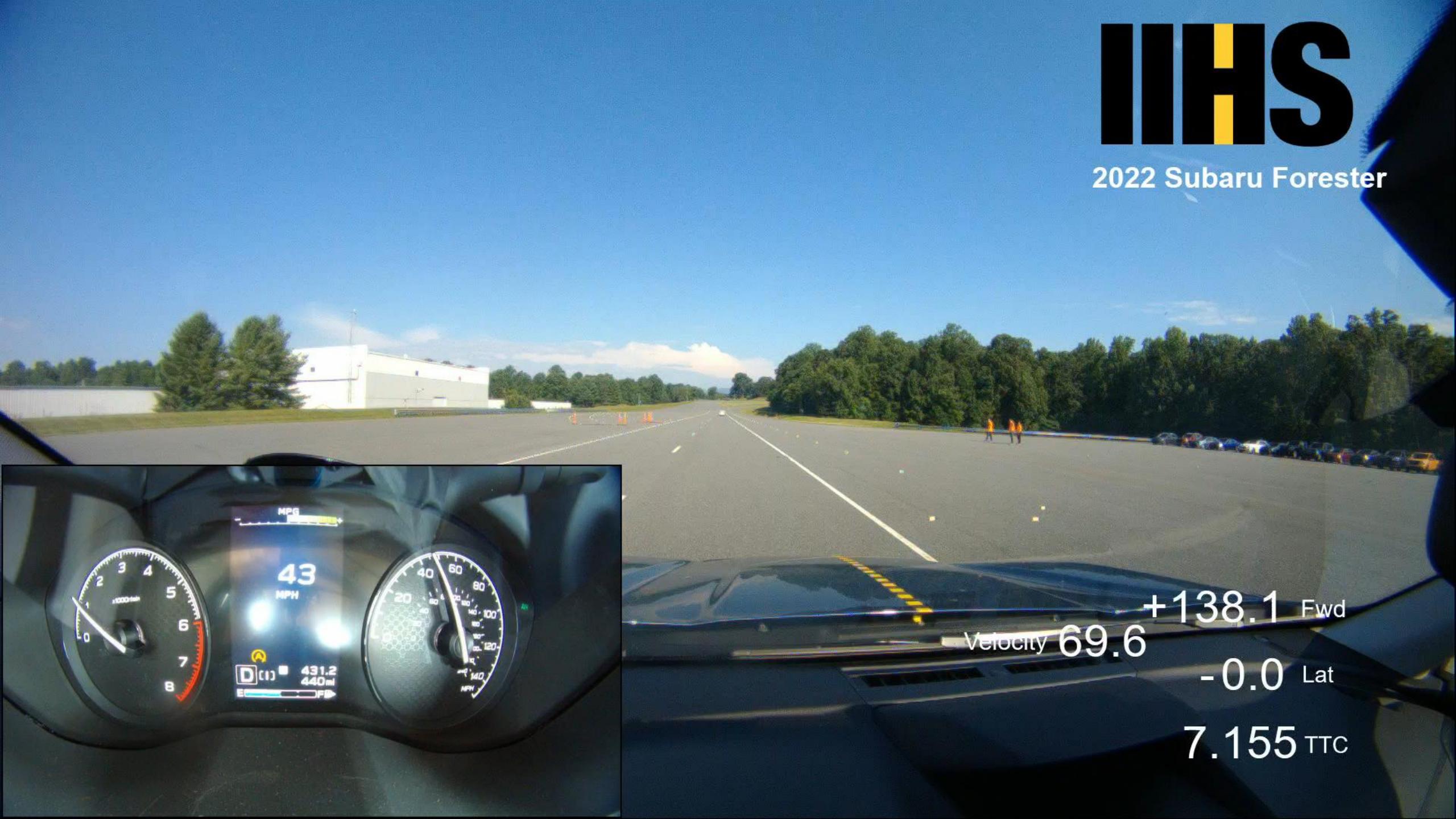


2021 Toyota CH-R



# IIHS

2022 Subaru Forester



# IIHS

2023 Chevrolet Equinox



# IIHS

2023 Hyundai Tucson





P

Chevrolet Equinox



M

Ford Escape



A

Honda CR-V



M

Hyundai Tucson



M

Jeep Compass

## Ratings for small SUVs

G

Good

A

Acceptable

M

Marginal

P

Poor



P

Mazda CX-5



P

Mitsubishi Outlander



G

Subaru Forester



A

Toyota RAV4



P

Volkswagen Taos

# IIHS

2022 Subaru Forester



# Effectiveness of front crash prevention systems on large trucks



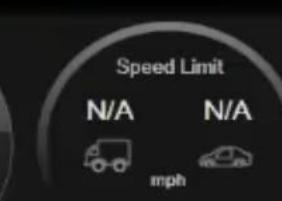




BRAKE OFF  
ABS OFF  
ATC OFF  
CRUISE CONTROL ON  
DRIVER SEAT BELT N/A



THROTTLE 100%  
ENG LOAD 58%  
PTO N/A  
ENGINE N/A  
ENG RETARDER N/A



FORWARD /  
BACKWARD  
0.01  
SIDE TO SIDE  
0.00

2:39:31.00 PM



MAP

CHART

SELECT ANY 2 OPTIONS ▾



FOLLOWING TIME (SD)

FOLLOWING TIME (ECM)

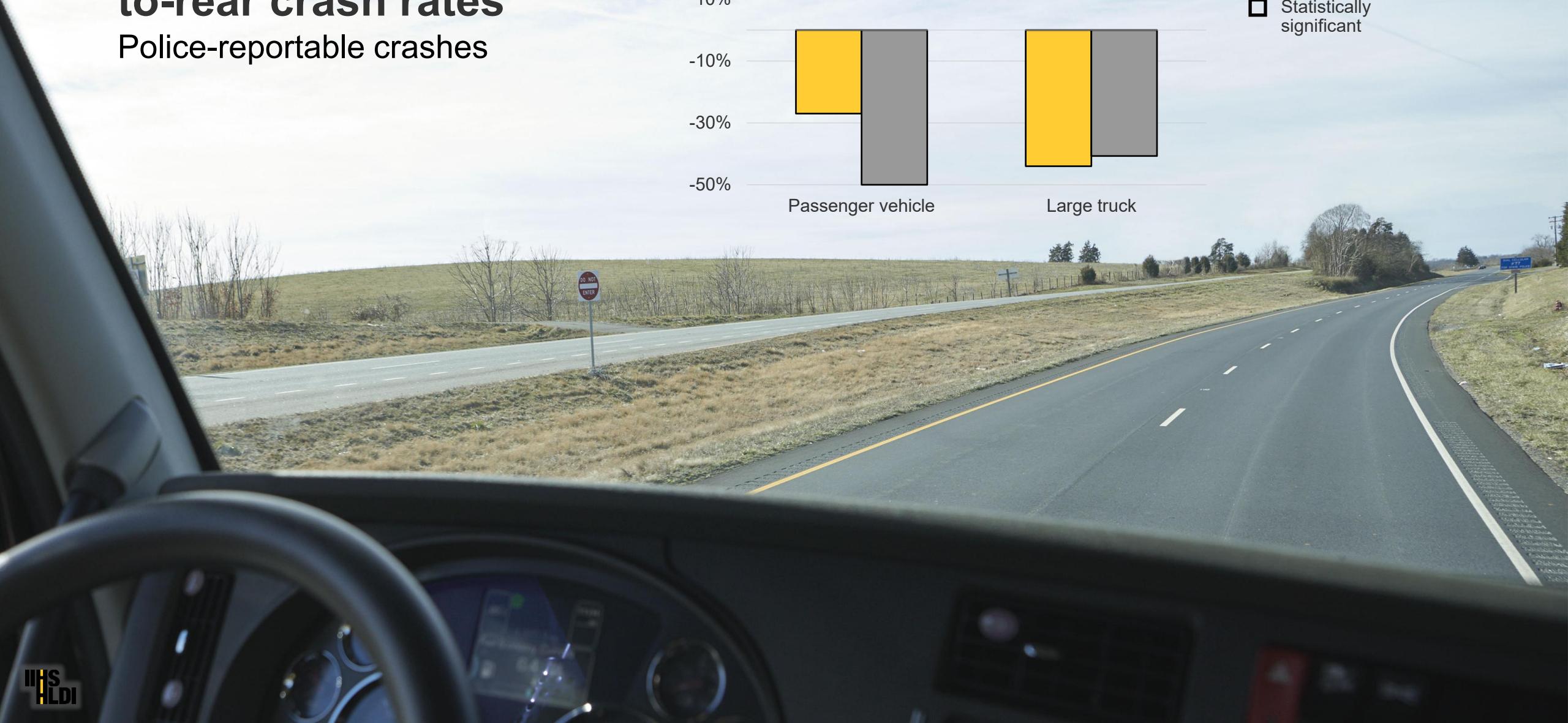
TIME TO COLLISION

FORWARD / BACKWARD

SIDE TO SIDE

# Effects on front-to-rear crash rates

## Police-reportable crashes

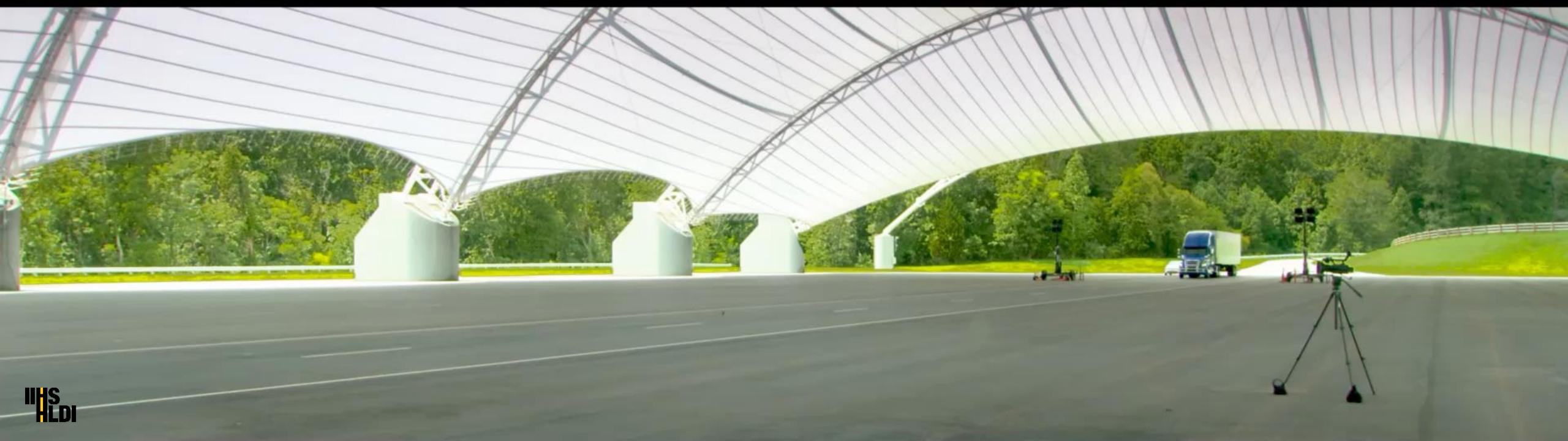
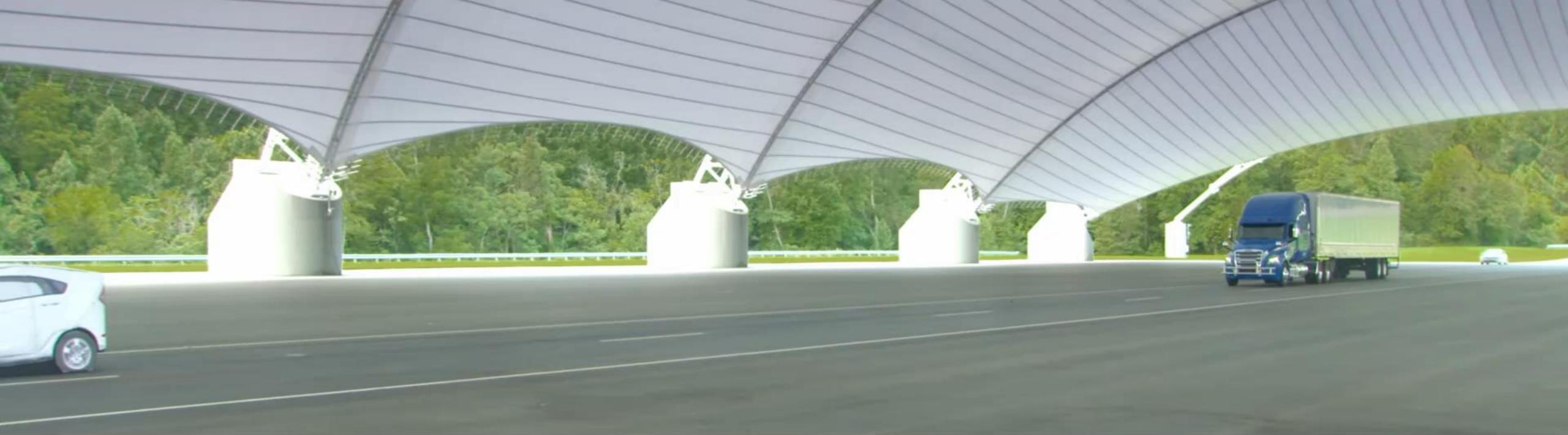


# Large truck AEB testing

30 mph into stationary target

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August 2020



# Partial driving automation







Does your  
vehicle have  
partial driving  
automation?



# Does your vehicle have partial driving automation?

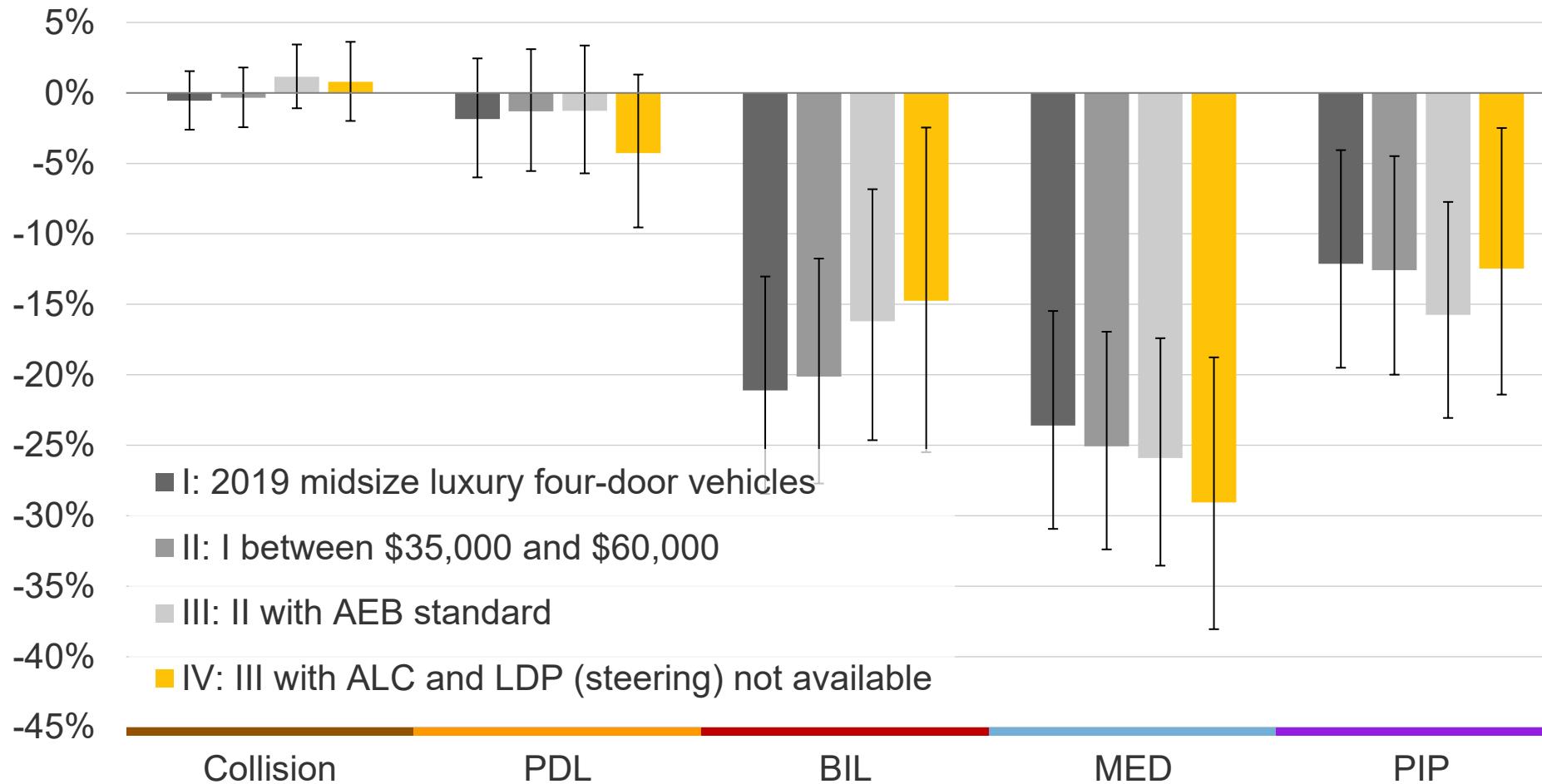
- ▶ A. Yes
- ▶ B. No
- ▶ C. I don't know

# Partial automation loss results



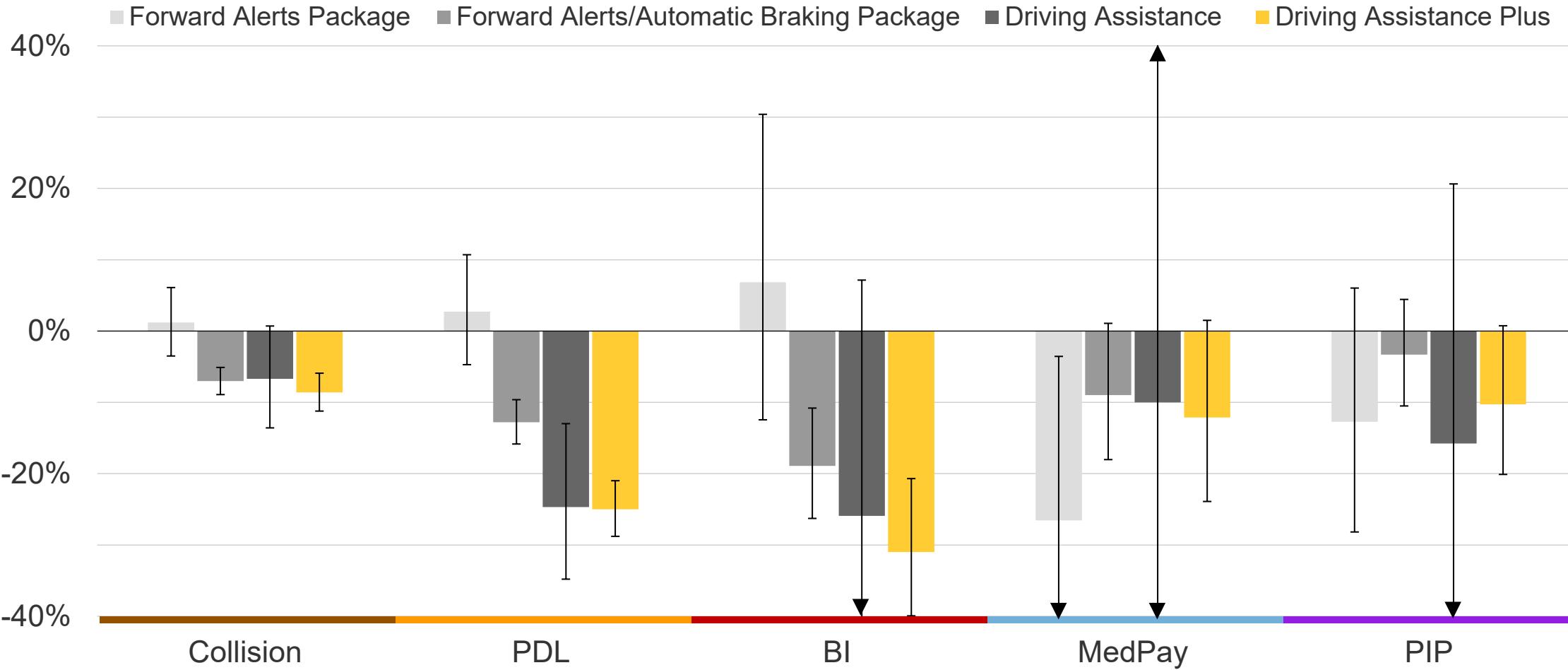
# Estimated differences in claim frequency

2019 Tesla Model 3 vs. different control groups, data since 4/11/2019



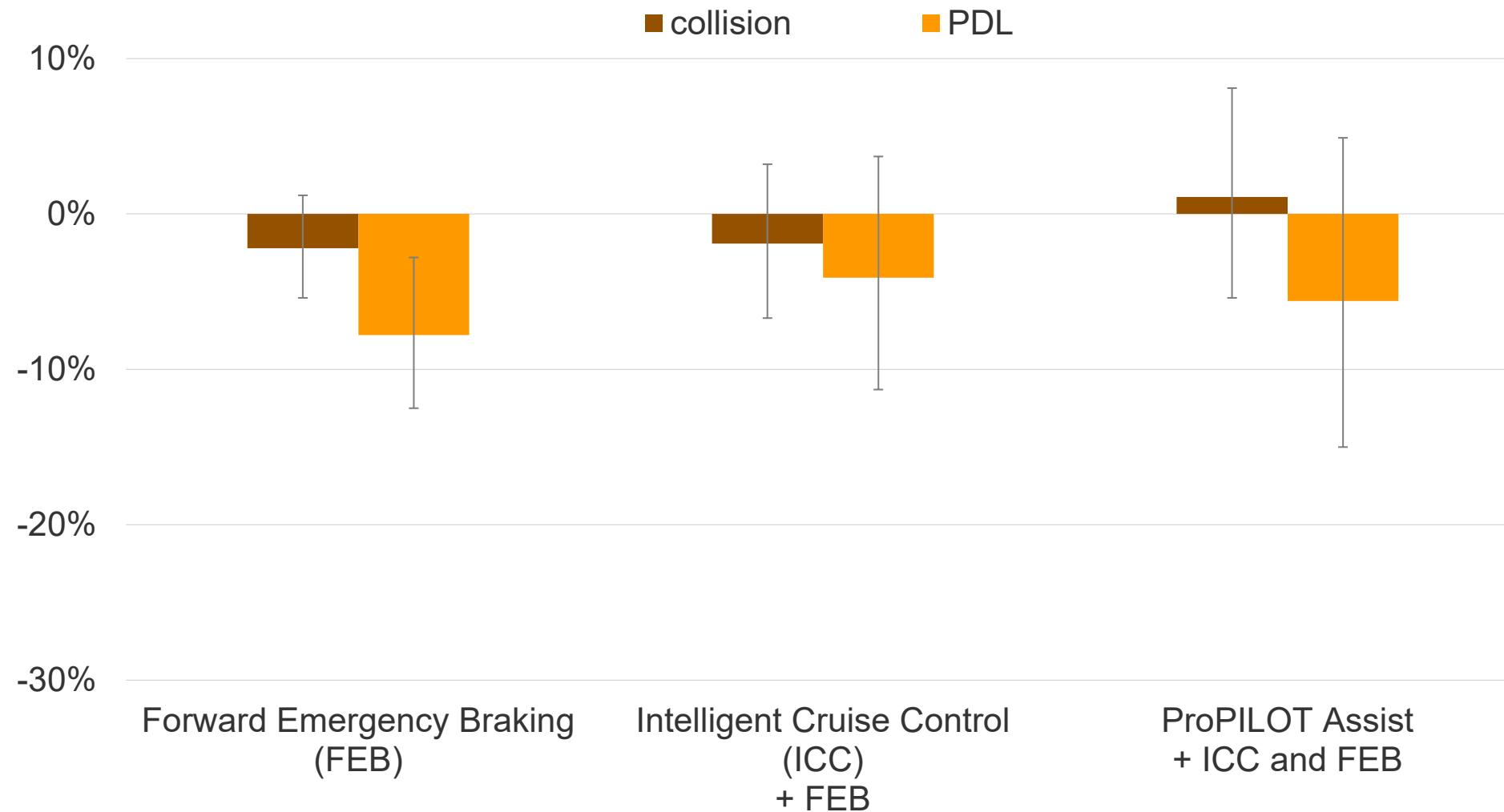
# Changes in claim frequency with BMW front crash prevention

December 2021 analysis of model years 2013-17



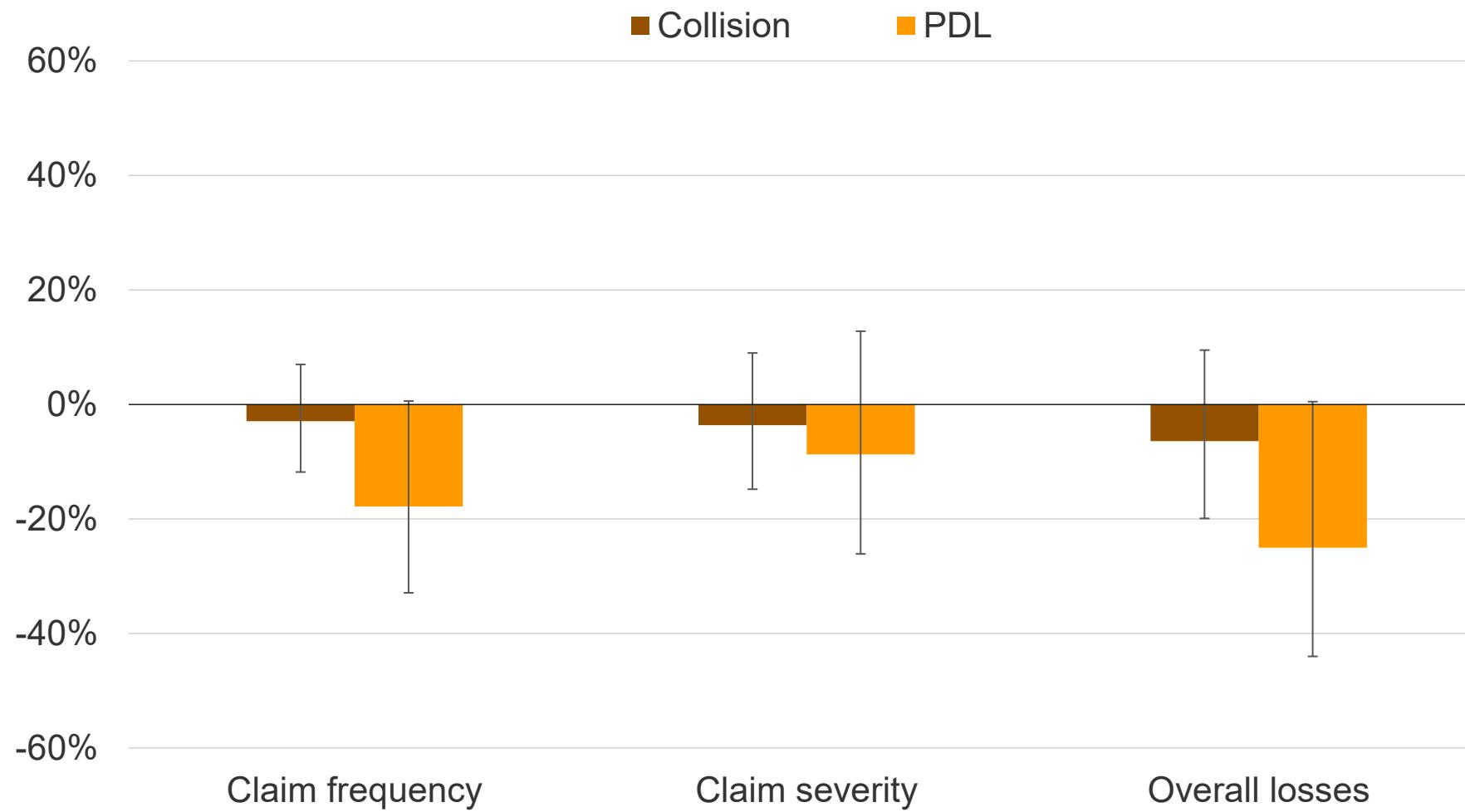
# Changes in frequency with Nissan front crash prevention system

April 2021 analysis of 2017-19 Nissan Rogue



# 2018-20 Cadillac CT6 Super Cruise bundle changes in loss results

Through calendar year 2021





iSpot.tv



00:00



00:00

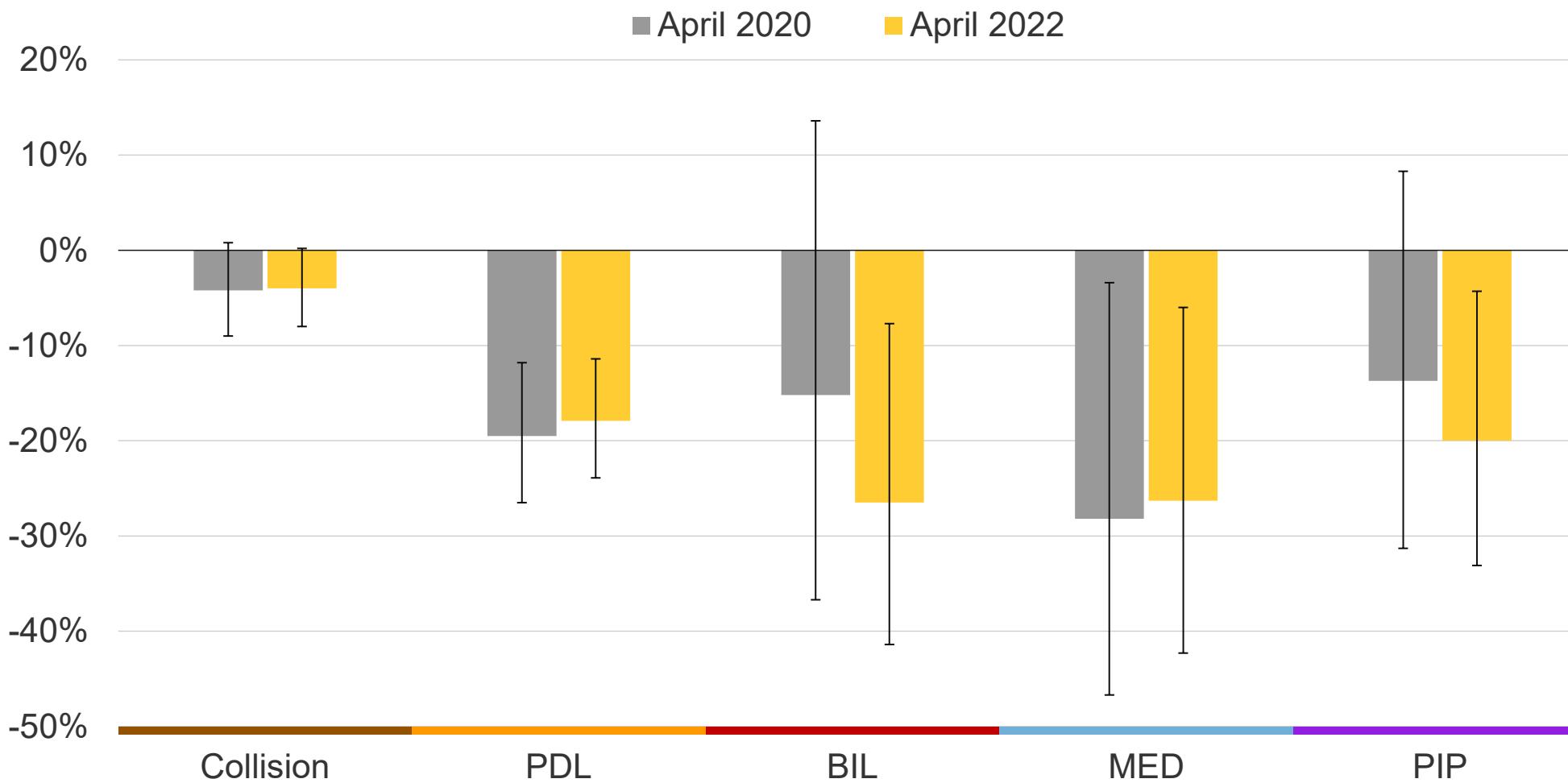


# Super Cruise retention rate

- ▶ \$2,200-\$2,500 optional feature
- ▶ 3-year trial
- ▶ \$25 per month or \$250 per year
- ▶ 20% of 18,000 subscribed after 3-year trial in 2024
- ▶ GM predicts \$2 billion annual revenue within 5 years

# Changes in claim frequency with Audi Traffic Jam Assist

## Analysis of 2017 Q7 and A4

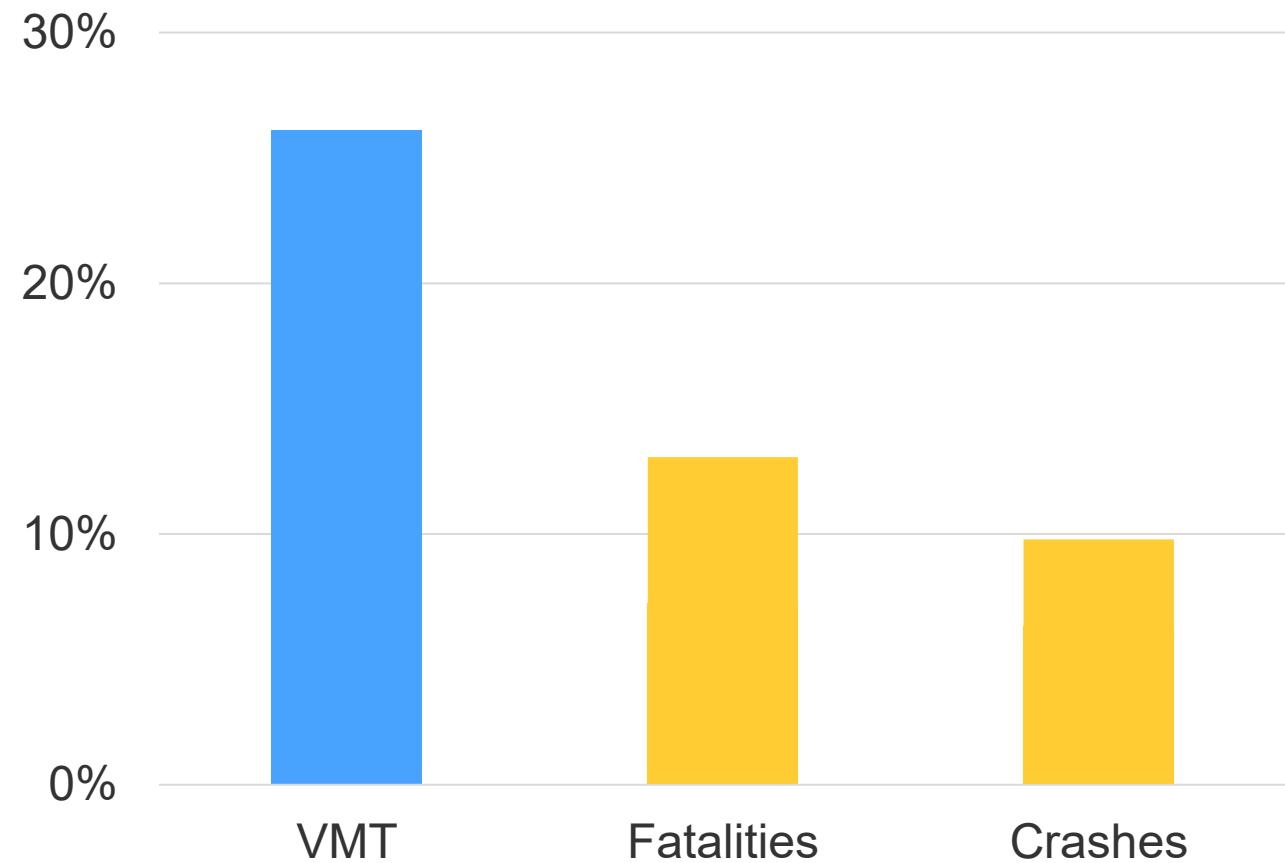


# Partial automation effects in police-reported crashes

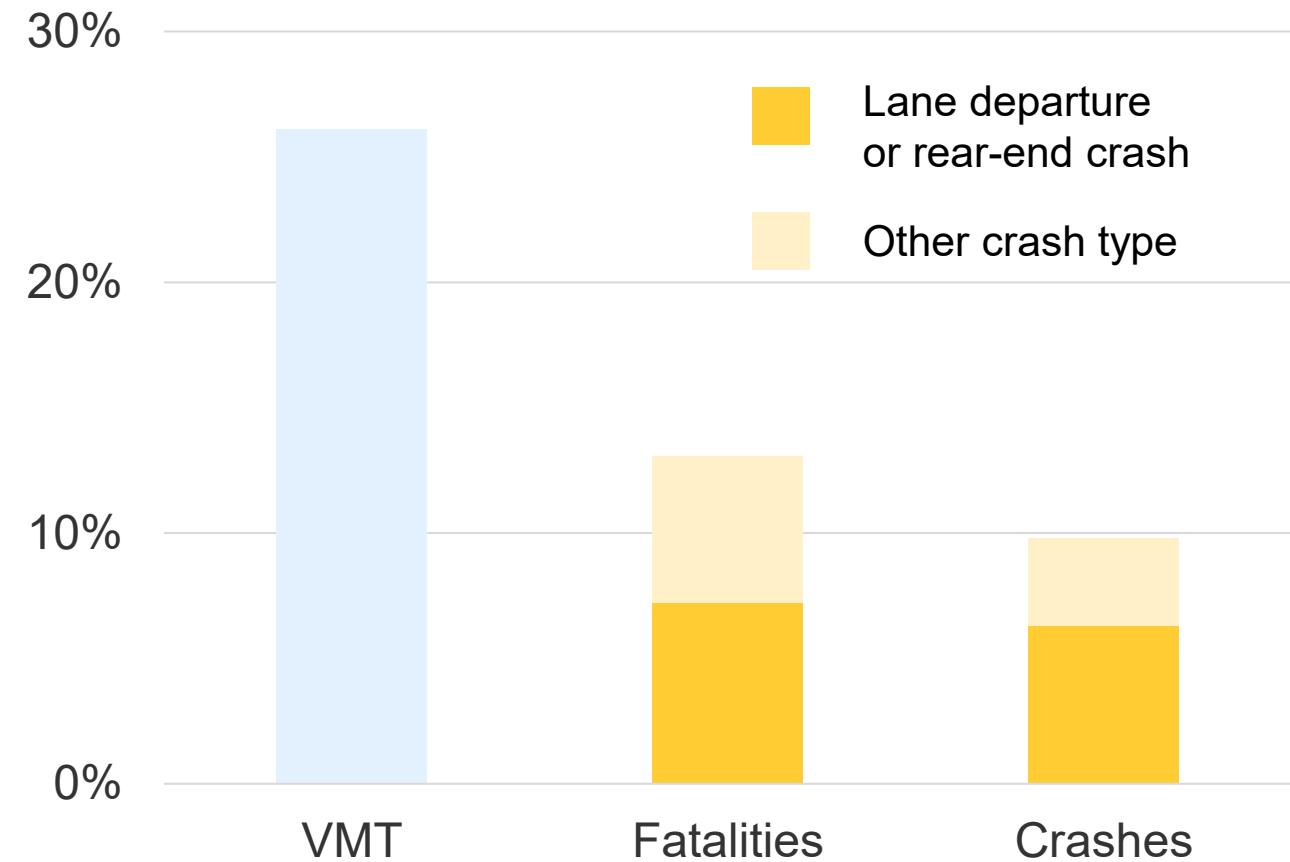


Interstate highways  
are among the  
safest roads

## Percent of miles traveled, fatalities, and crashes on interstates, 2022



## Percent of miles traveled, fatalities, and crashes on interstates, 2022



Only 7% of fatalities and 6% of crashes were addressable by partial driving automation systems limited to interstates

# Examined crash effects on limited-access highways



# Examined crash effects on limited-access highways

and roads with speed limits  $\leq 56$  kph



Examined  
lane departure crashes

and rear-end crashes



# Lane departure crash rate reductions for Nissan vehicles with partial driving automation

Statistically significant

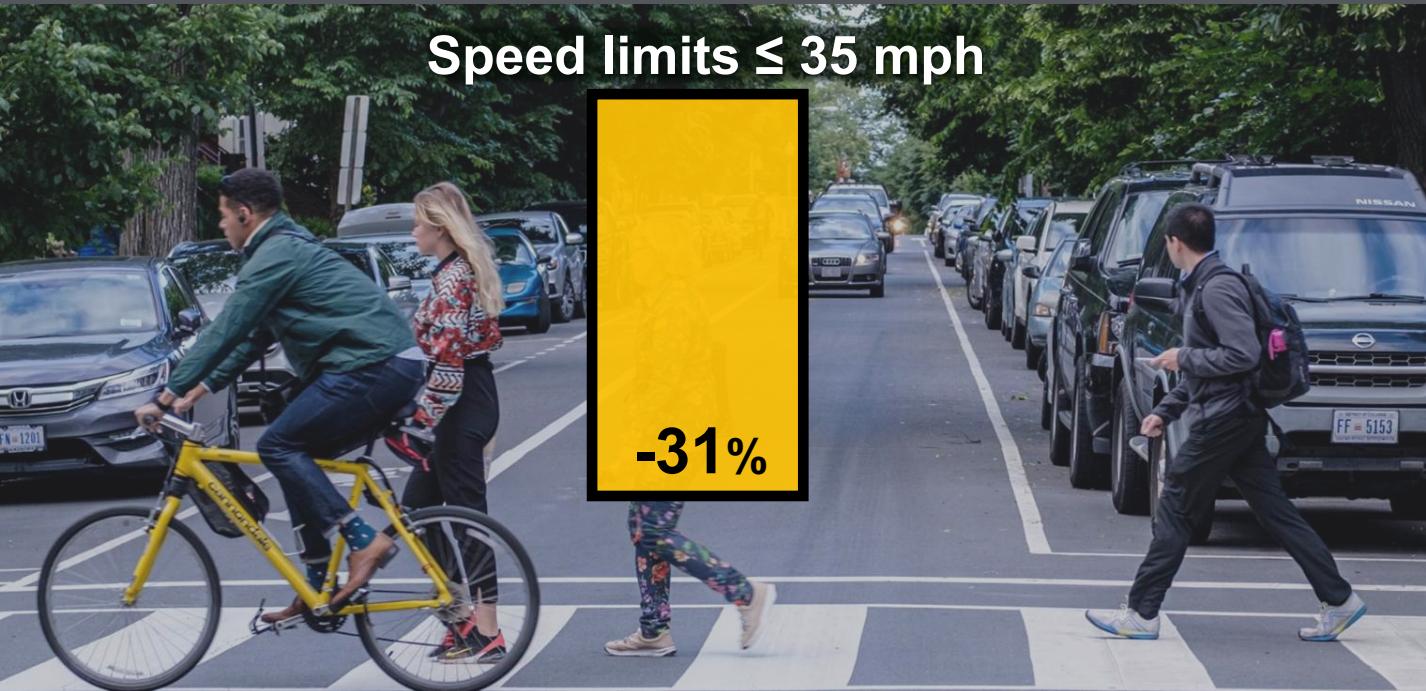
Limited-access highways

-25%



Speed limits  $\leq$  35 mph

-31%



**GOOD**



Deer targets at 200 feet

**POOR**



Headlights on the Rogue were rated

**A**

Acceptable or

**P**

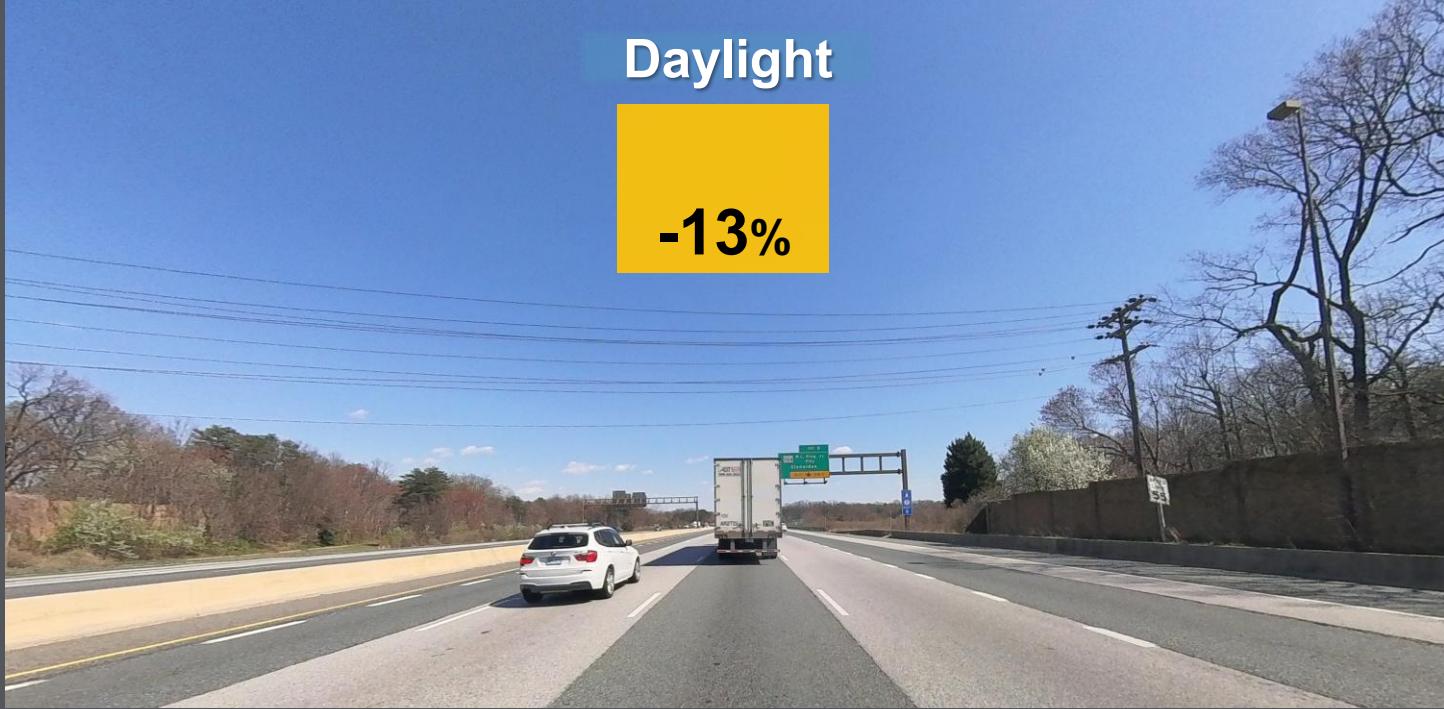
Poor

# Lane departure crash rate reductions for Nissan vehicles with **partial driving automation** on limited-access highways

- ☐ Statistically significant

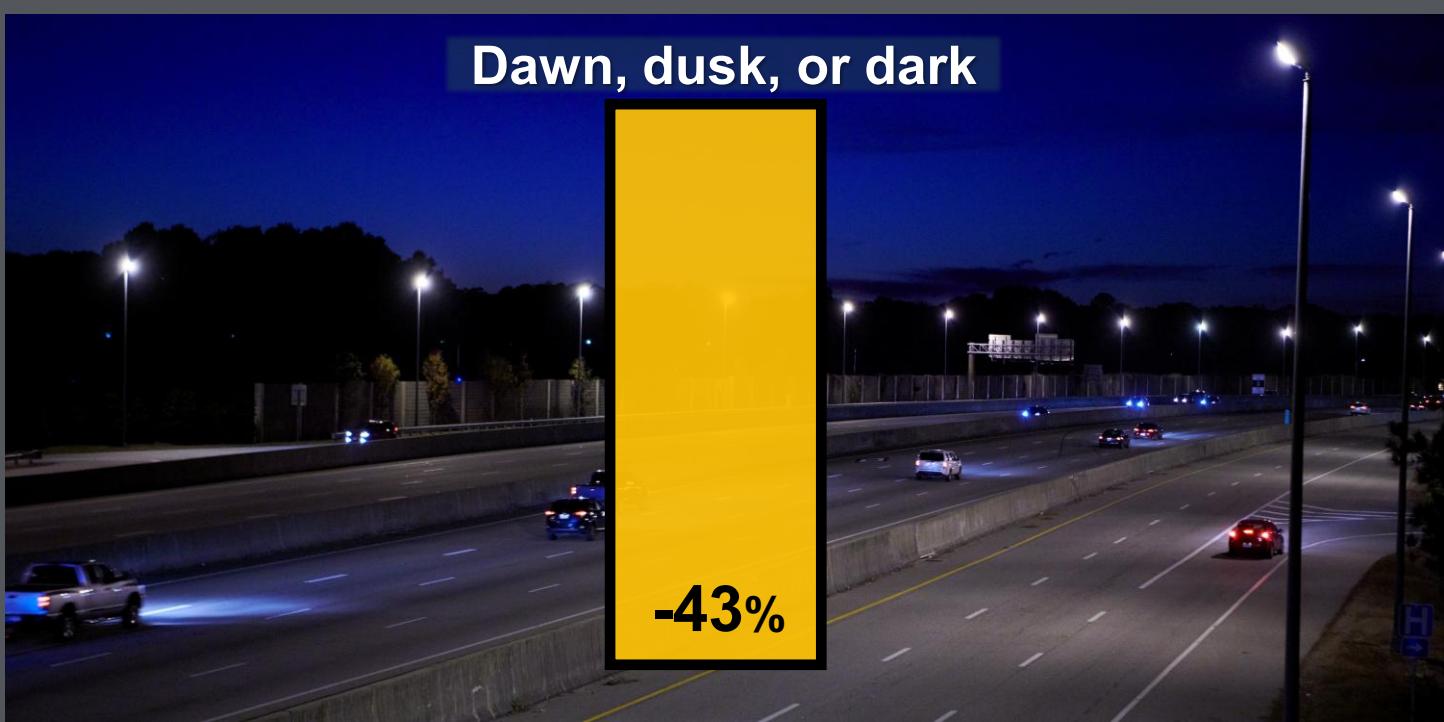
Daylight

-13%



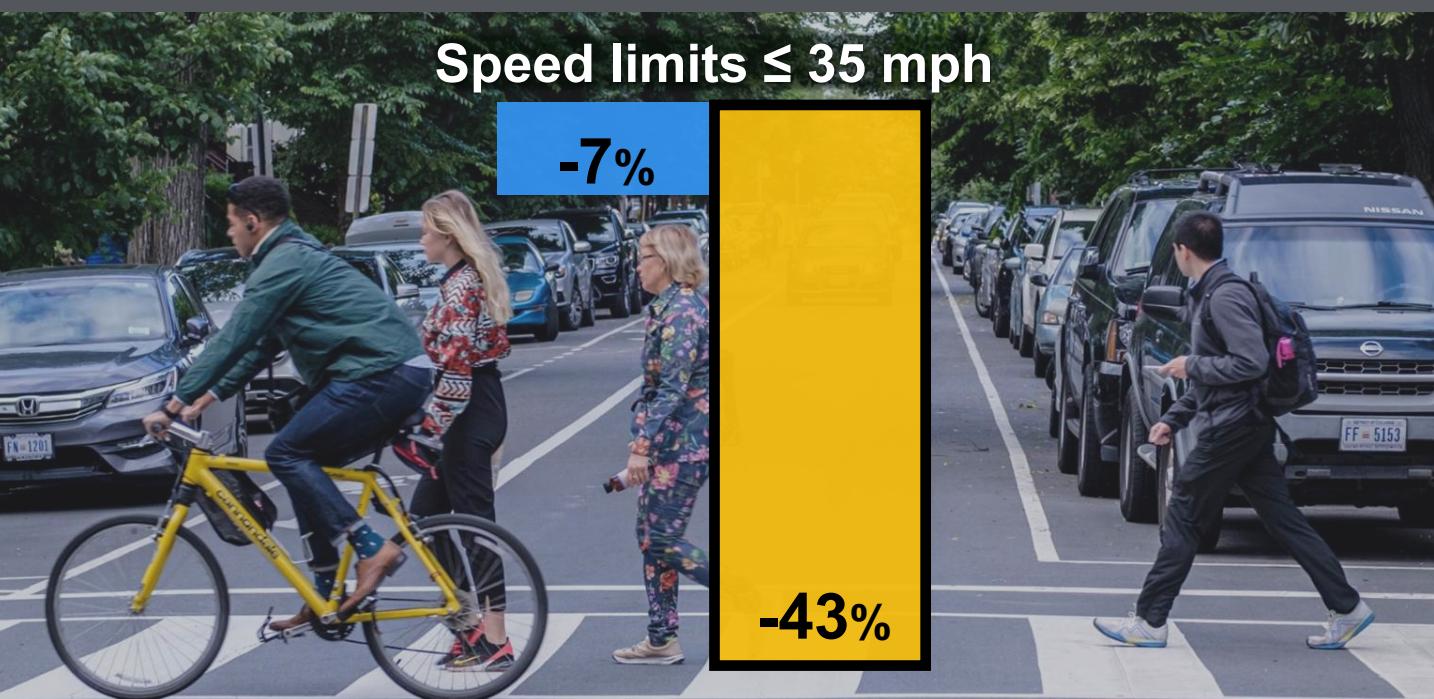
Dawn, dusk, or dark

-43%



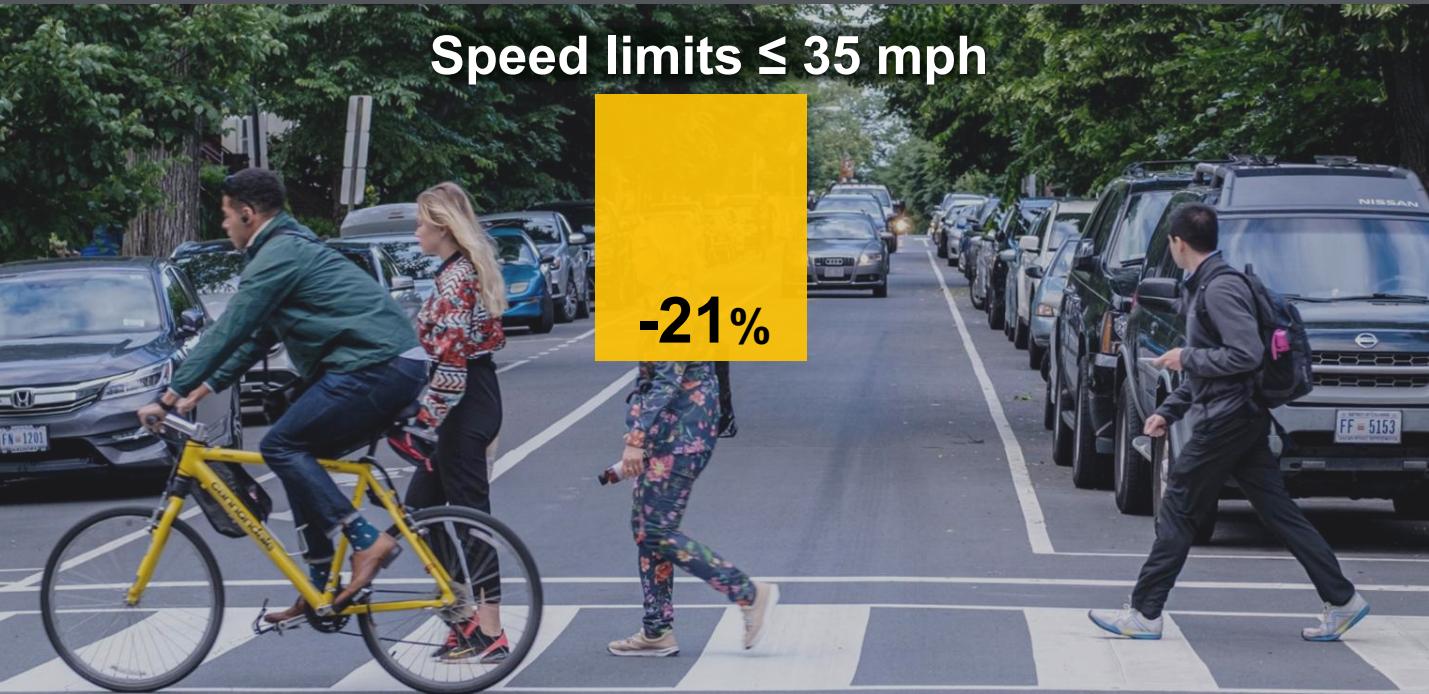
# Rear-end crash rate reductions for Nissan vehicles with **adaptive cruise control** and **partial driving automation**

- Statistically significant



# Lane departure crash rate reductions for BMW vehicles with partial driving automation

- Statistically significant



# AEB was more capable on BMW models when paired with ACC

**Without ACC**  
Radar system  
Operated up to 35 mph

**With ACC**  
Fusion system  
Operated at full speed range

Advanced

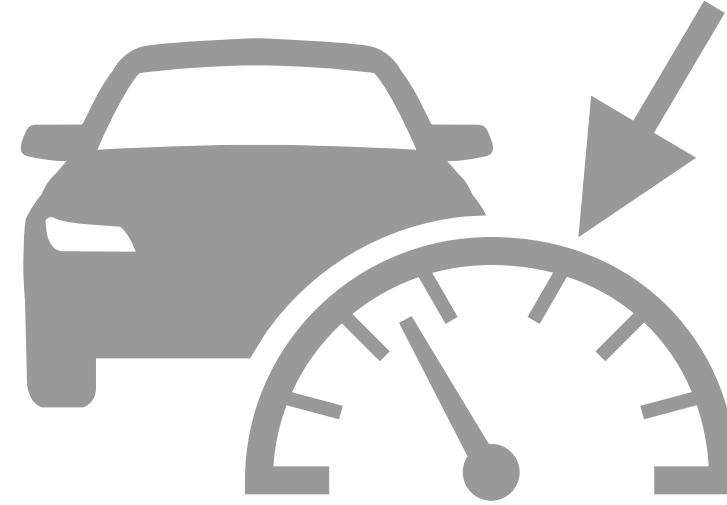


Superior



# Partial driving automation

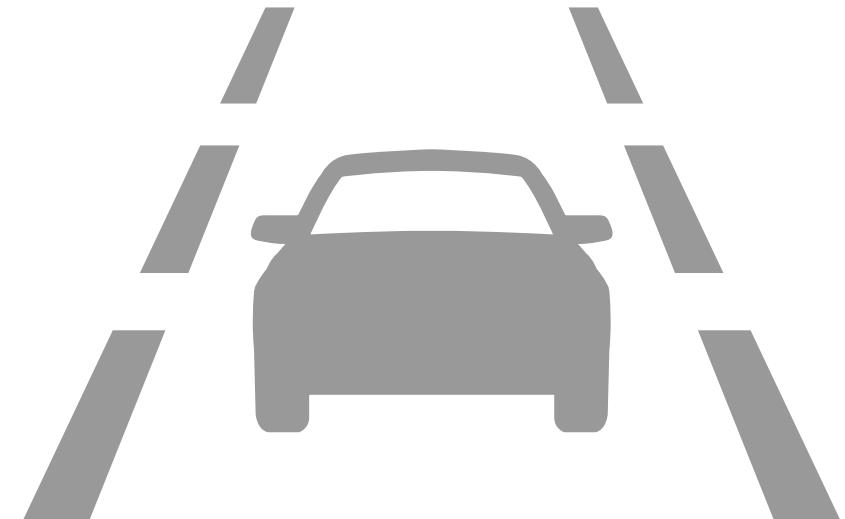
is a  
convenience feature



Adaptive Cruise Control



Lane following



# Automation information



# Mercedes-Benz Drive Pilot



## DRIVE PILOT

Our insatiable desire for pioneering new technology is ever-present in DRIVE PILOT by Mercedes-Benz, the first conditionally automated driving system that operates in real-life driving conditions.





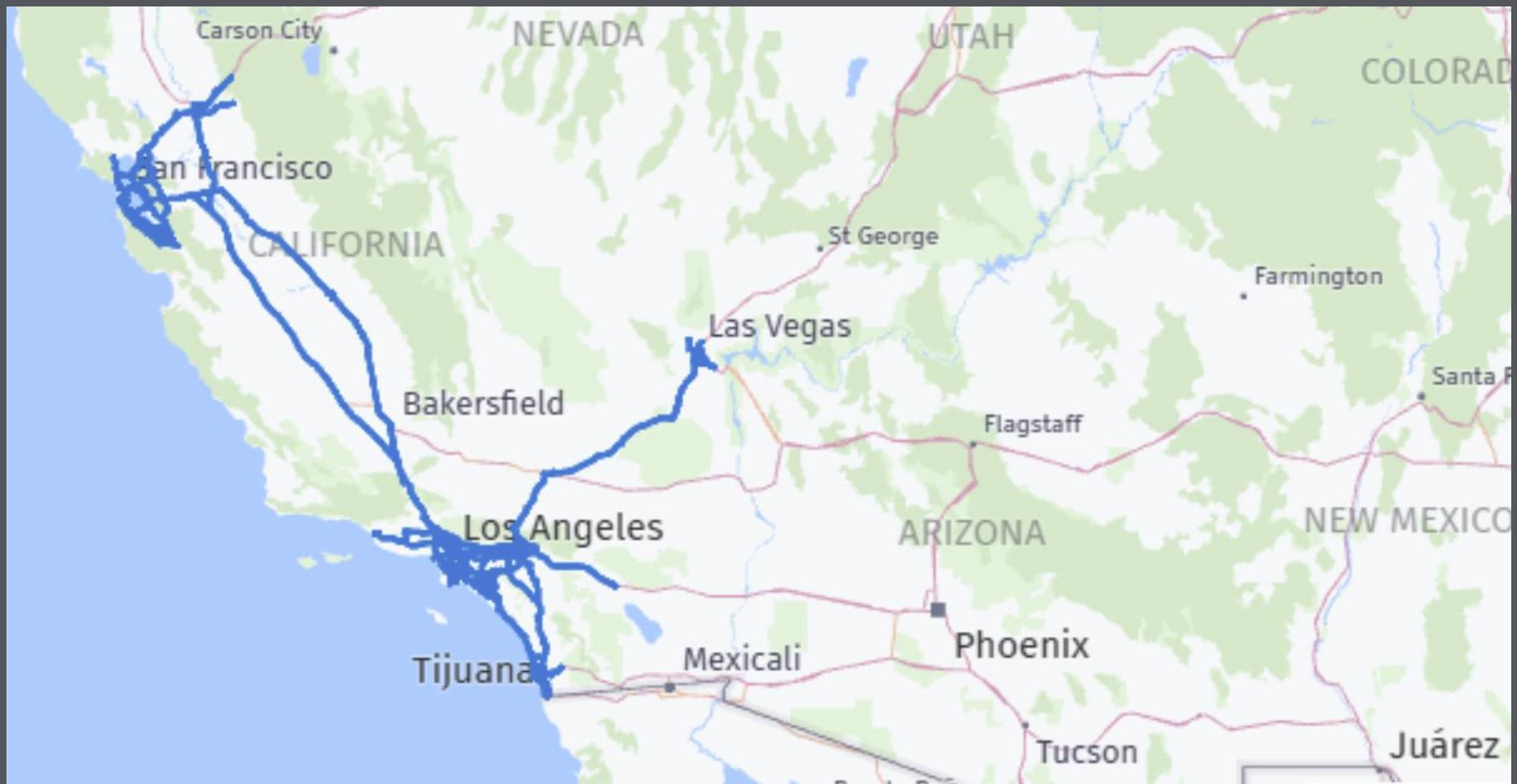
DrivePilot is the next groundbreaking  
innovation for Mercedes-Benz

# Mercedes-Benz Drive Pilot



# Mercedes-Benz Drive Pilot

## Certified roadways



- Operational in moderate to heavy traffic with speeds under 40 mph

# Mercedes-Benz Drive Pilot Costs



**S-class**  
Starting at \$117,750



**EQS**  
Starting at \$104,400

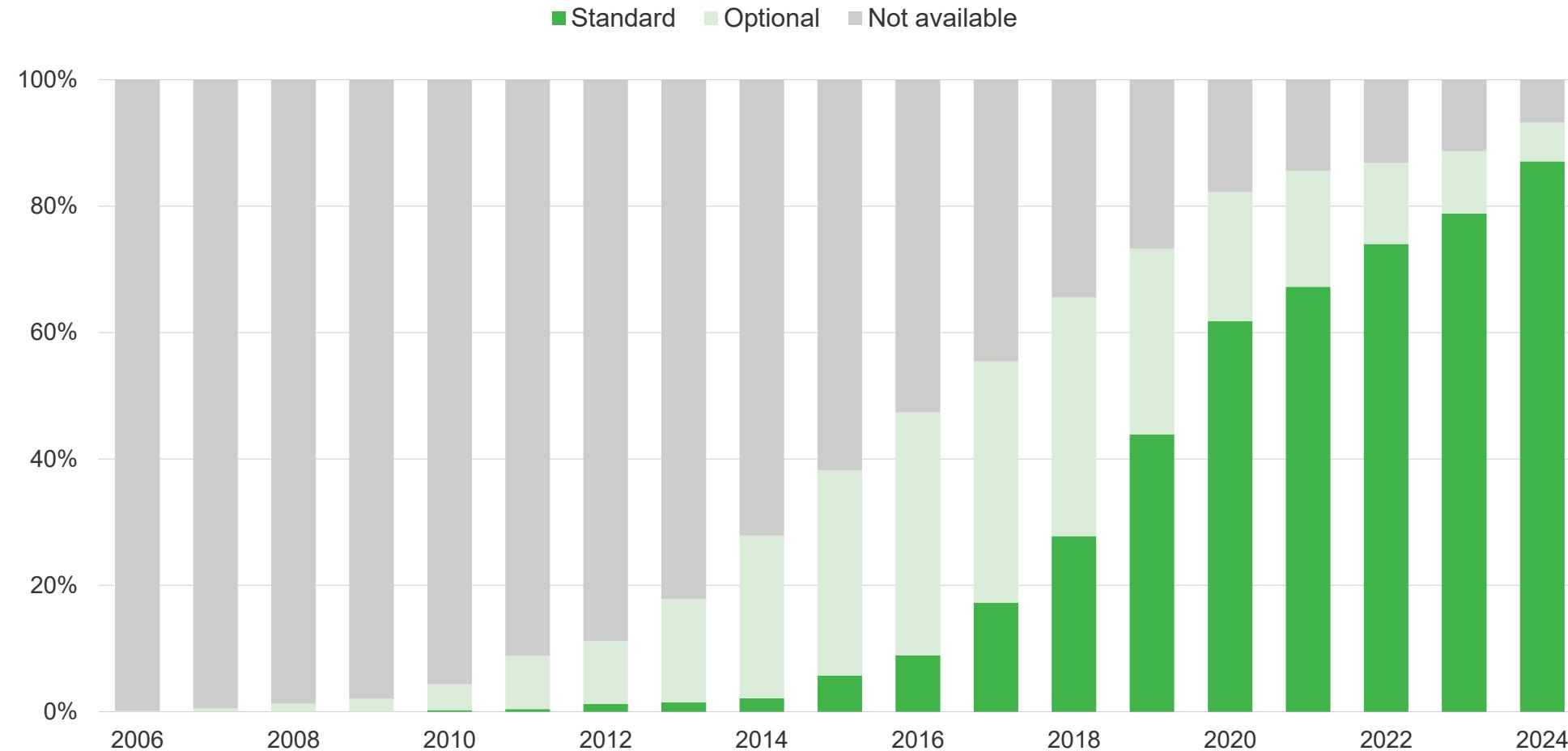
- ▶ Drive Pilot additional subscription cost of \$2,500 per year

# Phase-in of collision avoidance systems



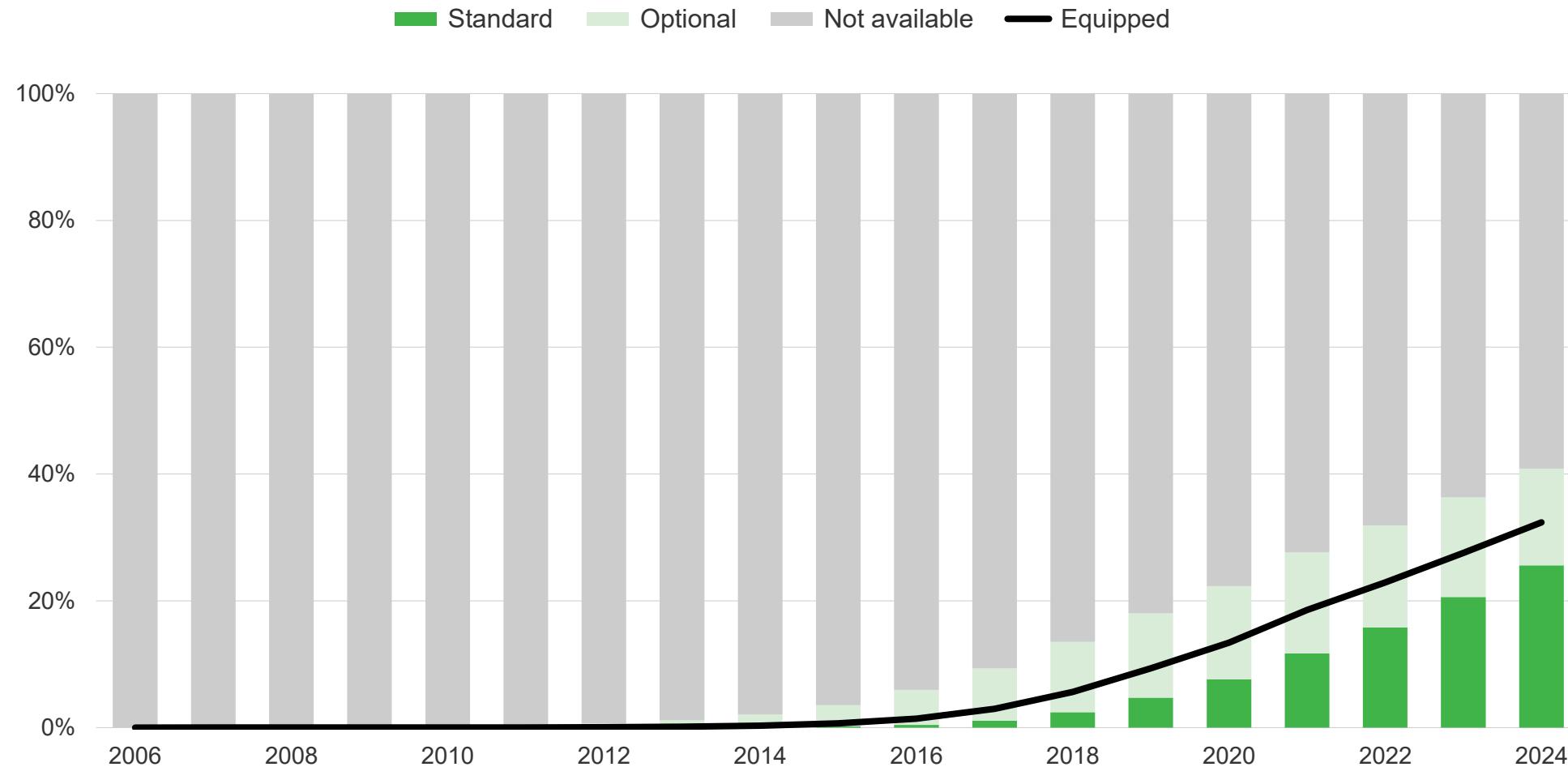
# New vehicle series with front automatic emergency braking

## By model year



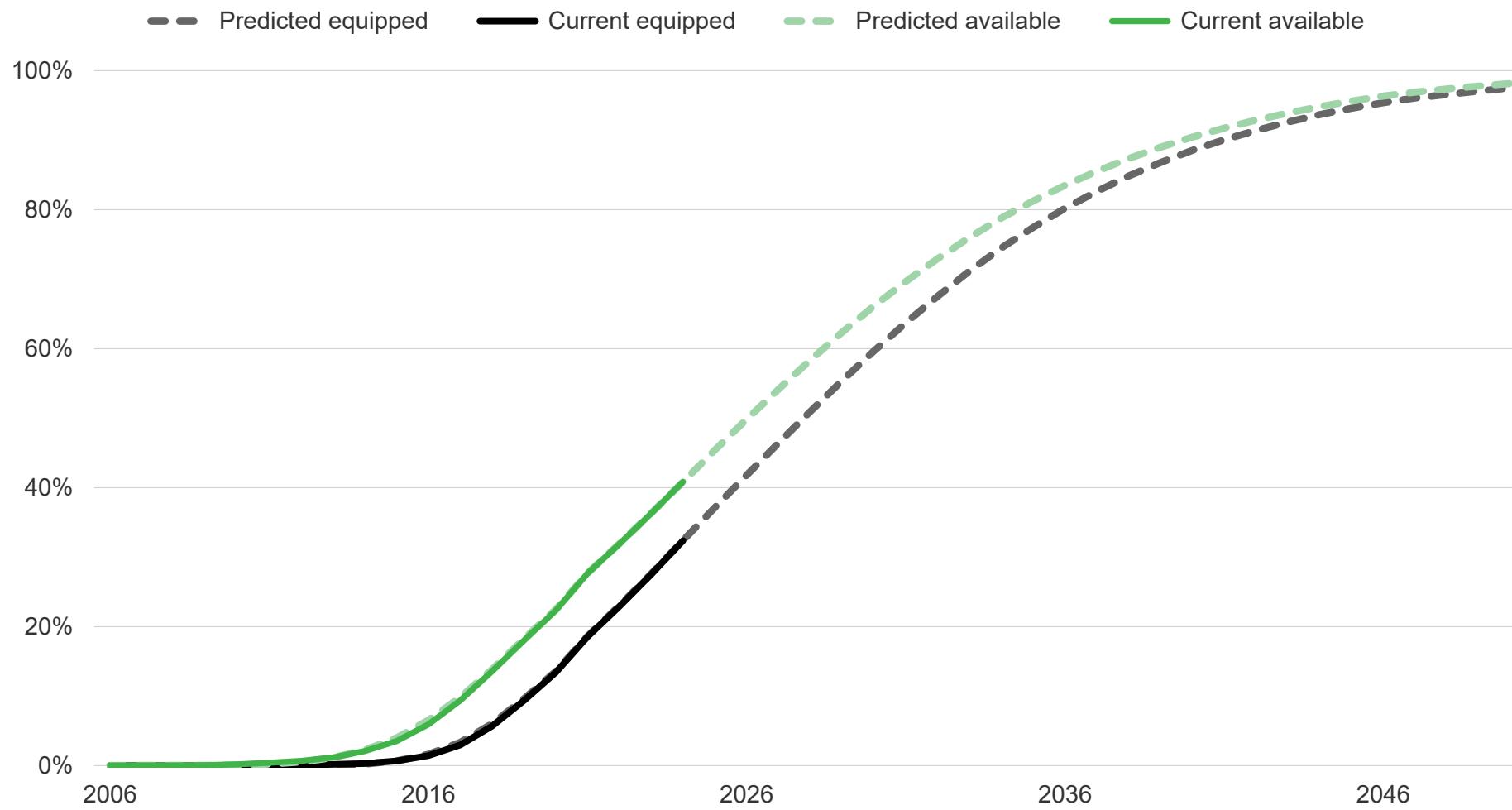
# Registered vehicles with front automatic emergency braking

By calendar year



# Predicted percentage of registered vehicles: front automatic emergency braking

By calendar year



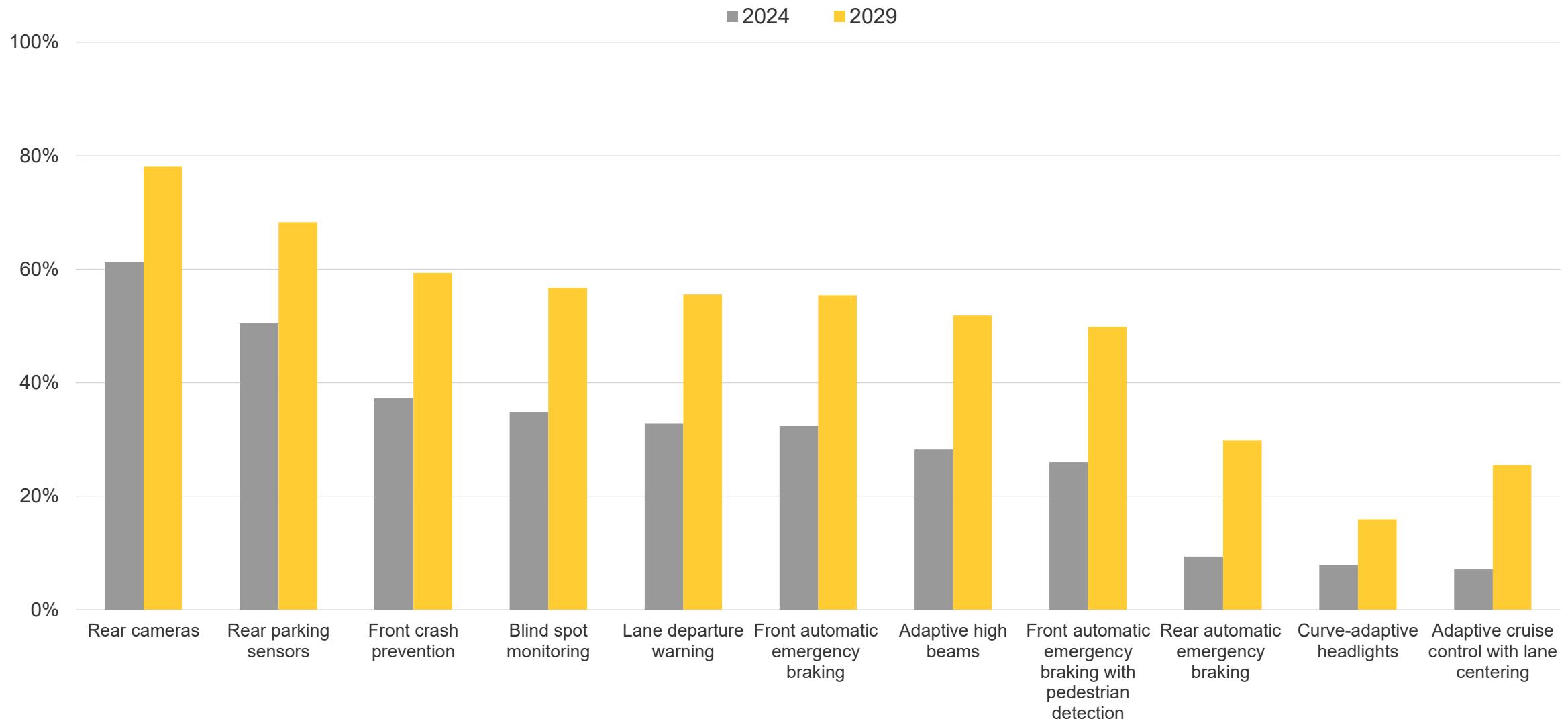
Which ADAS  
feature is most  
prevalent in  
the fleet?

# Which ADAS feature is most prevalent in the fleet?

- ▶ A. Automatic emergency braking
- ▶ B. Adaptive headlights
- ▶ C. Blind spot monitor
- ▶ D. Front AEB
- ▶ E. Front crash prevention
- ▶ F. Lane departure warning
- ▶ G. Rear camera
- ▶ H. Rear parking sensors

# Estimated registered vehicles by feature

Calendar years 2024 and 2029



Insurance Institute for Highway Safety  
Highway Loss Data Institute

[iihs.org](http://iihs.org)



/iihs.org



@IIHS\_autosafety



@iihs\_autosafety



IIHS



/company/iihs-hldi



@iihs\_autosafety

**THANK YOU**



**Kay Wakeman**

Director of Insurance Outreach

[kwakeman@hldi.org](mailto:kwakeman@hldi.org)

