

The evolution of ADAS, automation, and safety

AIRB

January 29, 2026



Kay Wakeman
Director of Insurance Outreach



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.

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and HUDS and HLDI are wholly supported by these Canadian insurance associations

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Auto Club Group
Auto-Owners Insurance
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DTRIC Insurance
Elephant Insurance Company
Encova Insurance
Erie Insurance Group
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Farm Bureau Mutual Insurance Company of Idaho
Farmers Insurance Group
Farmers Mutual of Nebraska
Florida Farm Bureau Insurance Companies
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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
Plymouth Rock Assurance
Plymouth Rock Mutual Insurance Company
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

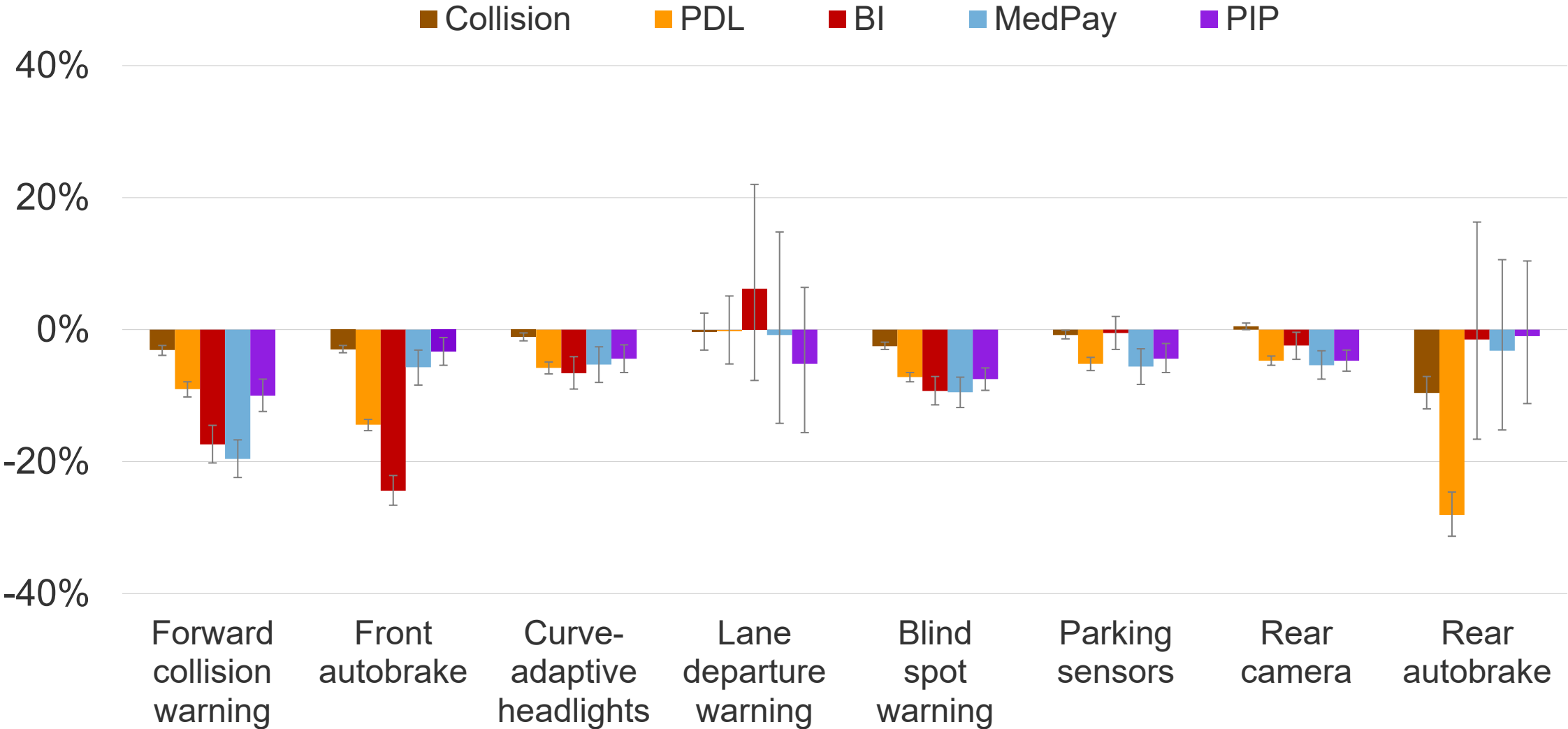
The Wawanesa Mutual Insurance Company

Advanced Driver Assistance Systems – early implementations



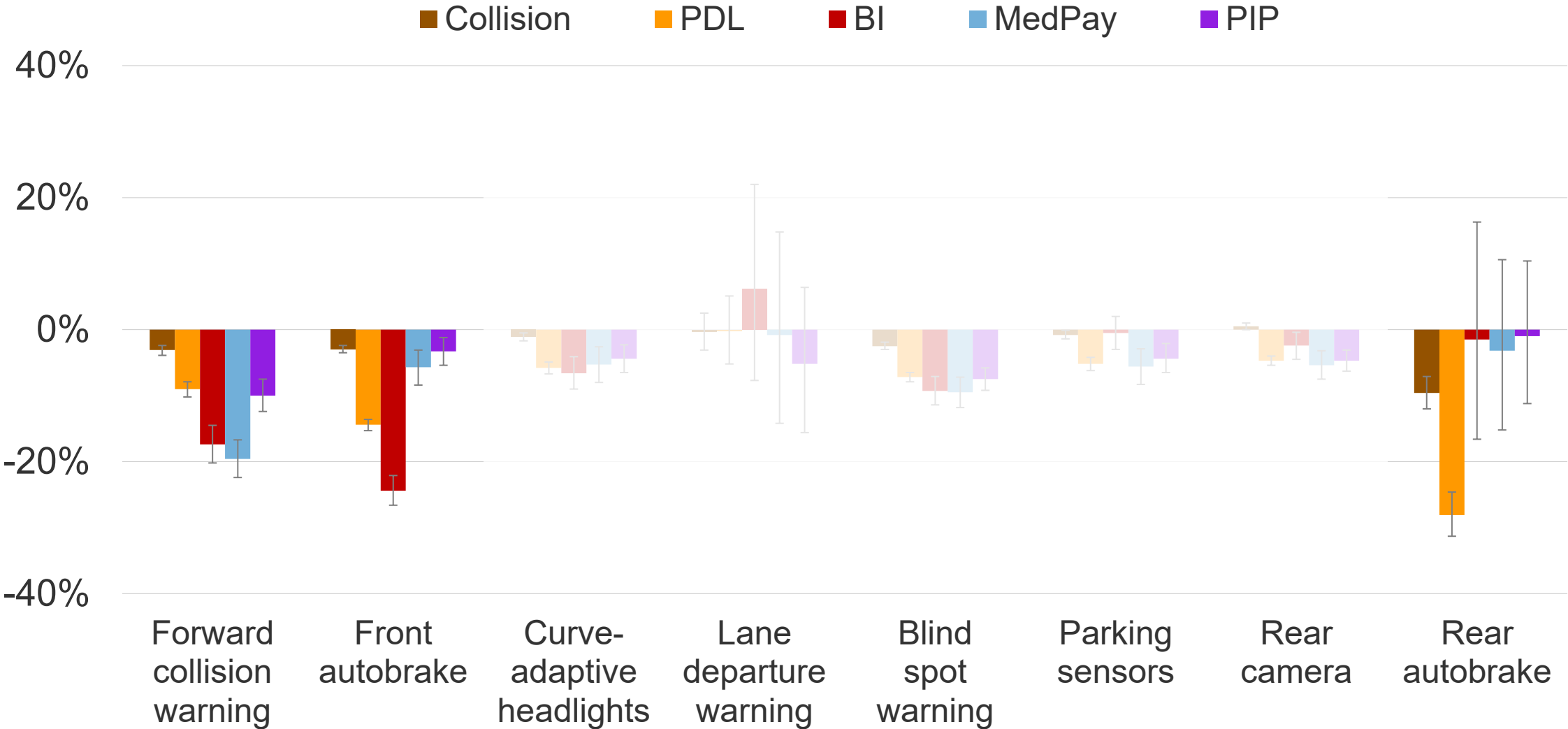
Summary of technology effects on insurance claim frequency

Early implementations



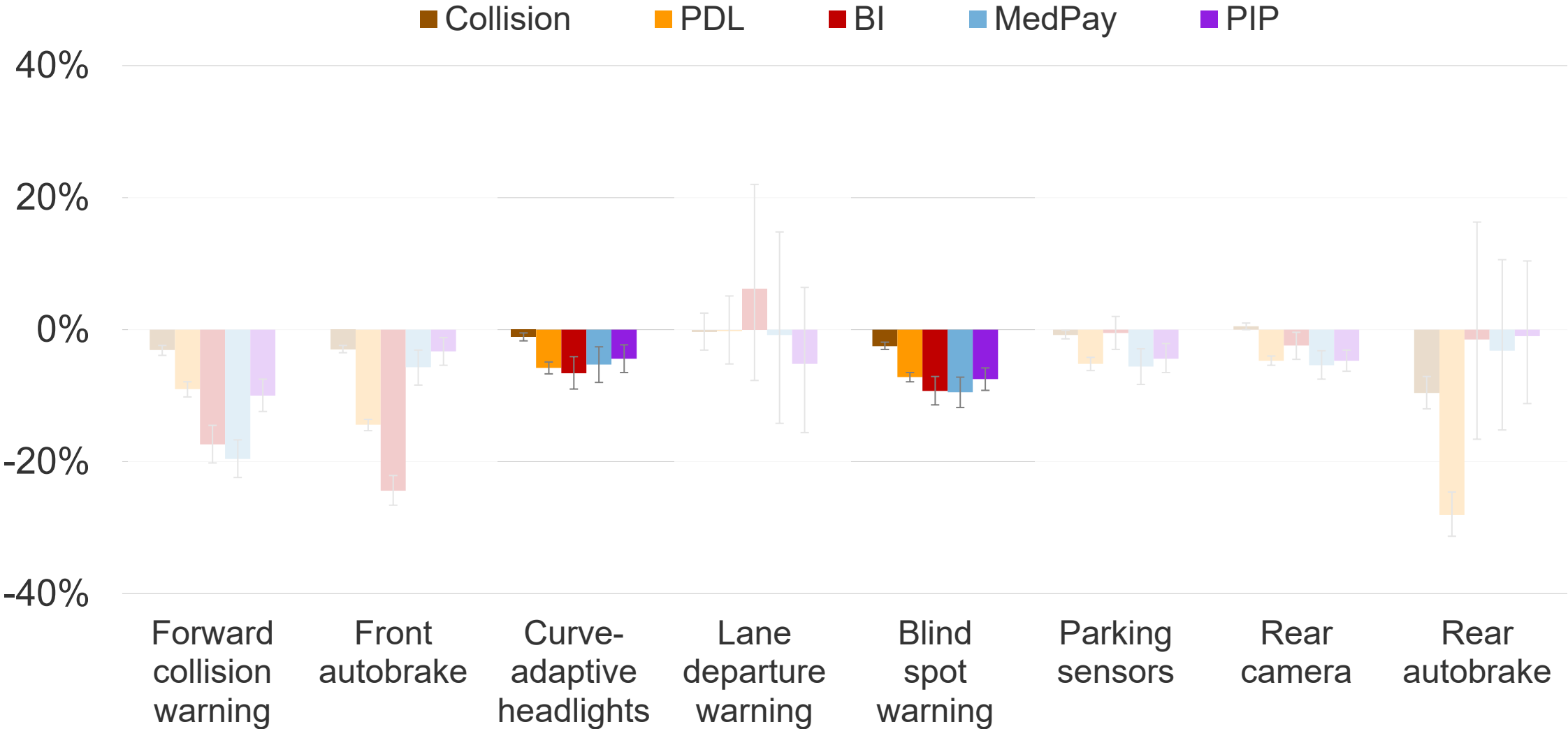
Summary of technology effects on insurance claim frequency

Early implementations



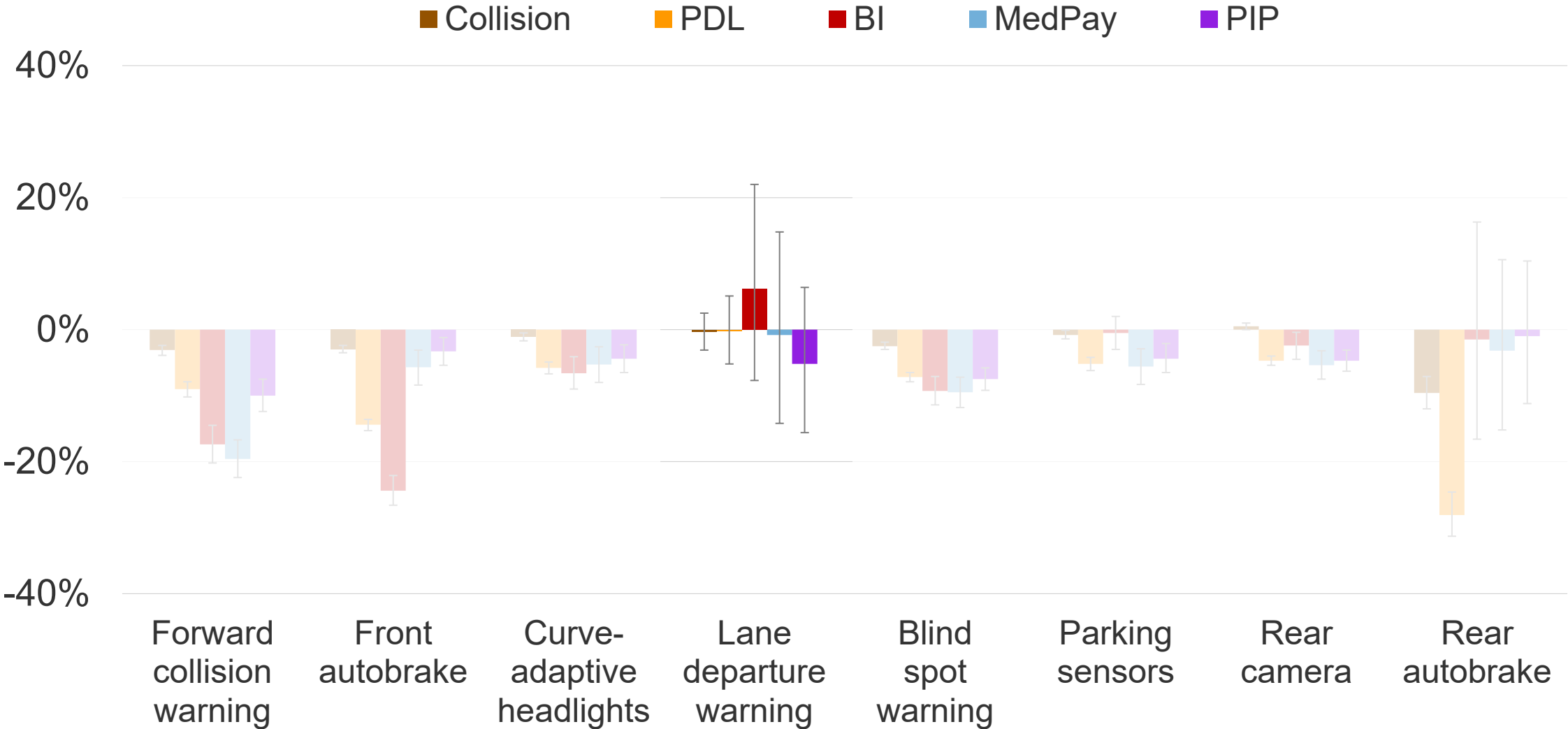
Summary of technology effects on insurance claim frequency

Early implementations



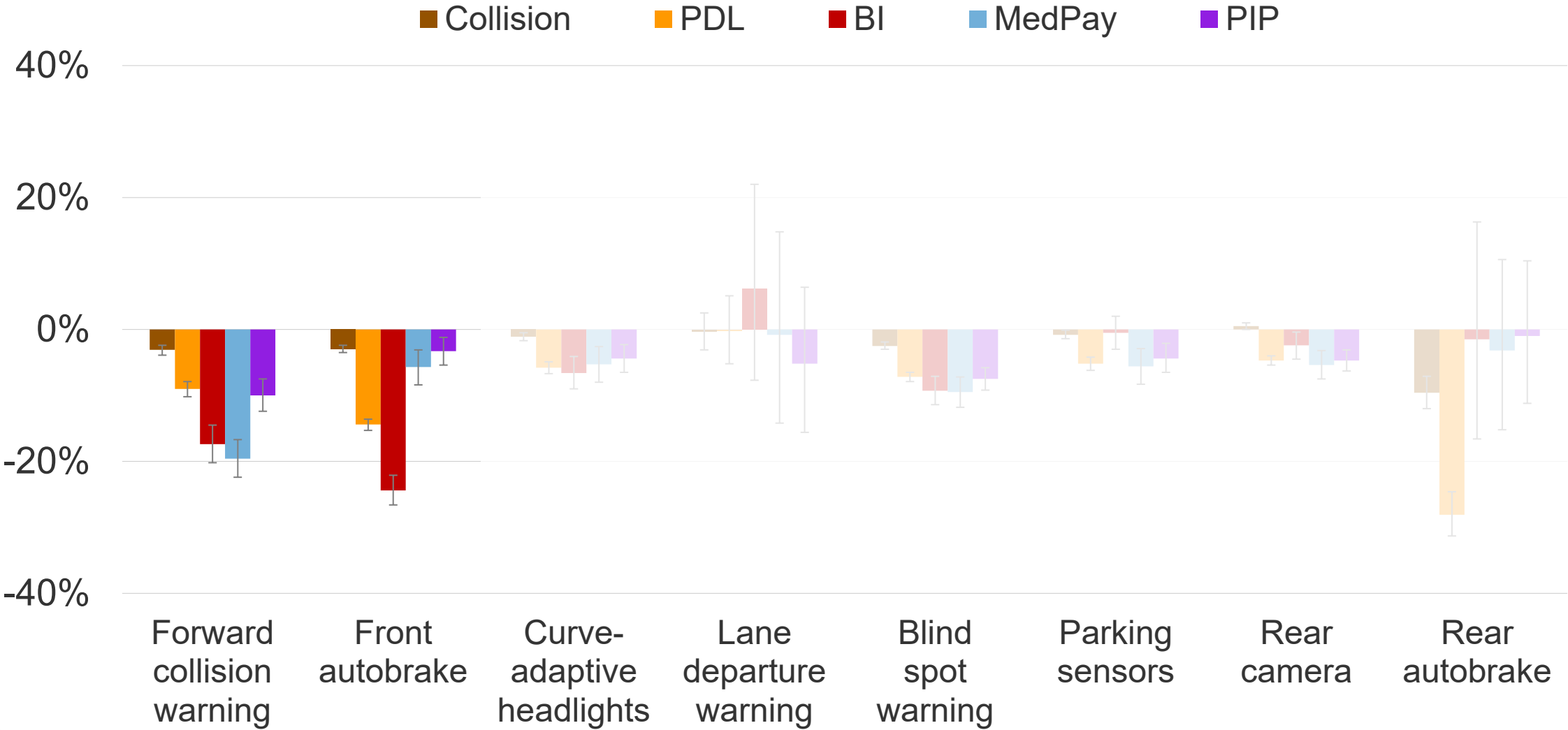
Summary of technology effects on insurance claim frequency

Early implementations



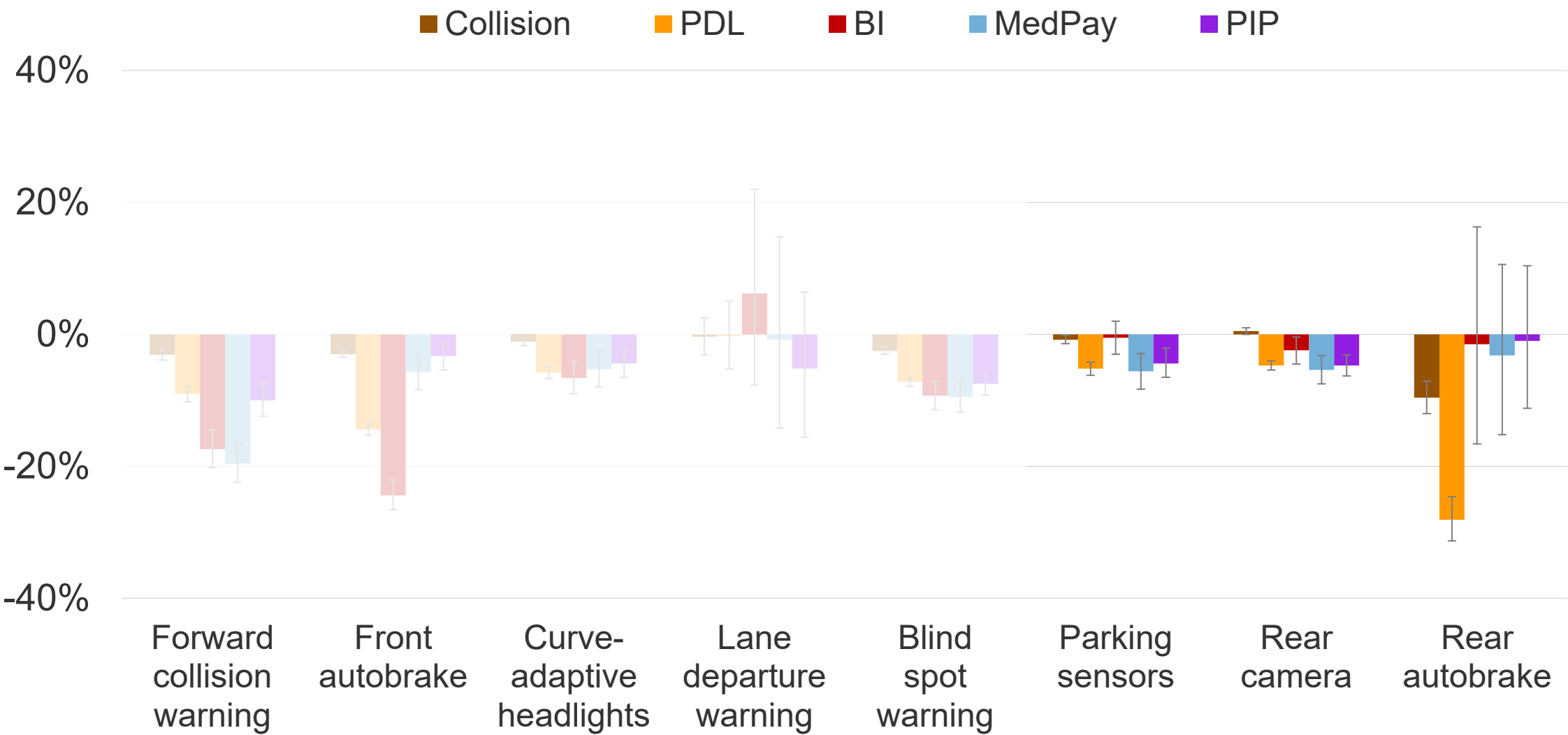
Summary of technology effects on insurance claim frequency

Early implementations



Summary of technology effects on insurance claim frequency

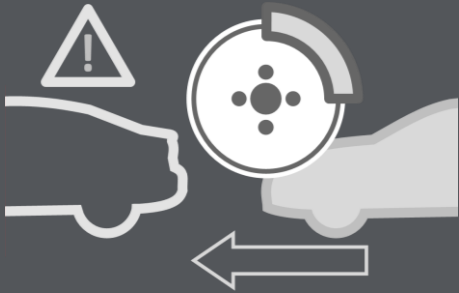
Early implementations



Crash reductions with front, lane departure and blind spot technologies

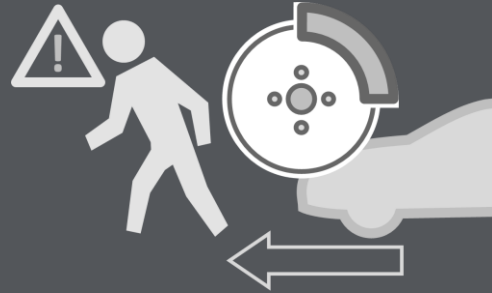
50%

With AEB



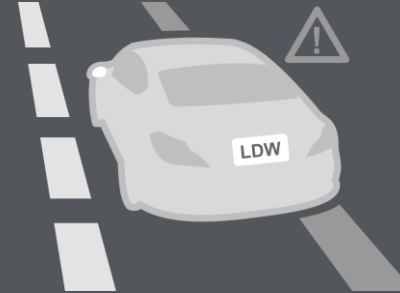
27%

With AEB
+ pedestrian detection



11%

With lane
departure warning



14%

With blind
spot warning

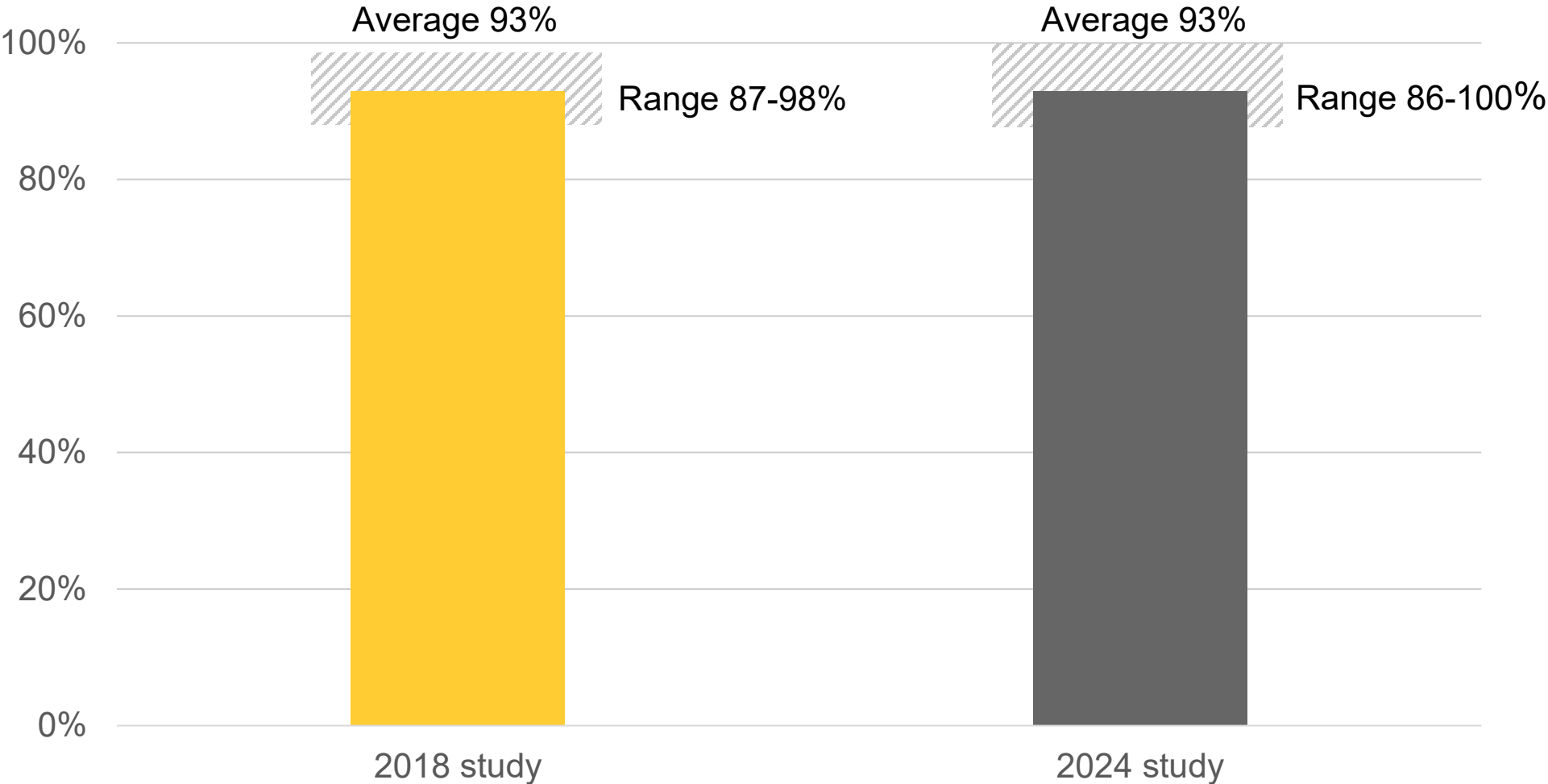


Usage rates of ADAS systems by drivers



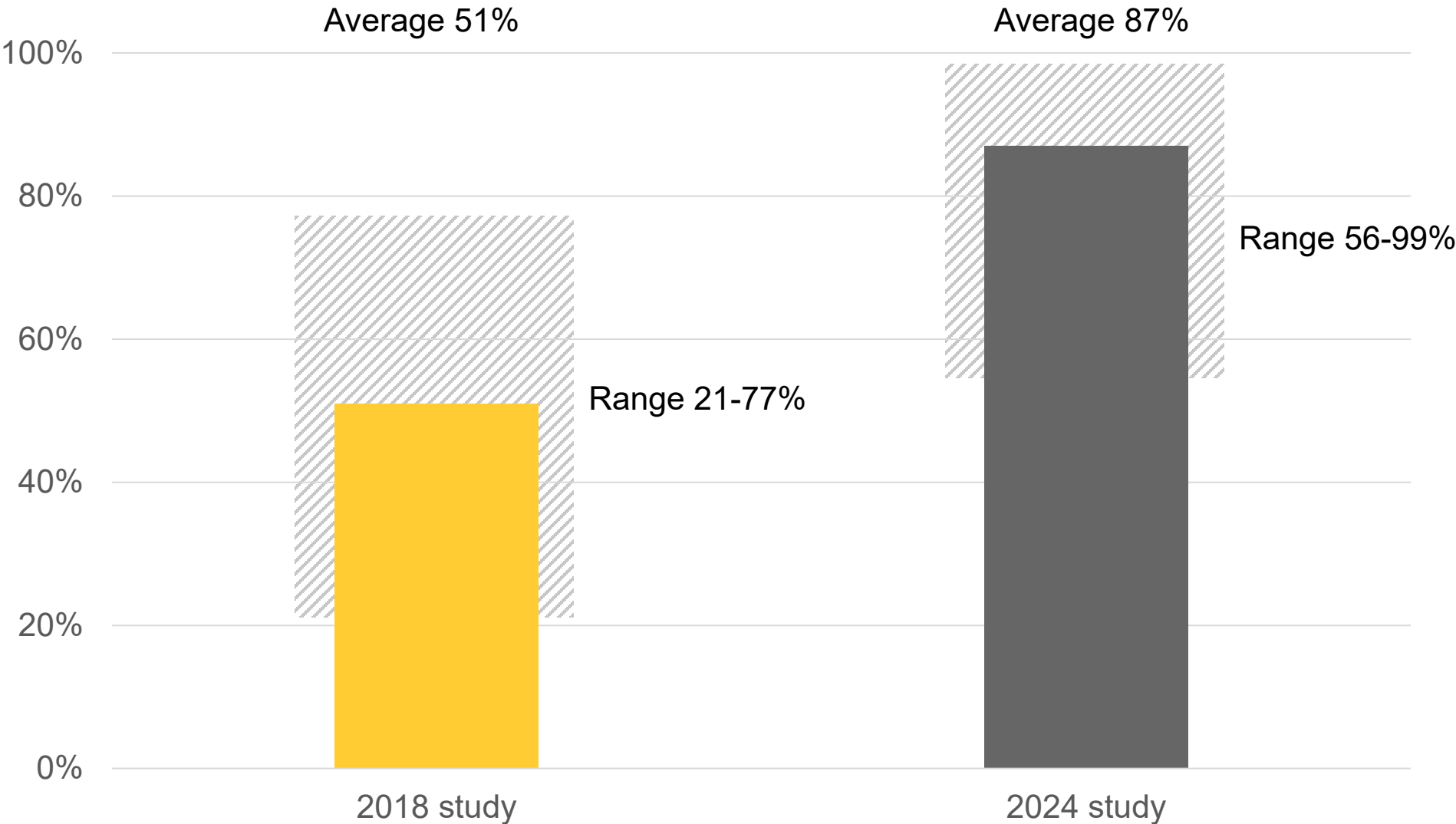
Dealership observations of front crash prevention system status

Percent with system on — mean values and range



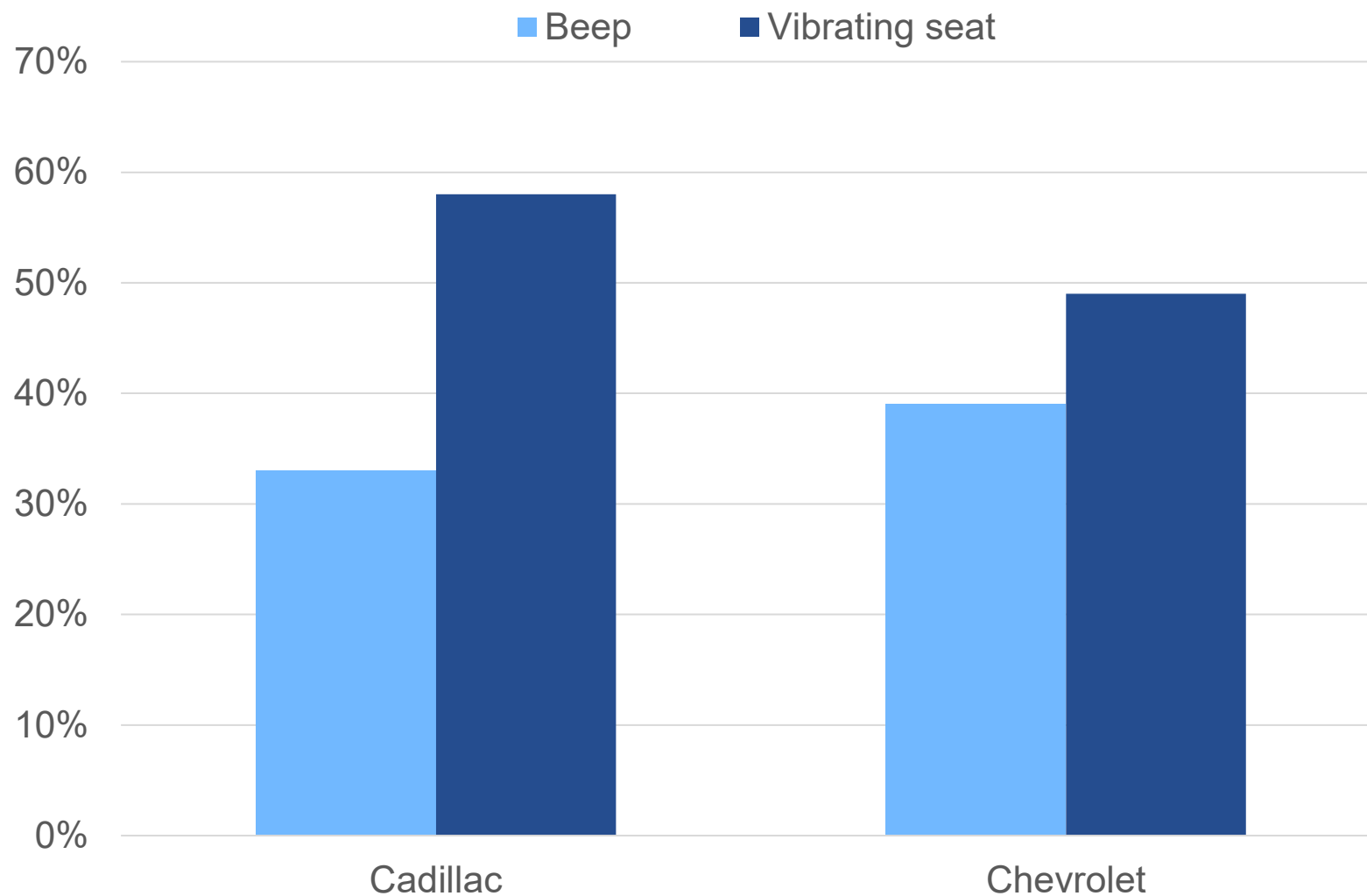
Dealership observations of lane departure mitigation system status

Percent with system on — mean values and range



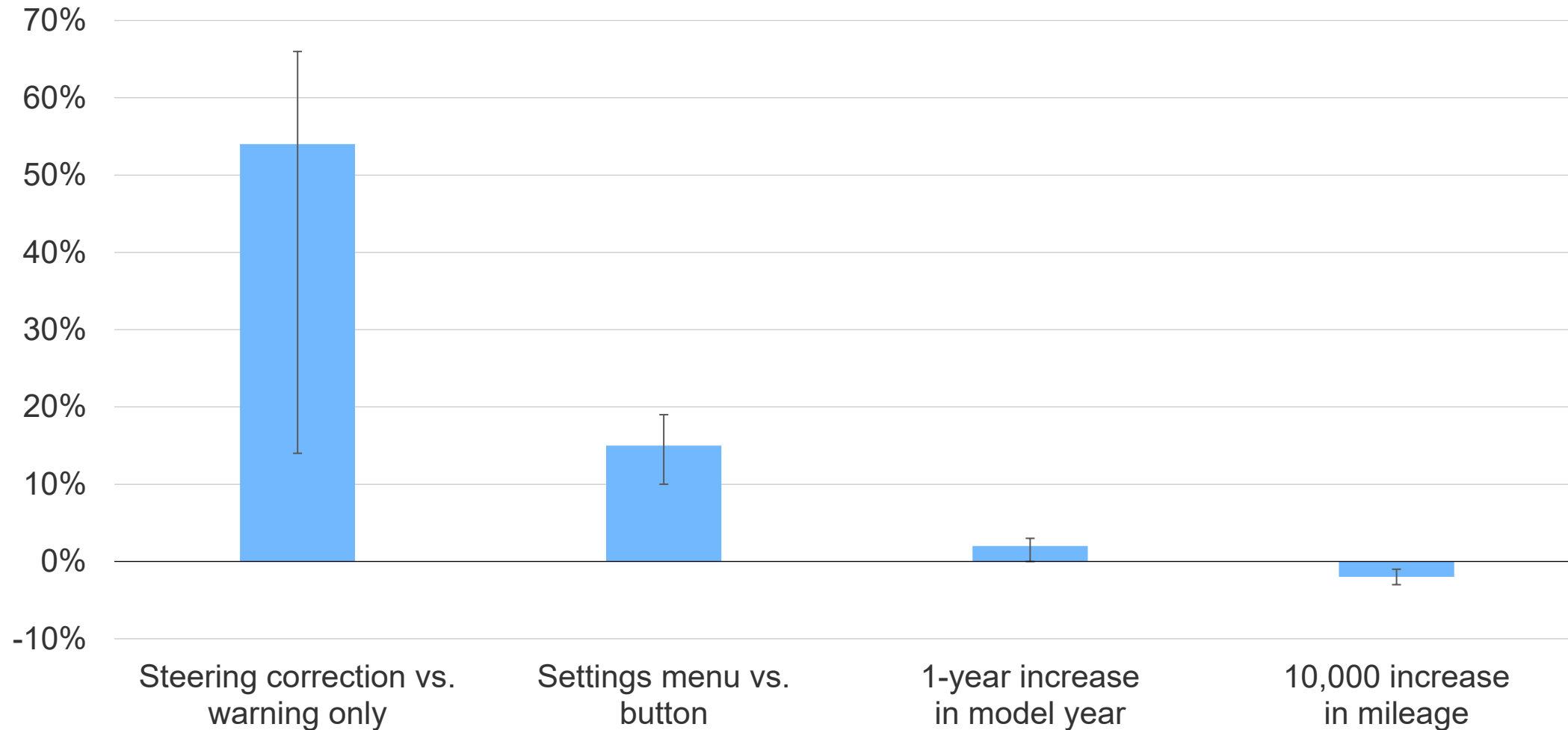
GM lane departure warning on-off status by warning type

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?

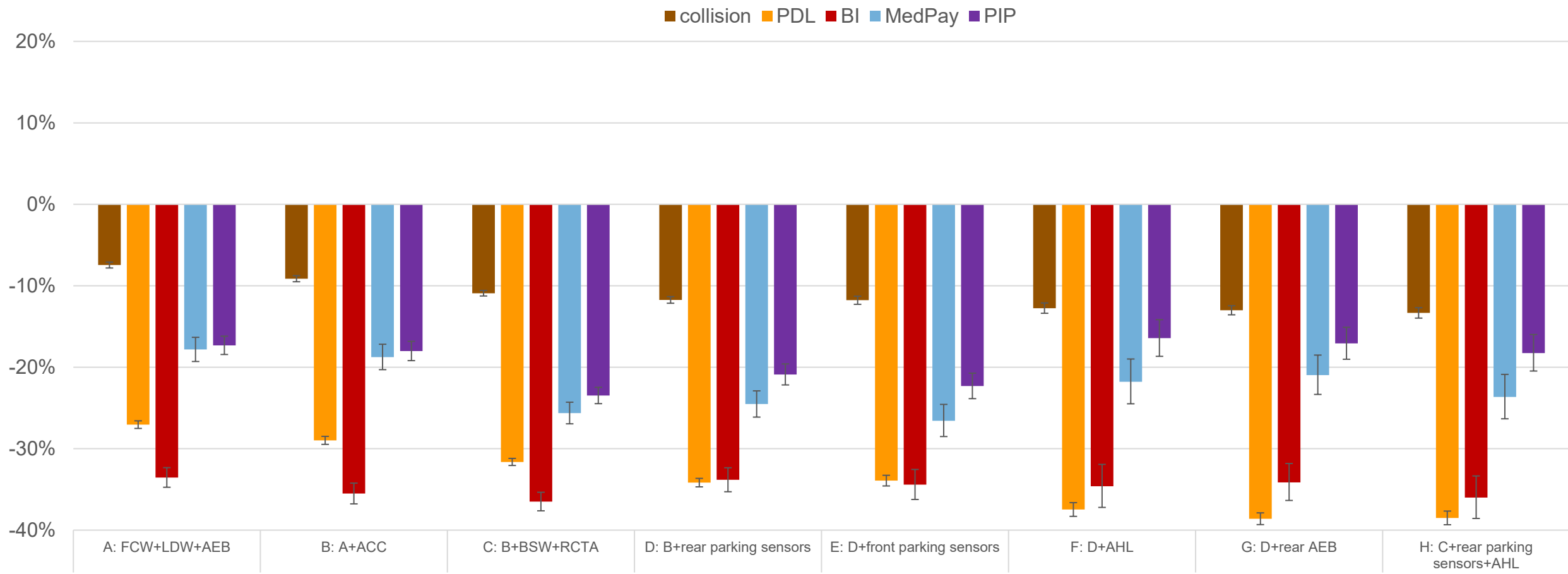
- ▶ A. Yes
- ▶ B. No
- ▶ C. I don't have one

ADAS bundles (model years 2017-22)



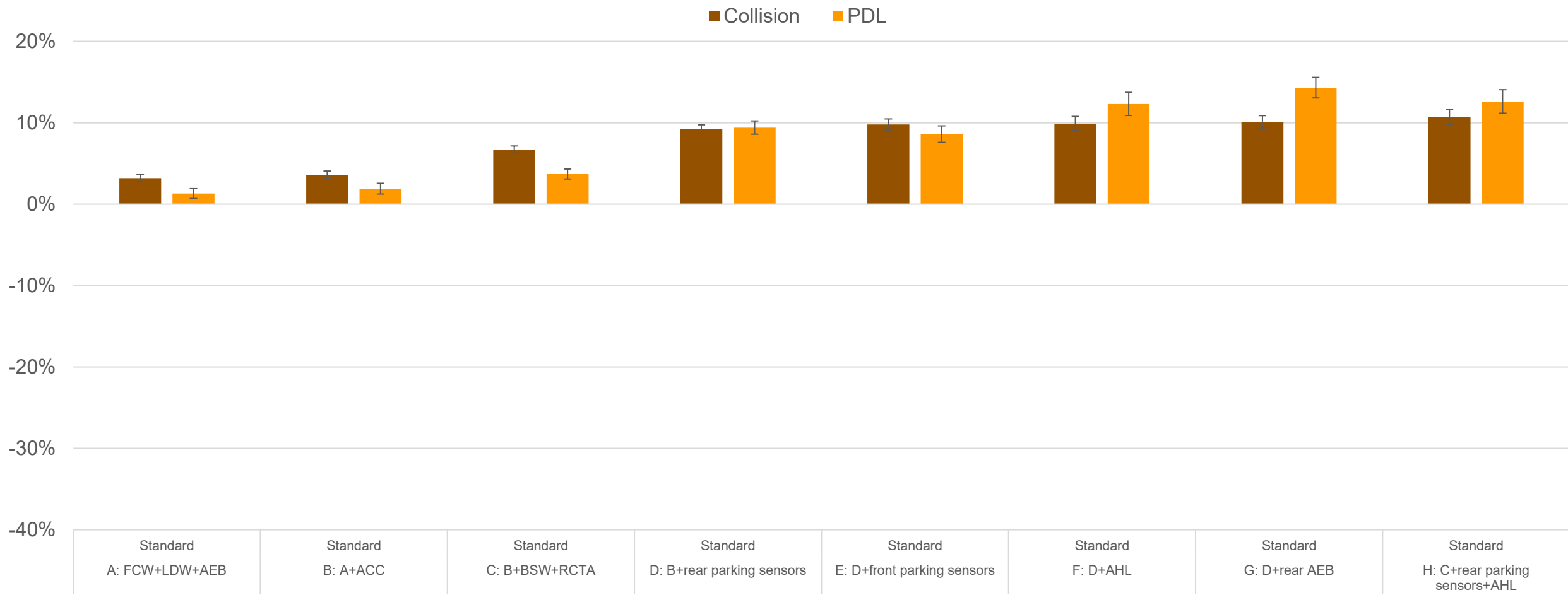
Estimated changes in claim frequency associated with ADAS bundles

Model years 2017-22



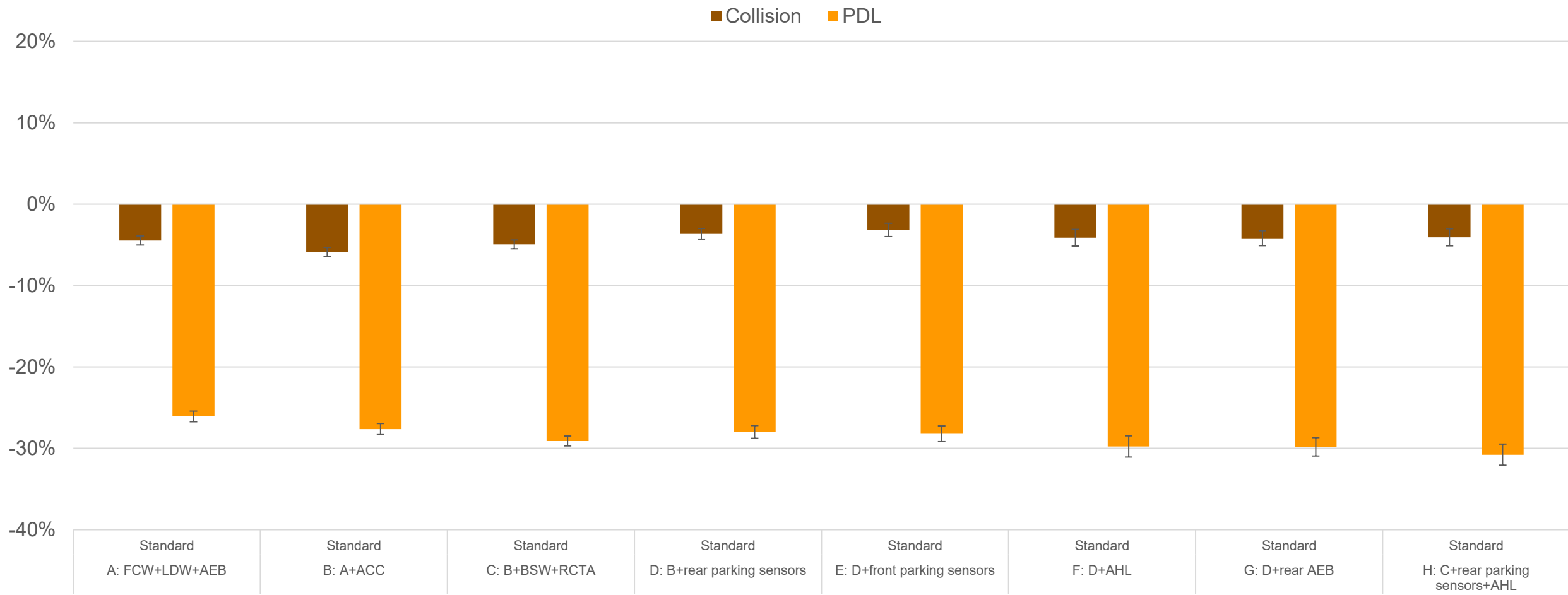
Estimated changes in physical damage claim severity associated with ADAS bundles

Model years 2017-22



Estimated changes in physical damage overall losses associated with ADAS bundles

Model years 2017-22

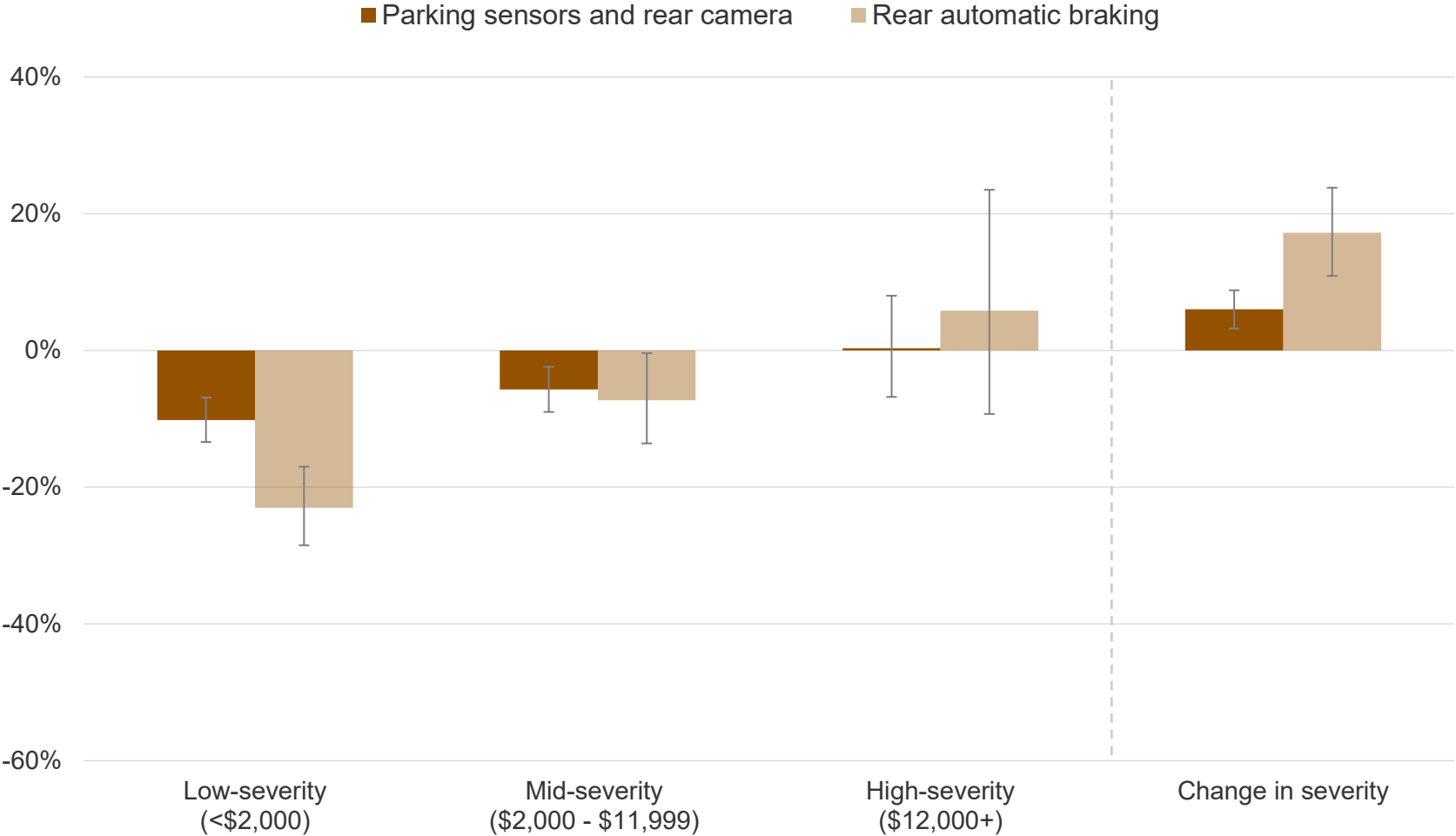


ADAS and claim severity for collision and PDL



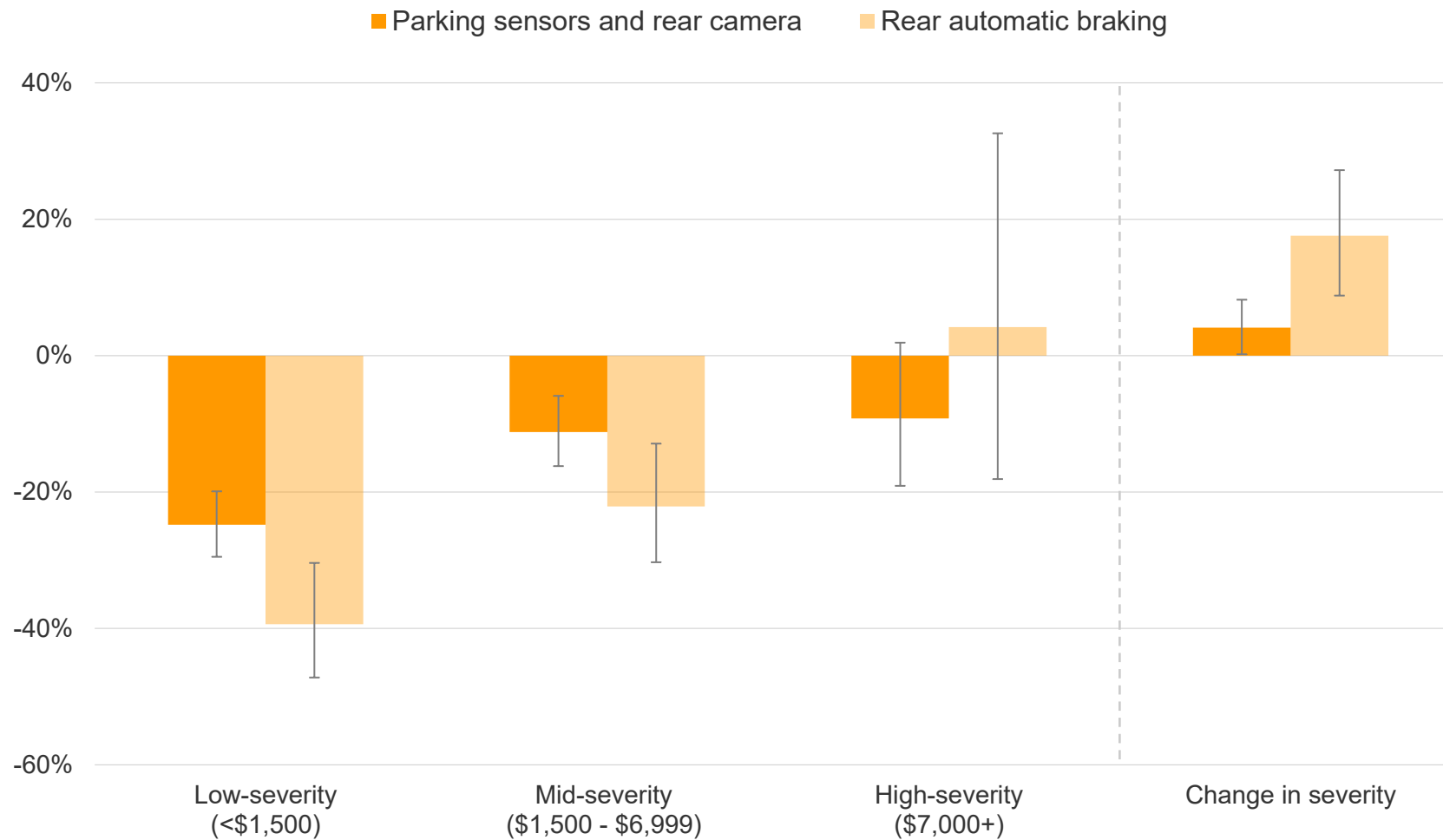
Changes in collision claim frequency by claim size

General Motors parking assist systems



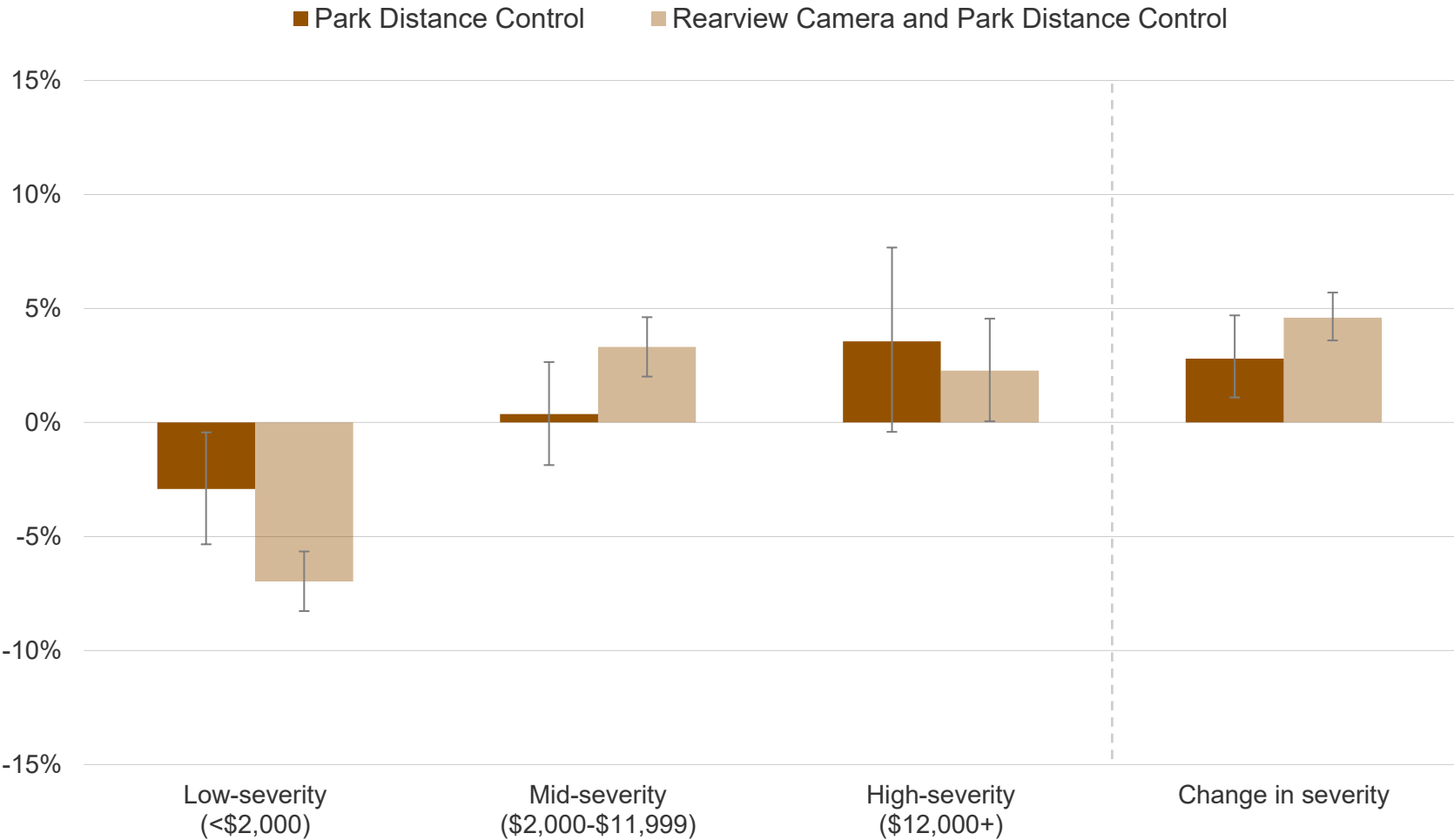
Changes in PDL claim frequency by claim size

General Motors parking assist systems



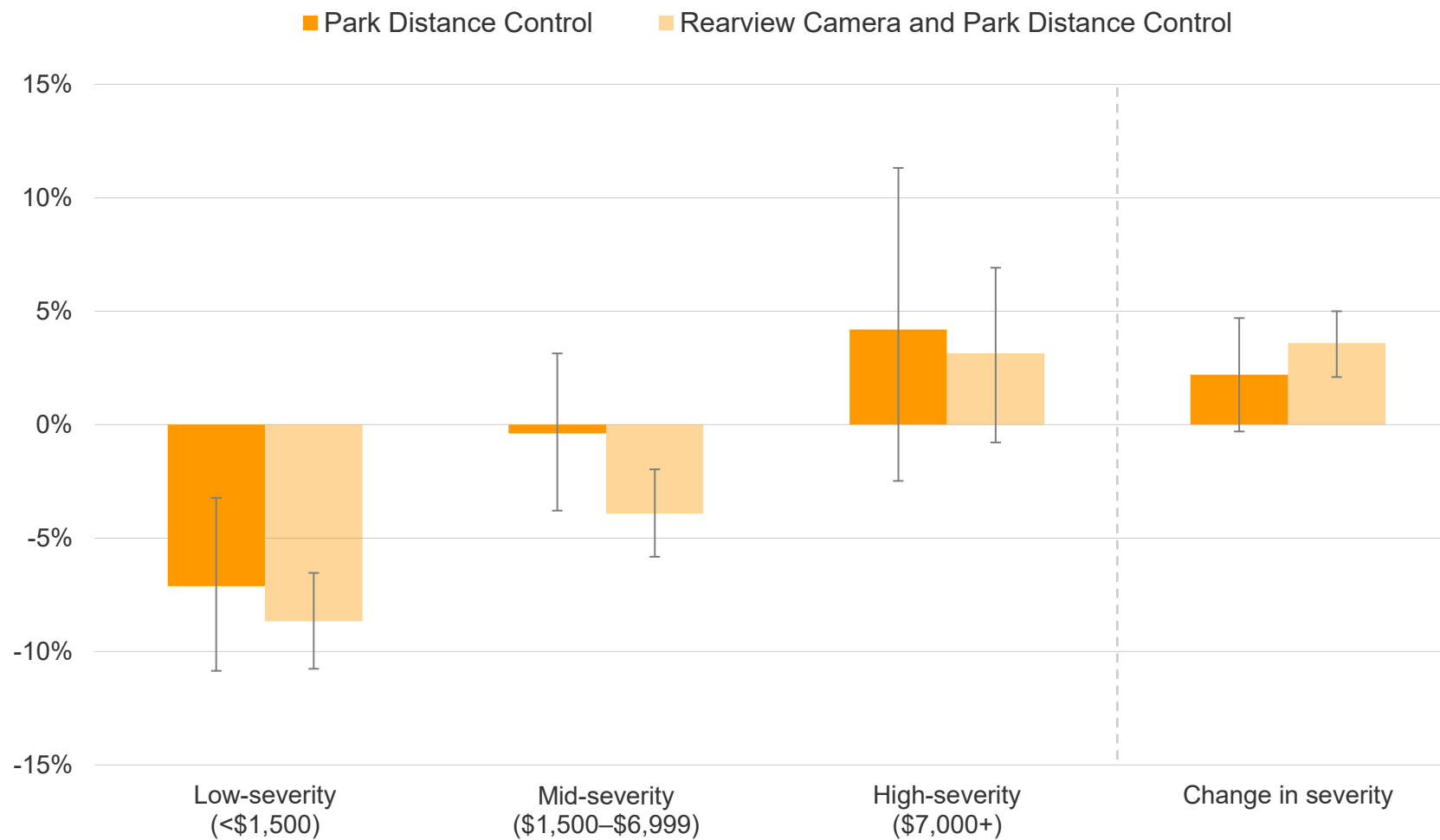
Changes in collision claim frequency by claim size

BMW parking assist systems



Changes in PDL claim frequency by claim size

BMW parking assist systems

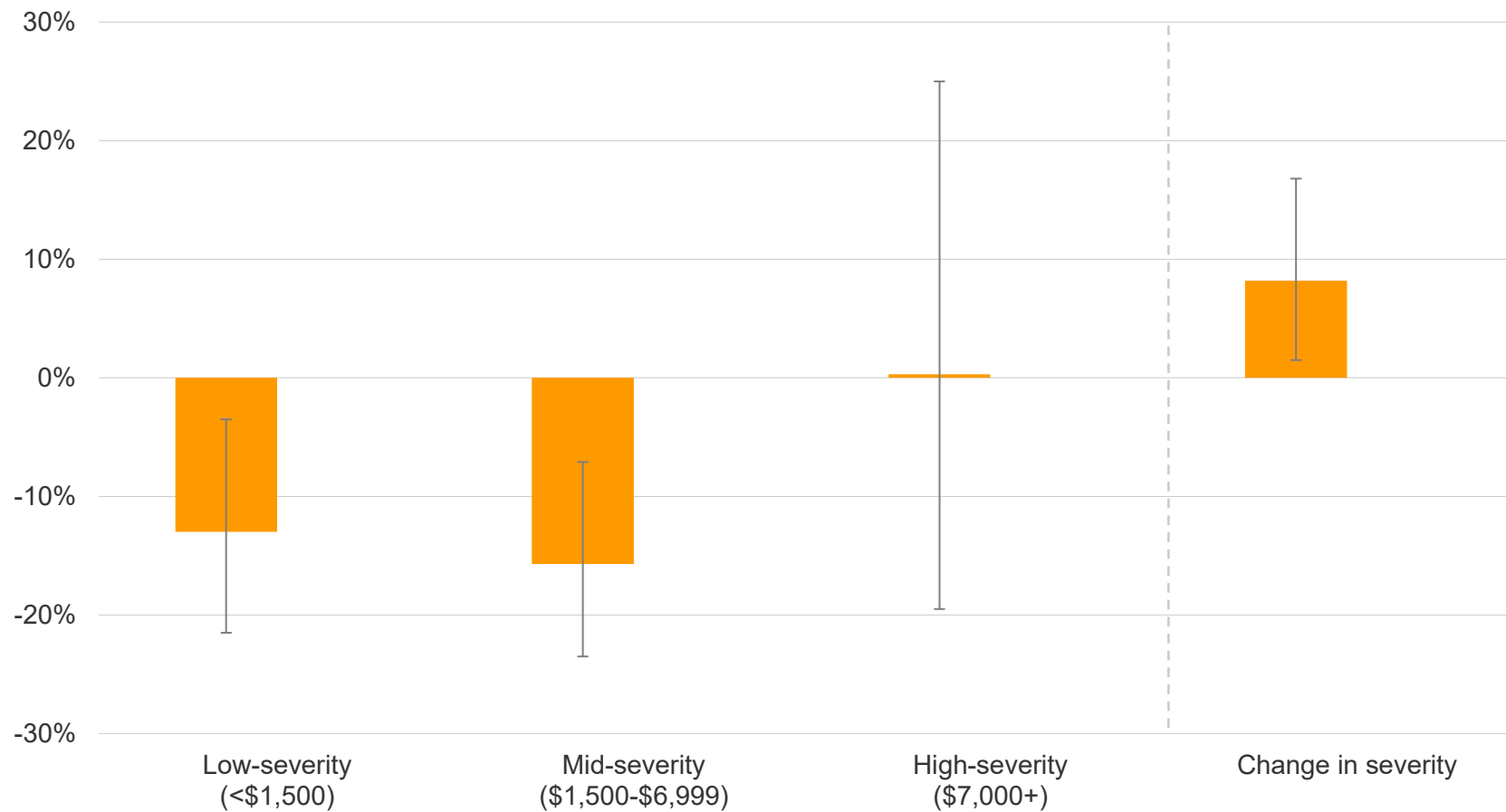


Operational speed ranges of front crash prevention systems impact on PDL severity



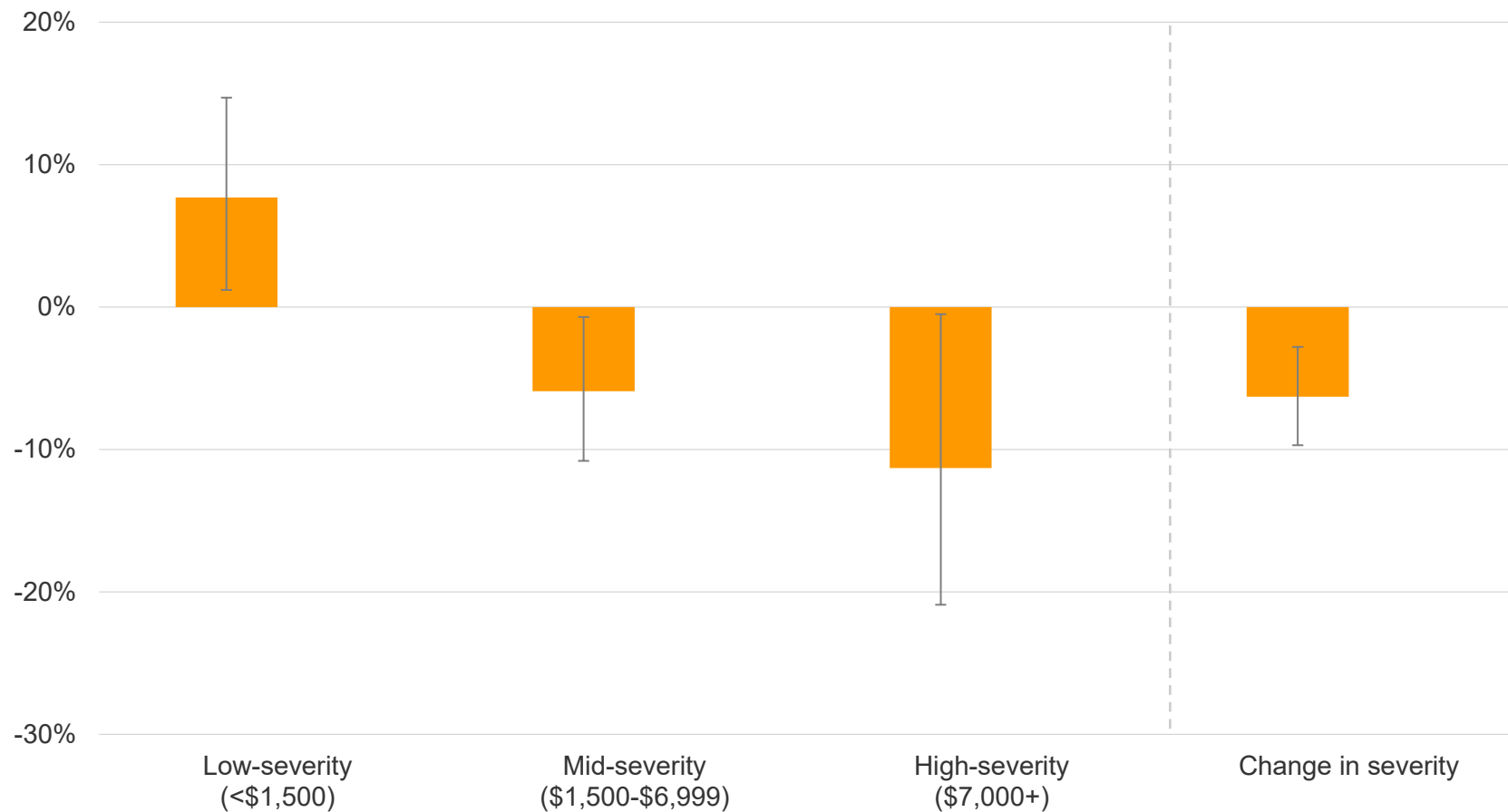
Changes in PDL claim frequency by claim size

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



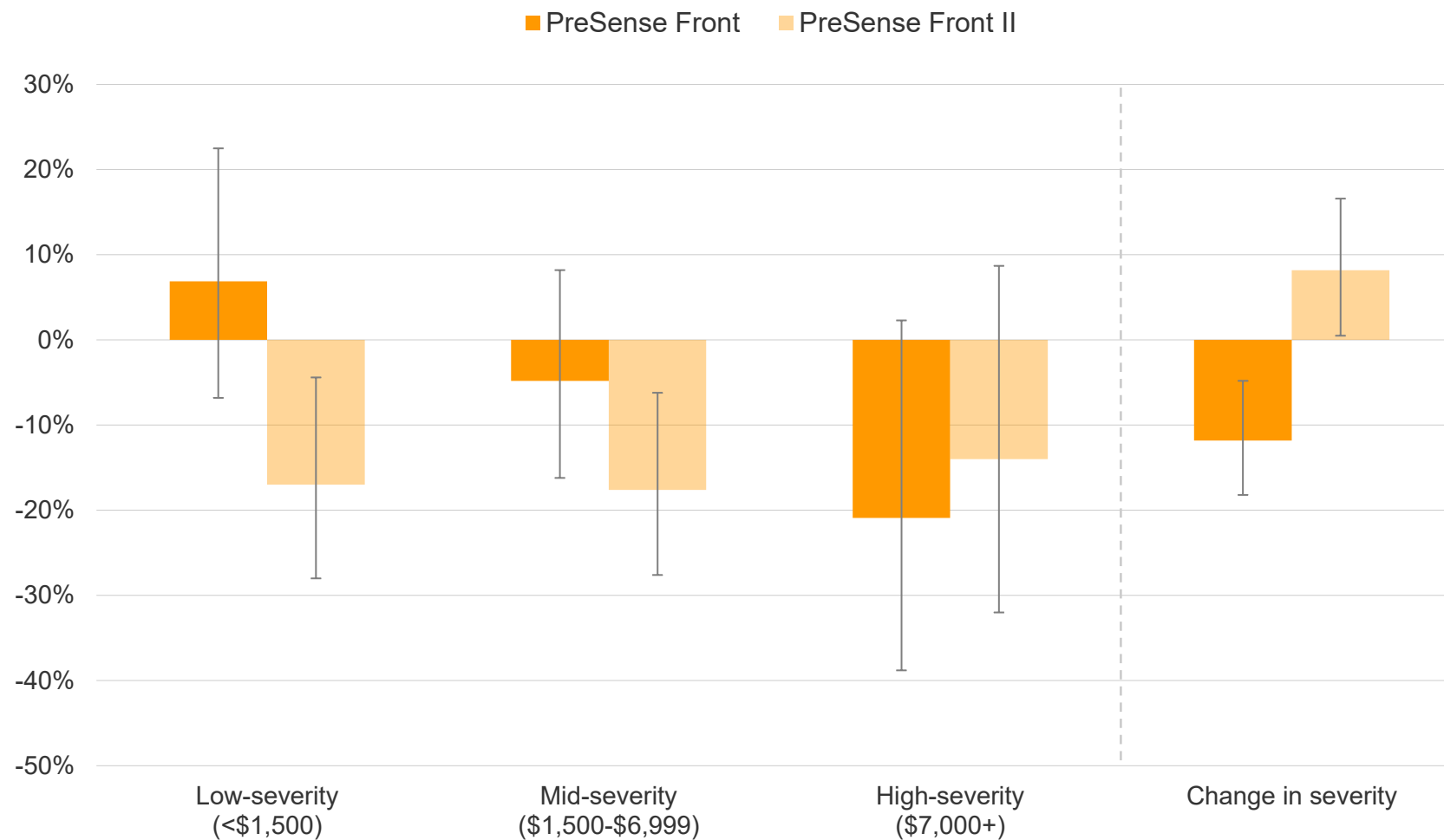
Change in PDL claim frequency by claim size

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



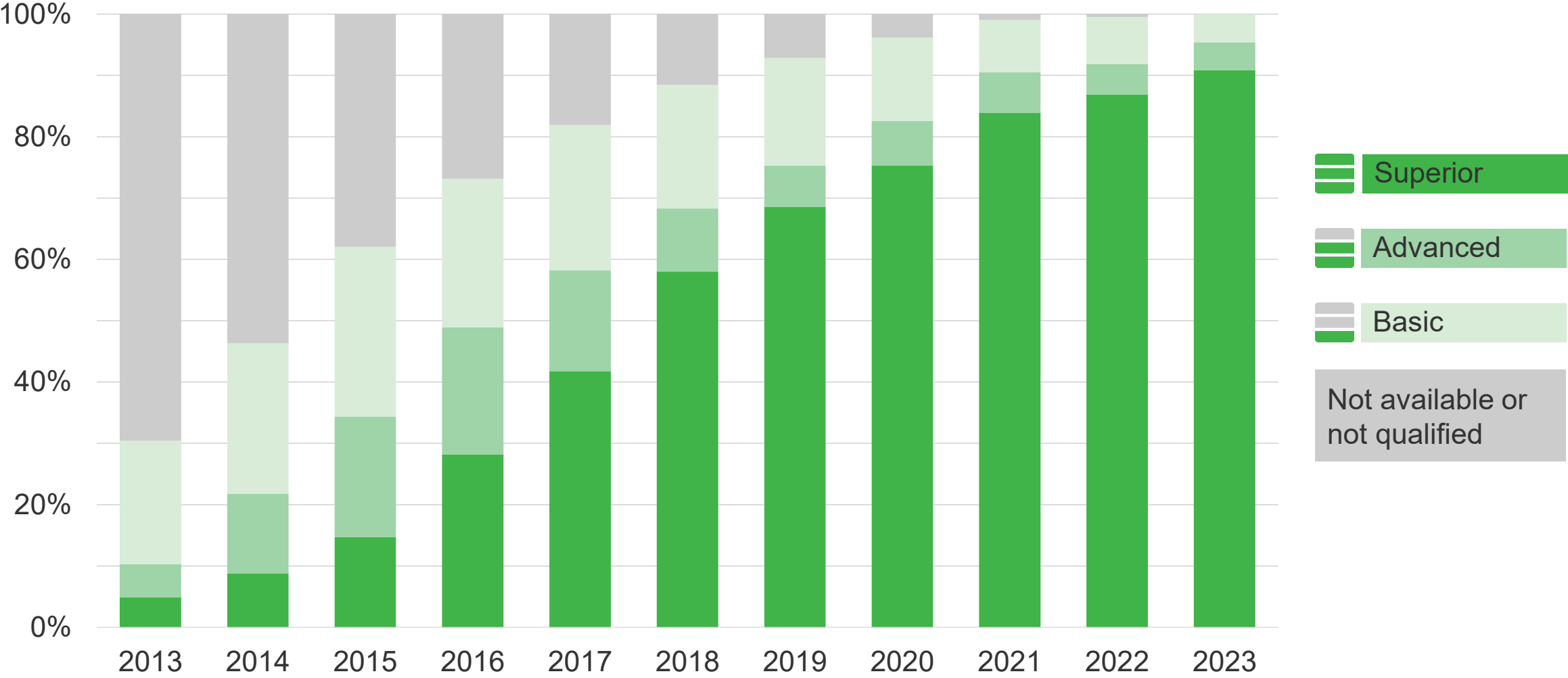
Basic

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 Hyundai Tucson



2023 Jeep Compass



2023 Mazda CX-5



2023 Toyota RAV4



2023 Subaru Forester



Superior

2023 Toyota RAV4



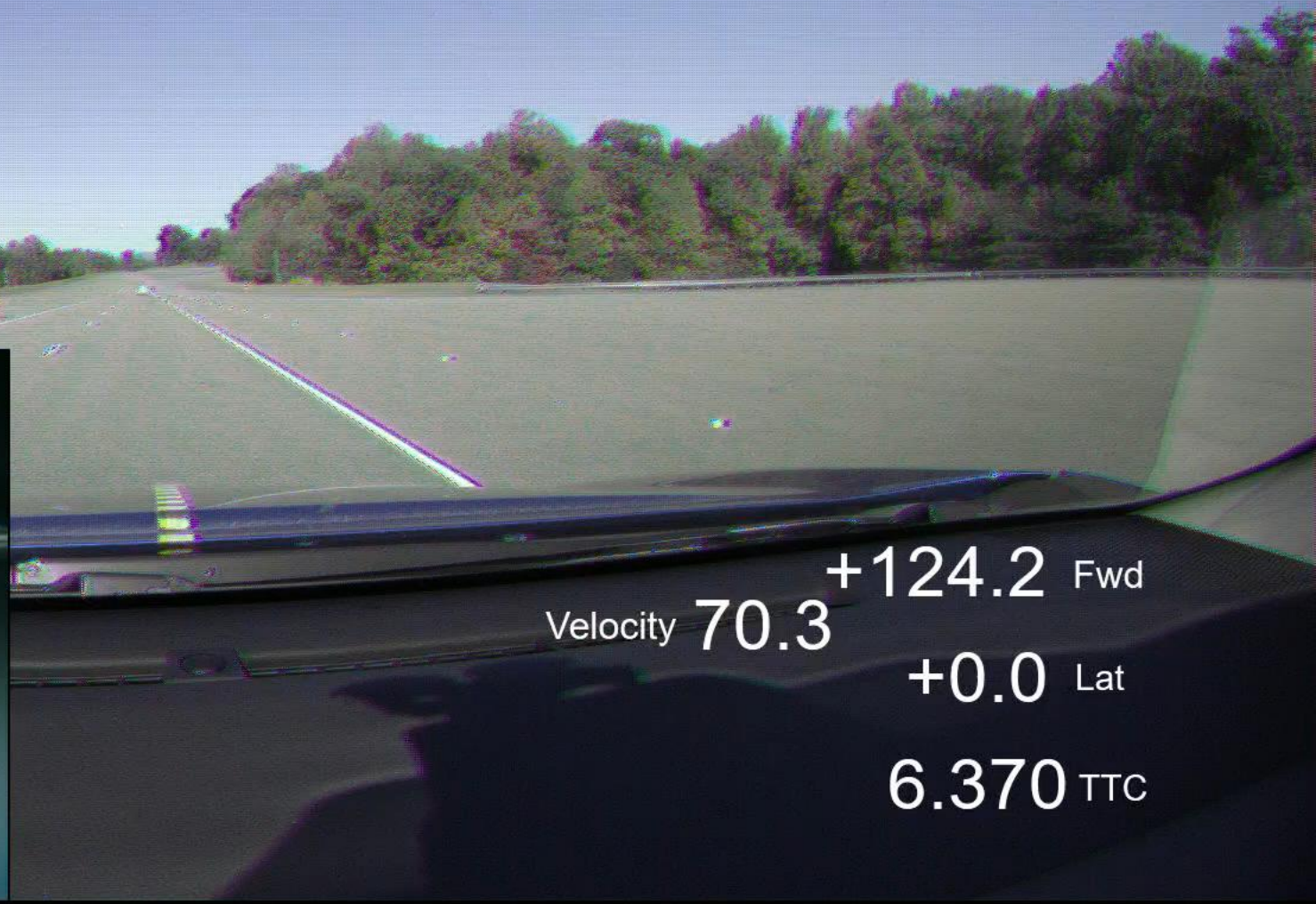
2023 Volkswagen Taos







2021 Toyota CH-R



Velocity 70.3
+124.2 Fwd
+0.0 Lat
6.370 TTC

IHS

2022 Subaru Forester



+138.1 Fwd
Velocity 69.6
-0.0 Lat
7.155 TTC



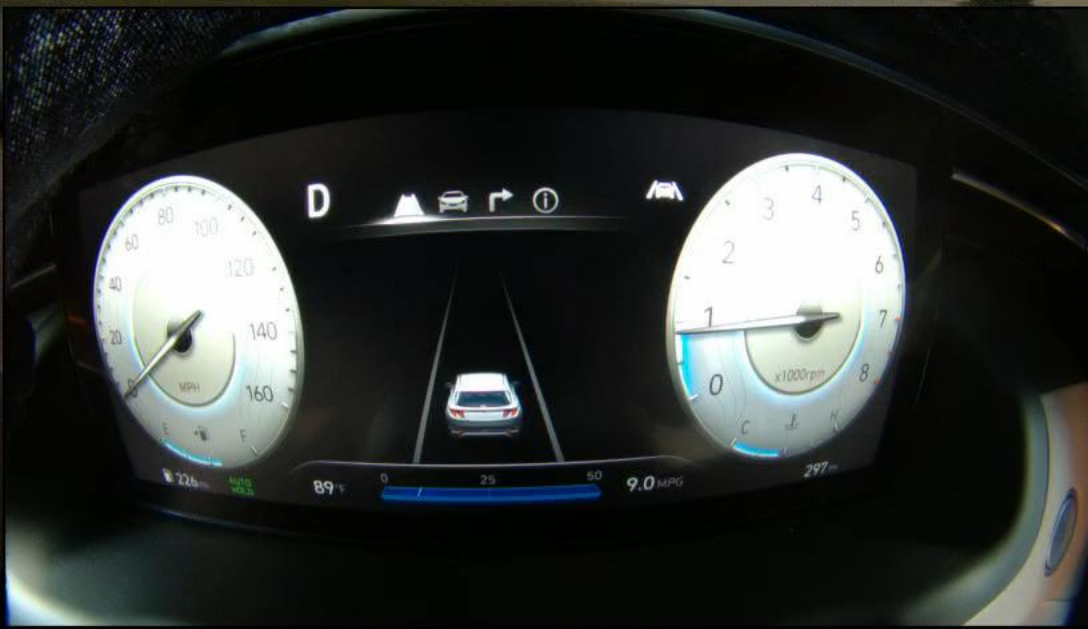
2023 Chevrolet Equinox



Velocity $+289.8$ Fwd
 0.0
 $+0.0$ Lat
 0.000 TTC

IHS

2023 Hyundai Tucson



Velocity 0.0 +284.3 Fwd
-0.2 Lat
0.000 TTC



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

IHS

2022 Subaru Forester



Effectiveness of front crash prevention systems on large trucks



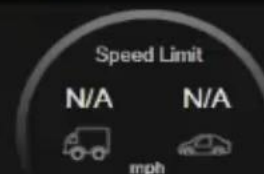




BRAKE ☐ OFF
 ABS ☐ OFF
 ATC ☐ OFF
 CRUISE CONTROL ☒ ON
 DRIVER SEAT BELT ☐ N/A



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

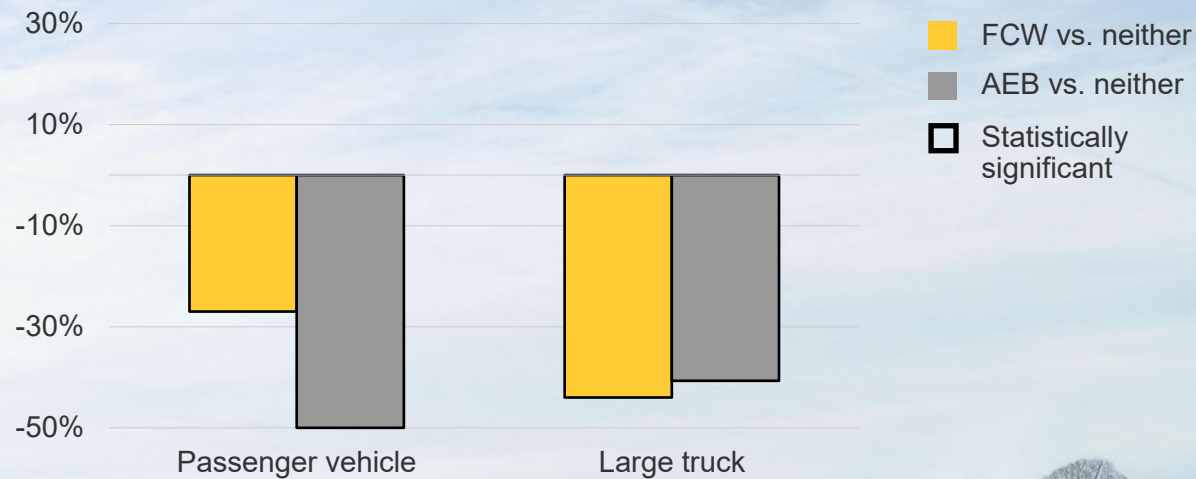
CHART

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

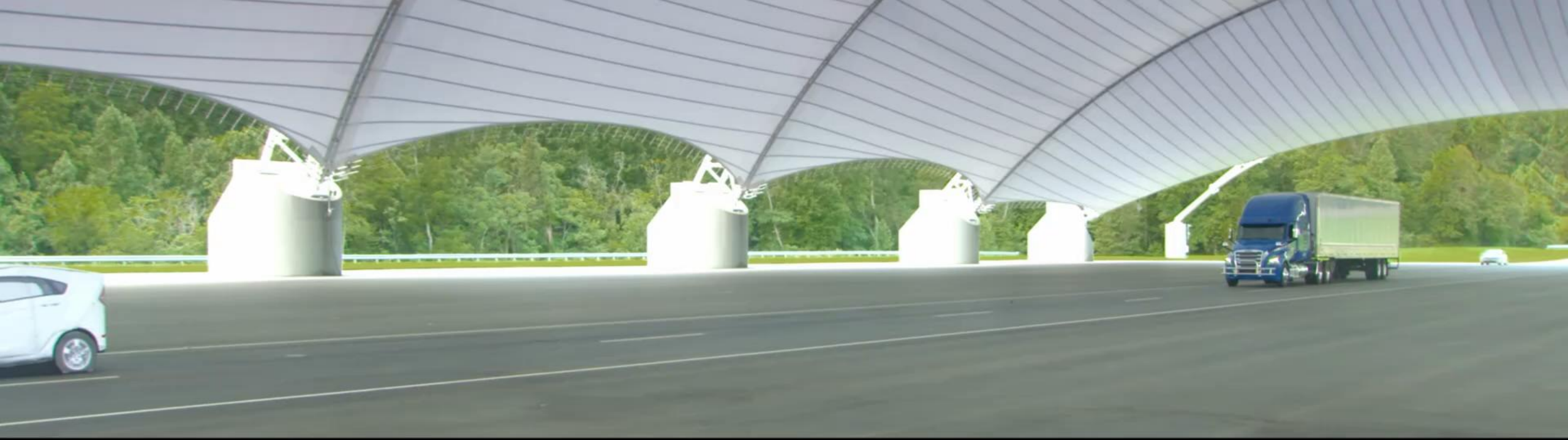
Police-reportable crashes



Large truck AEB testing

30 mph into stationary target

August 2020



Partial driving automation







**Does your
vehicle have
partial driving
automation?**



Does your vehicle have partial driving automation?

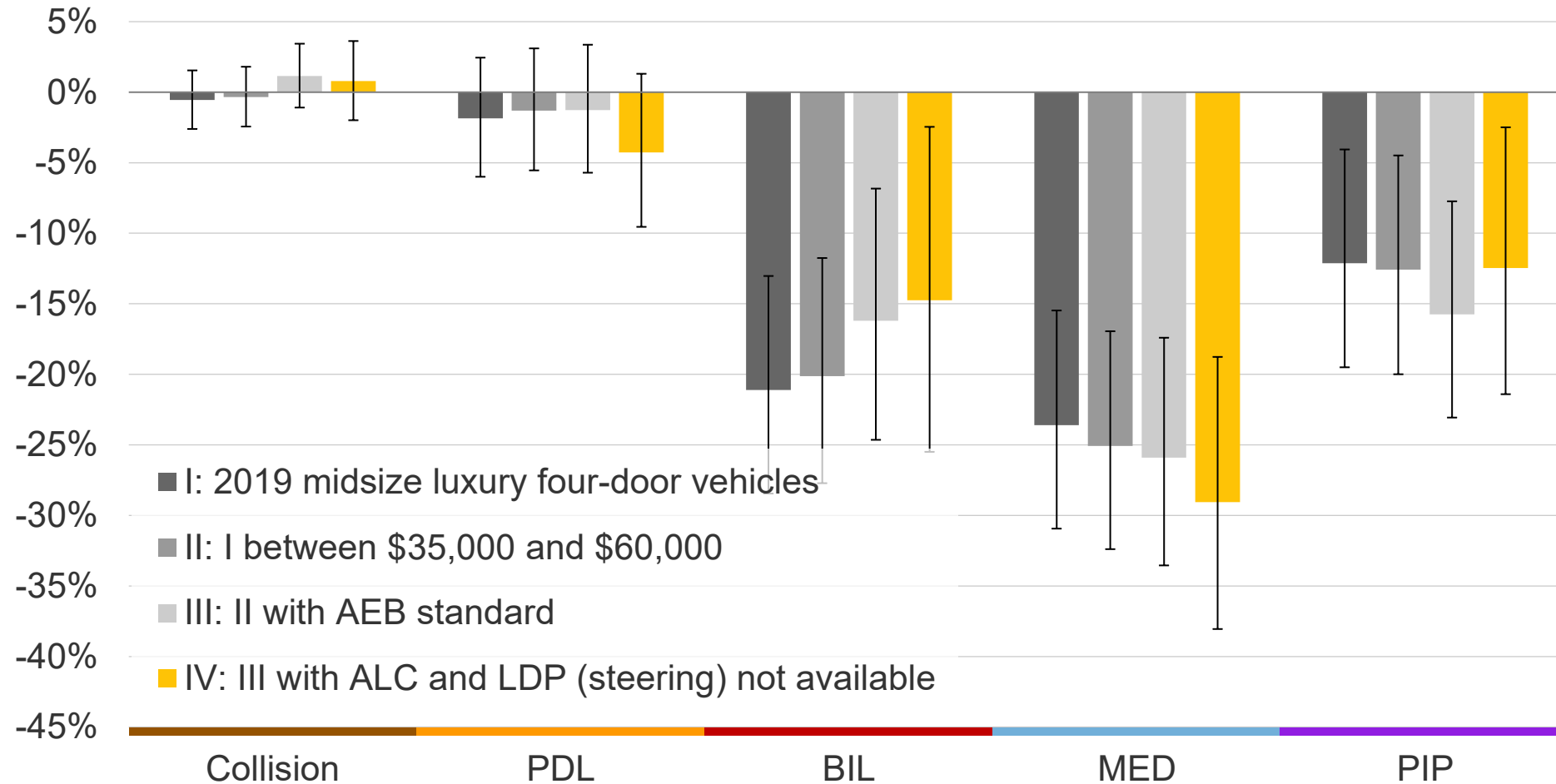
- ▶ A. Yes
- ▶ B. No
- ▶ C. I don't know

Partial automation loss results



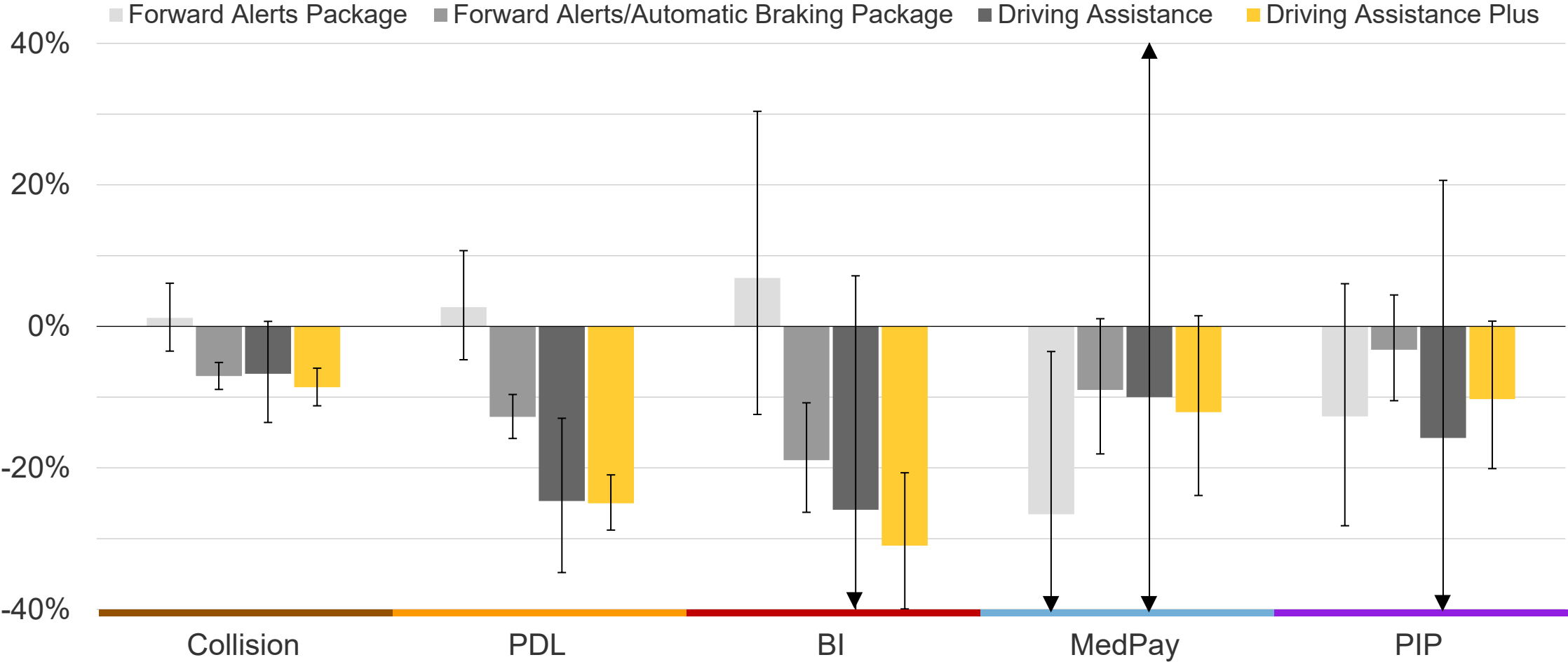
Estimated differences in claim frequency

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



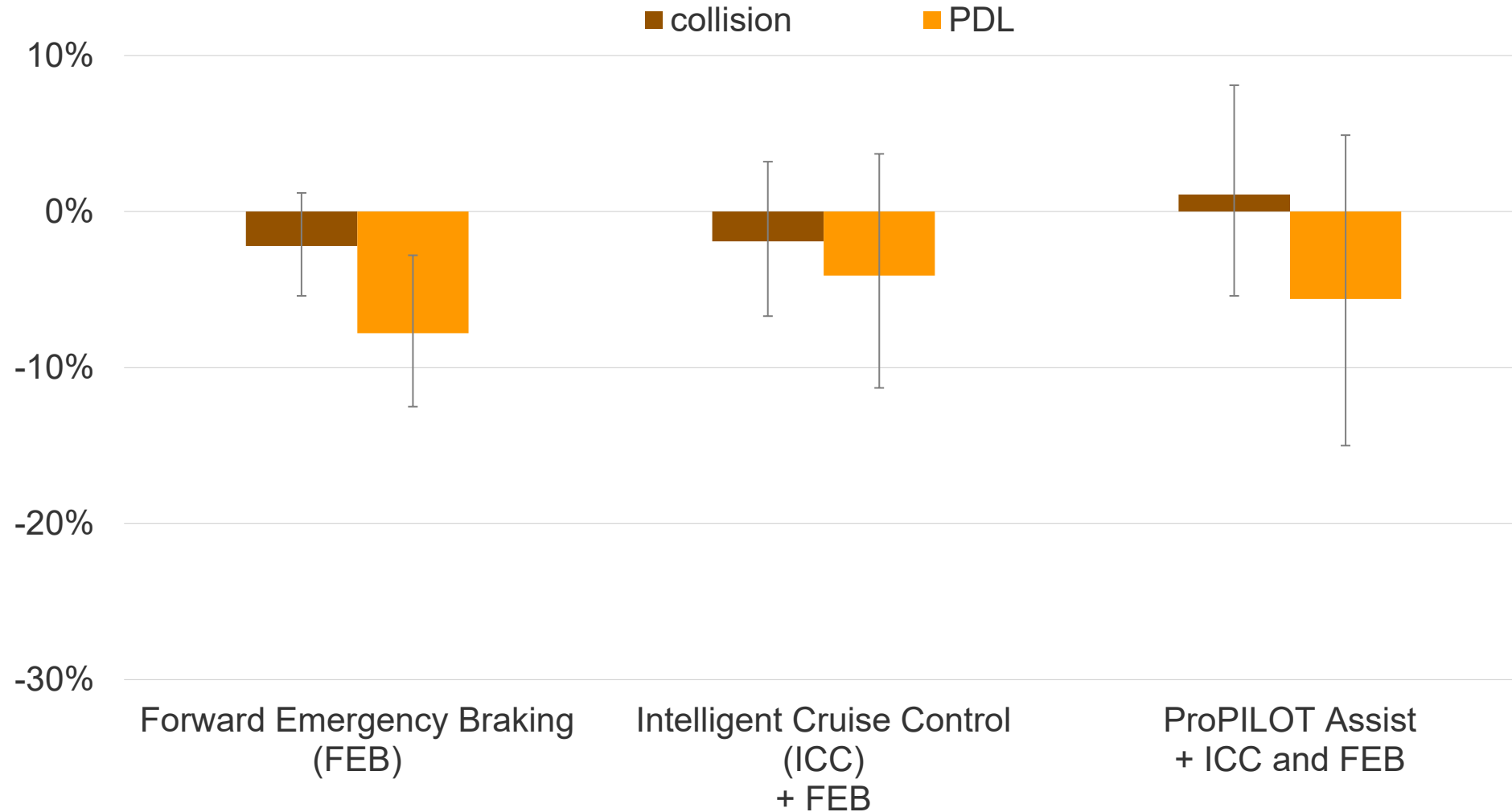
Changes in claim frequency with BMW front crash prevention

December 2021 analysis of model years 2013-17



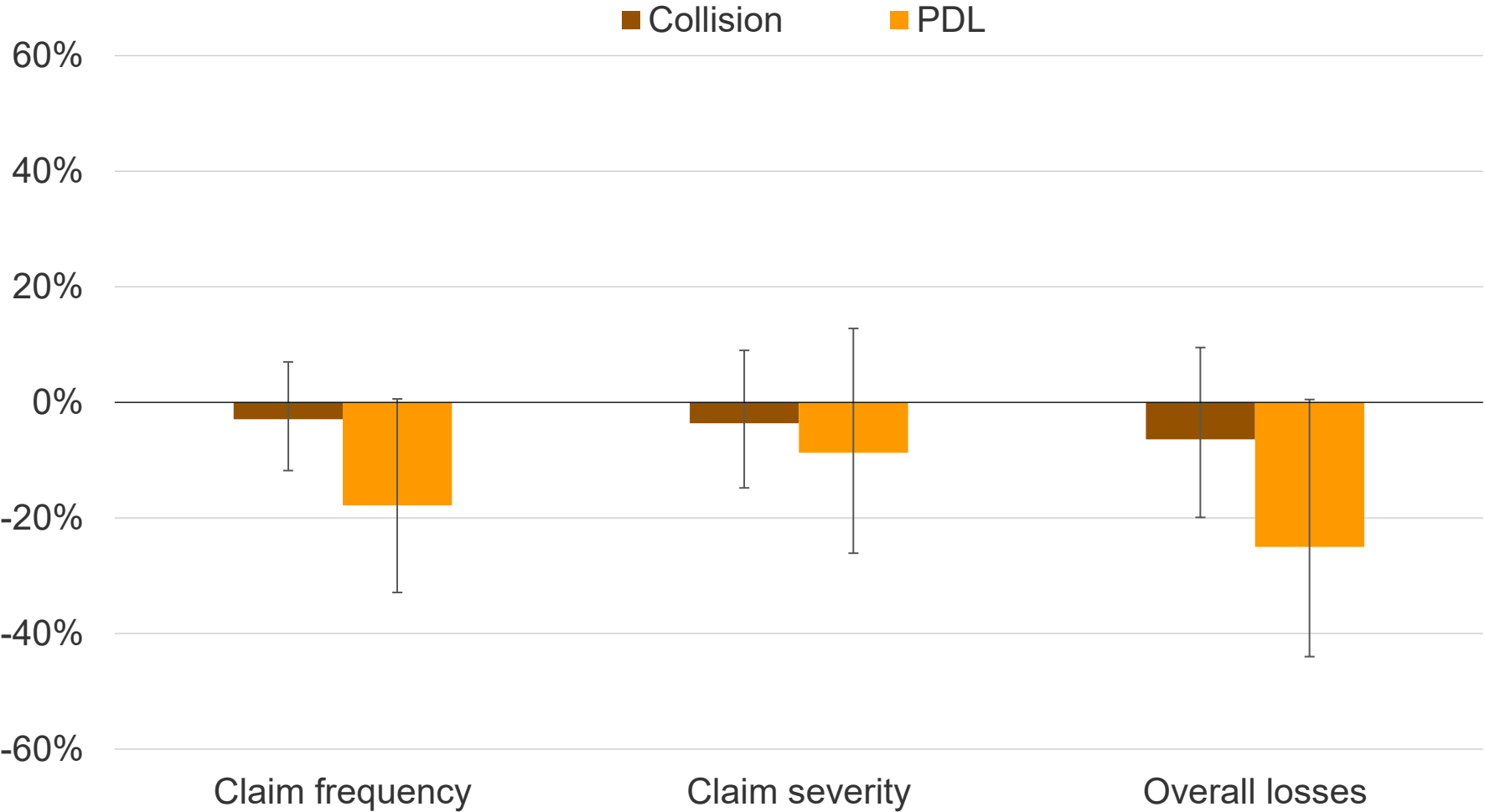
Changes in frequency with Nissan front crash prevention system

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

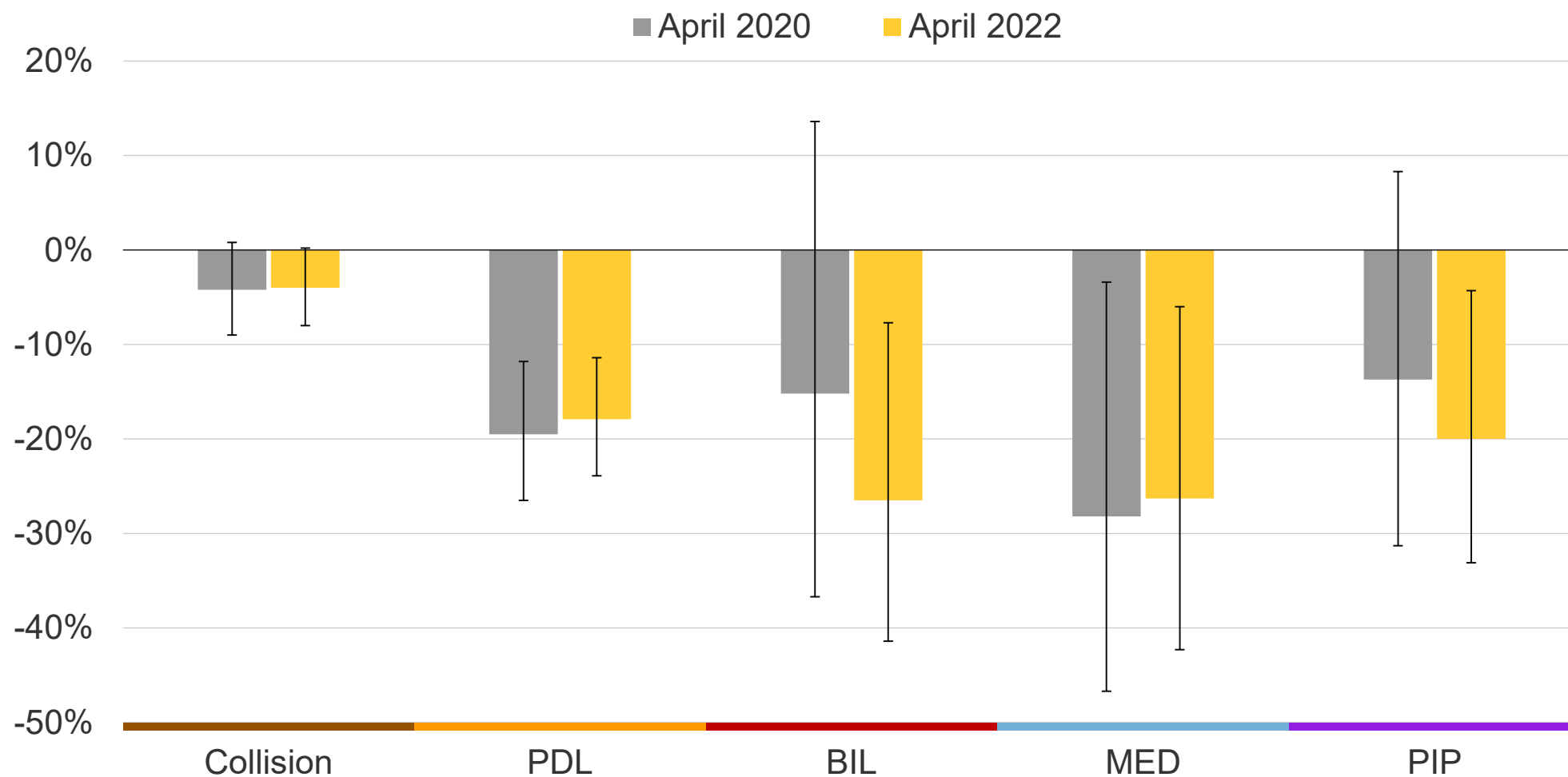


Super Cruise retention rate

- ▶ \$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

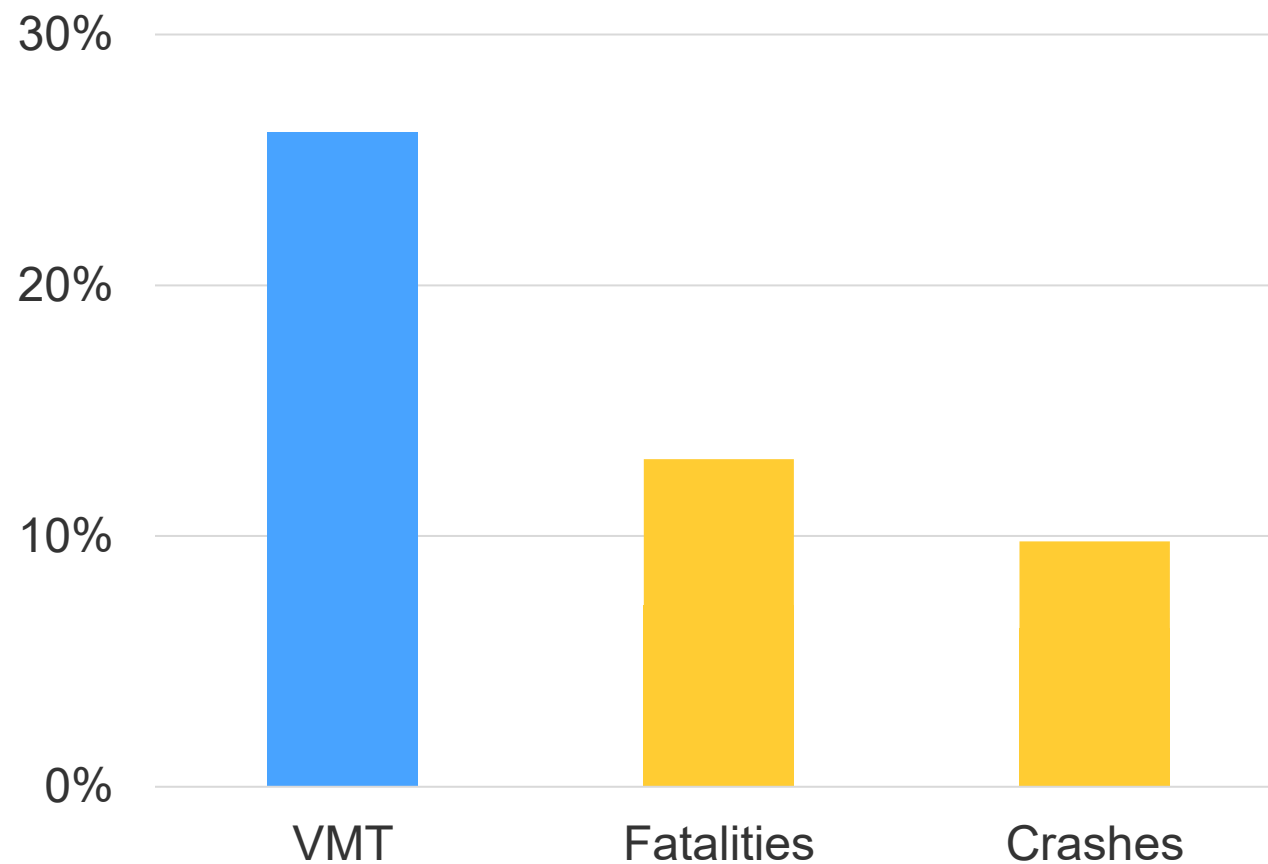


Partial automation effects in police-reported crashes



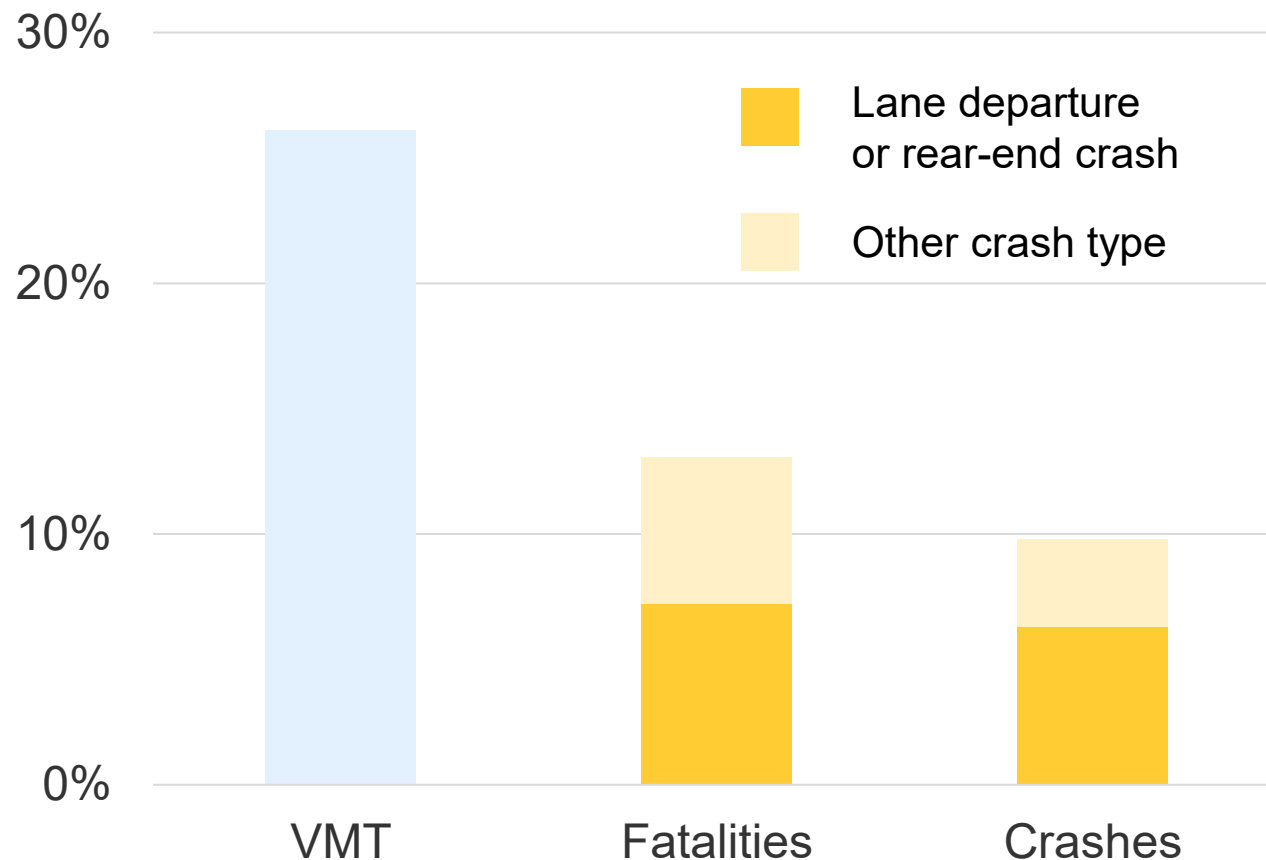
Interstate highways
are among the
safest roads

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



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

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



Examined crash effects on limited-access highways



Examined crash effects on
limited-access highways



and roads with
speed limits ≤ 56 kph



**Examined
lane departure crashes**

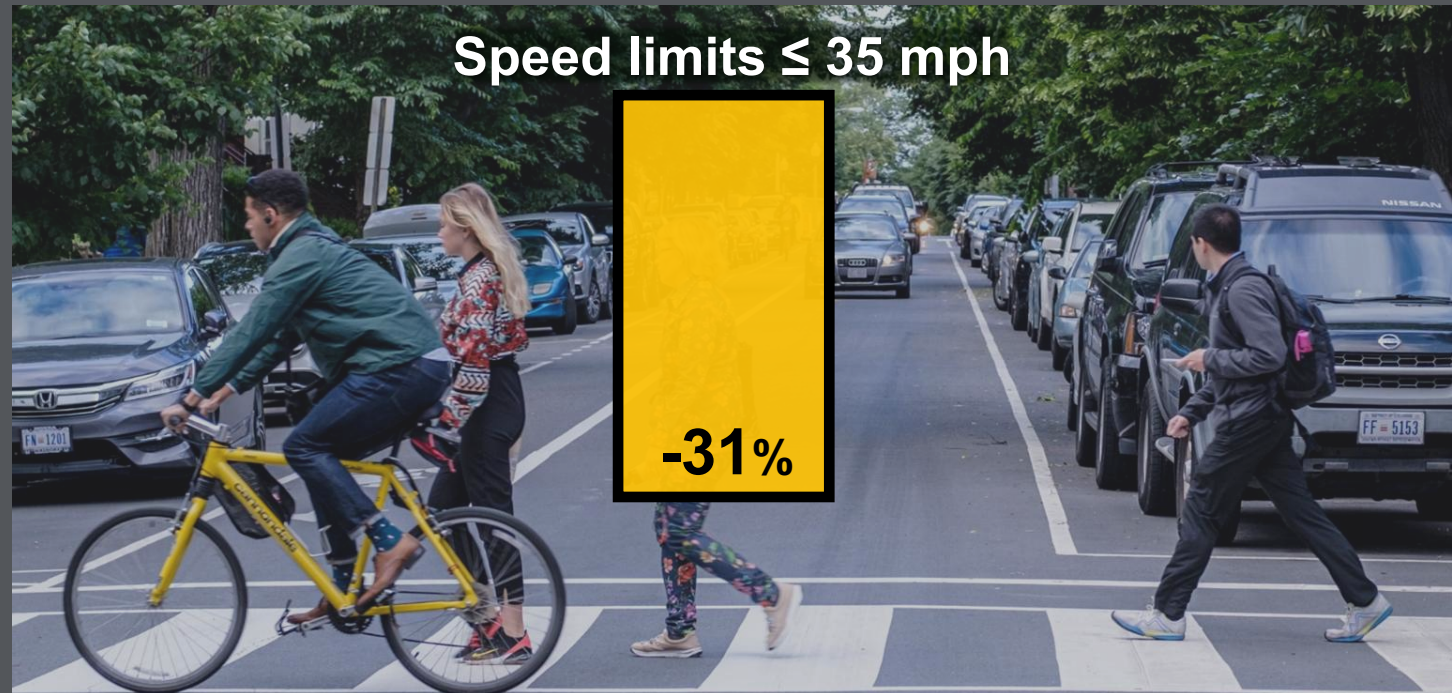


and rear-end crashes



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

■ Statistically significant



GOOD



POOR



Headlights on the Rogue were rated

A

Acceptable or

P

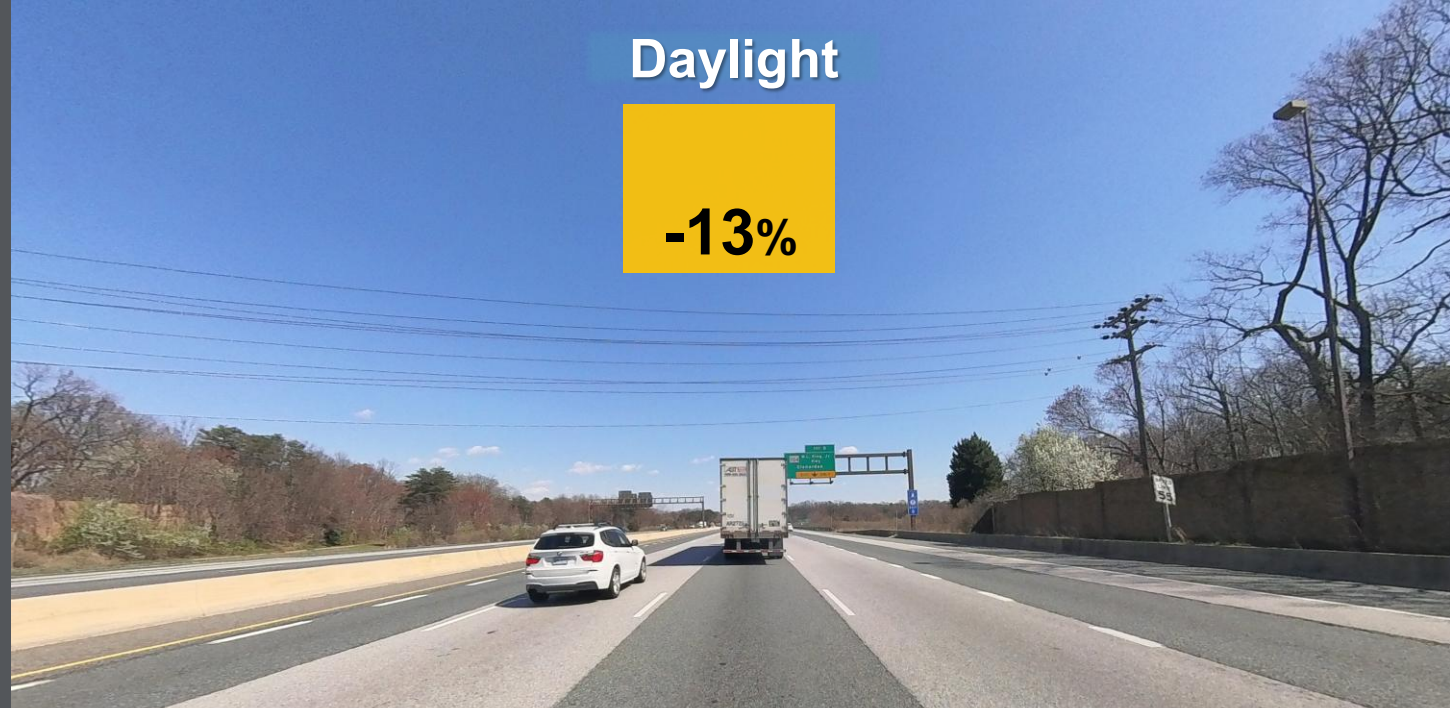
Poor

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

■ Statistically significant

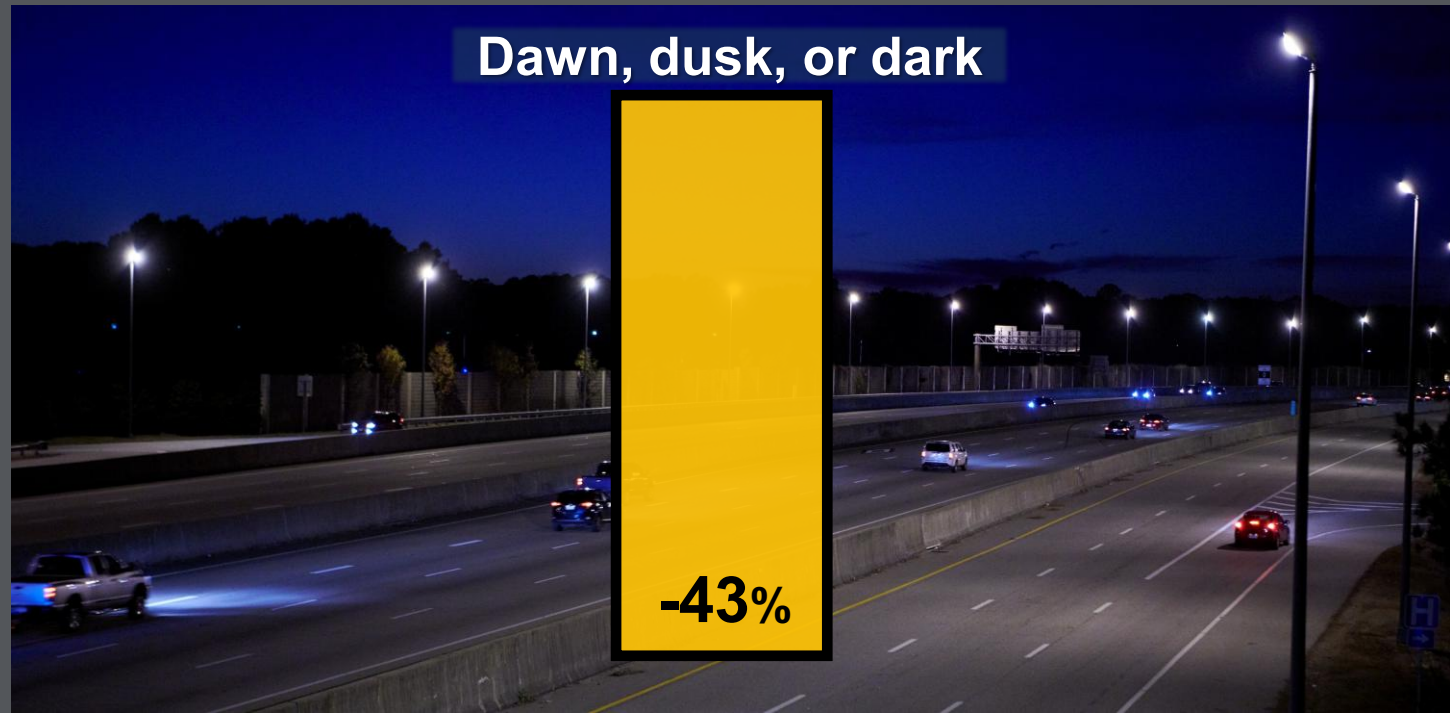
Daylight

-13%



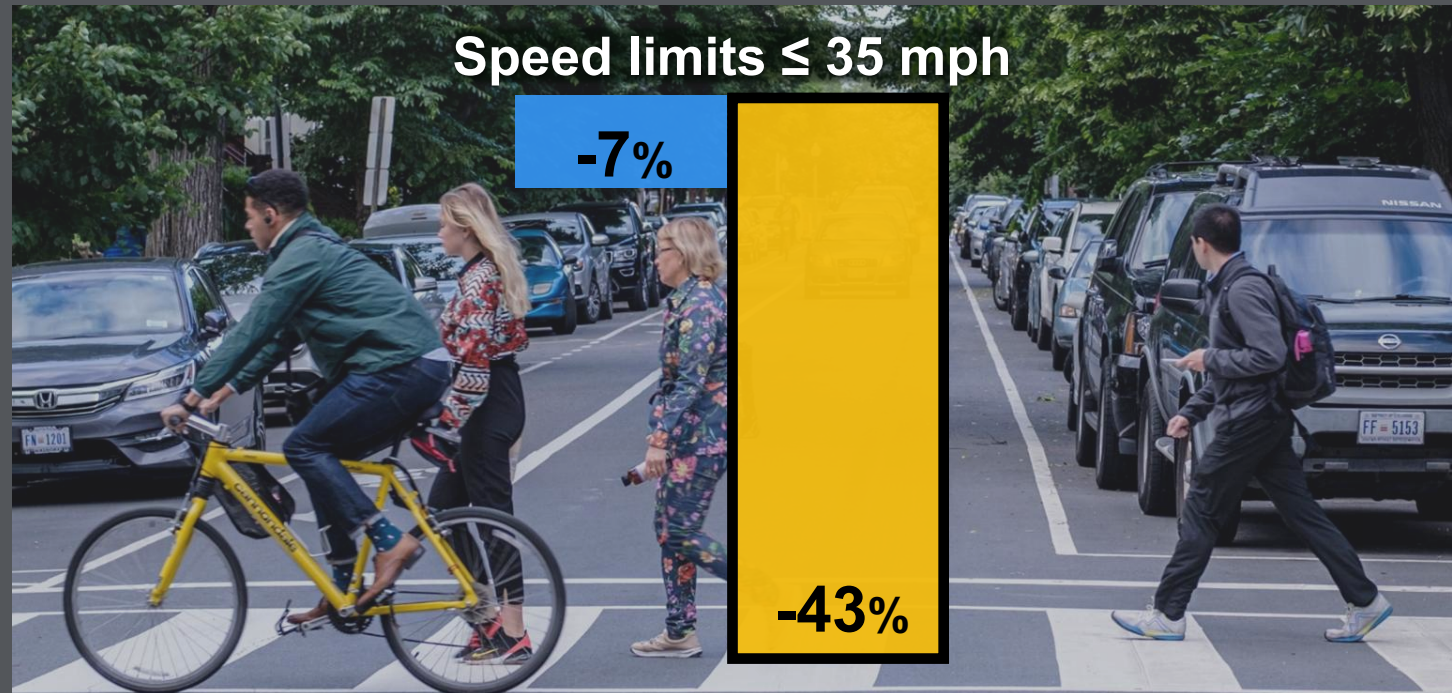
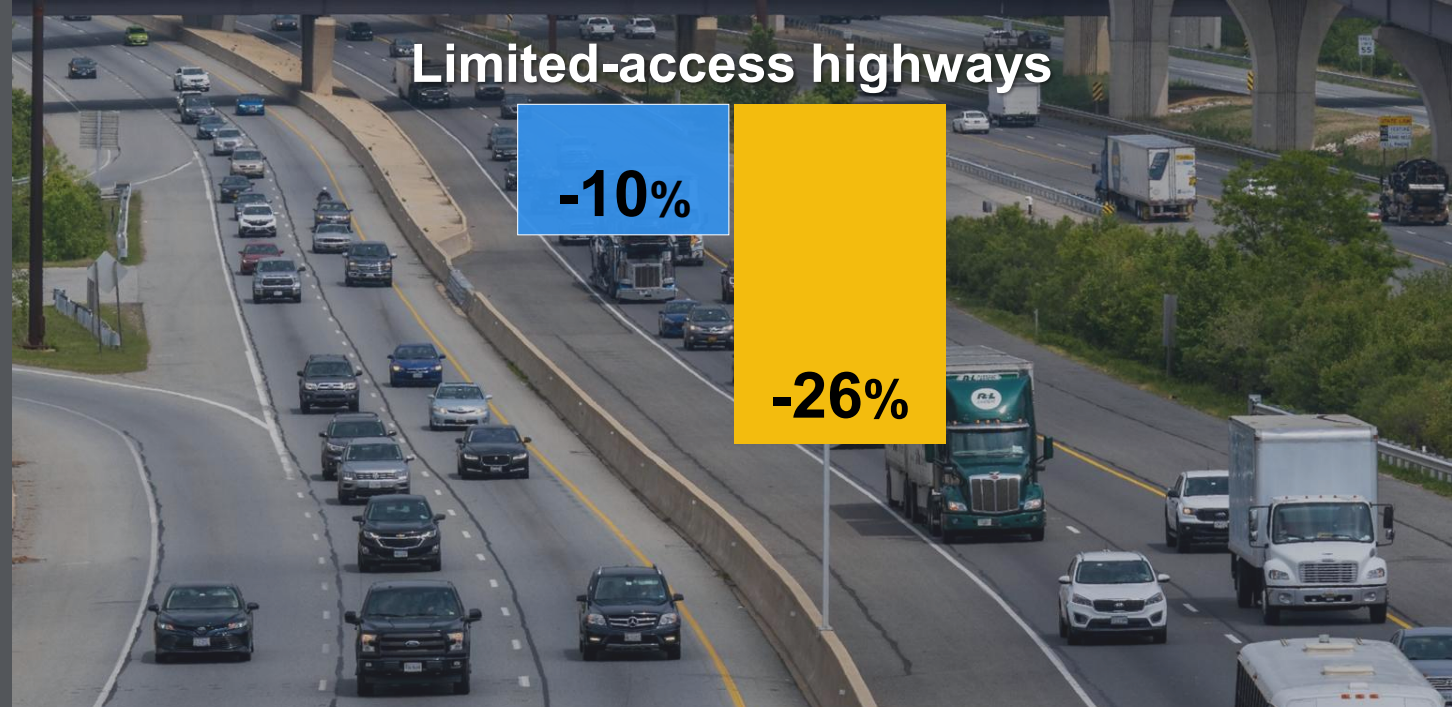
Dawn, dusk, or dark

-43%



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

■ Statistically significant



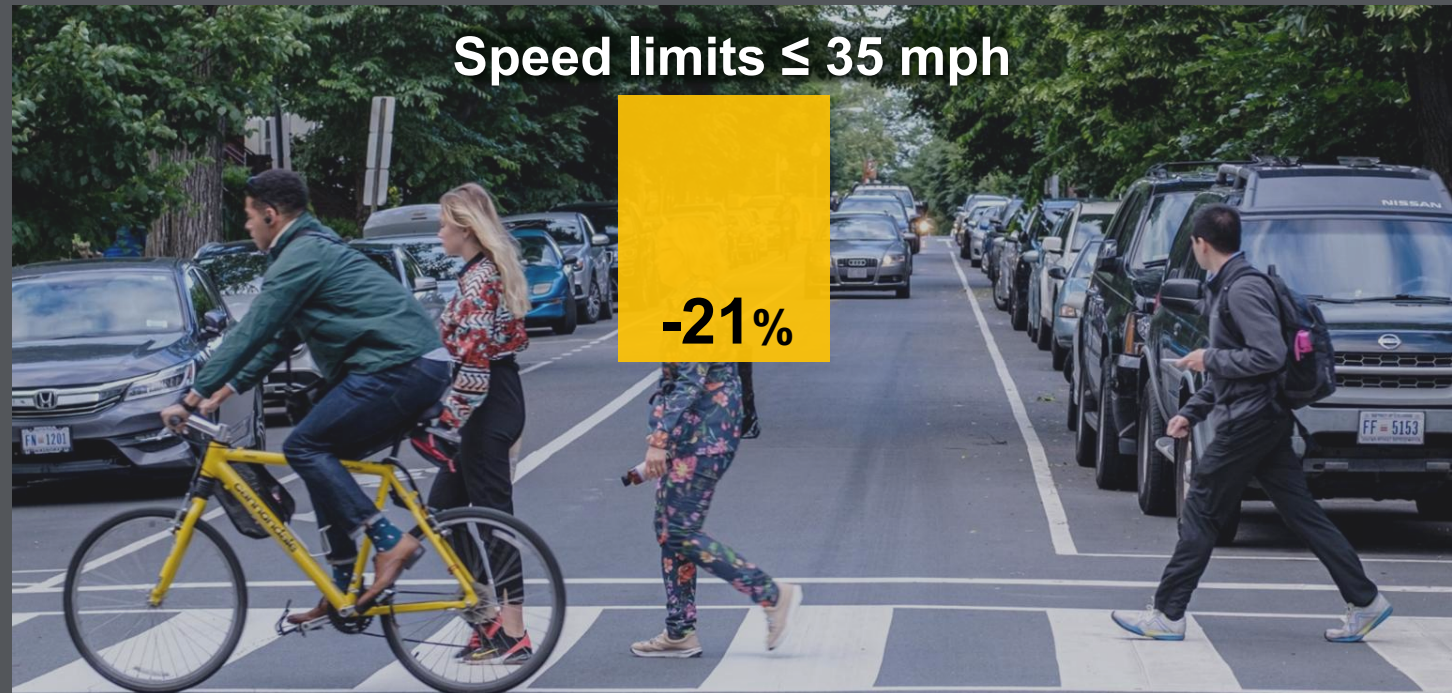
Lane departure
crash rate reductions for
BMW vehicles with
partial driving automation

■ Statistically significant



Limited-access highways

-11%



Speed limits \leq 35 mph

-21%

AEB was more capable on BMW models when paired with ACC

Without ACC

Radar system
Operated up to 35 mph

Advanced



With ACC

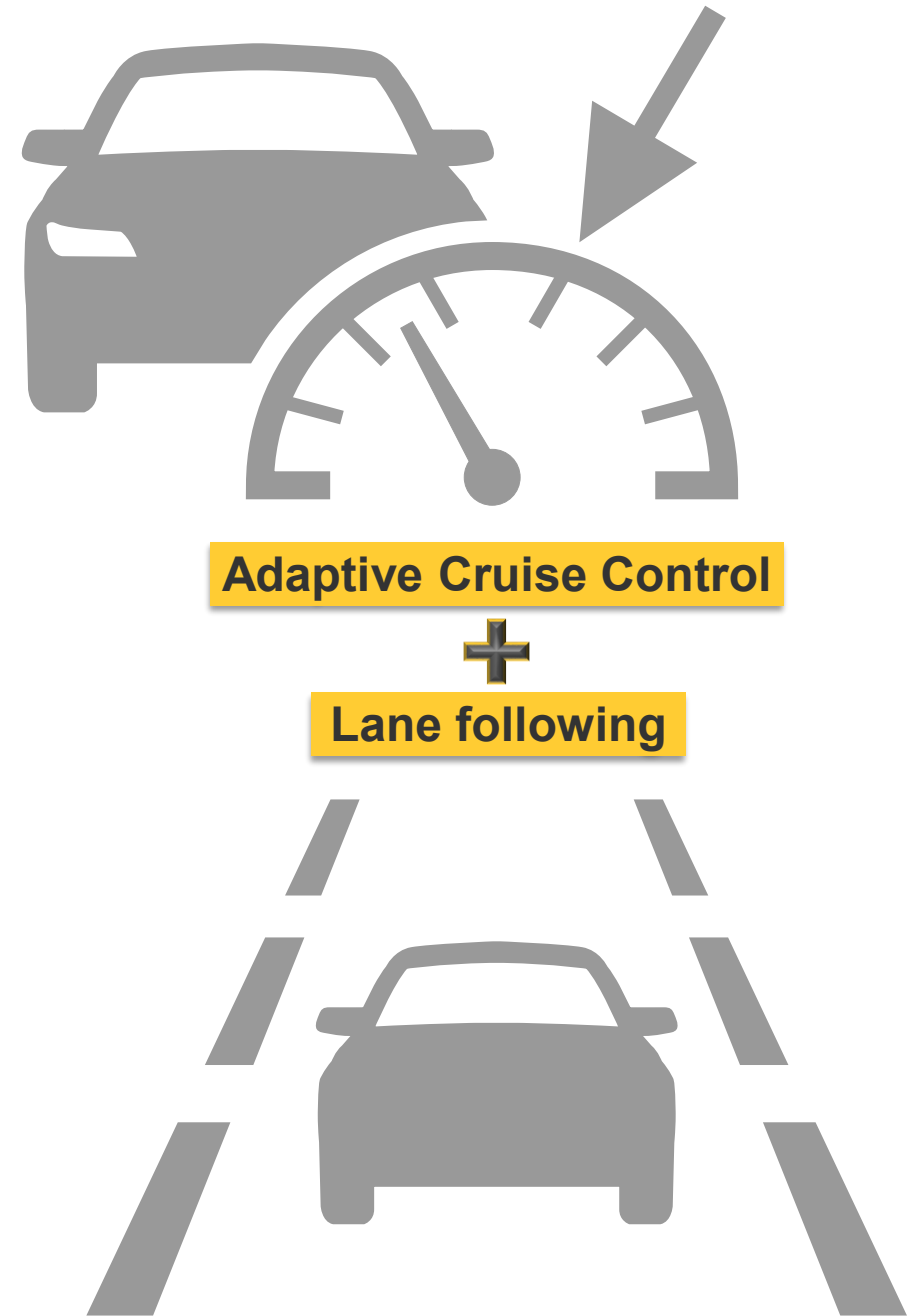
Fusion system
Operated at full speed range

Superior



Partial driving automation

is a
convenience feature



Automation information

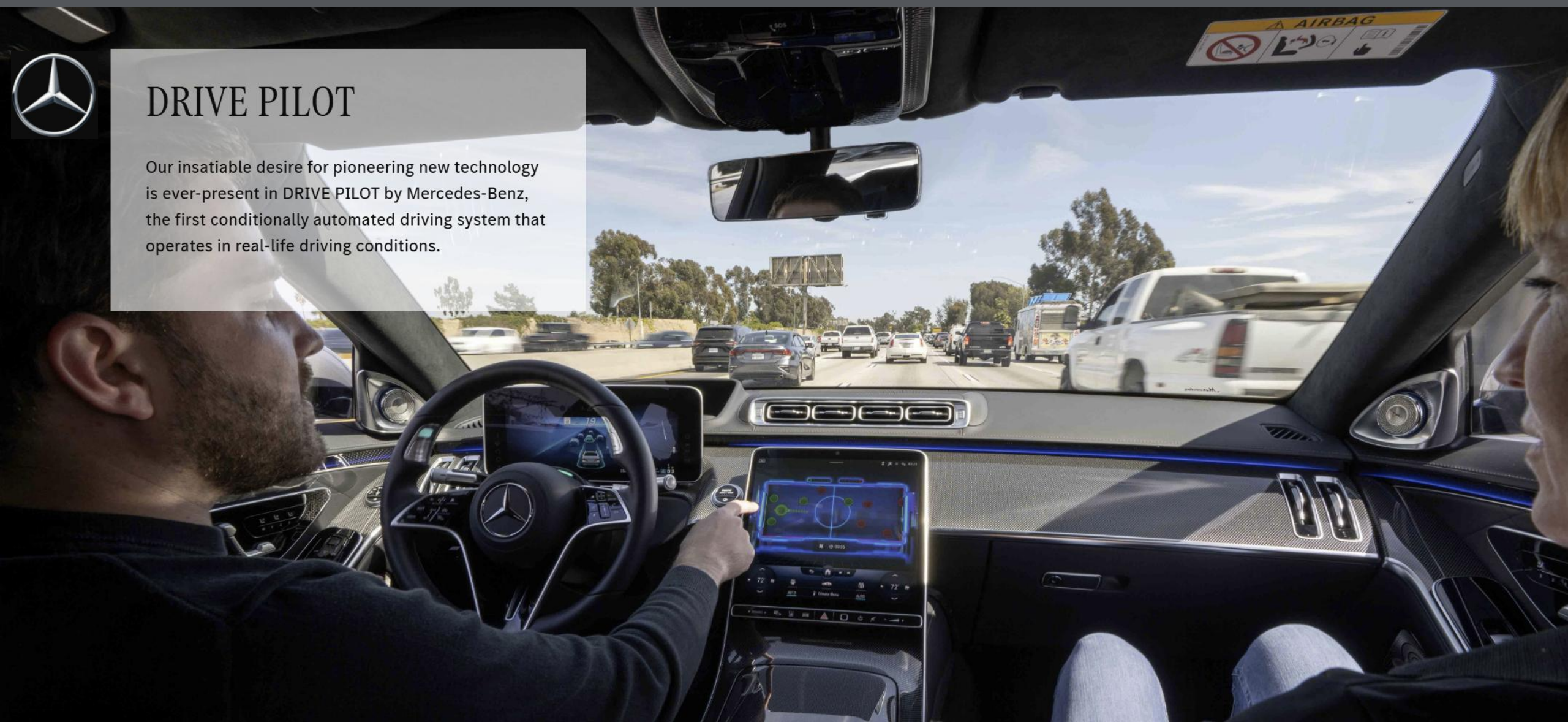


Mercedes-Benz Drive Pilot



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

Camera

Optical Image Capture for
3D Environment

Antenna Array

Highly Accurate Positioning

LiDAR

Laser Beams for
3D Environment

Ultrasonic Sensor

Sonic Impulses to Detect the
Near Vehicle Surroundings

Driver Camera

Detection of Driver Attention

Radar

Electromagnetic Waves for
Distance and Speed Measurement

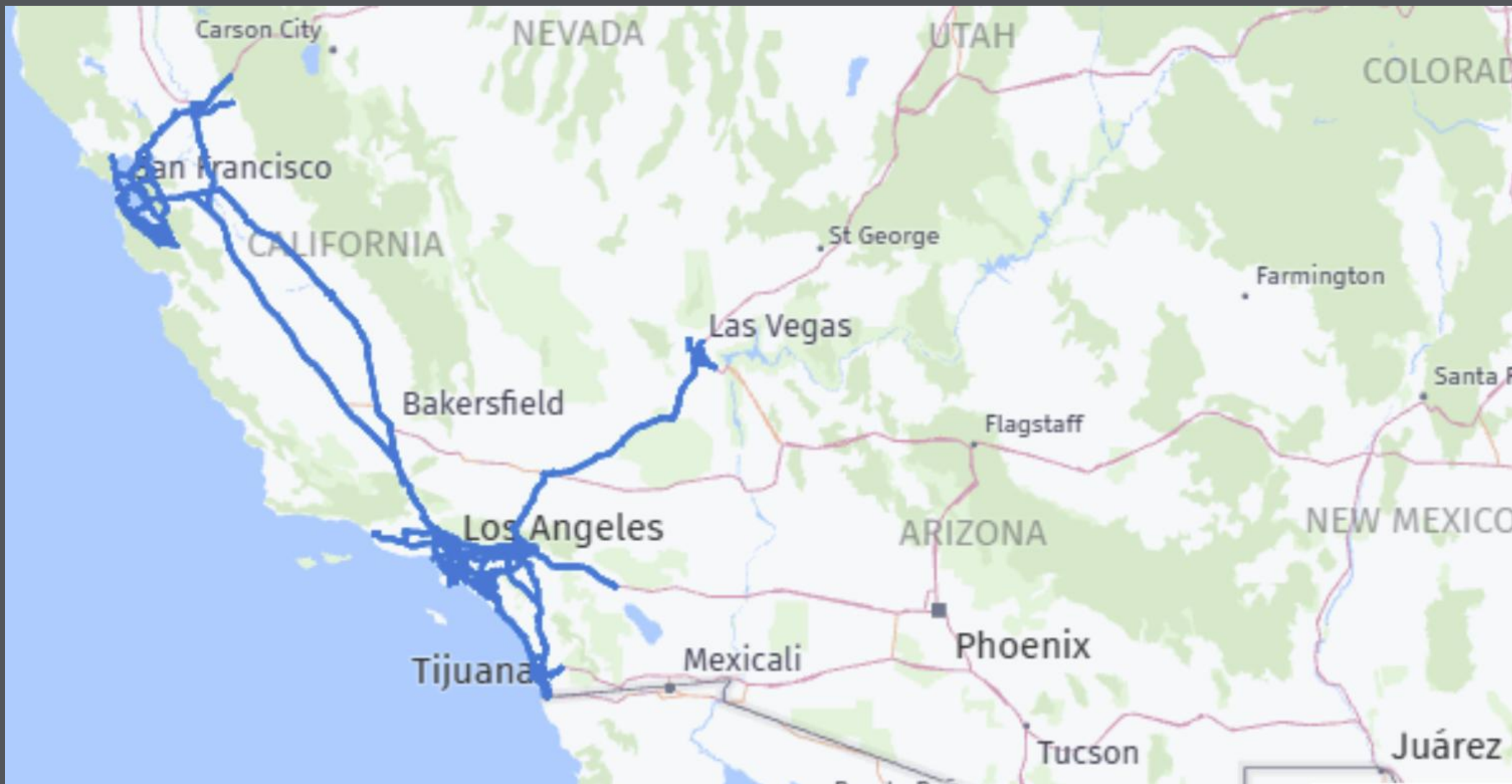
Road Moisture Sensor

Detection of Road Surface Wetness



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

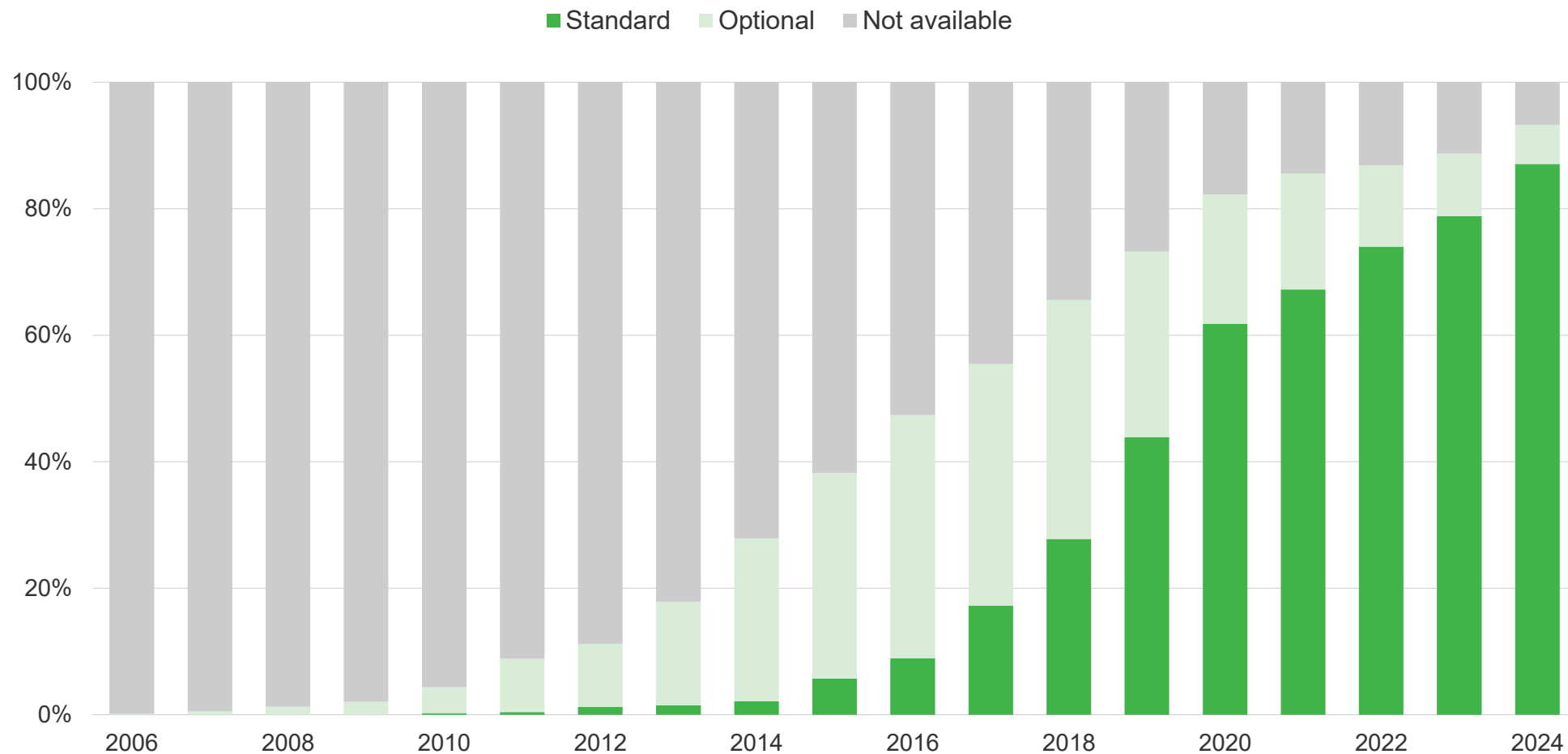
▶ Drive Pilot additional subscription cost of \$2,500 per year

Phase-in of collision avoidance systems



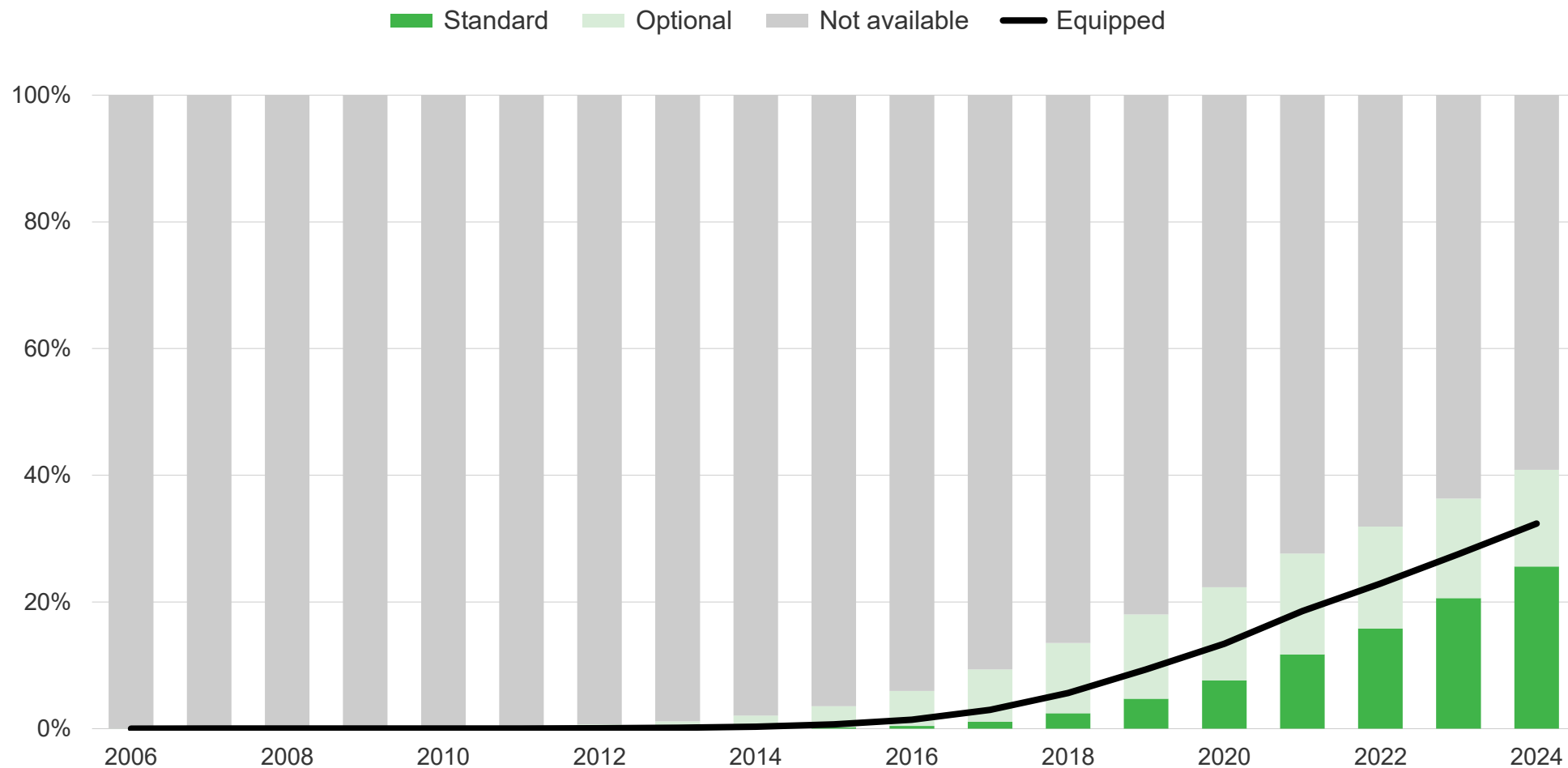
New vehicle series with front automatic emergency braking

By model year



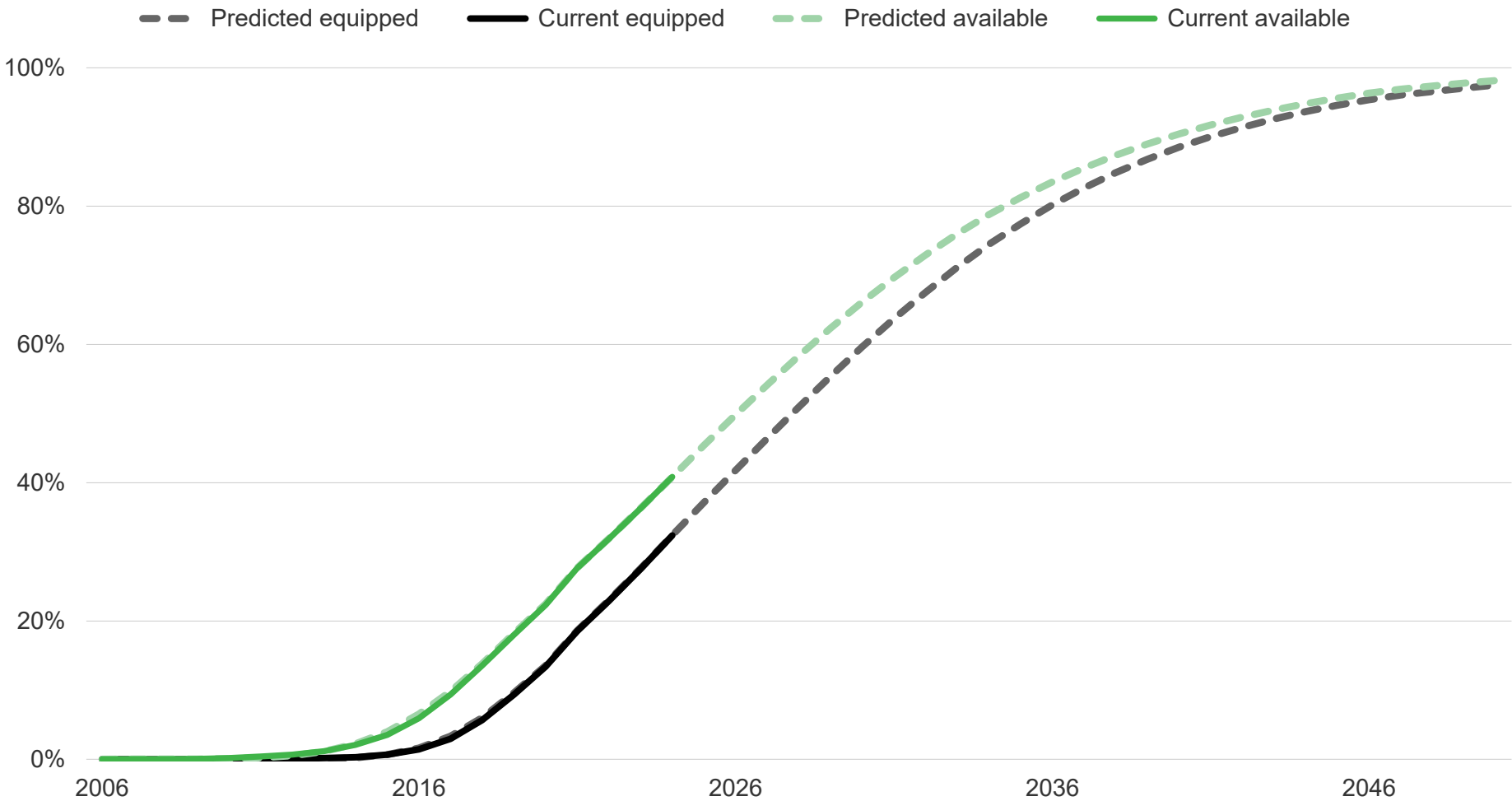
Registered vehicles with front automatic emergency braking

By calendar year



Predicted percentage of registered vehicles: front automatic emergency braking

By calendar year



**Which ADAS
feature is most
prevalent in
the fleet**

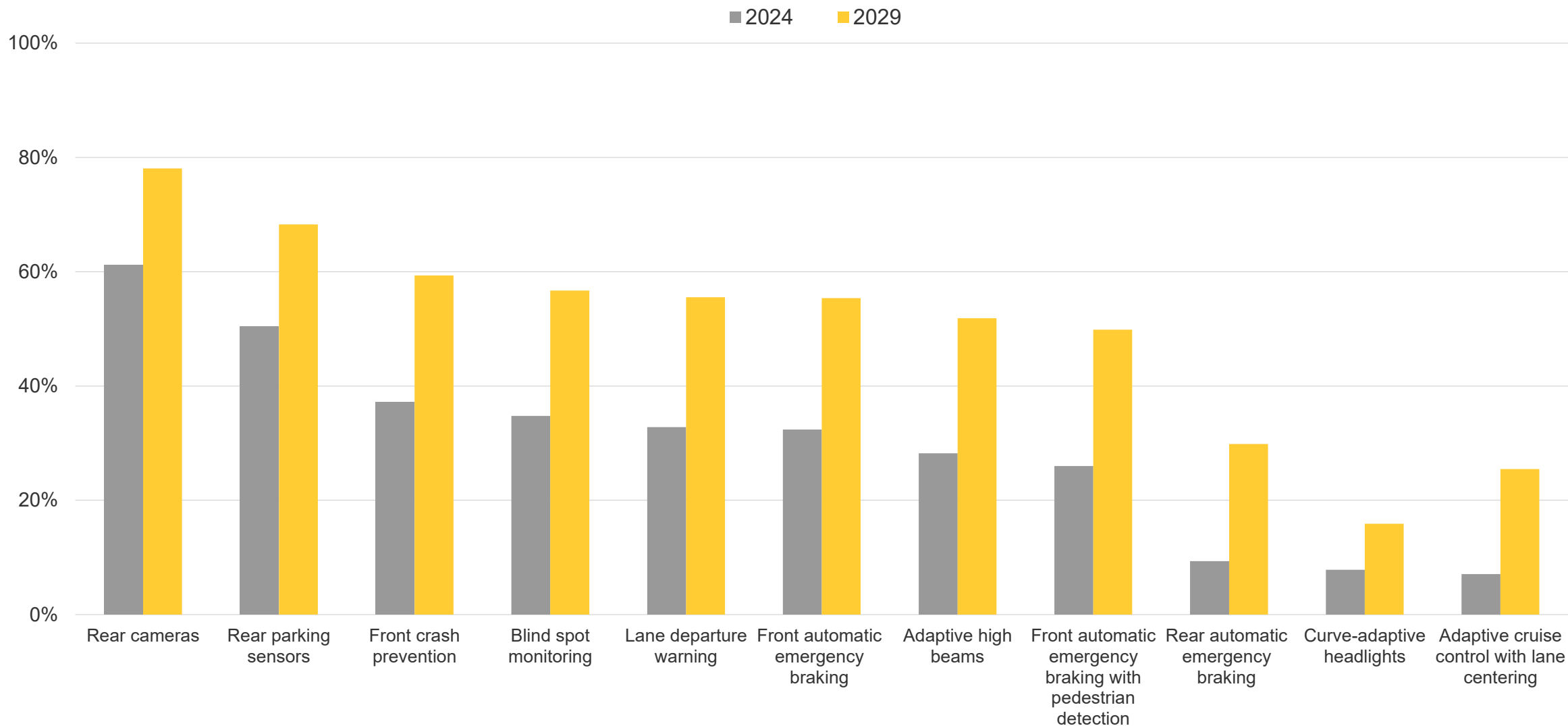


Which ADAS feature is most prevalent in the fleet?

- ▶ 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



/iihs.org



@IIHS_autosafety



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IIHS



/company/iihs-hldi



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THANK YOU



Kay Wakeman

Director of Insurance Outreach

kwakeman@hldi.org

