

IIHS-HLDI: ADAS, Marijuana, Teens and Theft

January 30, 2024



Matt Moore
Senior Vice President



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.

Member groups

IHS and HLDI are wholly supported by these auto insurers and insurance associations

Acceptance Insurance
Acuity Insurance
Allstate Insurance Group
American Family Insurance
American National
AmericanAg
Amica Mutual Insurance
AmShield Insurance
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
CSE Insurance Group

Desjardins Insurance
Donegal Insurance Group
DTRIC Insurance
ECM Insurance Group
Elephant Insurance Company
EMC Insurance Companies
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
FBAlliance Insurance Company
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Frankenmuth Insurance
Gainsco Insurance
GEICO Corporation
The General Insurance
Georgia Farm Bureau Mutual Insurance Company
Goodville Mutual Casualty Company

Gore Mutual
Grange Insurance
Hallmark Financial Services, Inc.
The Hanover Insurance Group
The Hartford
Haulers Insurance Company, Inc.
Horace Mann Insurance Companies
Indiana Farm Bureau Insurance
Indiana Farmers Insurance
Just Auto Insurance
Kemper Corporation
Kentucky Farm Bureau Mutual Insurance Companies
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
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
PEMCO Mutual Insurance Company
Plymouth Rock Assurance
Progressive Insurance
Redpoint County Mutual Insurance Company
The Responsive Auto Insurance Company
Rider Insurance
Rockingham Insurance
Root Insurance Co
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
Swiss Reinsurance Company Ltd
Texas Farm Bureau Insurance
The Travelers Companies, Inc.
United Auto
USAA
Virginia Farm Bureau Mutual Insurance
West Bend Mutual Insurance Company
Westfield
Zurich North America

Funding associations

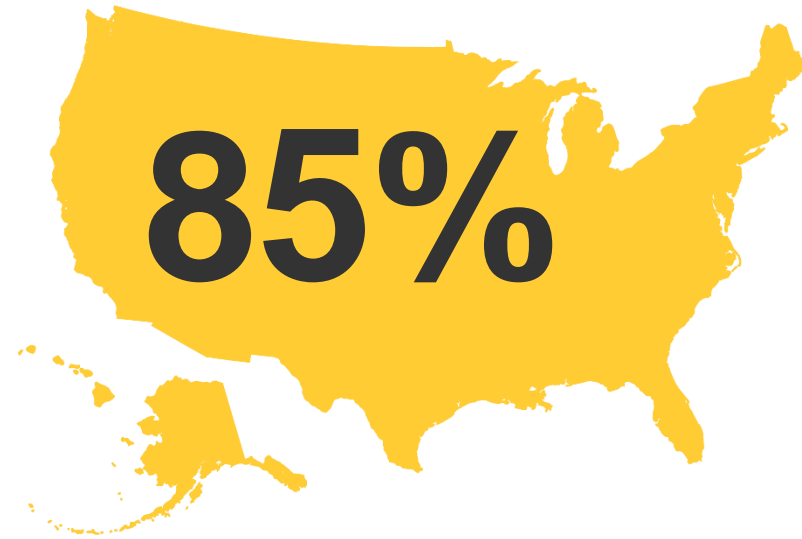
American Property Casualty Insurance Association
National Association of Mutual Insurance Companies



41 staff members



**HLDI data providers
represent**



**of the U.S.
private passenger
auto market**

21st Century Insurance
Allstate Insurance Group
American Family Insurance
American National
Amica Mutual Insurance
Company
Auto Club Group
Automobile Insurers Bureau
of Massachusetts
CHUBB
COUNTRY Financial

CSAA Insurance Group
Erie Insurance Group
Esurance
Farm Bureau Financial Services
Farm Bureau Insurance of
Tennessee
Farmers Insurance Group
Florida Farm Bureau Insurance
Companies
Foremost
GEICO Corporation

The Hanover Insurance Group
The Hartford
Kemper Corporation
Kentucky Farm Bureau Mutual
Insurance Companies
Liberty Mutual Insurance
MetLife
National General Insurance
Nationwide
NJM Insurance Group
PEMCO Mutual Insurance
Company

Plymouth Rock Assurance
Progressive Insurance
Rockingham Insurance
Safeco Insurance®
SECURA Insurance
Sentry Insurance
Shelter Insurance
State Farm Insurance
Companies
Texas Farm Bureau Insurance
The Travelers Companies, Inc.
USAA

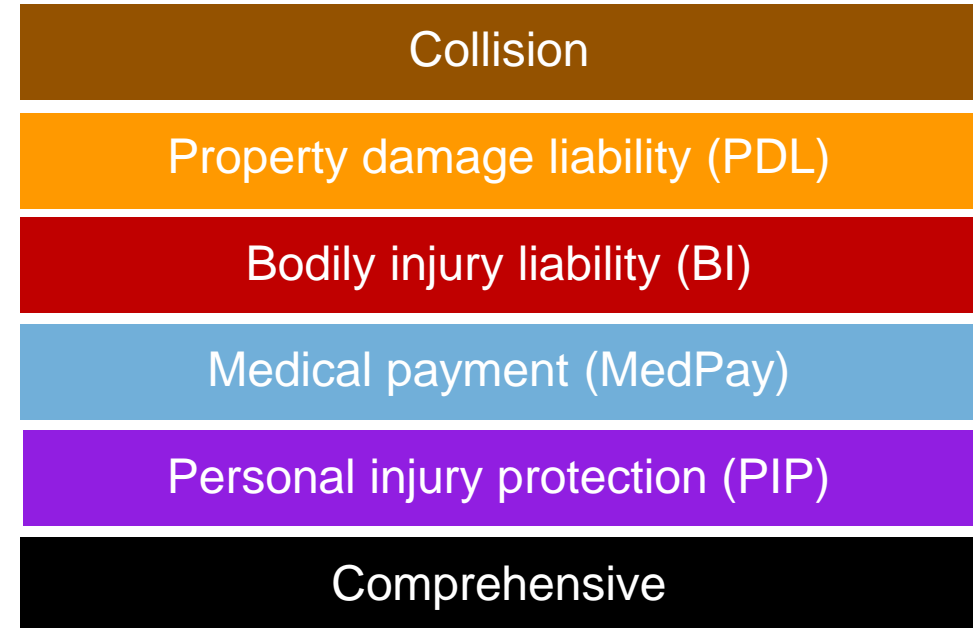
Other data suppliers



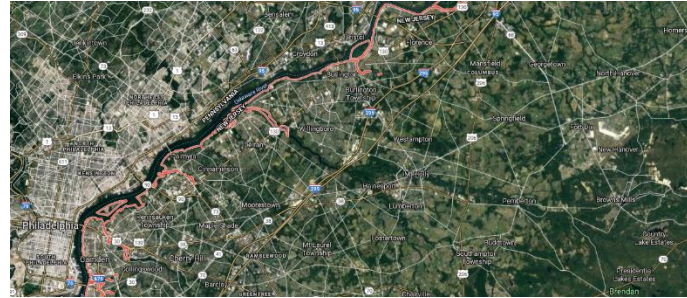
Loss data overview

6 coverage types:

- ▶ Monthly transactional data for coverage and loss
- ▶ Auto and motorcycle



Covariates



	Limits	Deductible	Premium
Liability Coverage			\$138
Bodily Injury Liability	\$250,000 each person/\$500,000 each accident		
Property Damage Liability	\$100,000 each accident		
Uninsured Motorists			12
Uninsured Motorists Bodily Injury	\$250,000 each person/\$500,000 each accident		
Uninsured Motorists Property Damage	\$100,000 each accident		
Medical Expense Benefits	\$2,500 per person		5
Other Than Collision	Actual Cash Value	\$500	26
Collision	Actual Cash Value	\$500	81
Transportation Expenses	\$600 each occurrence		7
Towing and Labor Costs	\$75 per disablement		5

Rated driver variables

- ▶ Age
- ▶ Gender
- ▶ Marital status
- ▶ Risk

Geographic variables

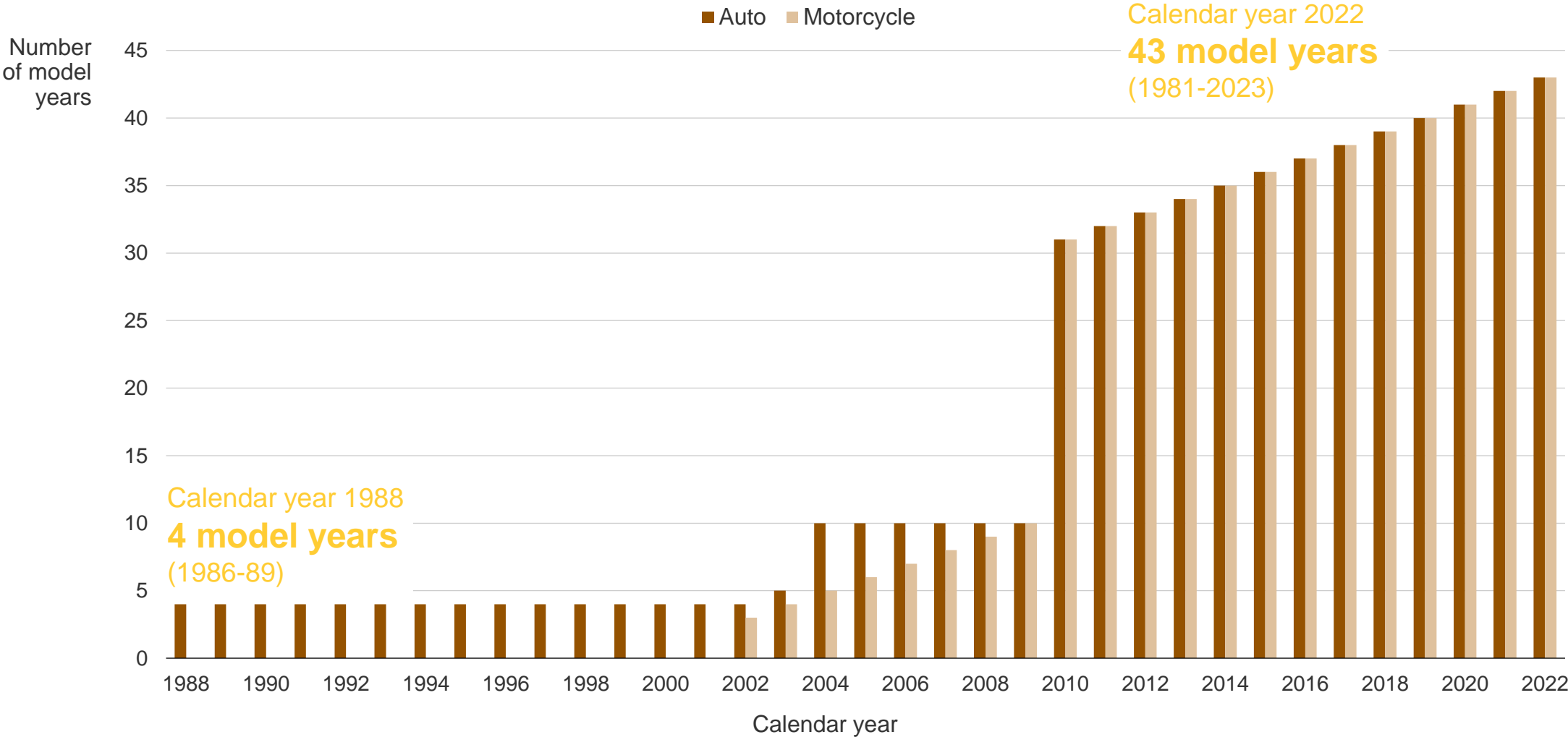
- ▶ Garaging ZIP code
- ▶ Garaging state
- ▶ Registered vehicles per square mile

Policy variables

- ▶ Deductibles
- ▶ Limits

Loss data availability

Collision, by calendar year



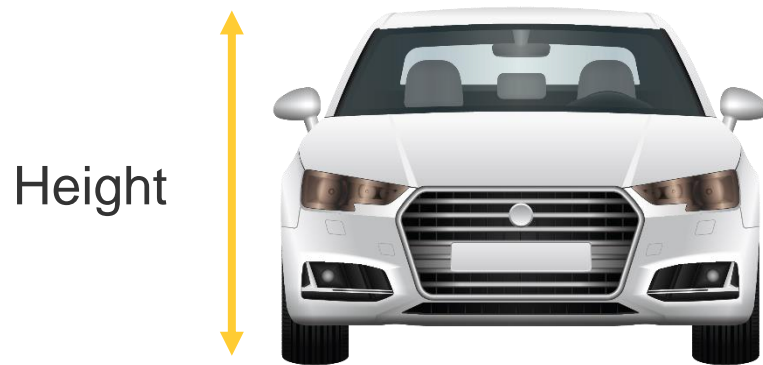
Vehicle specifications



Base price

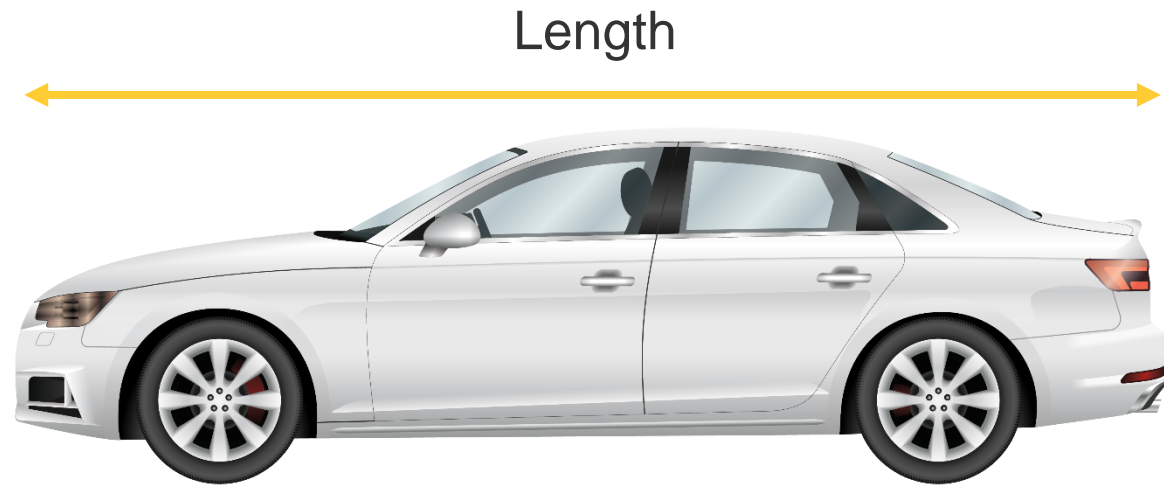


Curb weight



Height

Width



Length

Wheelbase

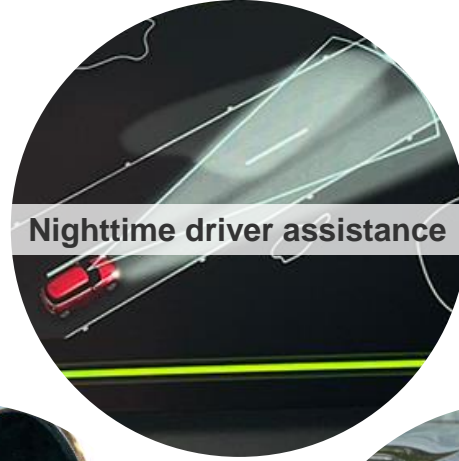
Vehicle features



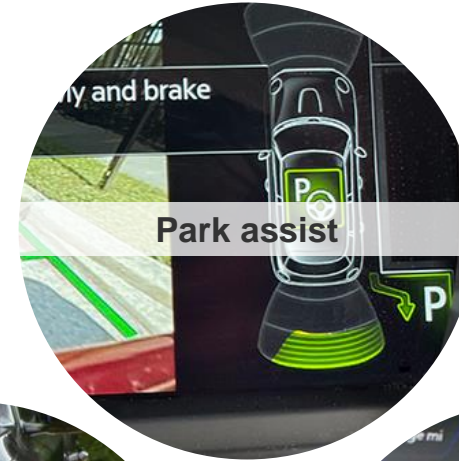
Front crash prevention



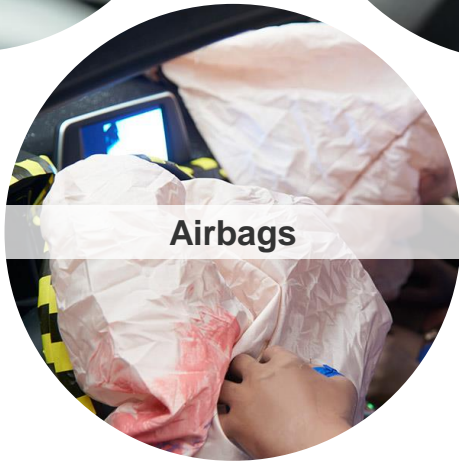
Lane maintenance



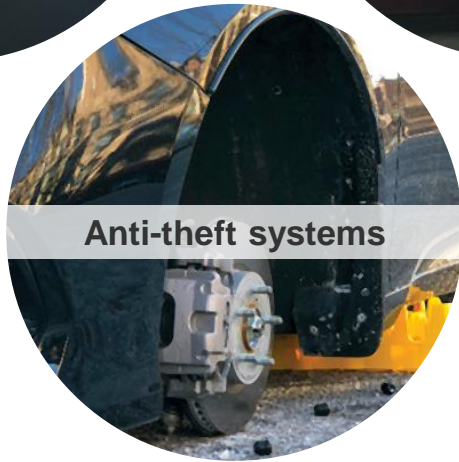
Nighttime driver assistance



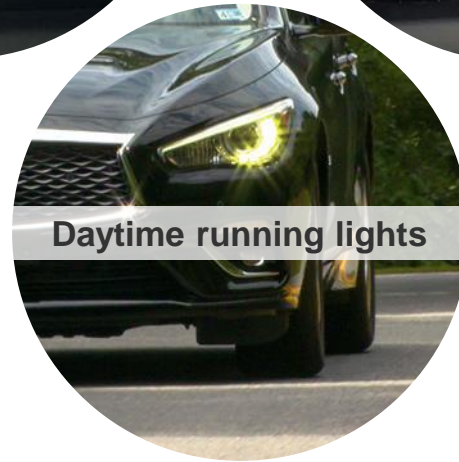
Park assist



Airbags



Anti-theft systems



Daytime running lights



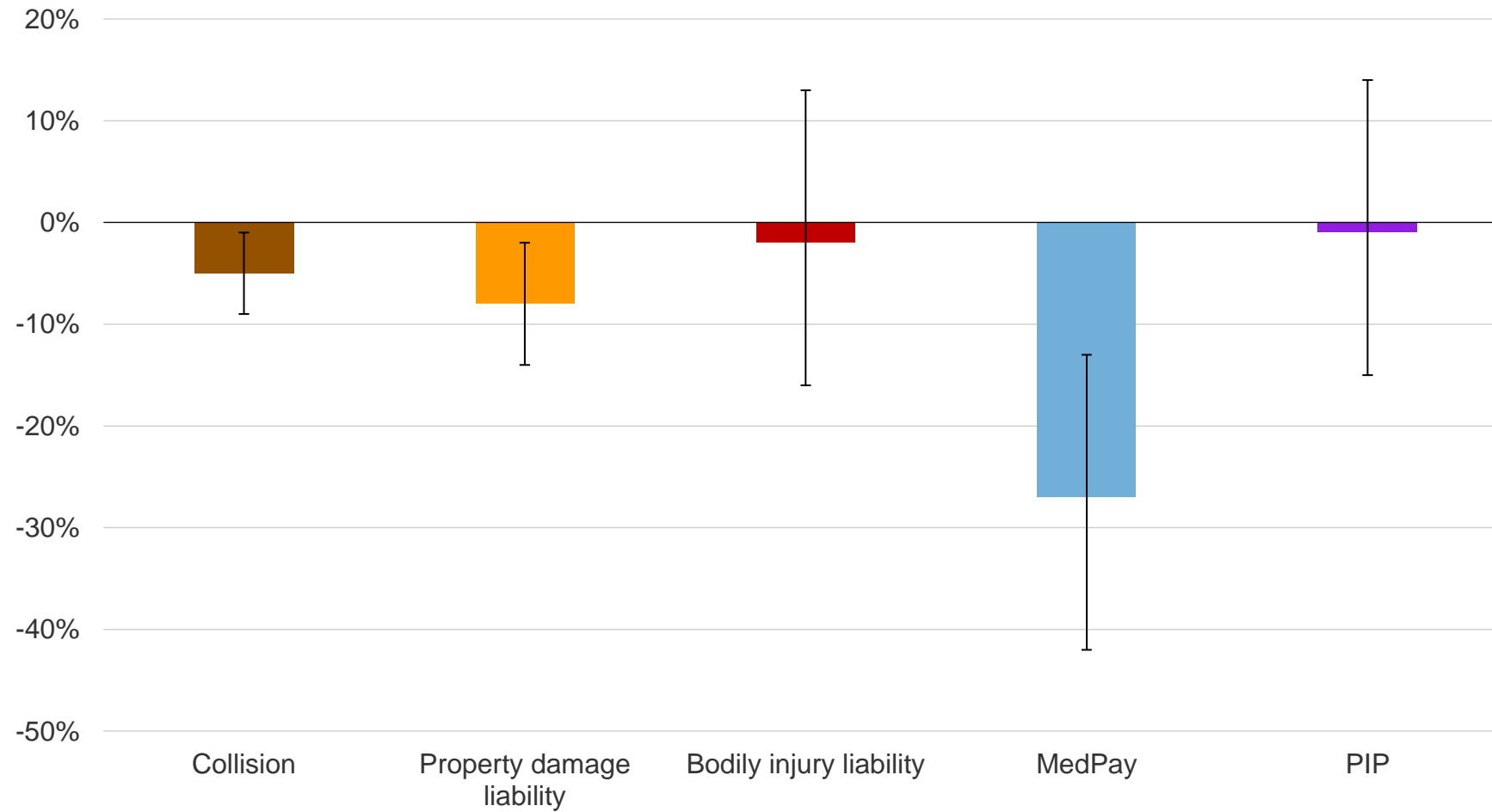
ABS

Advanced driver assistance systems

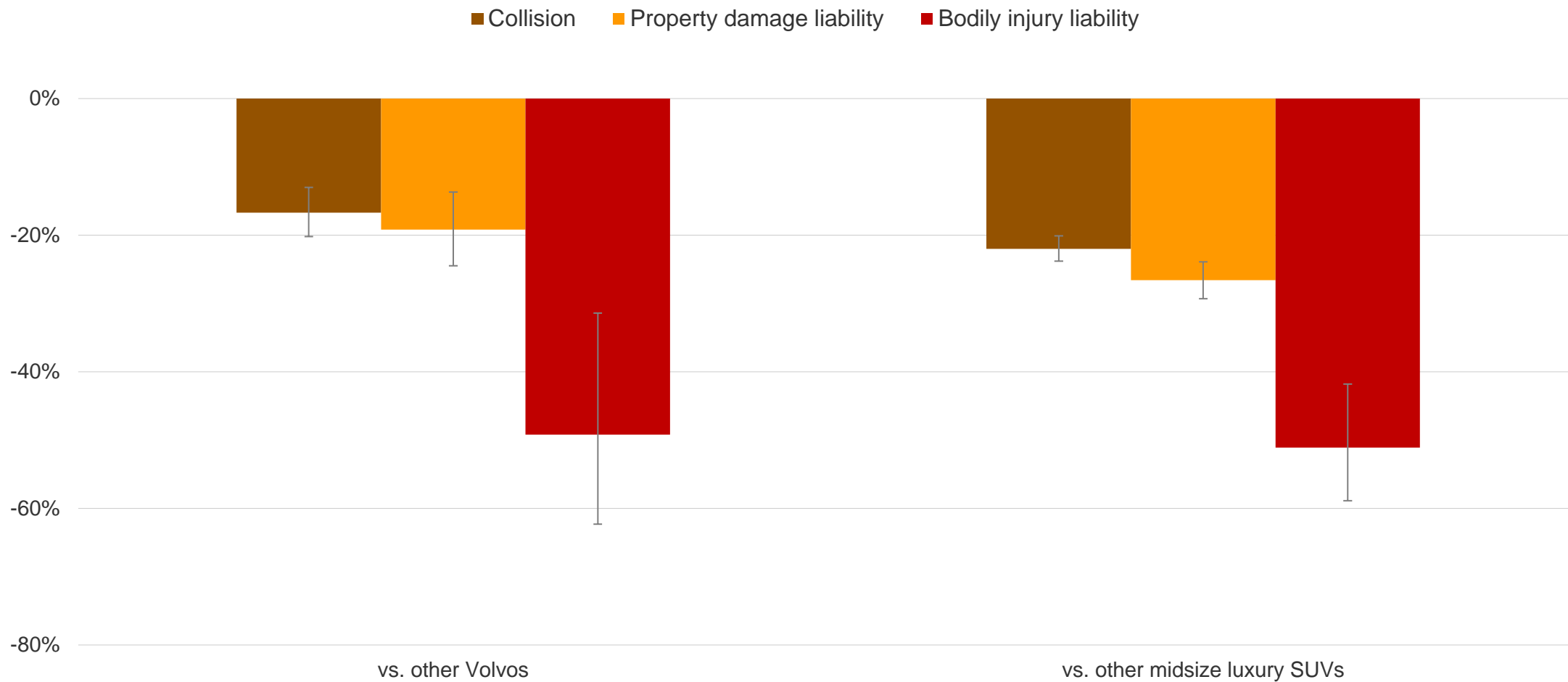


2009 study of Mercedes-Benz Distronic

With Distronic vs. without

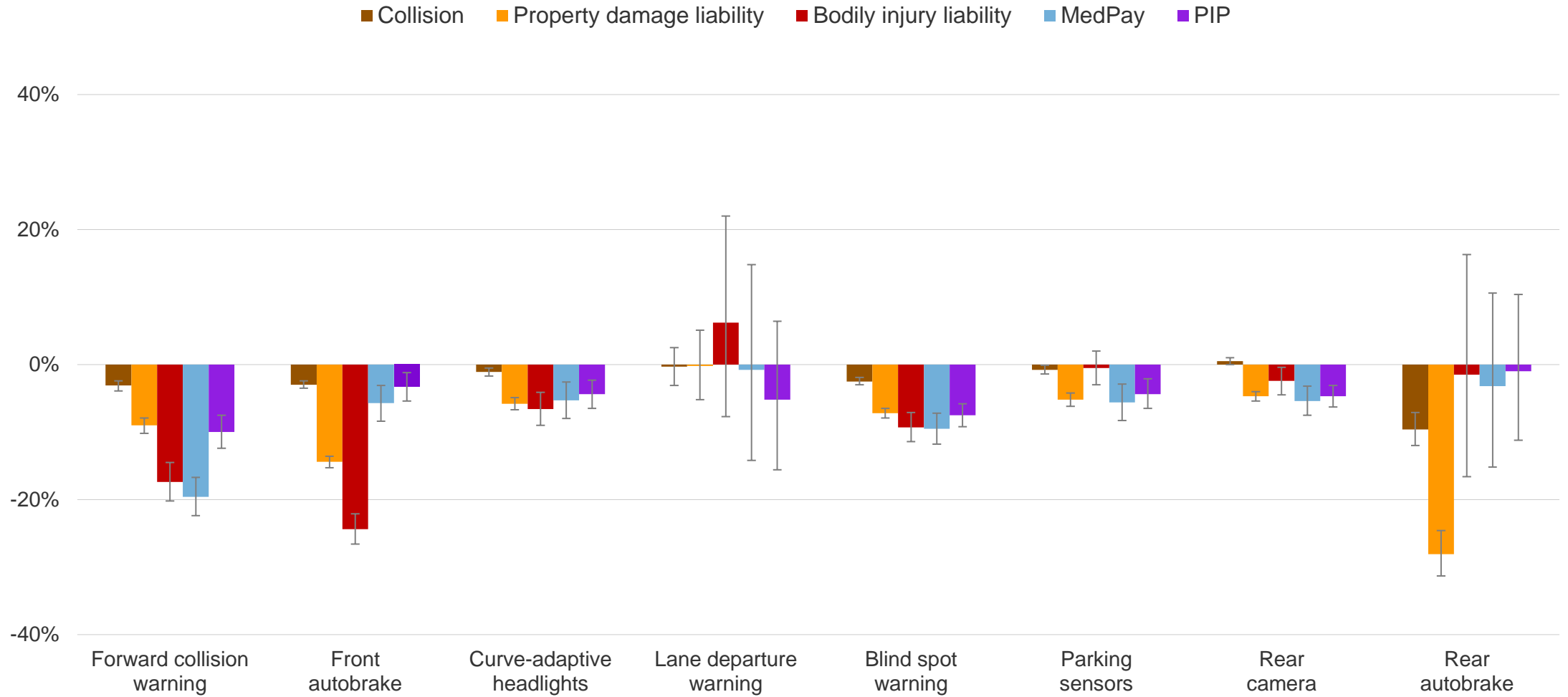


2011 study of Volvo XC60 City Safety



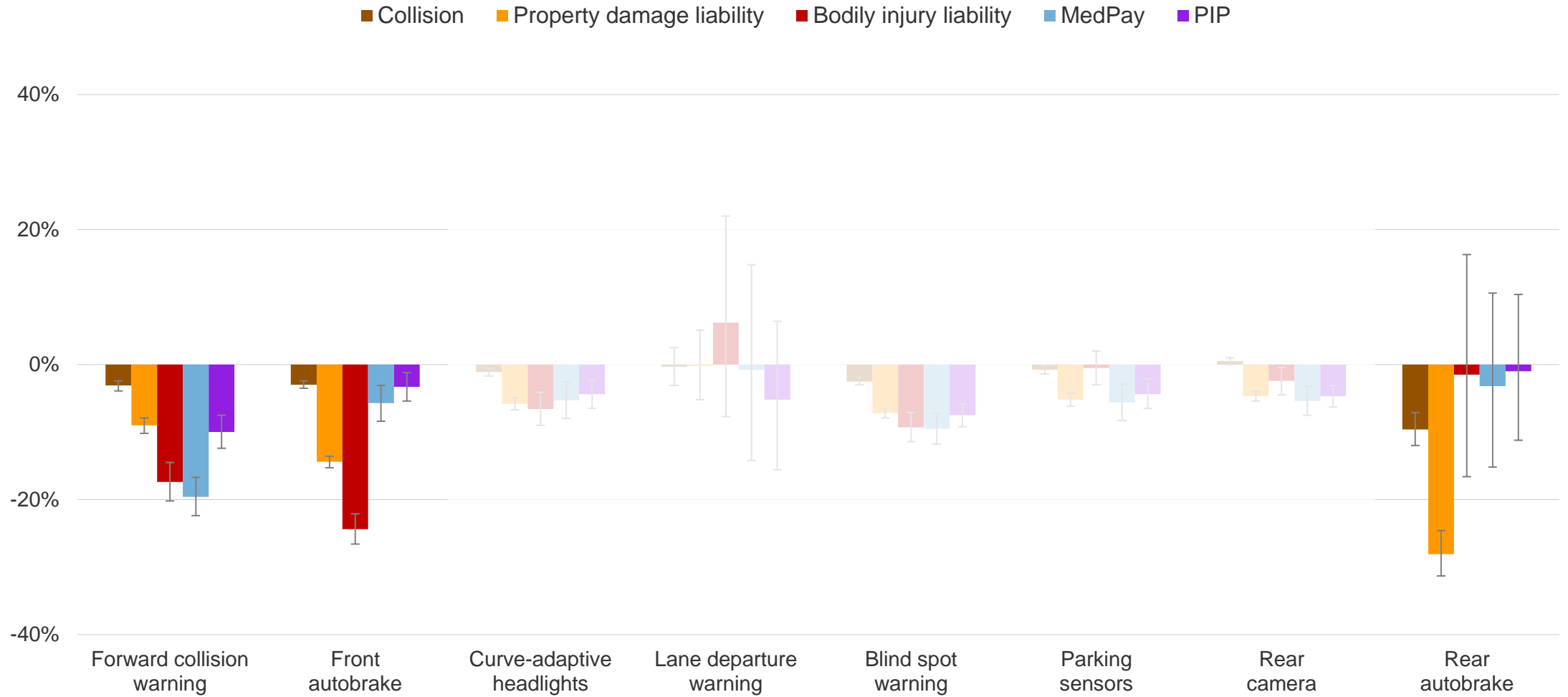
Summary of technology effects on insurance claim frequency

Results pooled across automakers



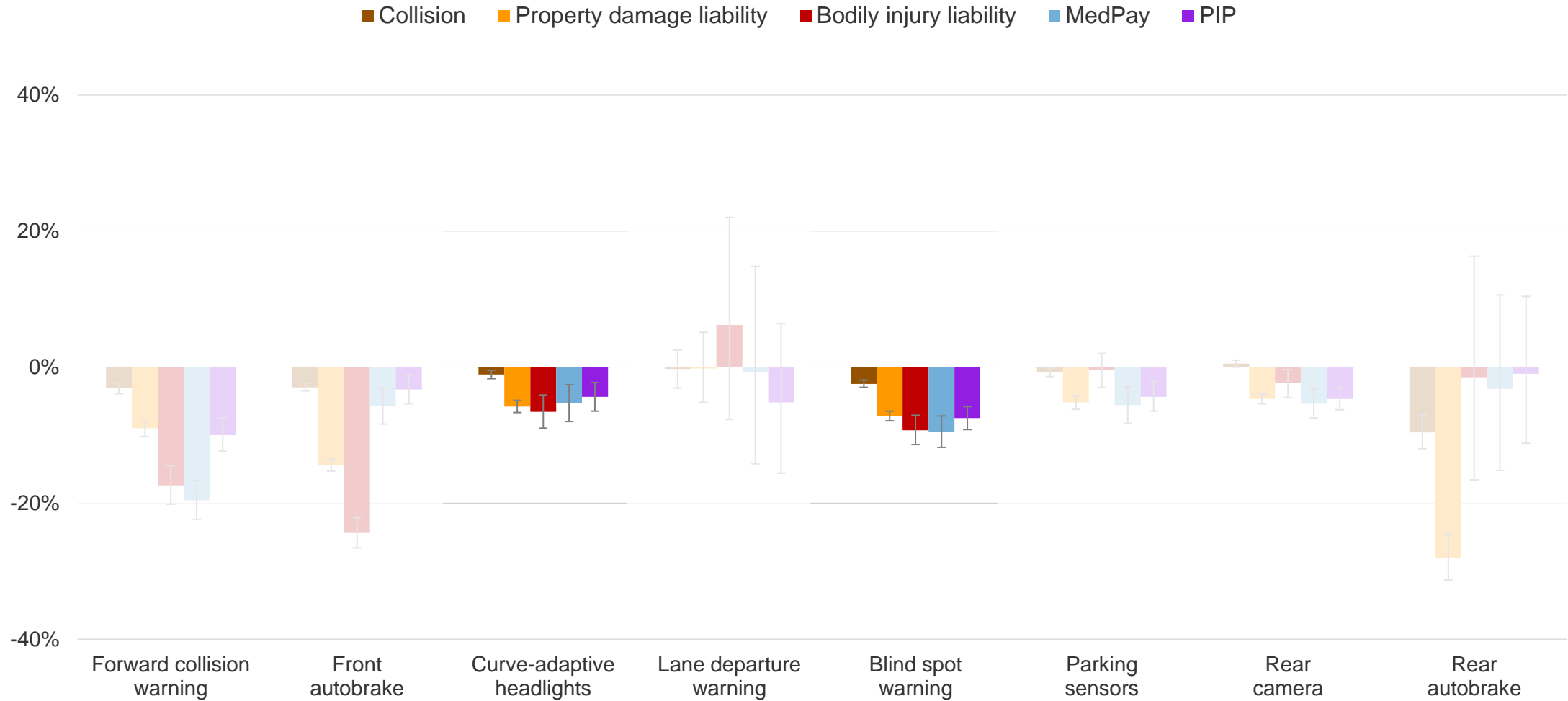
Summary of technology effects on insurance claim frequency

Results pooled across automakers



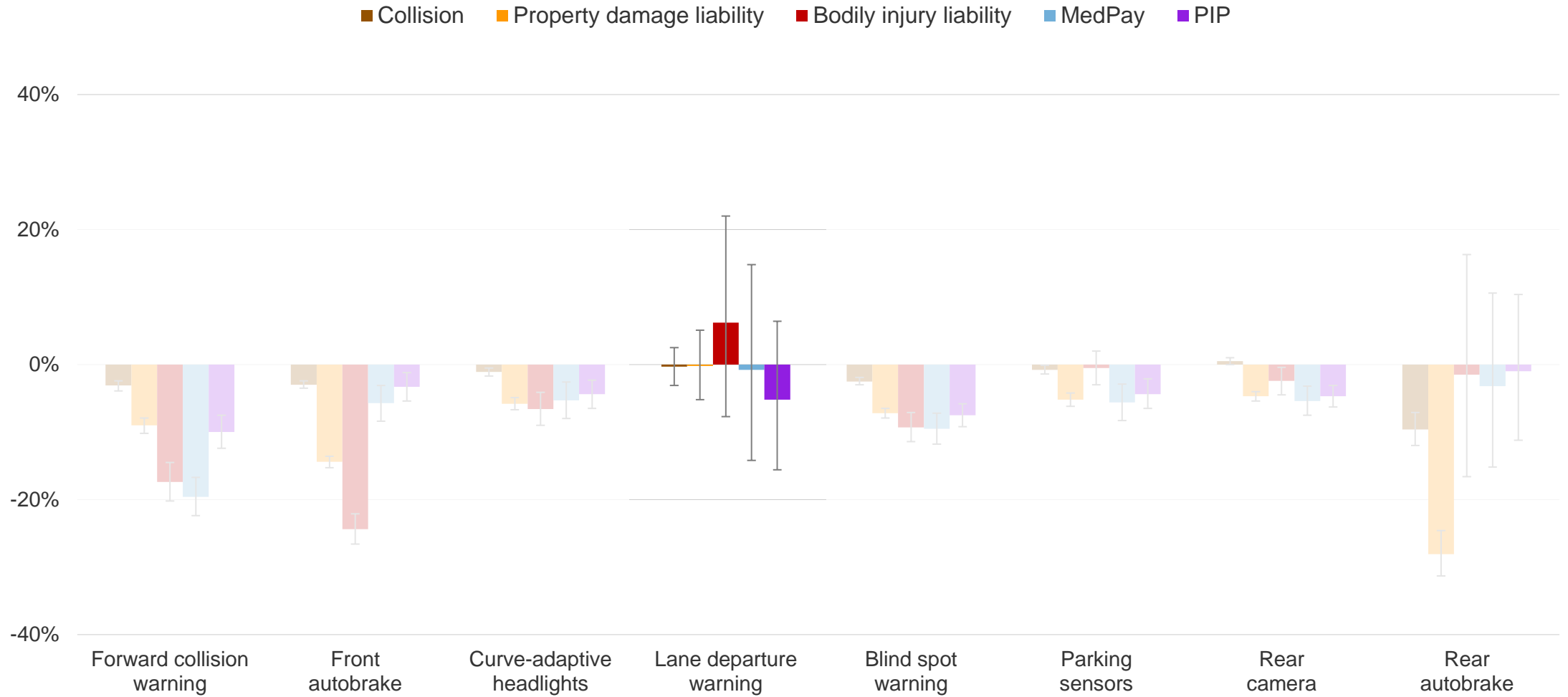
Summary of technology effects on insurance claim frequency

Results pooled across automakers



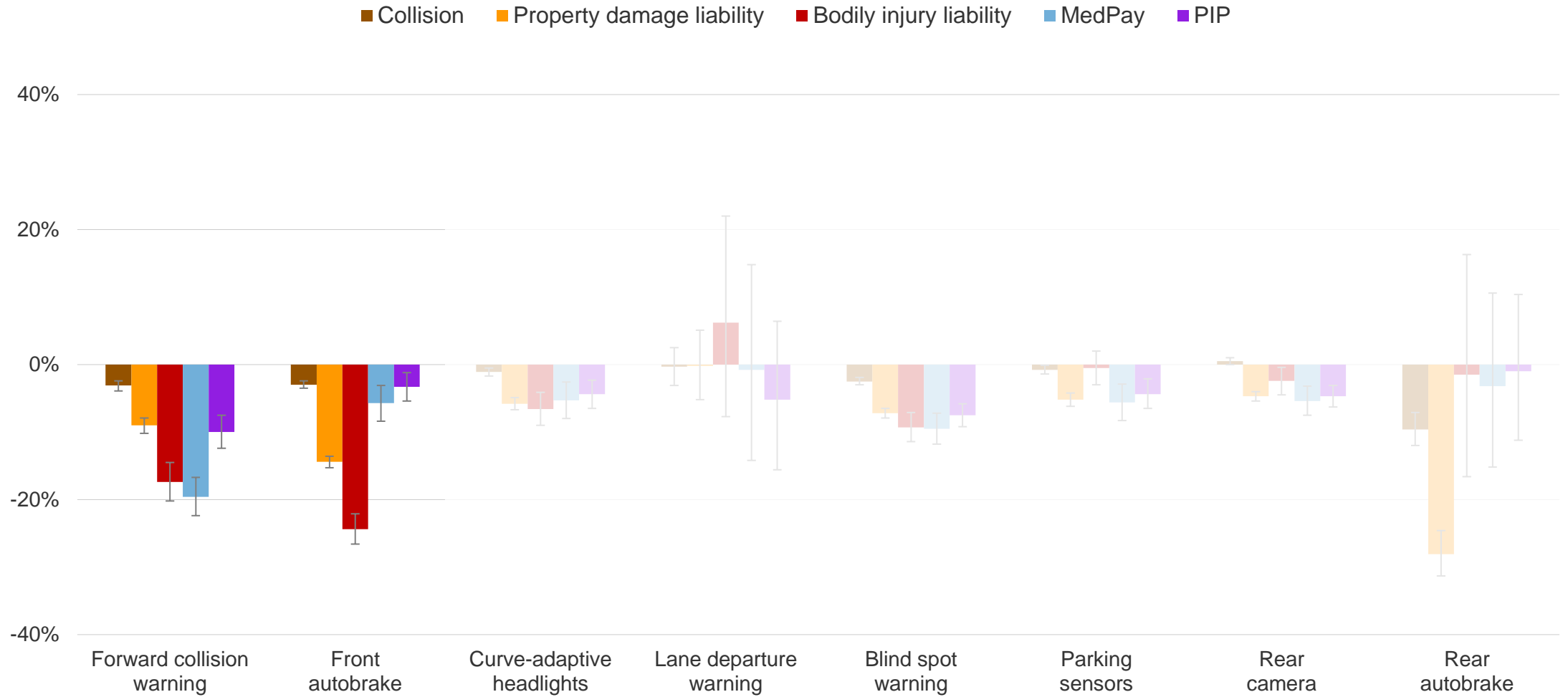
Summary of technology effects on insurance claim frequency

Results pooled across automakers



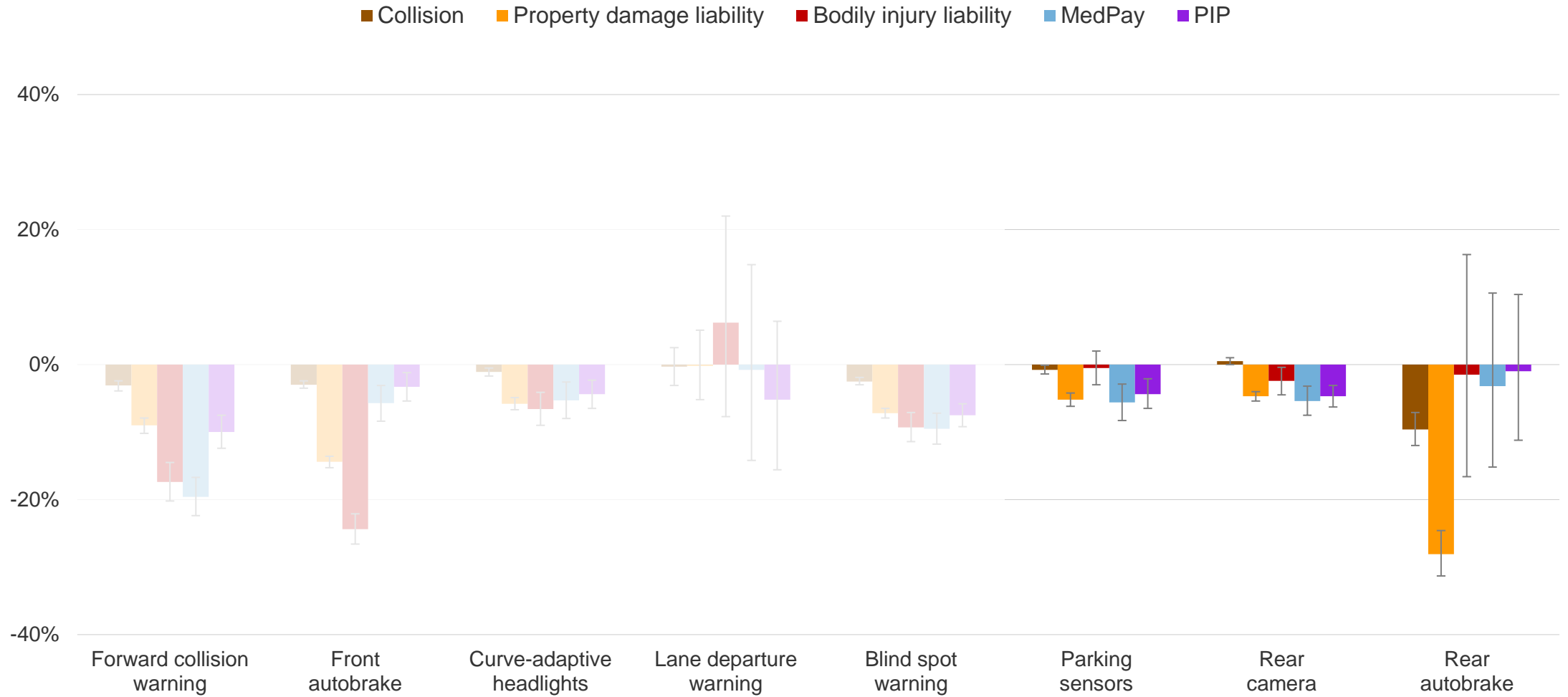
Summary of technology effects on insurance claim frequency

Results pooled across automakers

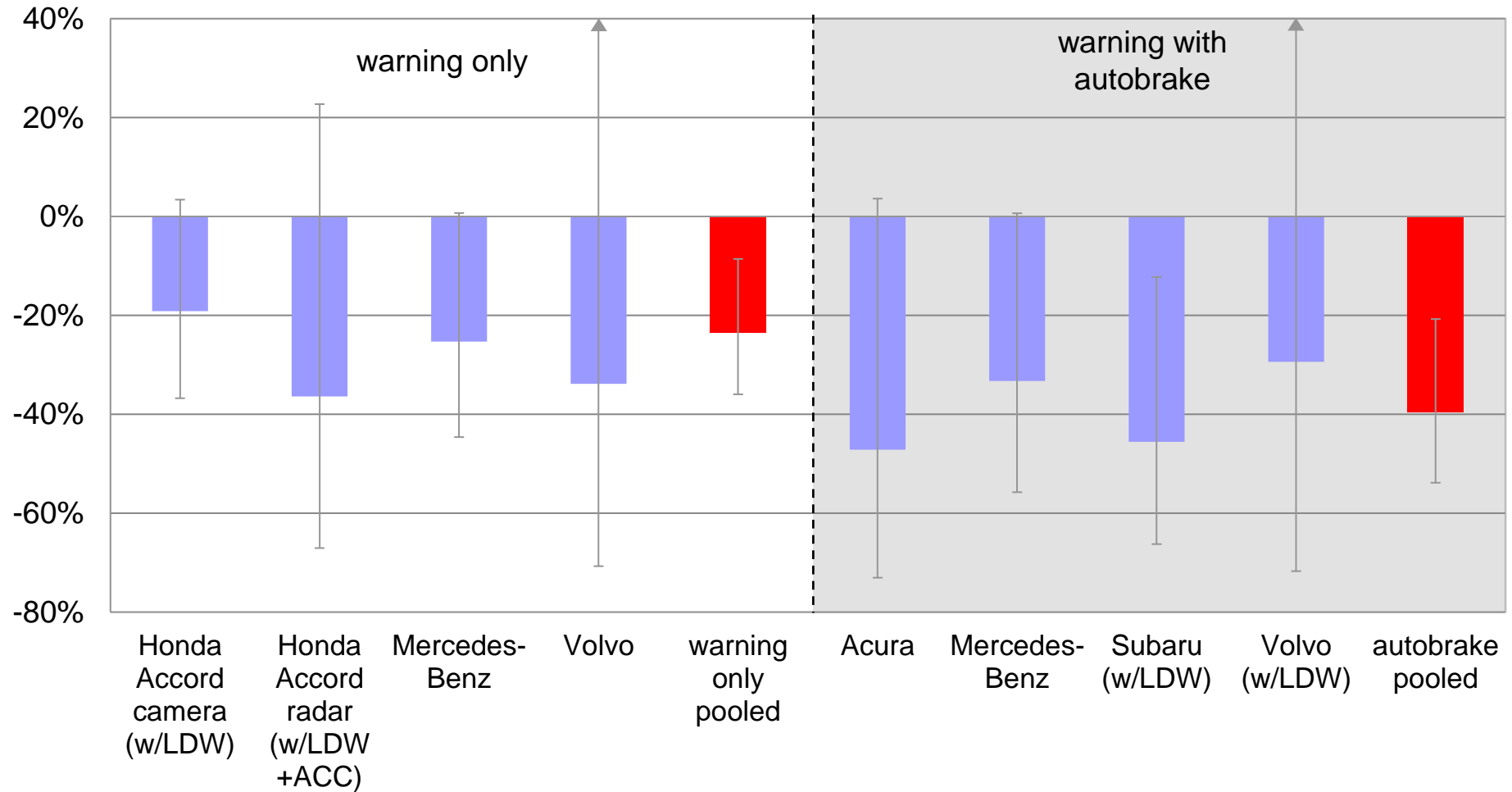


Summary of technology effects on insurance claim frequency

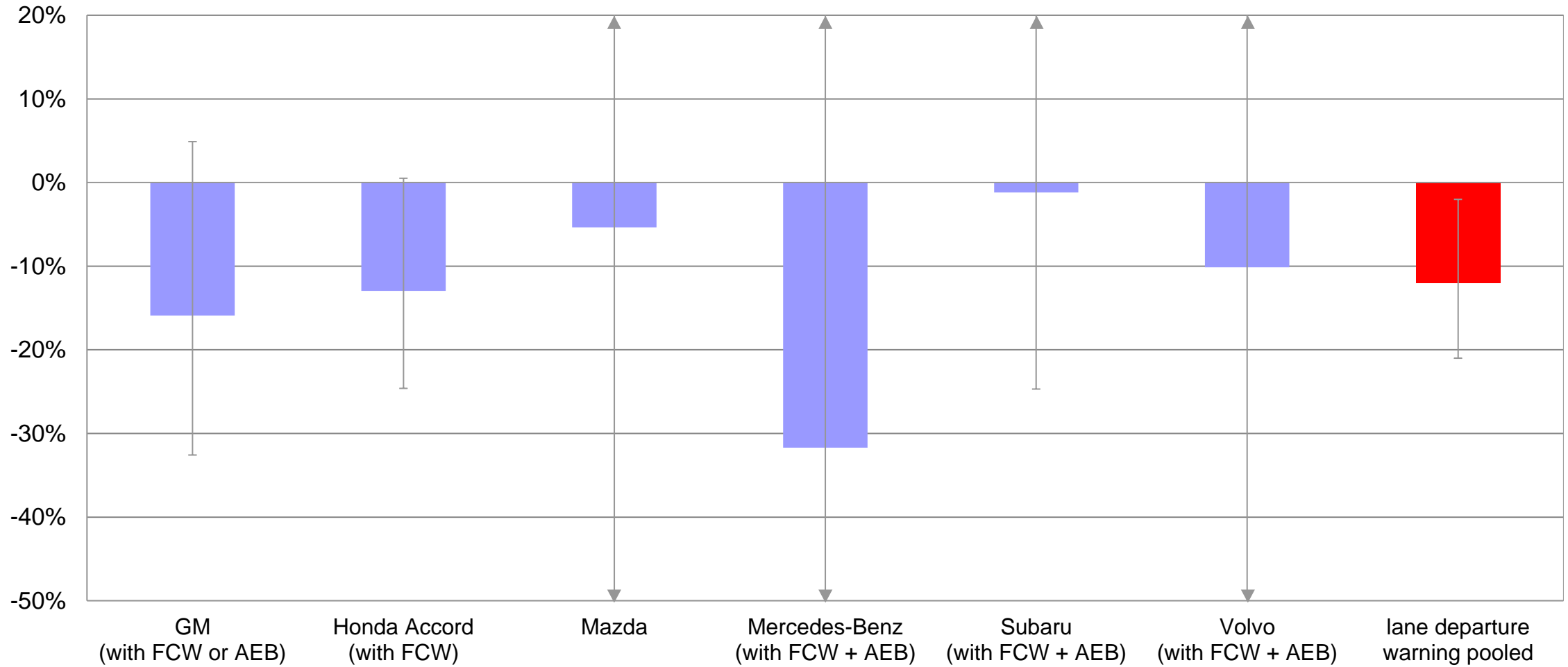
Results pooled across automakers



2015 study of system on rear-end police reported crashes



2017 study of lane departure warning systems on relevant police reported crash types

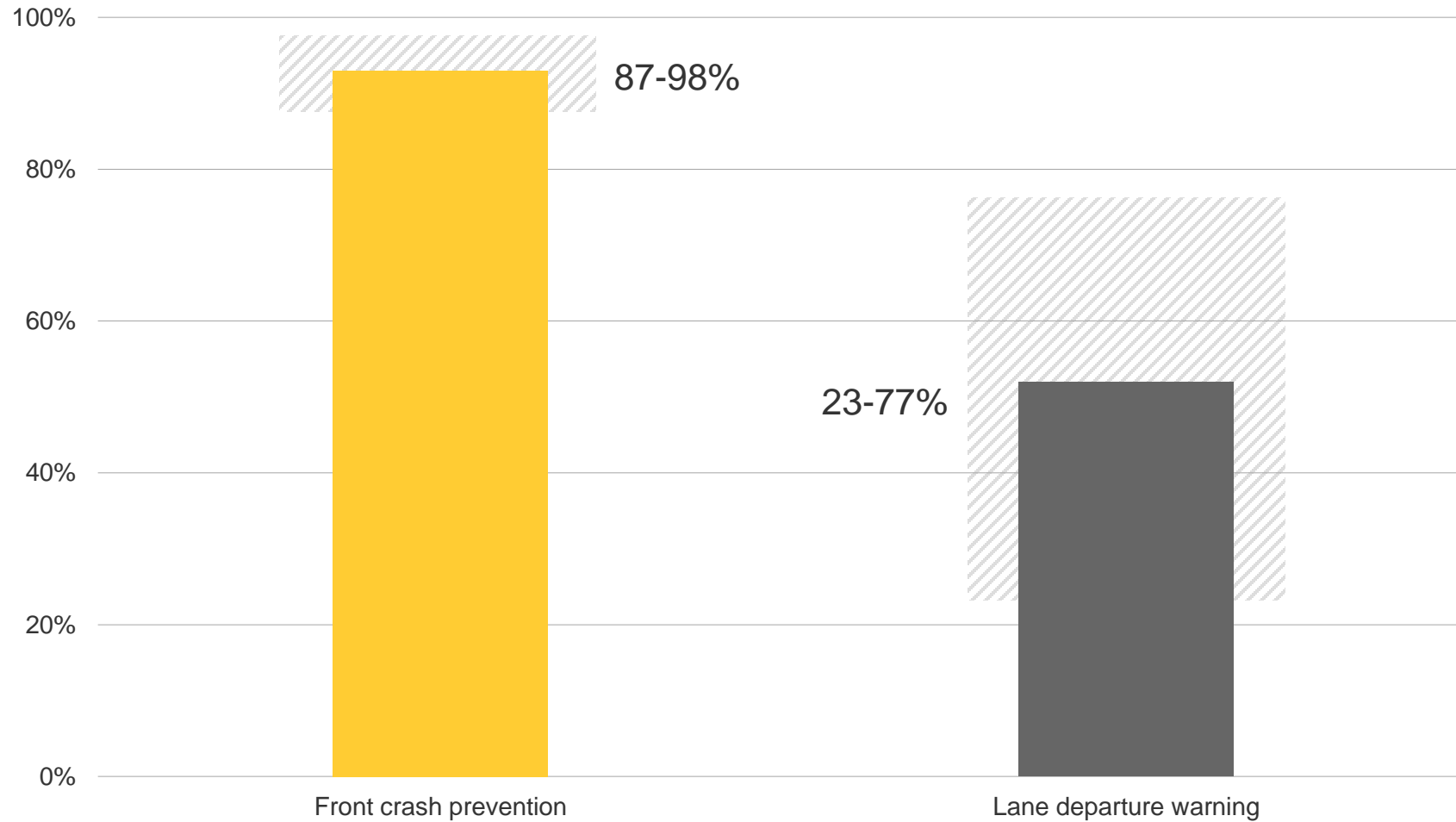


Effects of crash avoidance technologies on relevant police-reported crashes



2018 dealer observations of crash avoidance system status

Percent with system on — mean values and value range



AEB test track evaluations

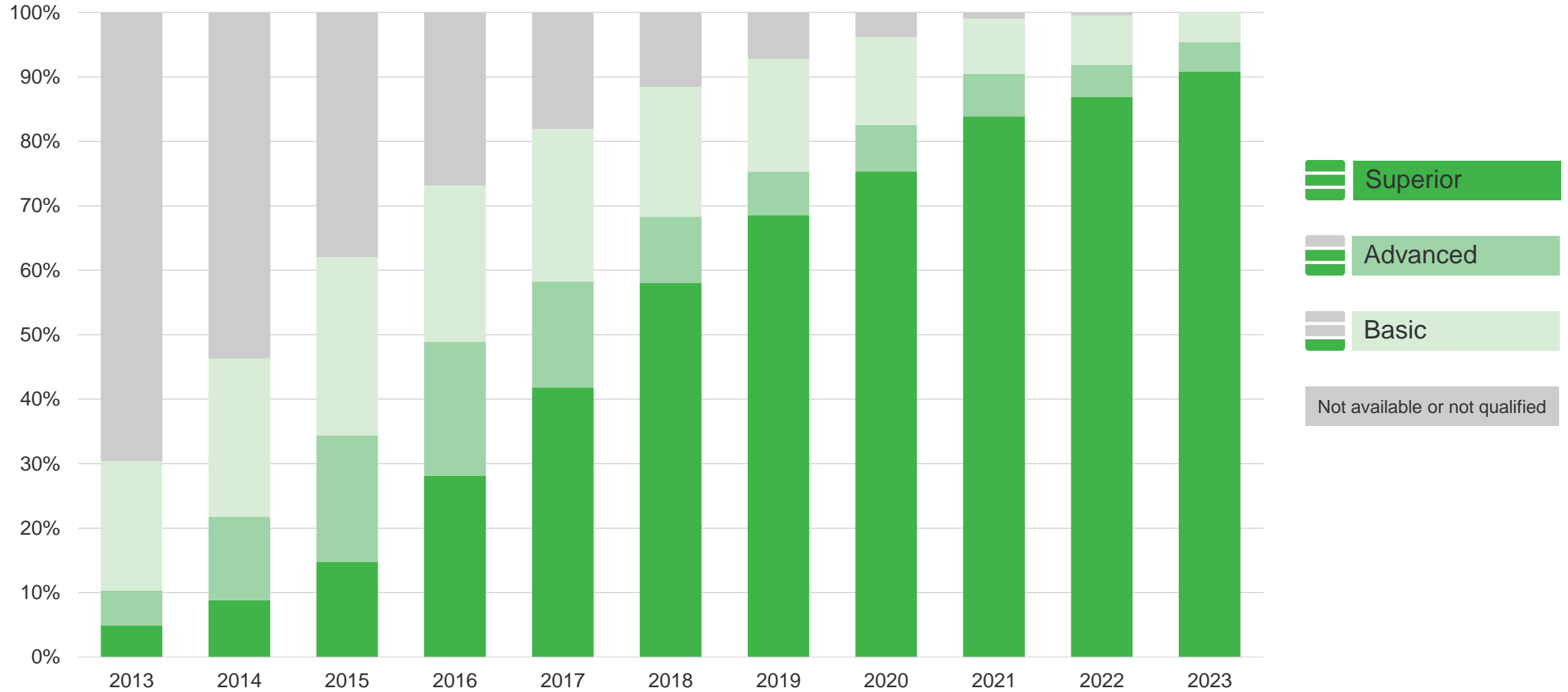


Front AEB testing



Front crash prevention ratings

2013-23 models



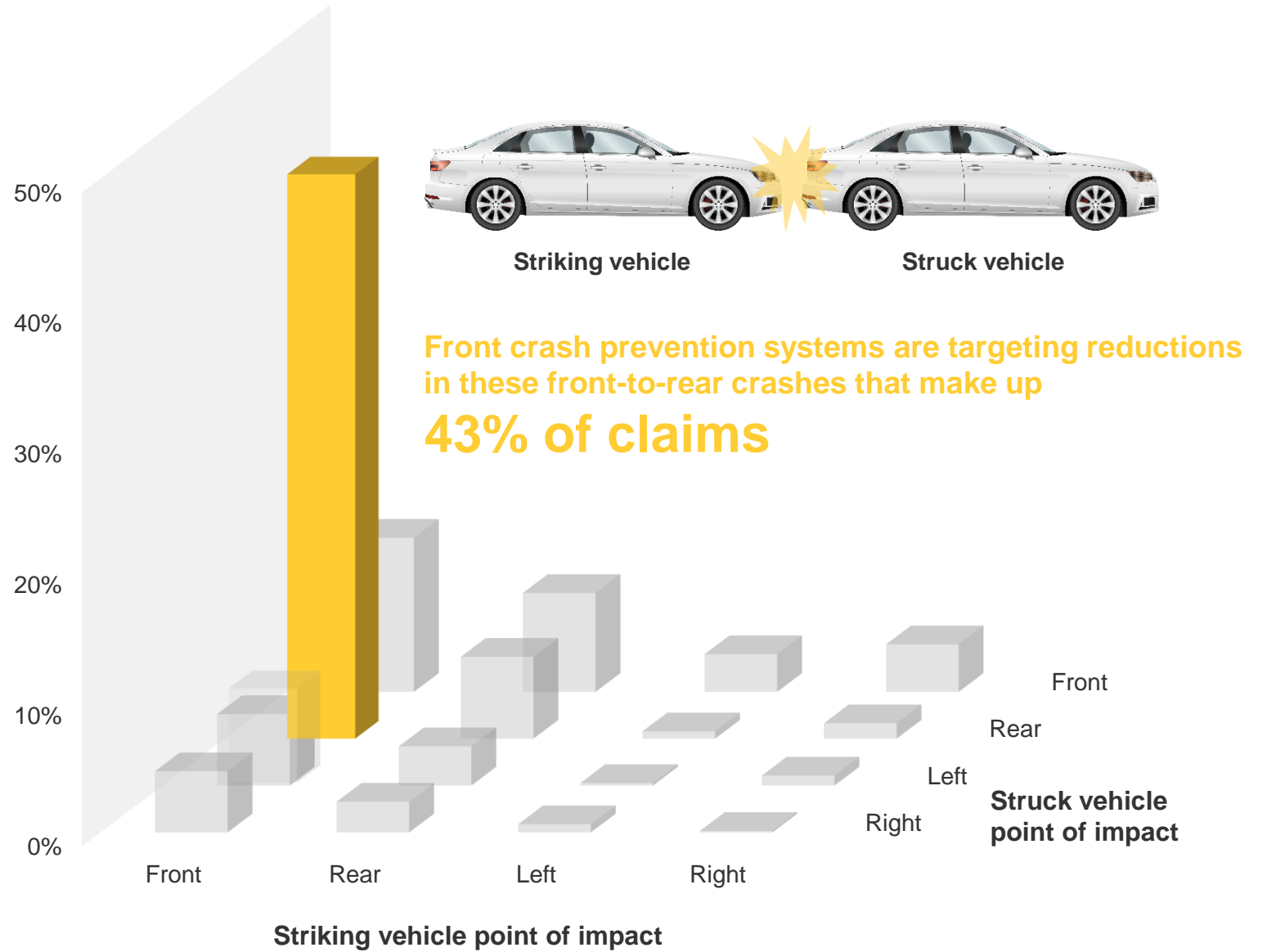


20 automakers
(99+% of the U.S. market)
have committed to making
autobrake standard by September 2022



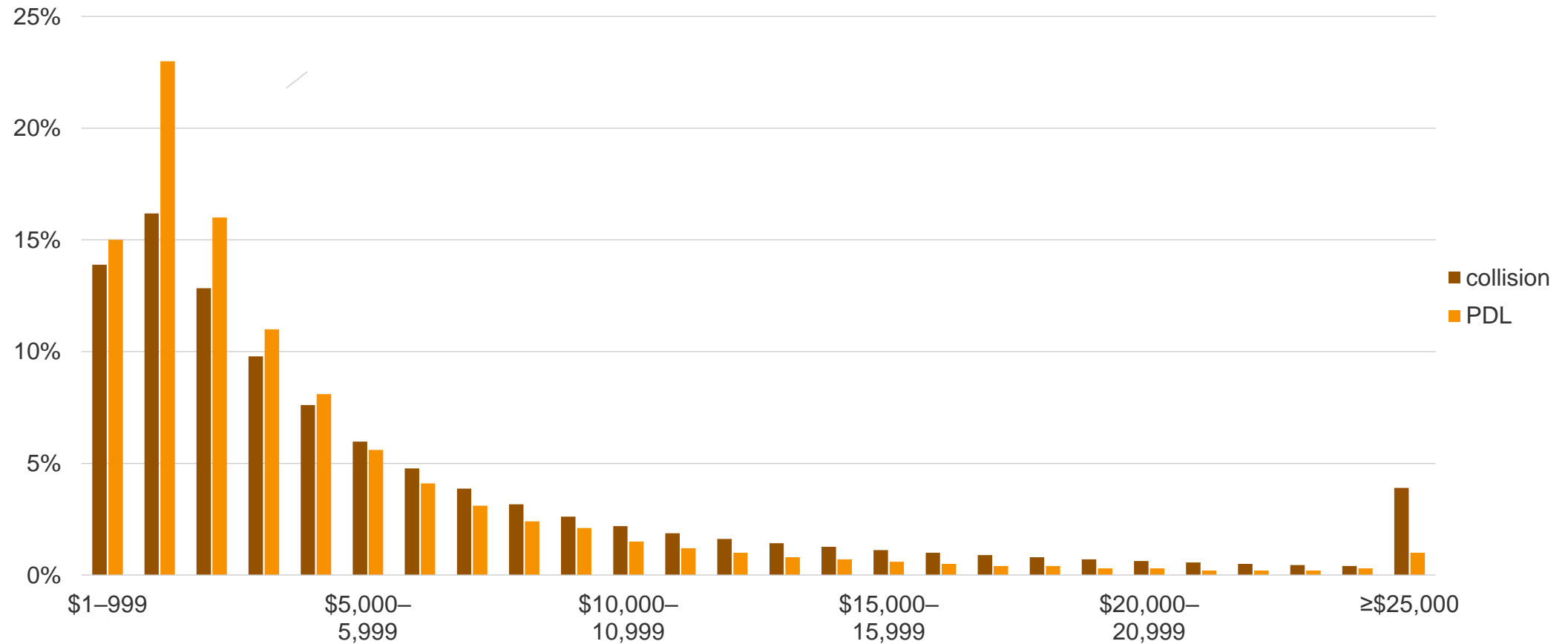
Collision and PDL claims by point of impact

Vehicles of same size and weight, 1981-2022 models

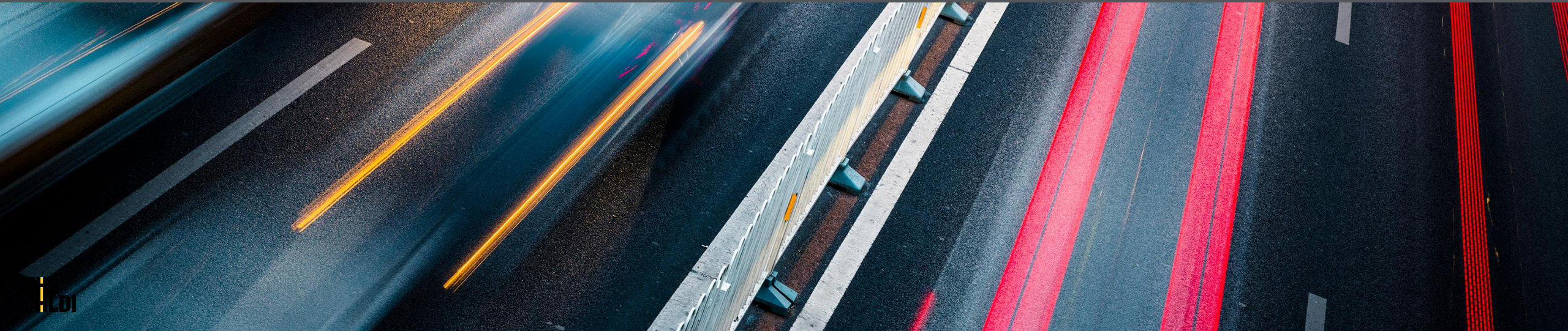


Distribution of collision & PDL claims, 2021 calendar year

By claim size, 1981-2022 models

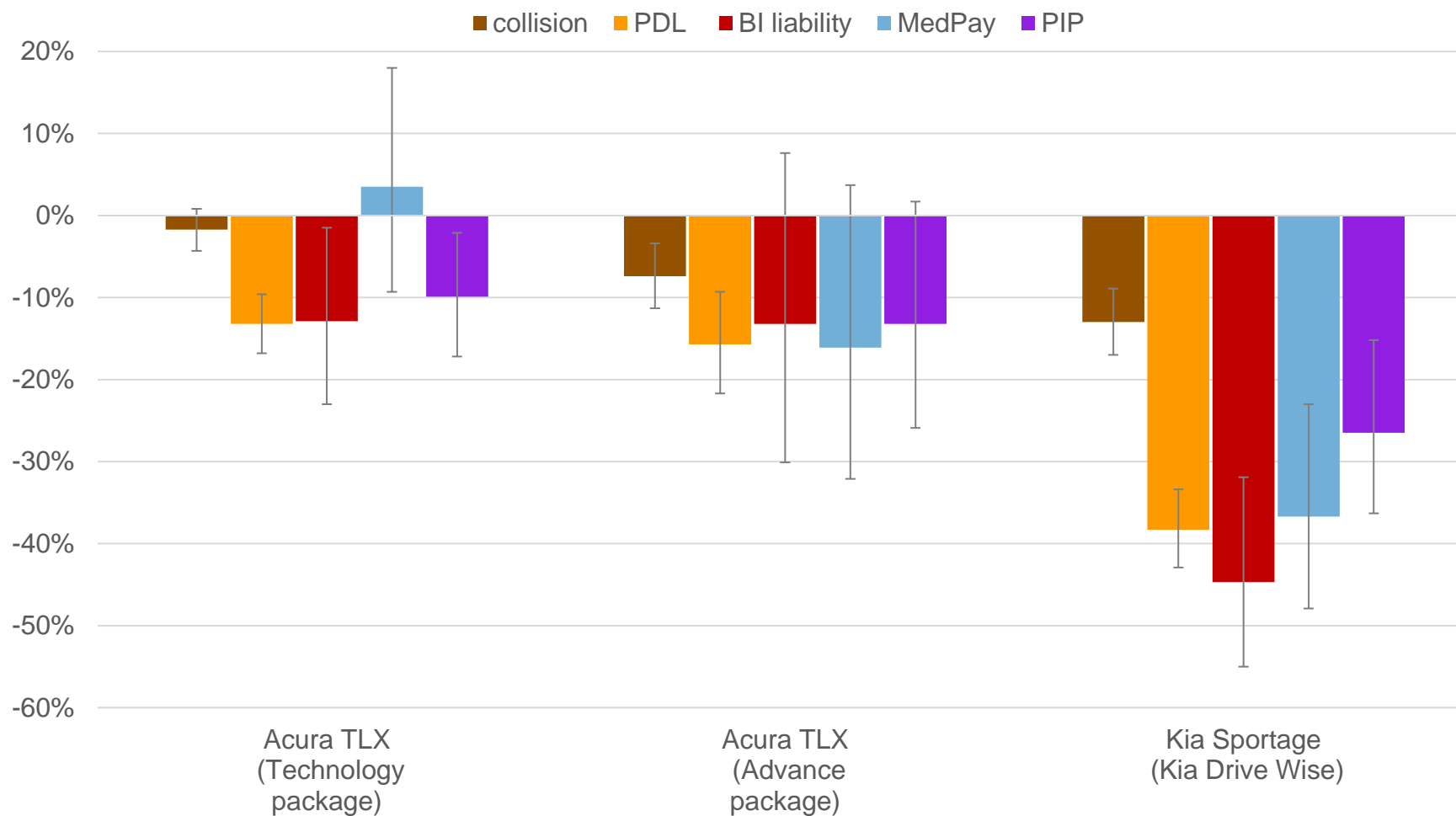


Analysis of ADAS bundles

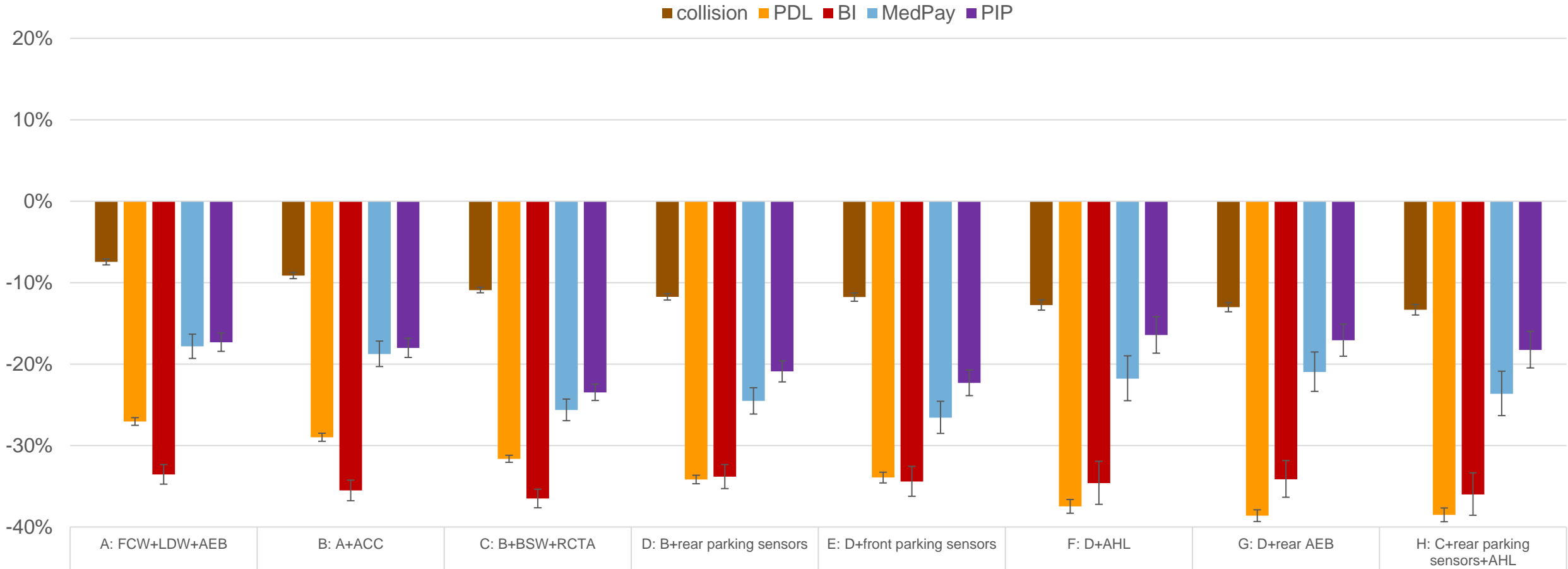


Summary of technology bundles

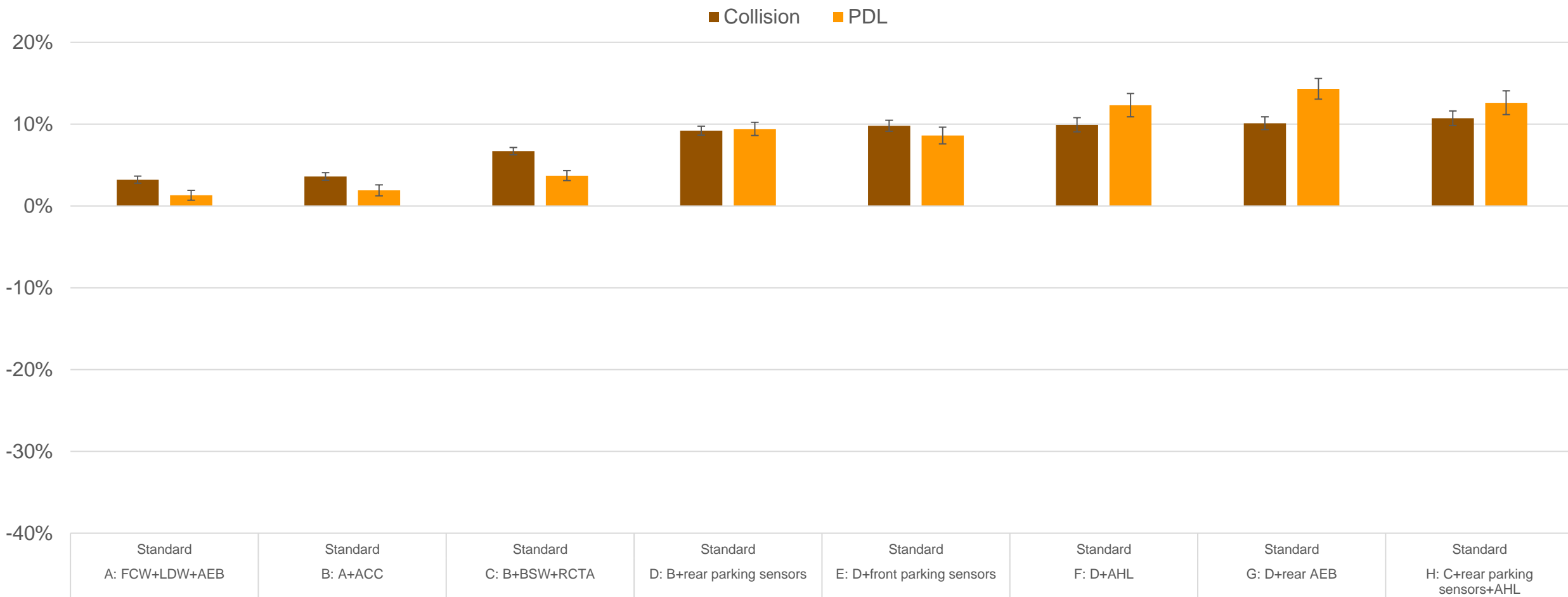
Change in claim frequency



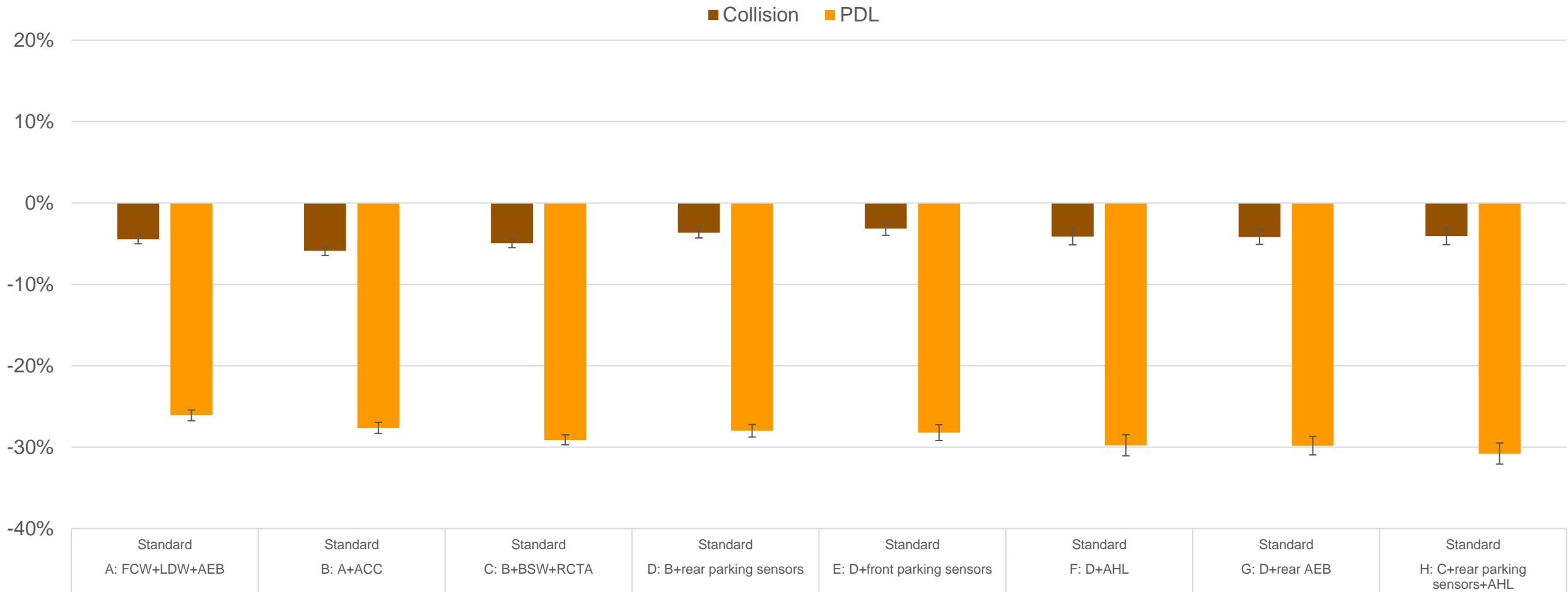
Estimated changes in injury-related claim frequency associated with ADAS bundles



Estimated changes in physical damage claim severity associated with ADAS bundles

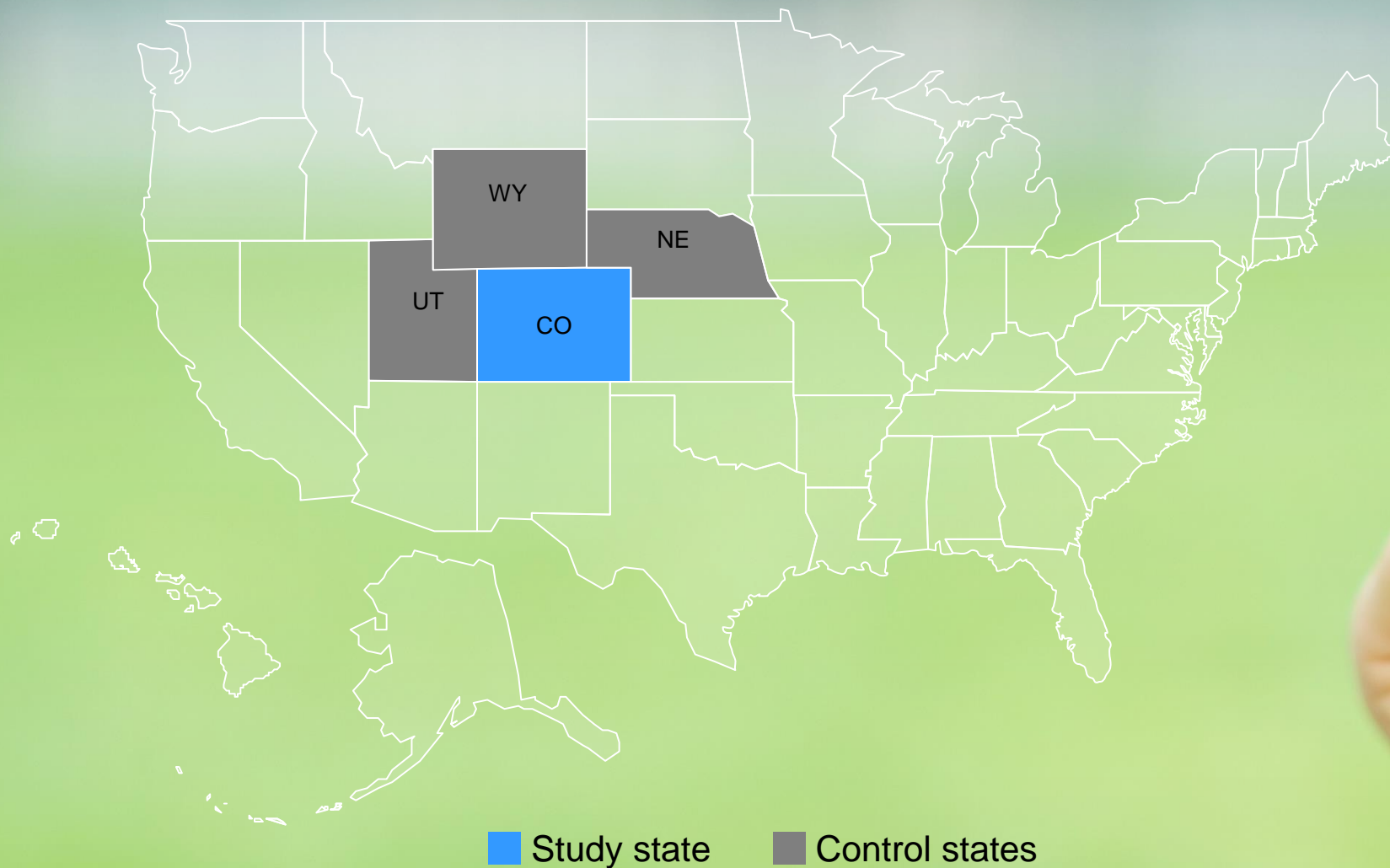


Estimated changes in physical damage overall losses associated with ADAS bundles



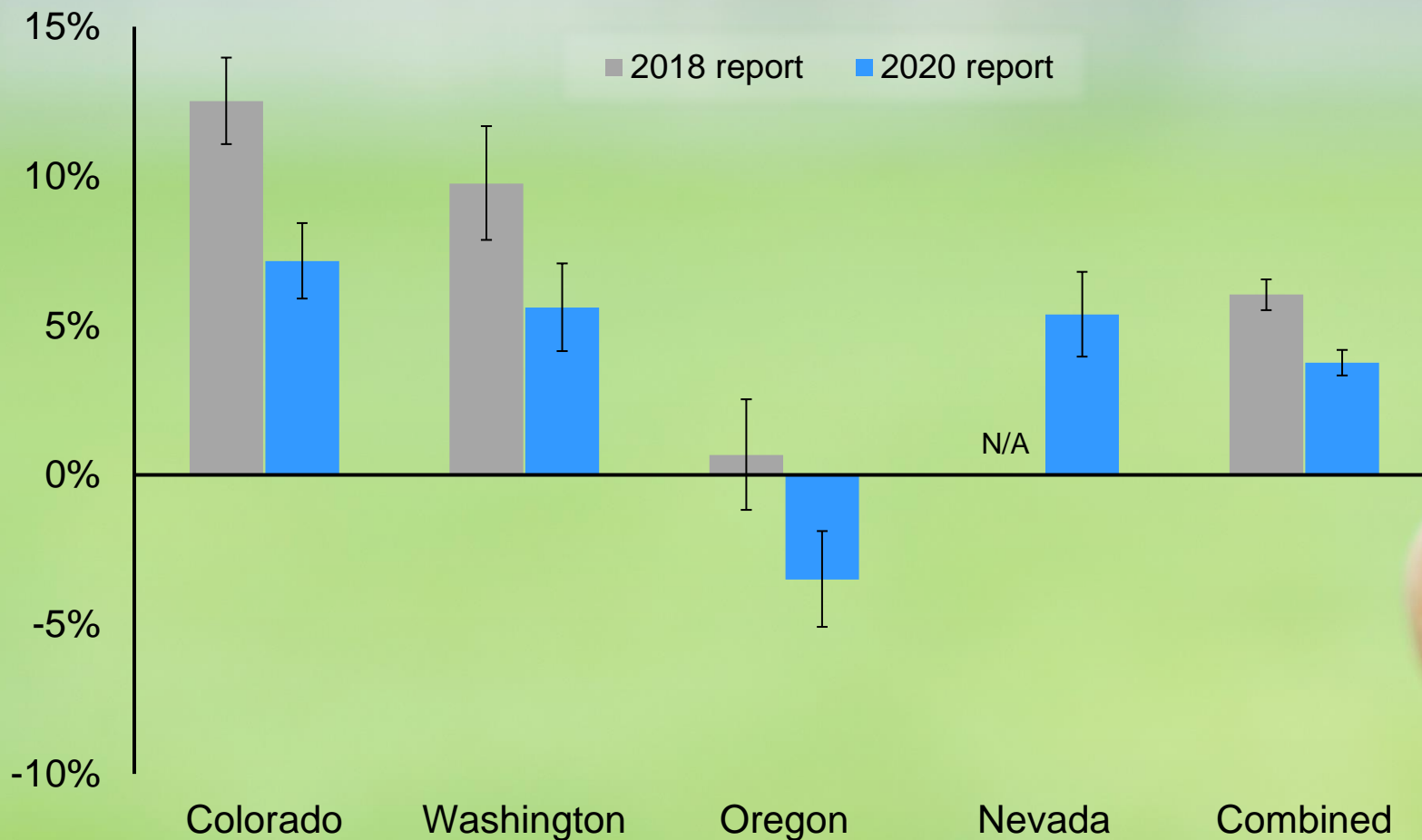
Effects of marijuana legalization on collision claims

Colorado evaluation



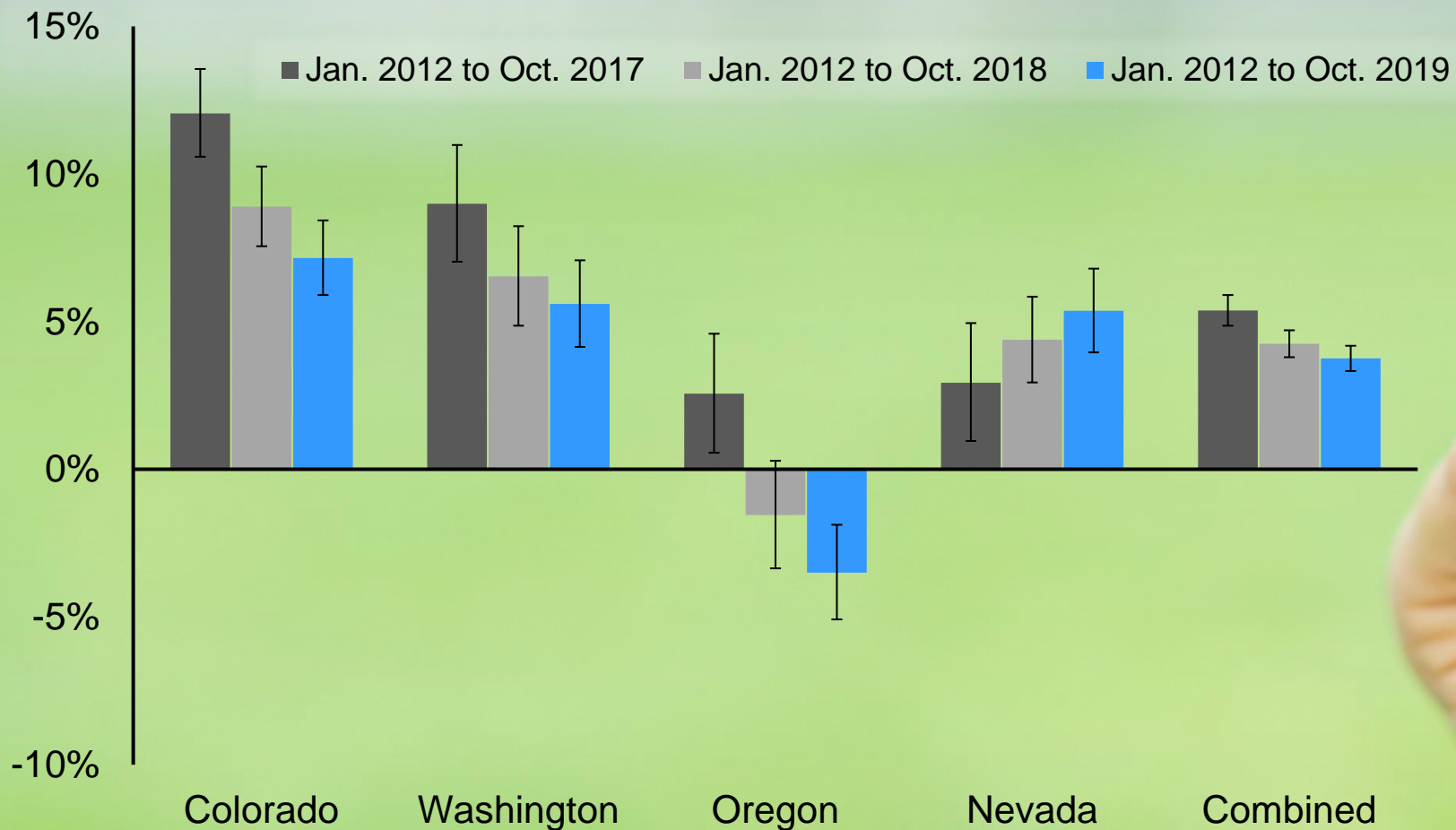
Changes in collision claim frequency associated with marijuana sales

2018 report and 2020 report



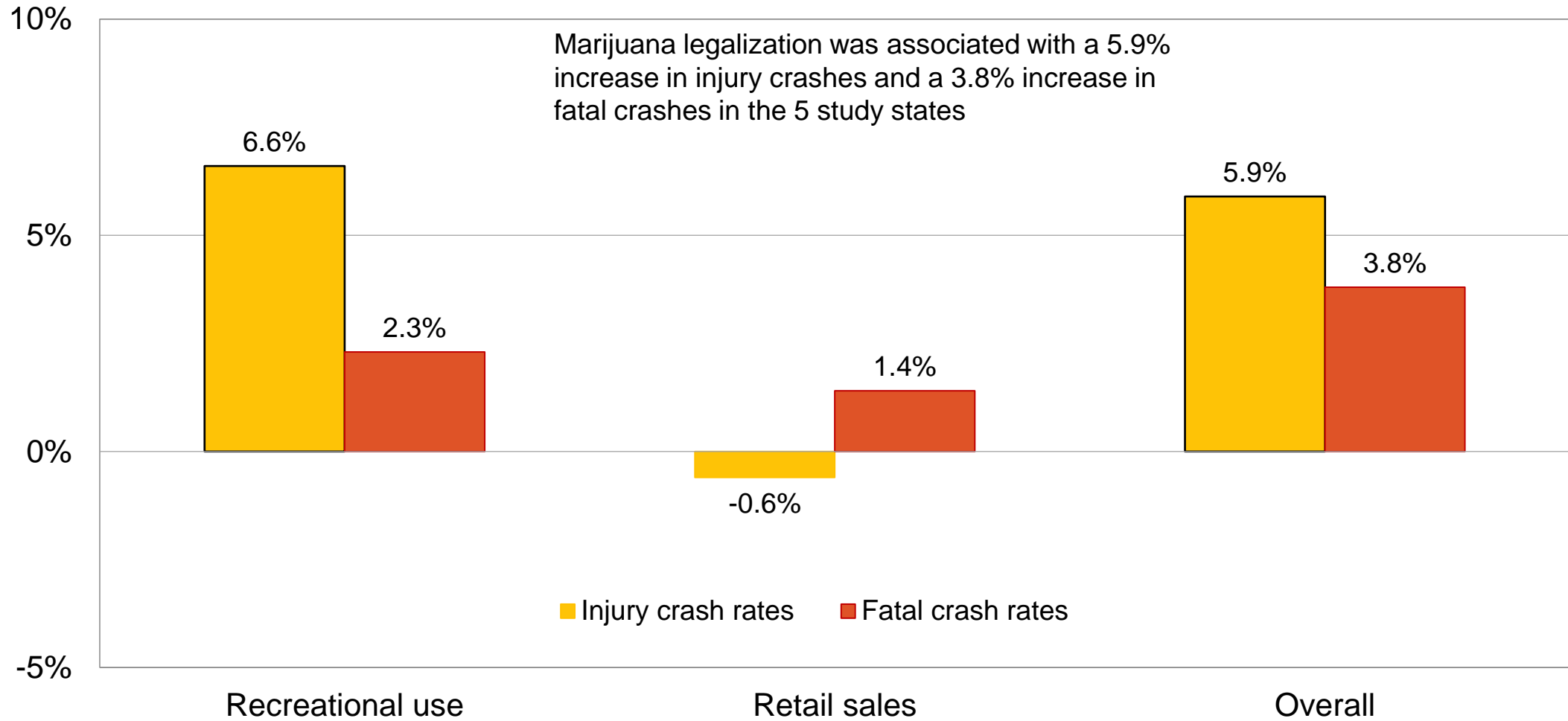
Changes in collision claim frequency associated with marijuana sales

By time range



Changes in crash rates

Study states vs. comparison states

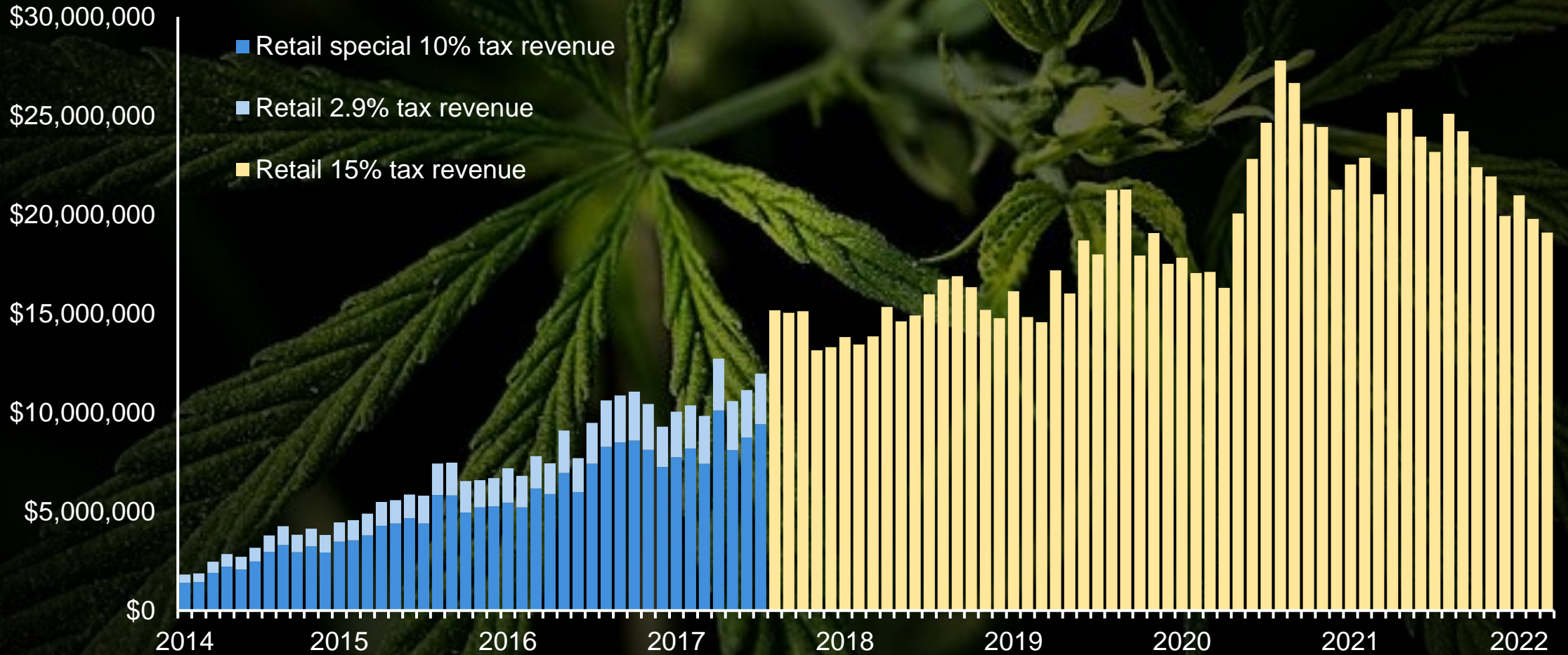


How much marijuana is being used?



Colorado marijuana retail tax revenue

By month

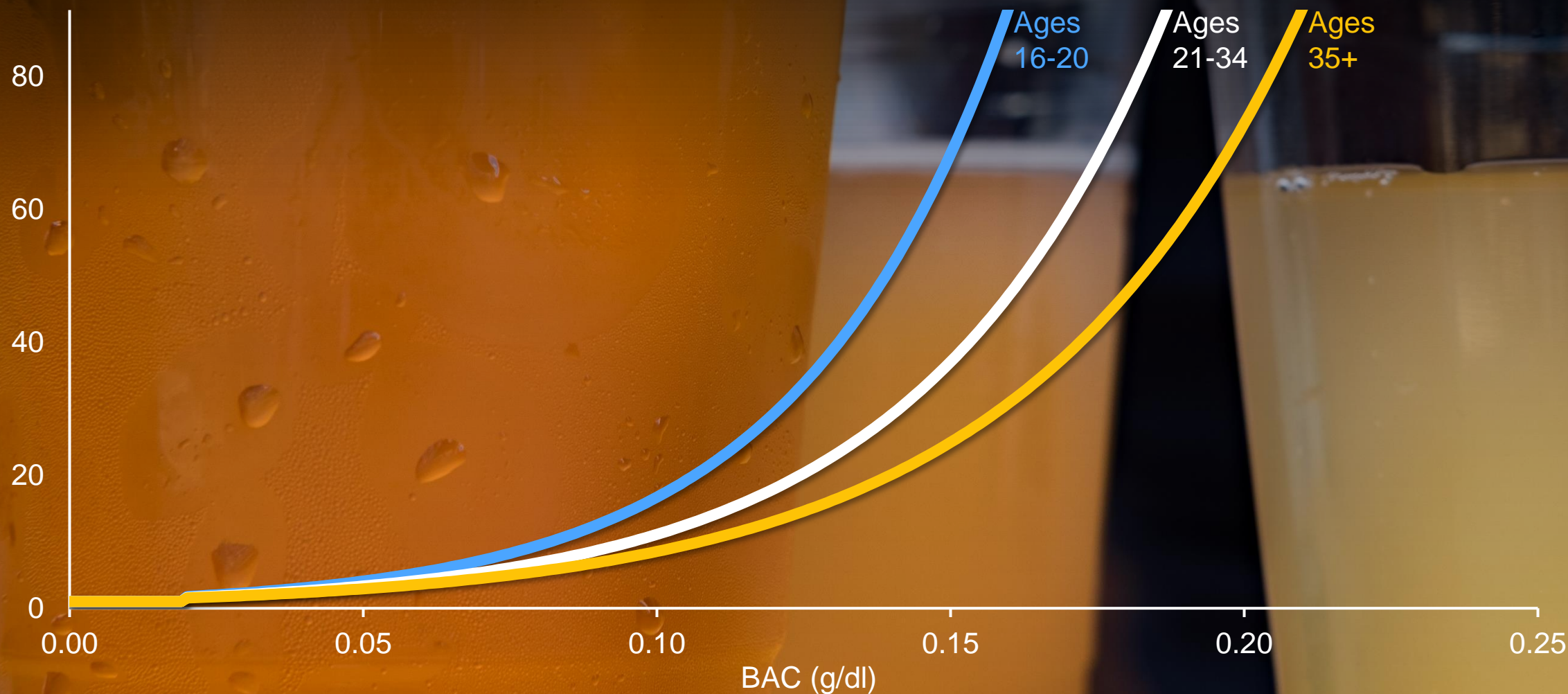


Marijuana and crash risk



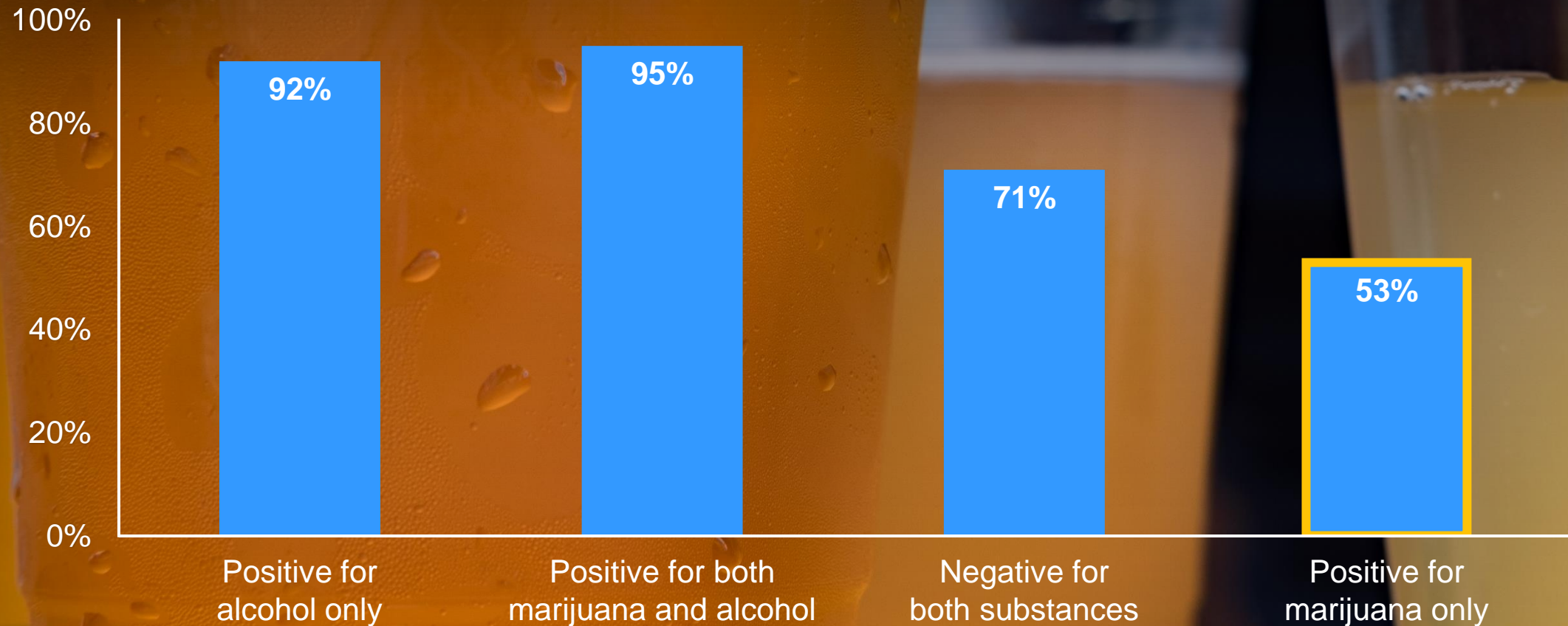
Relative risk of fatal crash involvement at various BACs compared to zero BAC

Passenger vehicle drivers by age (Voas et al., 2012)



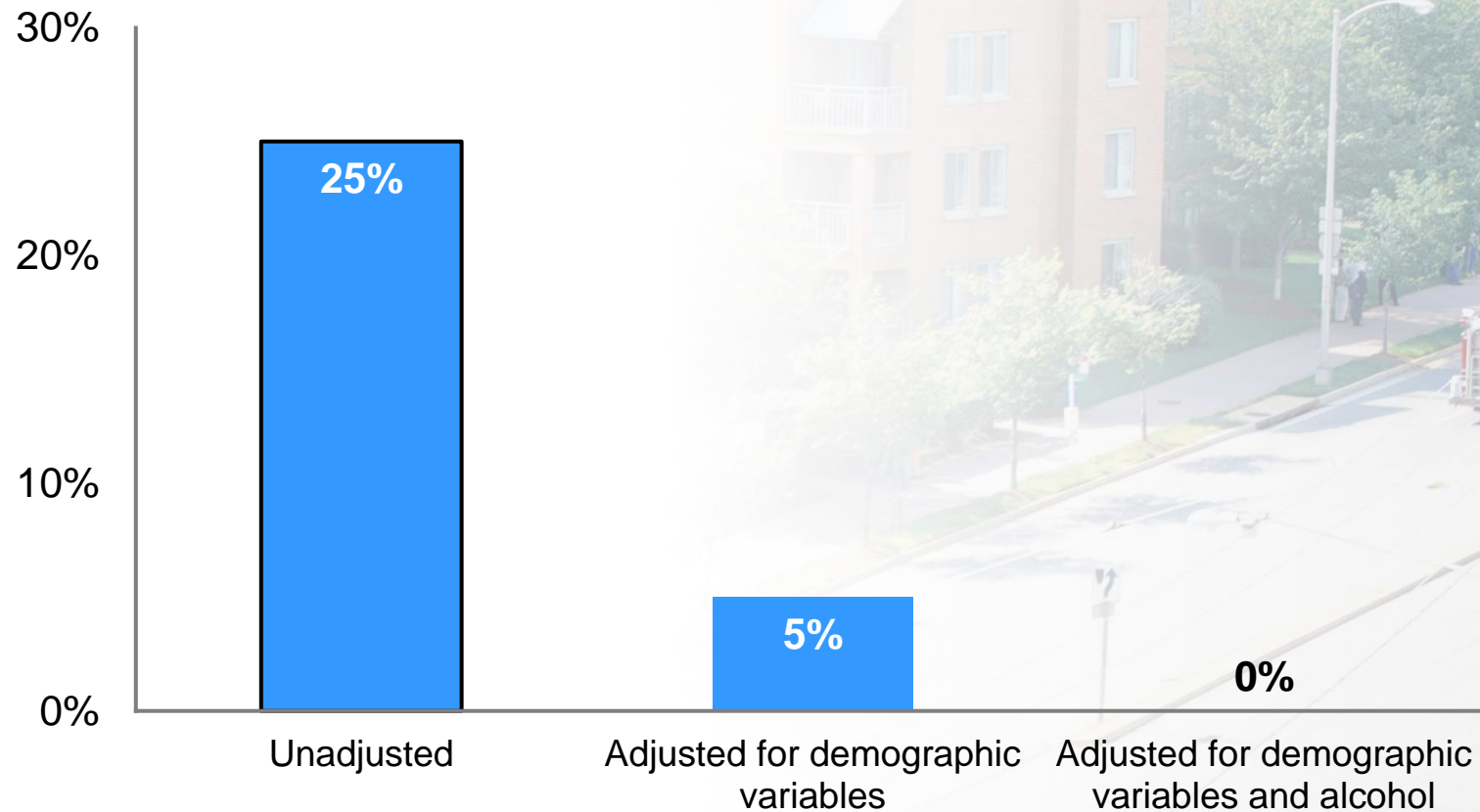
1985 study: Drivers killed in crashes were more likely to be responsible if they used alcohol, **but not marijuana alone**

Drivers who were responsible for their crashes



Federal study published in 2015 found no increase in crash risk associated with marijuana use

Increase in crash risk



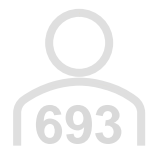
How does marijuana use affect crash risk?

- ▶ Data collection sites
 - Oregon Health & Sciences University
 - University of California Davis Medical Center
 - Denver Health Medical Center
- ▶ Study participants
 - Injured drivers who were in a motor vehicle crash (cases)
 - Medical patients not in motor vehicle crashes (controls)
- ▶ Data collection
 - Blood and breath samples
 - Self-reported substance use

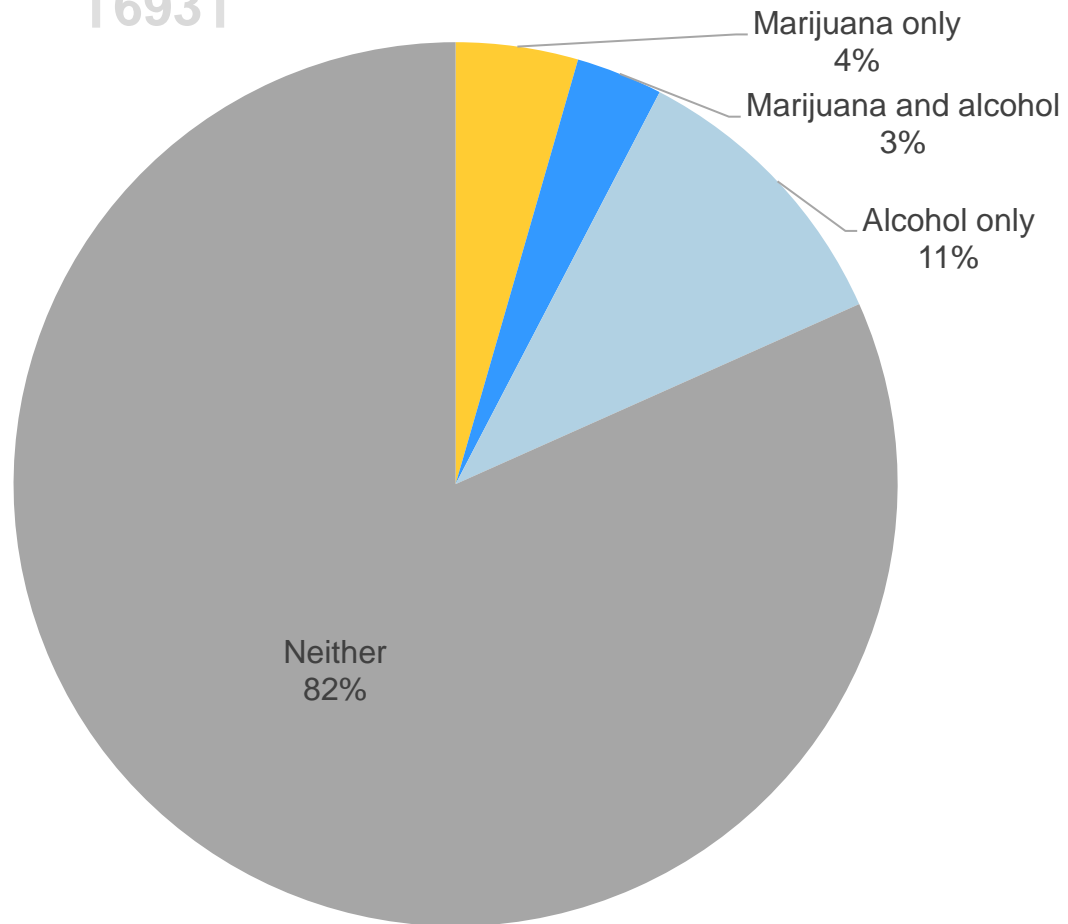


Self-reported substance use within 8 hours

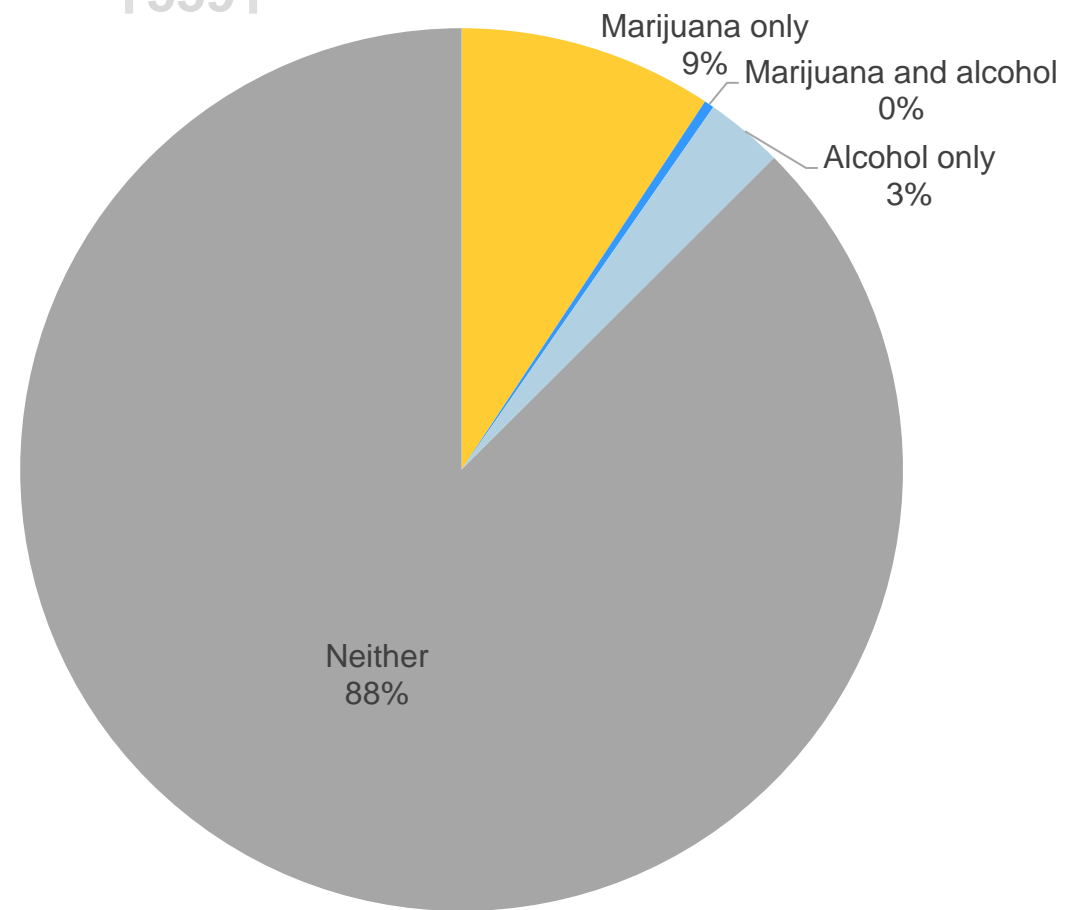
Crash cases vs. medical controls



Crashed drivers



Control drivers

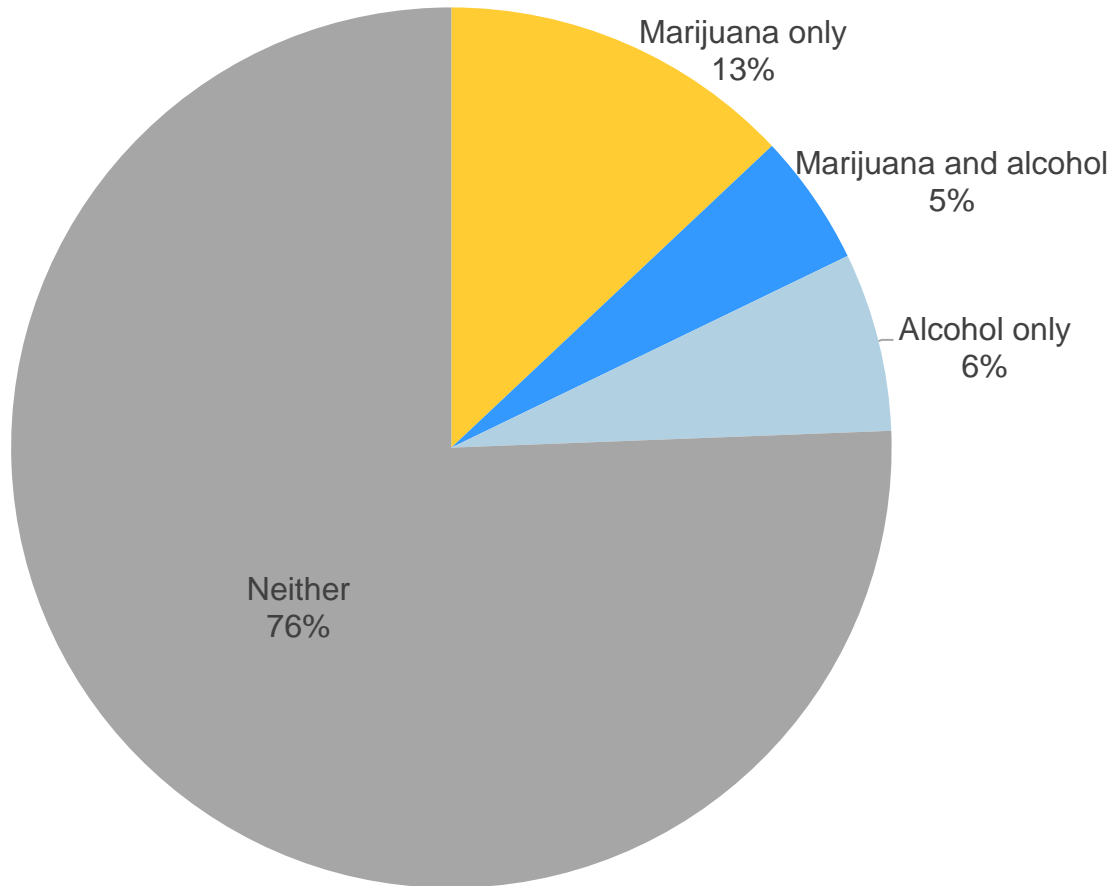


Lab results

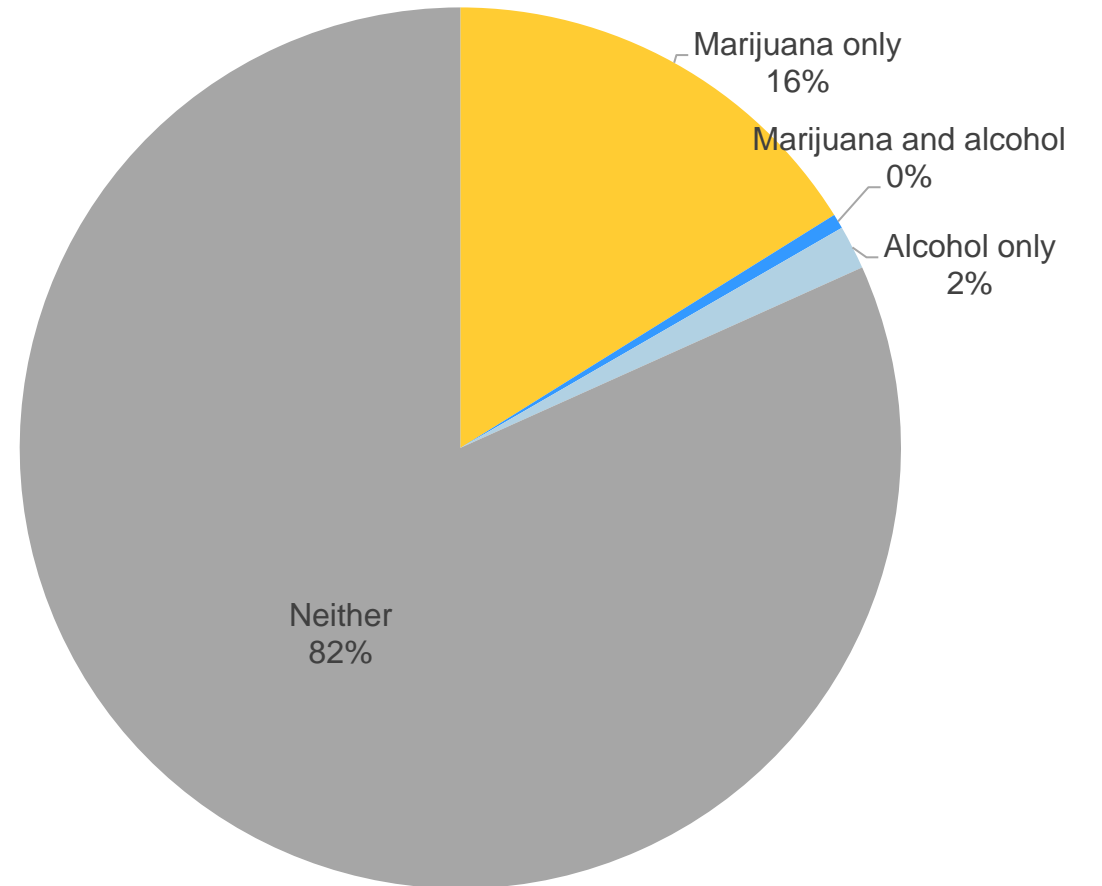
Crash cases vs. medical controls



Crashed drivers



Control drivers

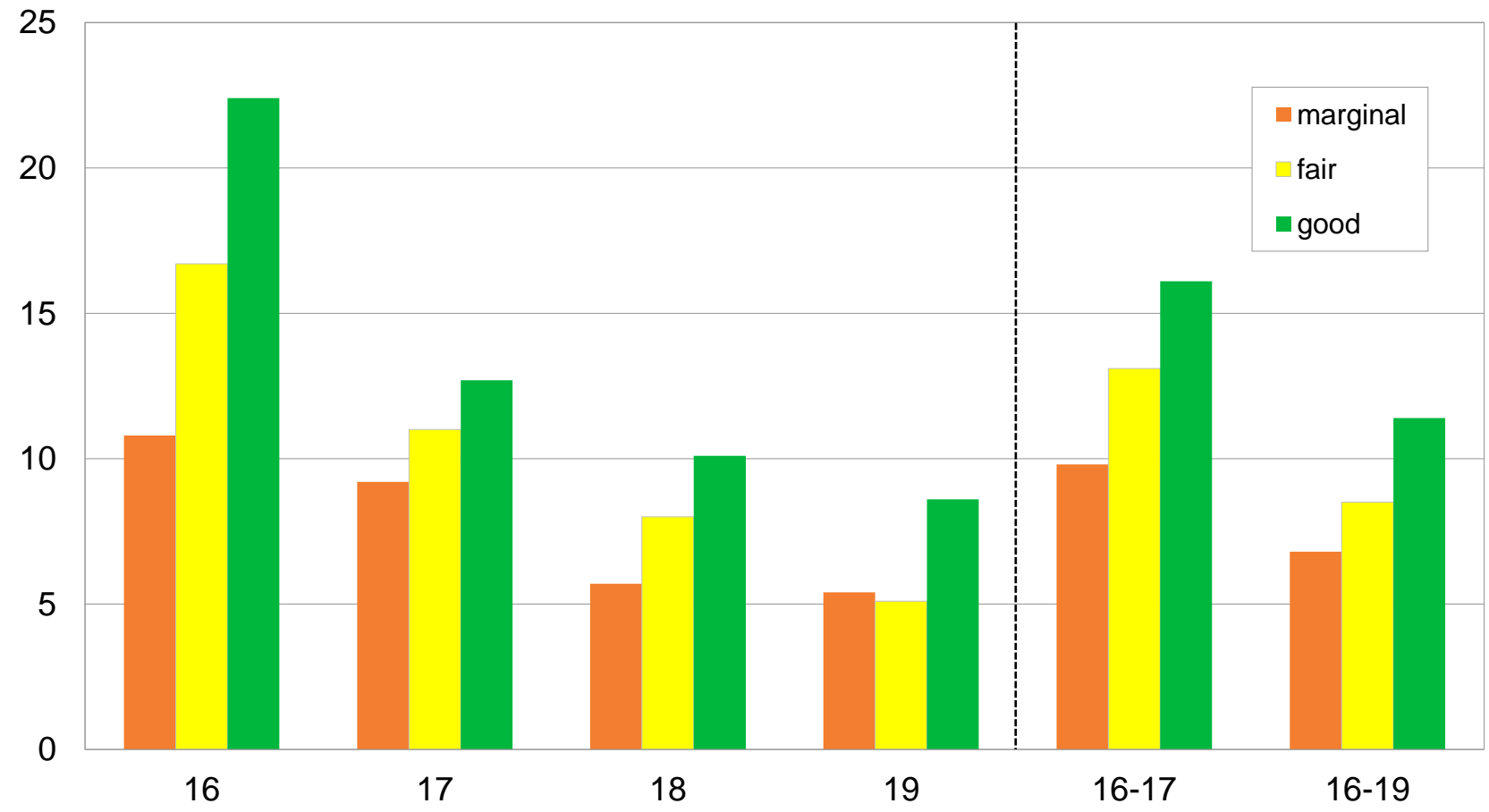


Teenage drivers



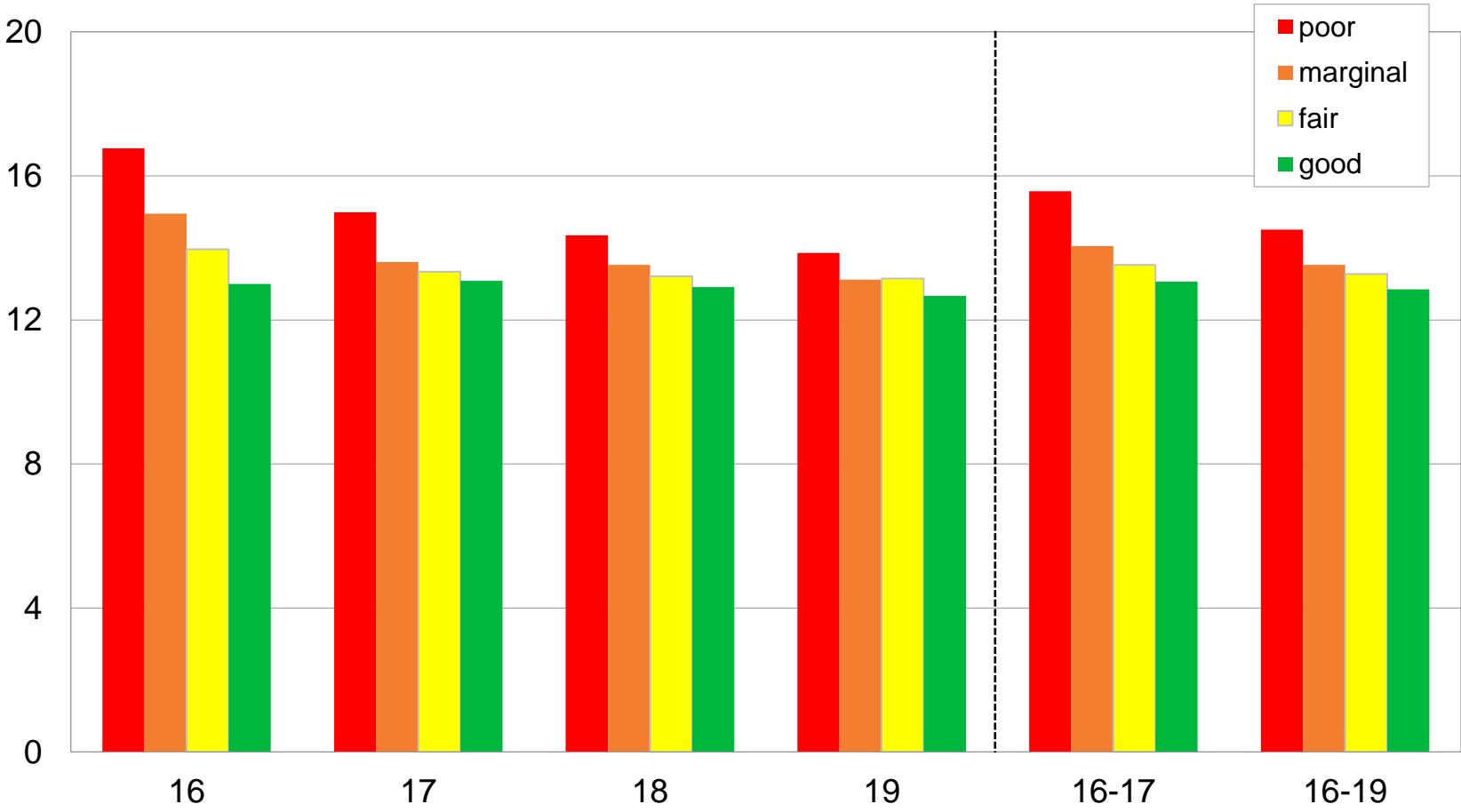
2009 HLDI study on teen collision claim frequencies

Compared with states that have poor graduated licensing laws, by rated driver age



Predicted collision claim frequencies, by graduated licensing law rating and rated driver age

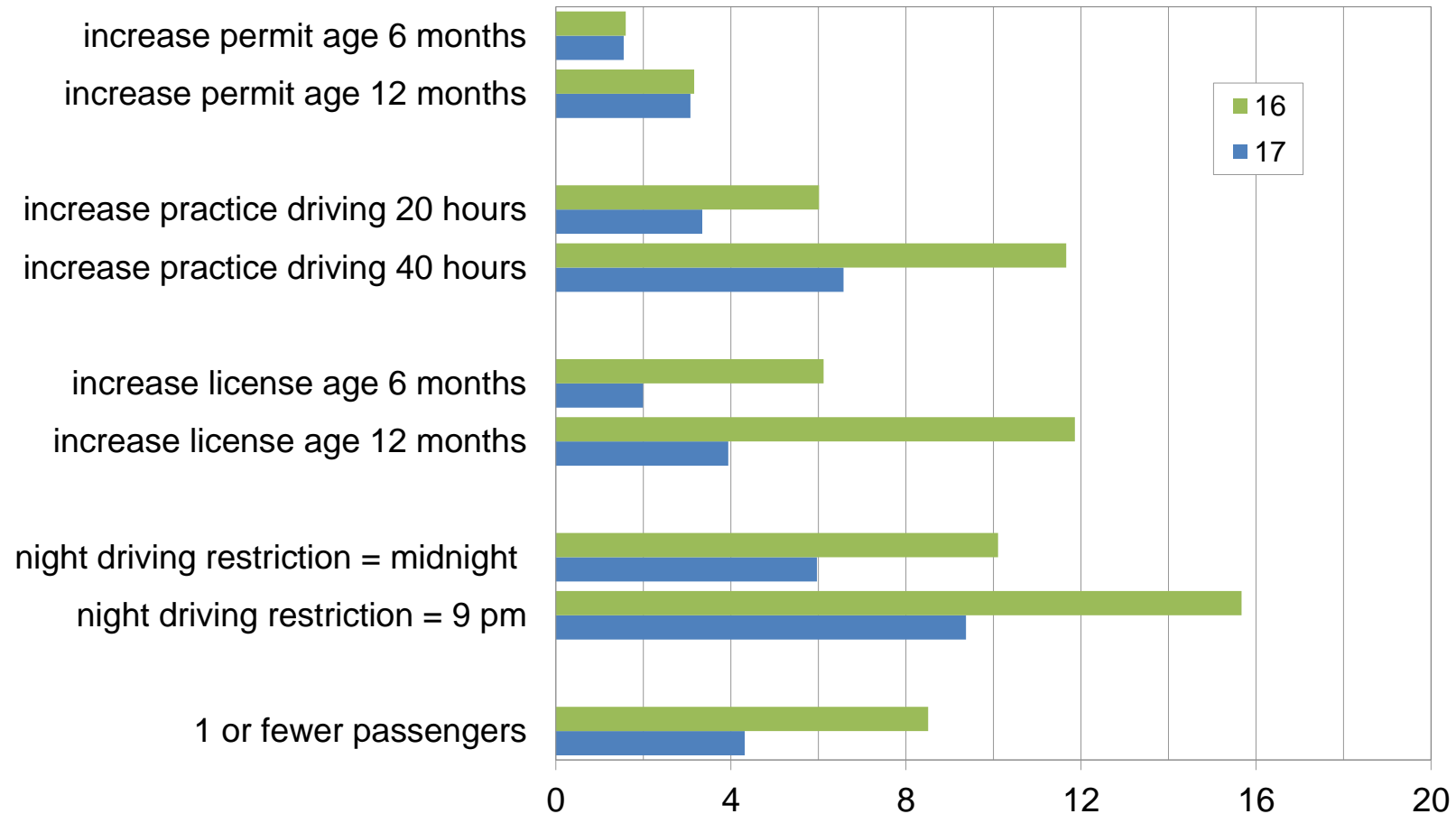
Claims per 100 insured vehicle years



*Assumes frequency of 6.4 claims per 100 insured vehicle years for ages 35-55 (covariate in the model)

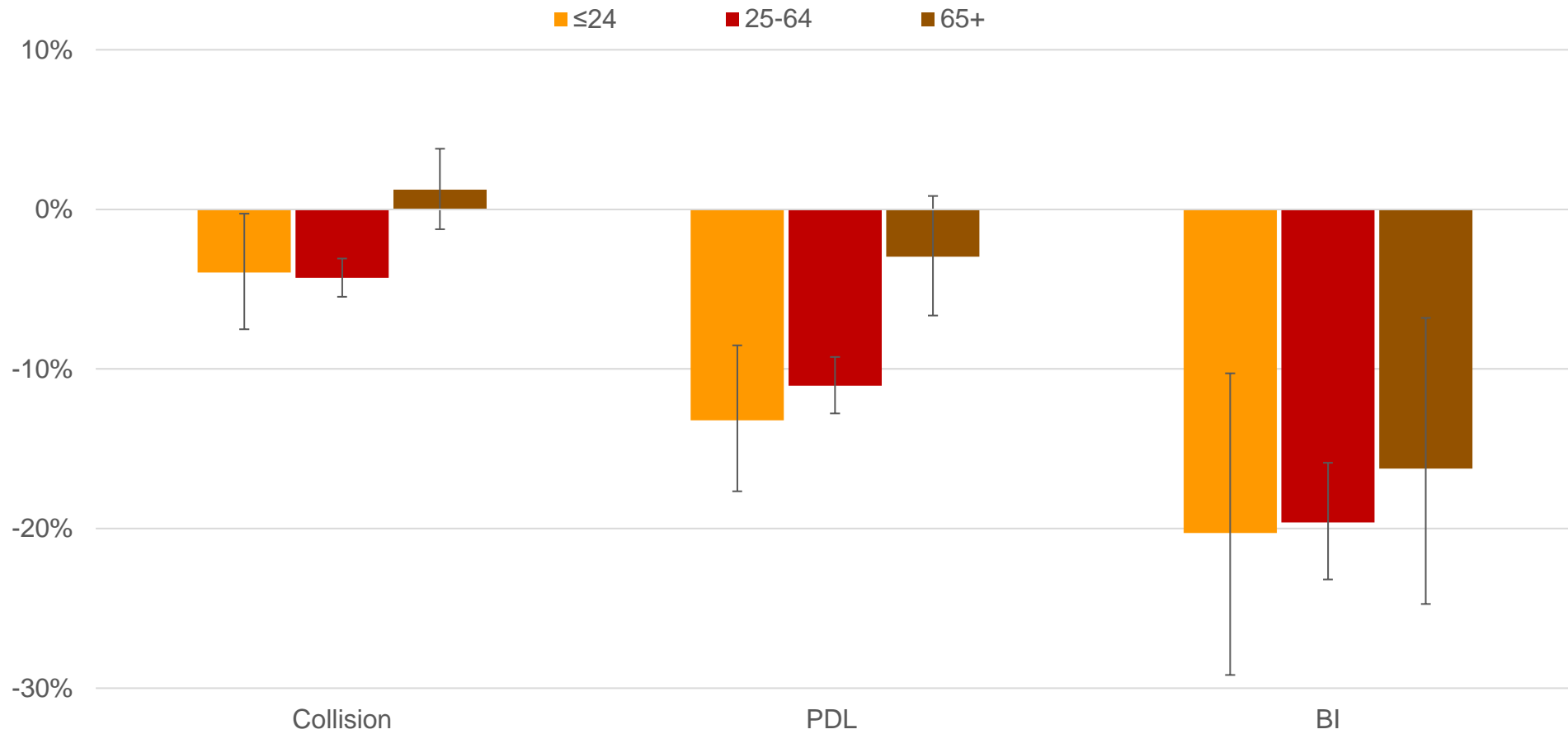
Predicted percent reduction in collision claim frequencies

Rated drivers 16-17 years old, by graduated licensing law component



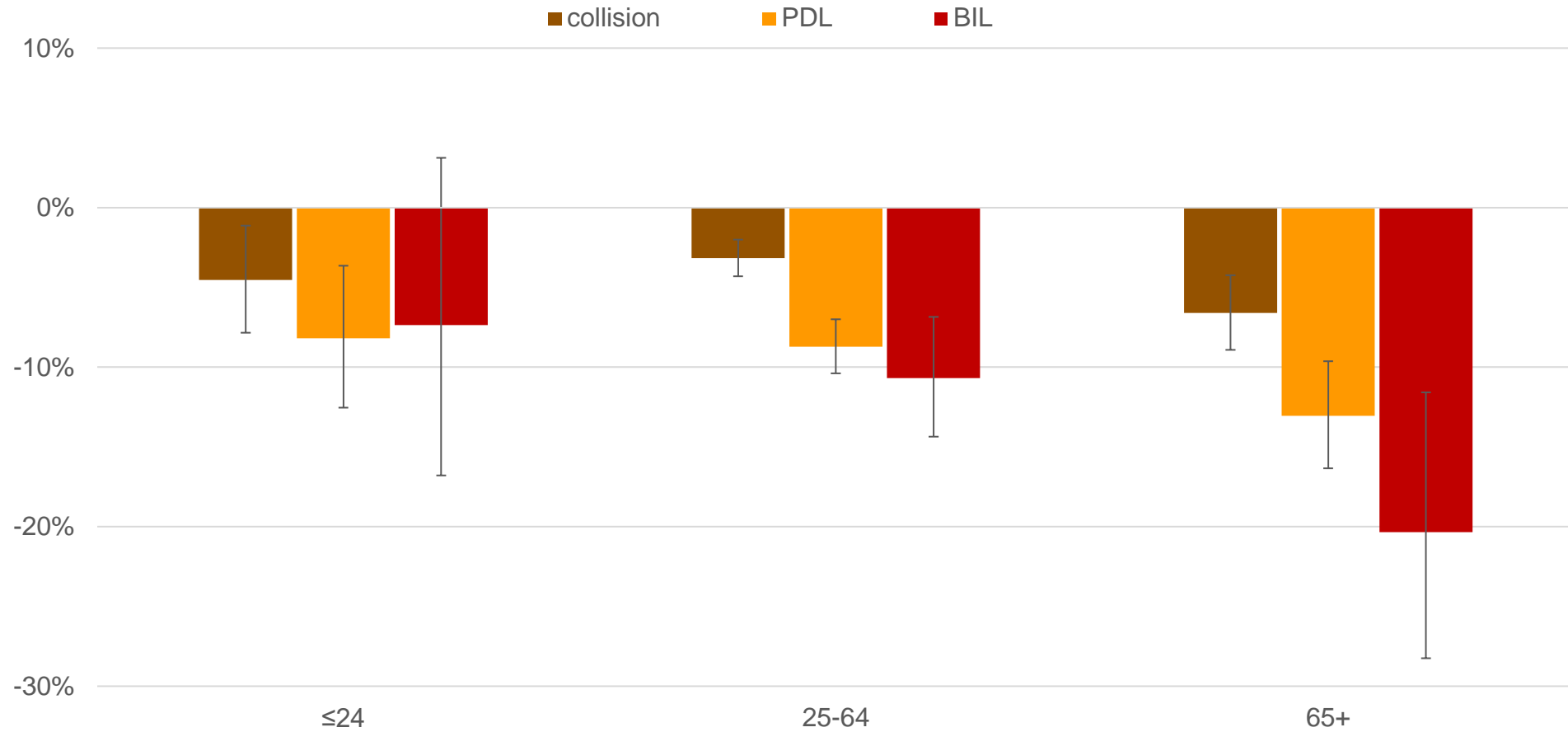
2013-15 Honda Accord FCW and LDW

Change in claim frequency by rated driver age



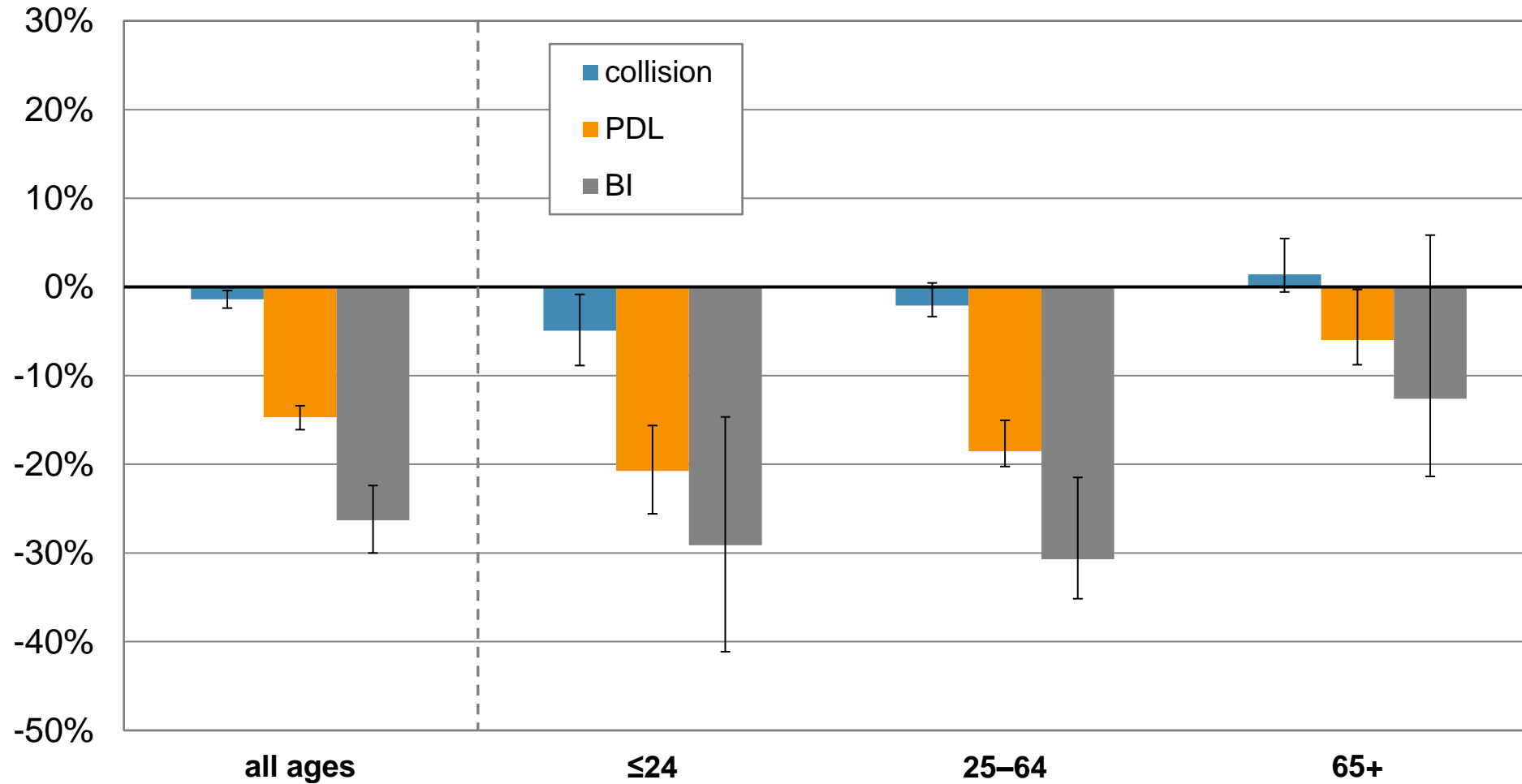
2013-15 Honda Accord LaneWatch

Change in claim frequency by rated driver age



Changes in claim frequency for Subaru EyeSight

By coverage type and rated driver age

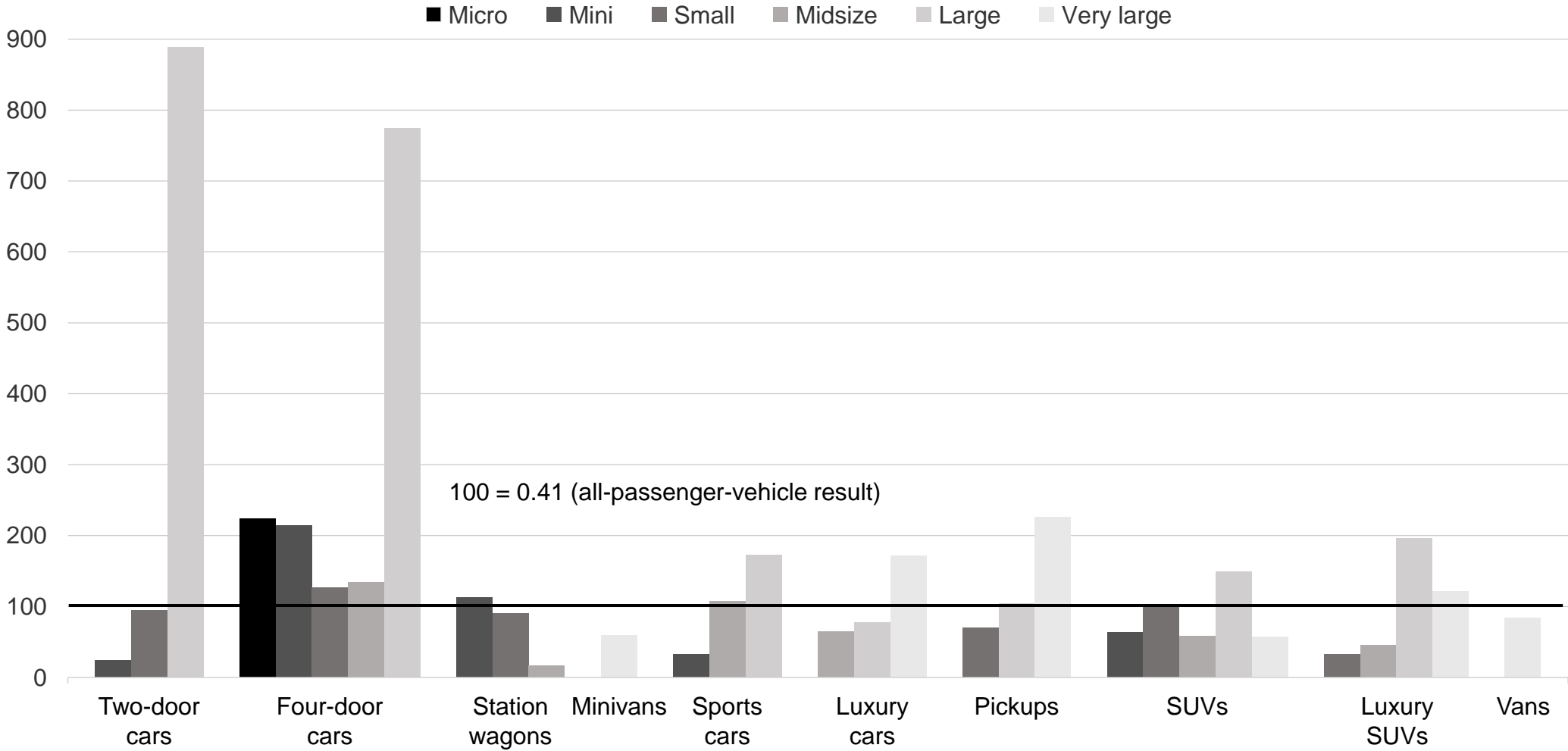


Whole vehicle theft



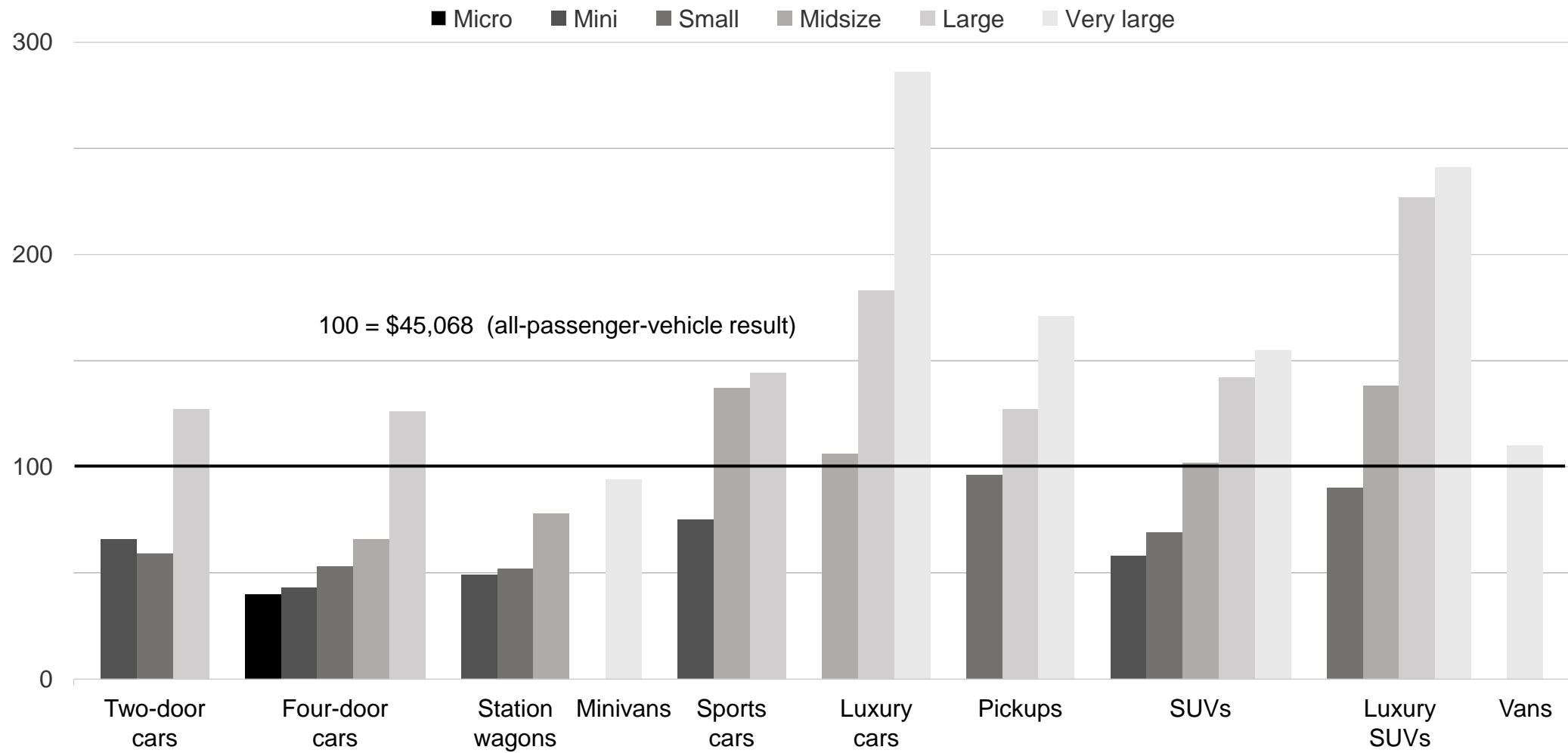
Relative whole vehicle theft claim frequencies by class and size

Model years 2020-22



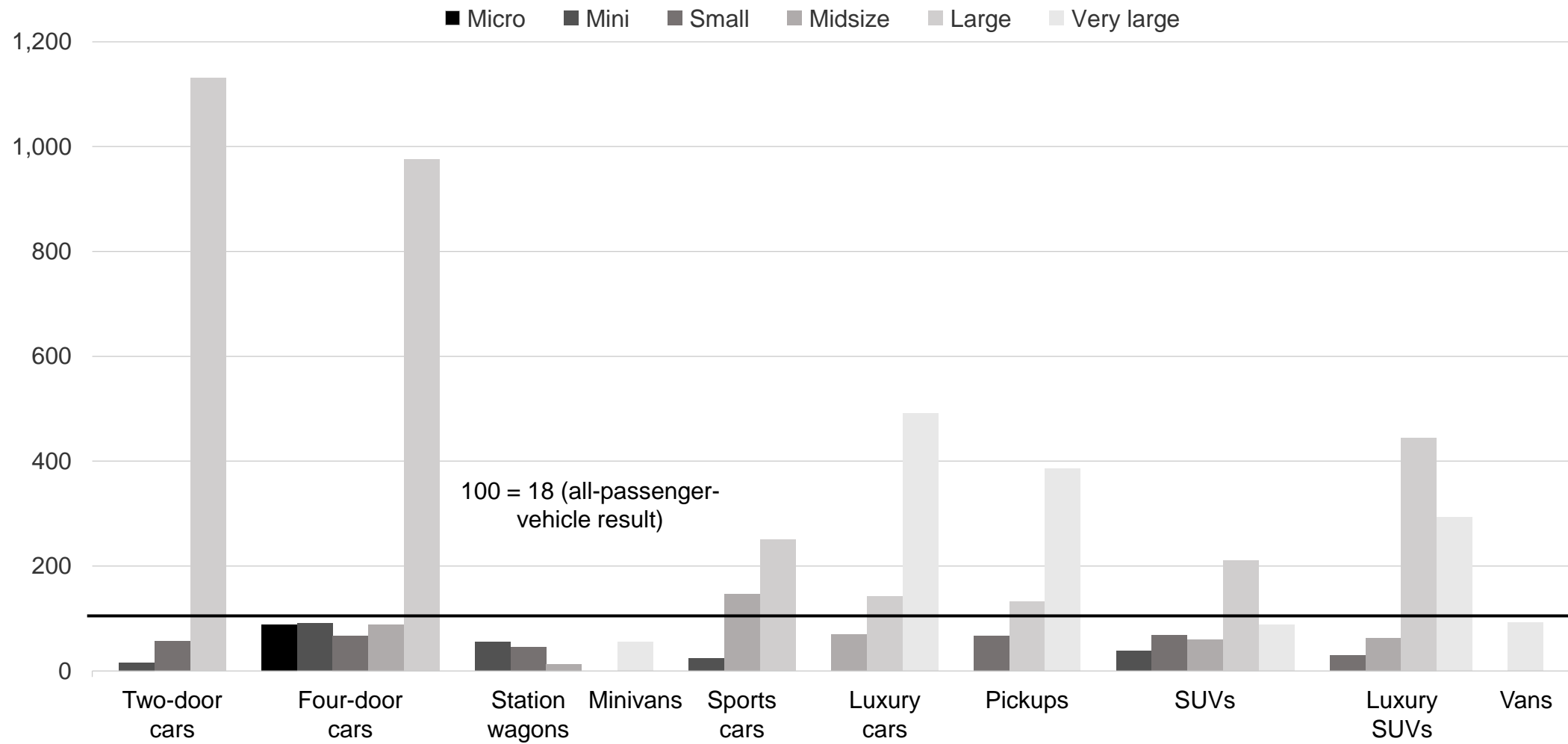
Relative whole vehicle theft claim severities by class and size

Model years 2020-22



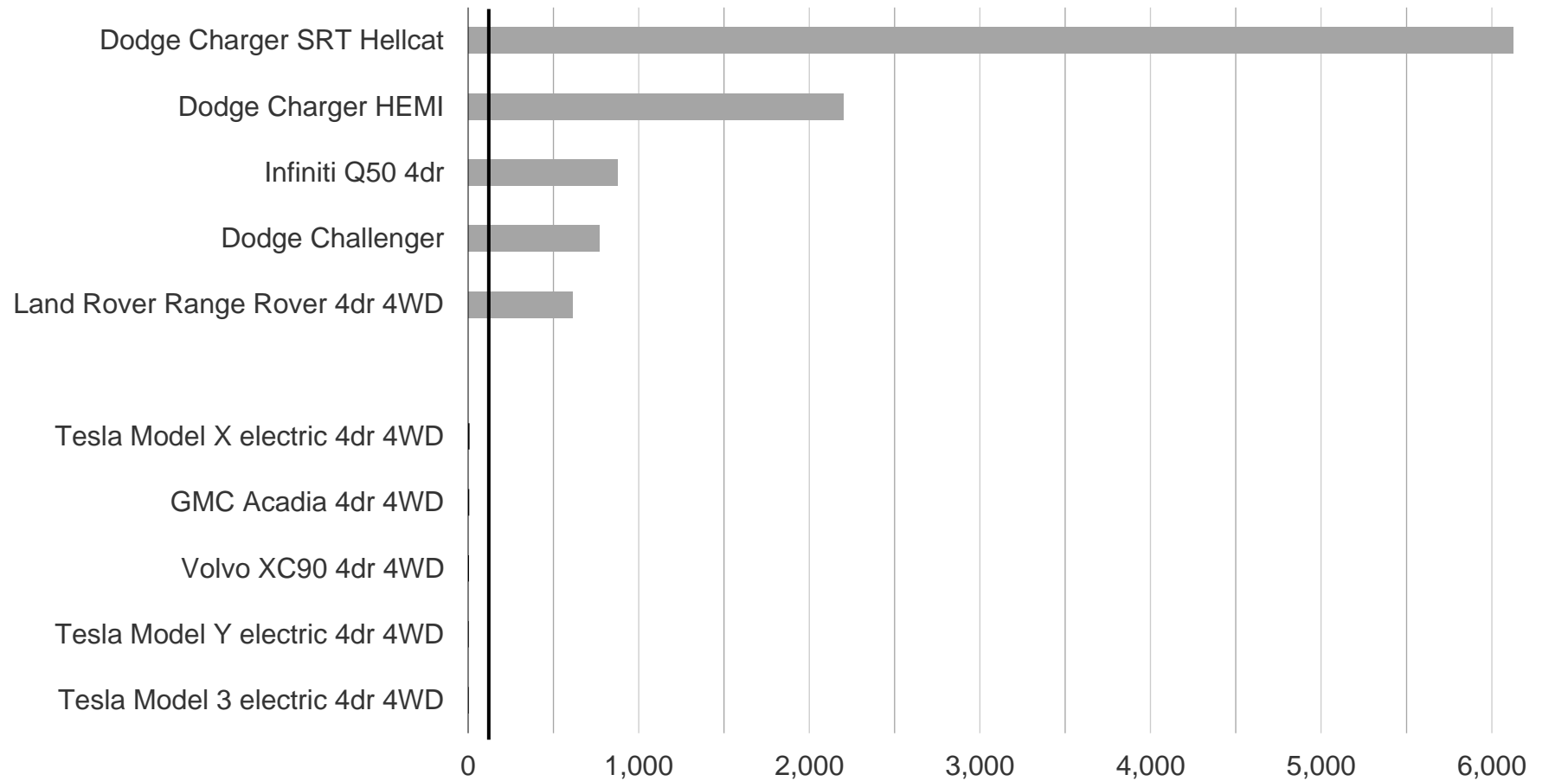
Relative whole vehicle theft overall losses by class and size

Model years 2020-22



Highest and lowest whole vehicle theft claim frequencies

2020-22 passenger vehicles



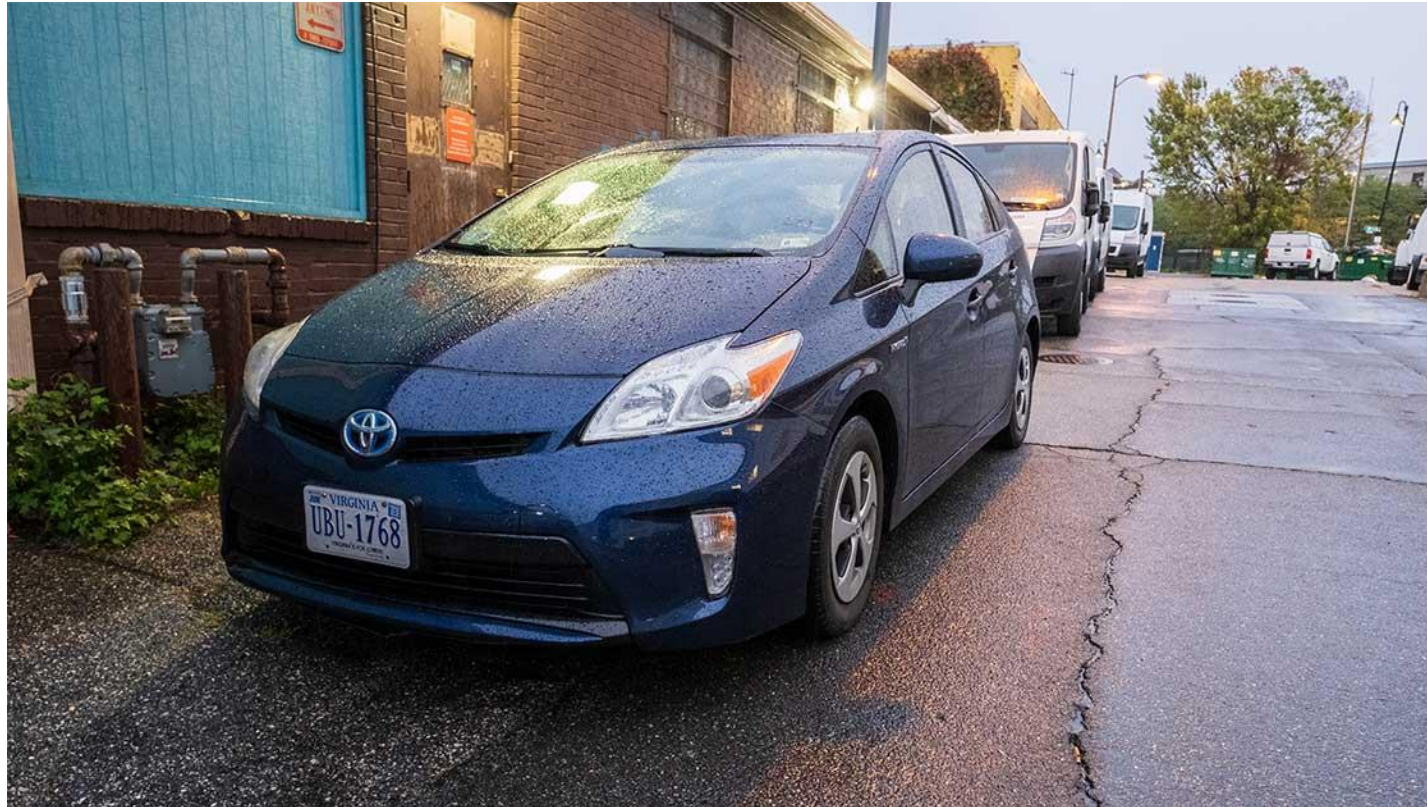
= 0.41 claims per 1,000
insured vehicle years

Prius theft



Catalytic converters make 2004-09 Toyota Prius unlikely theft target

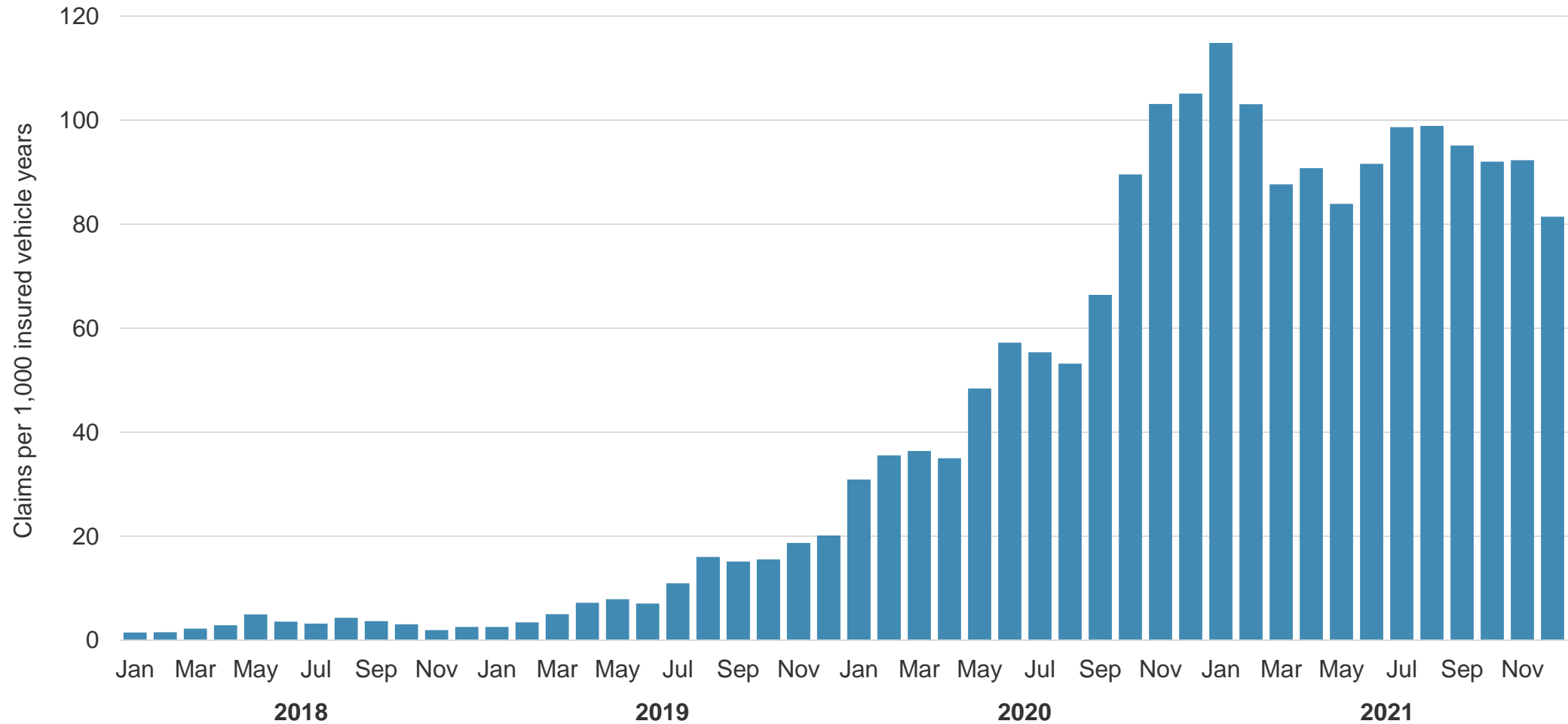
November 18, 2021



A spike in demand for precious metals has made Toyota Prius vehicles that are more than 10 years old an unlikely target of thieves, a recent report from the Highway Loss Data Institute shows.

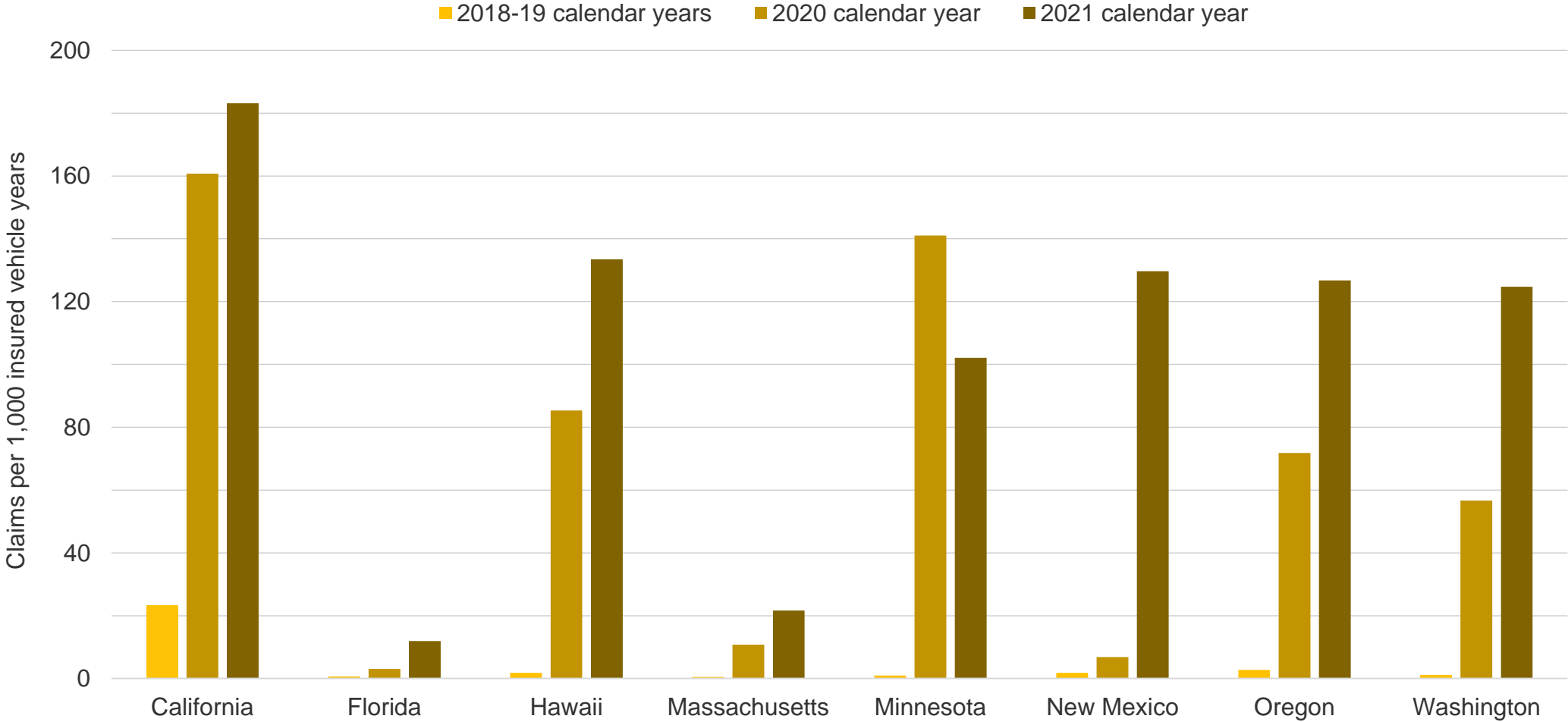
2004-09 Toyota Prius theft claim frequency by month

Catalytic converter thefts still high

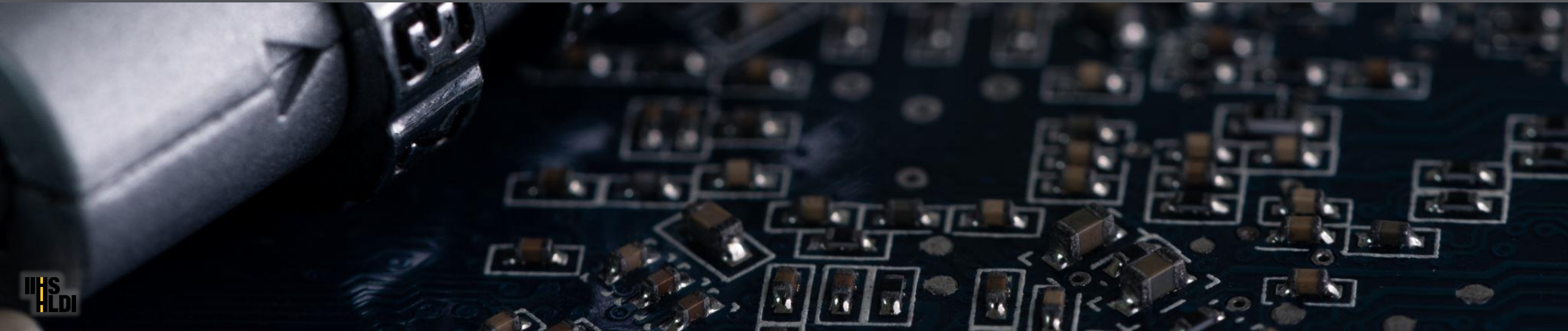


2004-09 Toyota Prius theft claim frequency

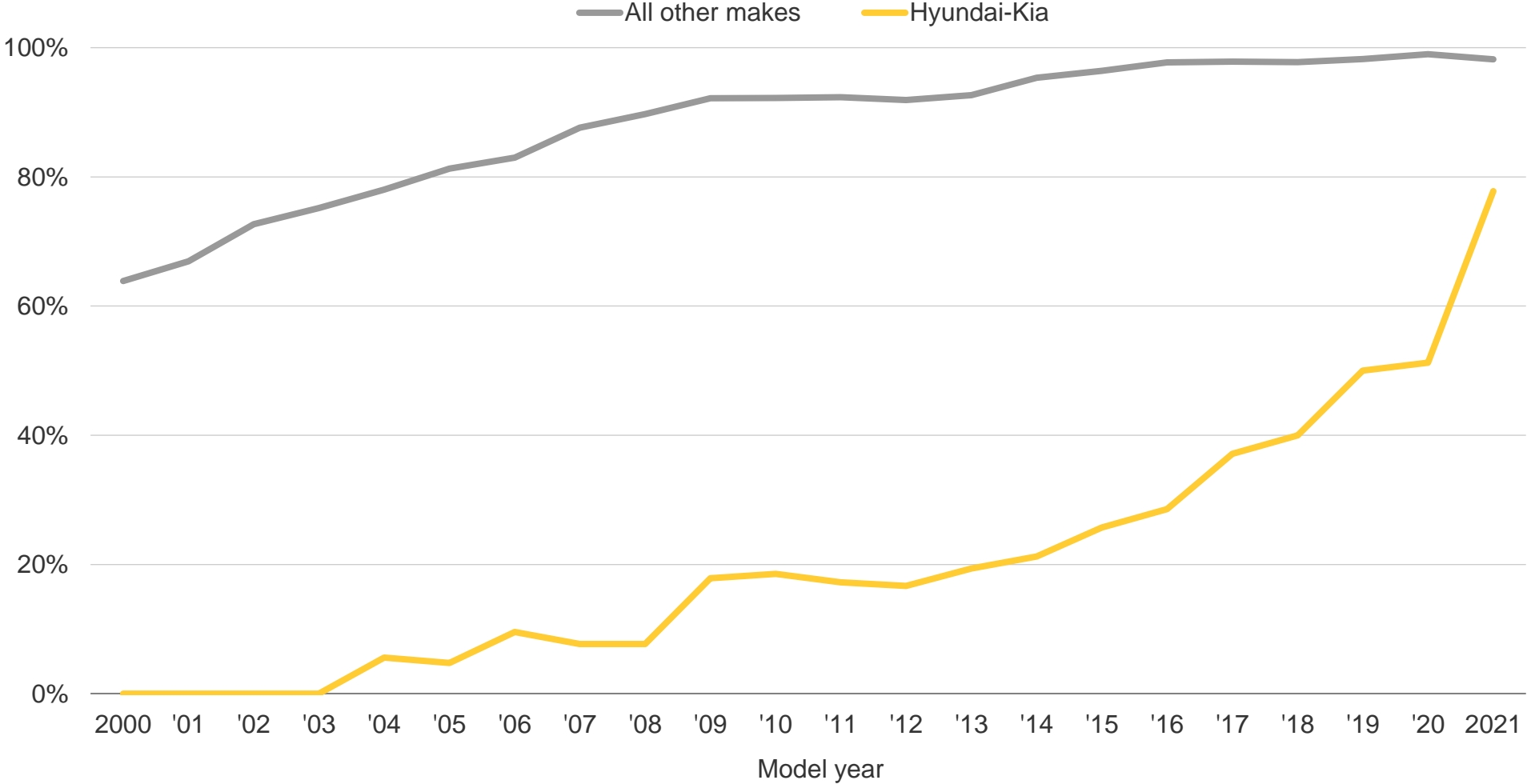
By calendar period for selected states



Hyundai and Kia theft and vandalism losses

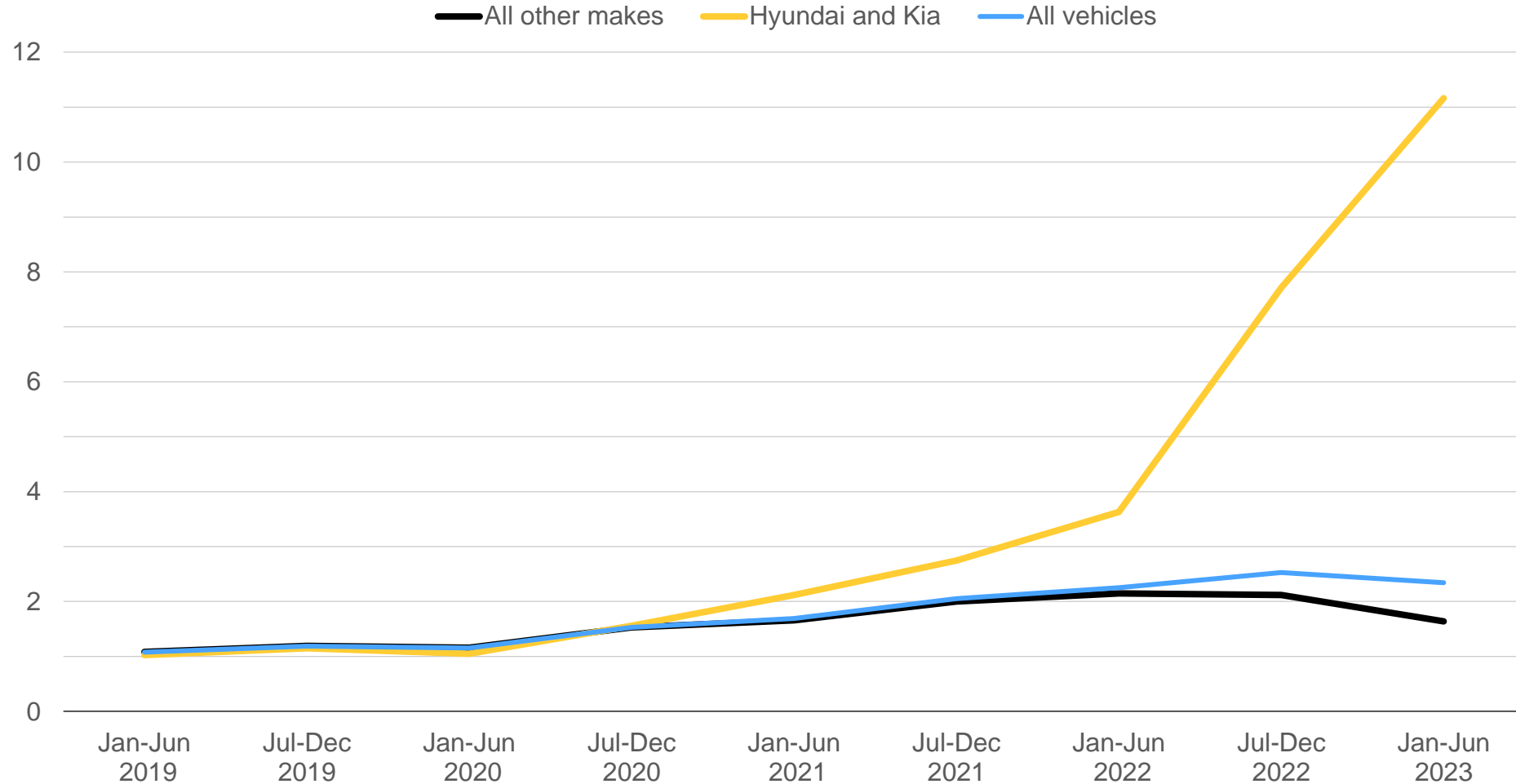


Percentage of vehicle series with passive immobilizer as standard equipment, by model year

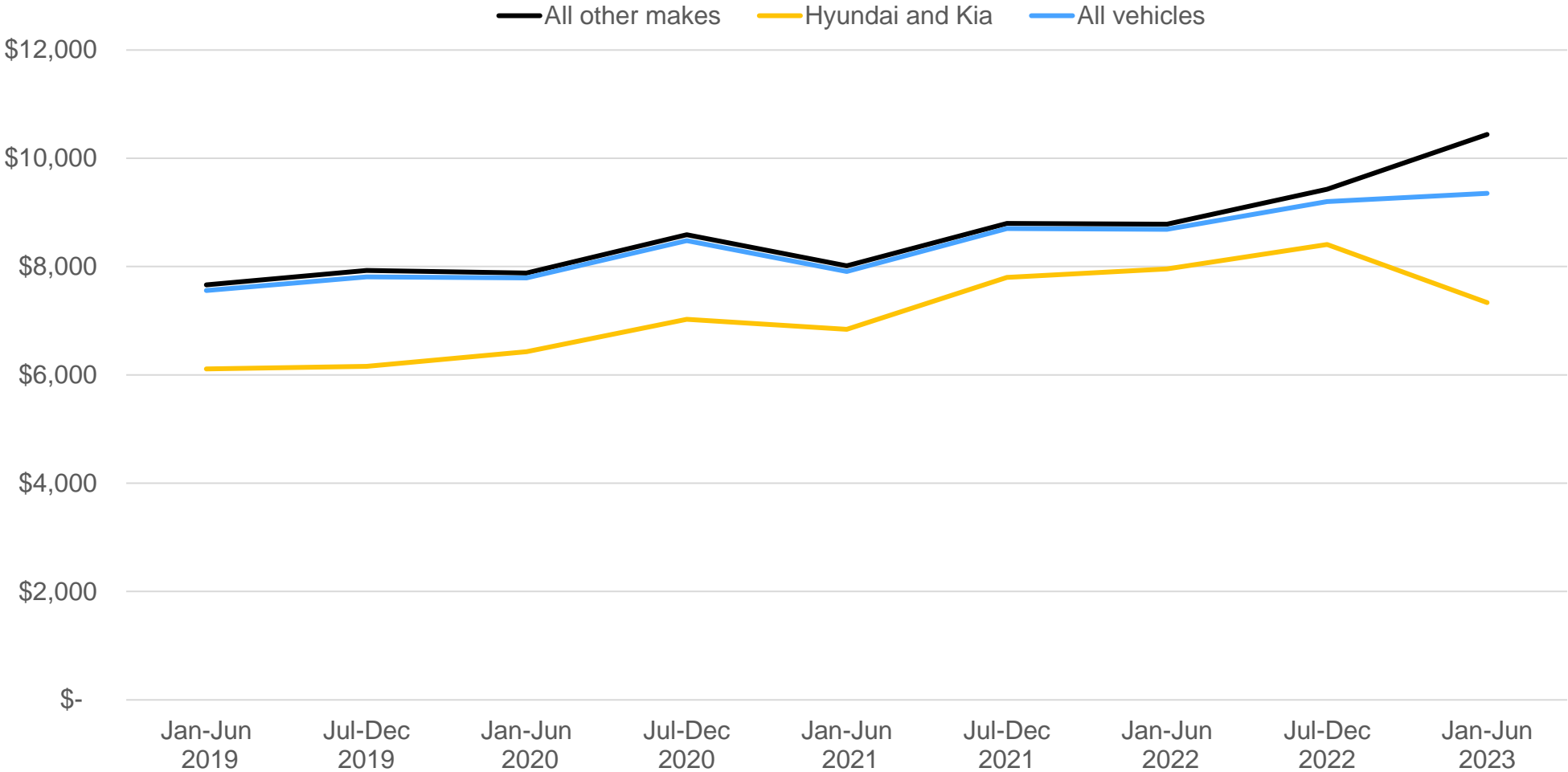


Theft claim frequency by calendar period for 2003-23 model years

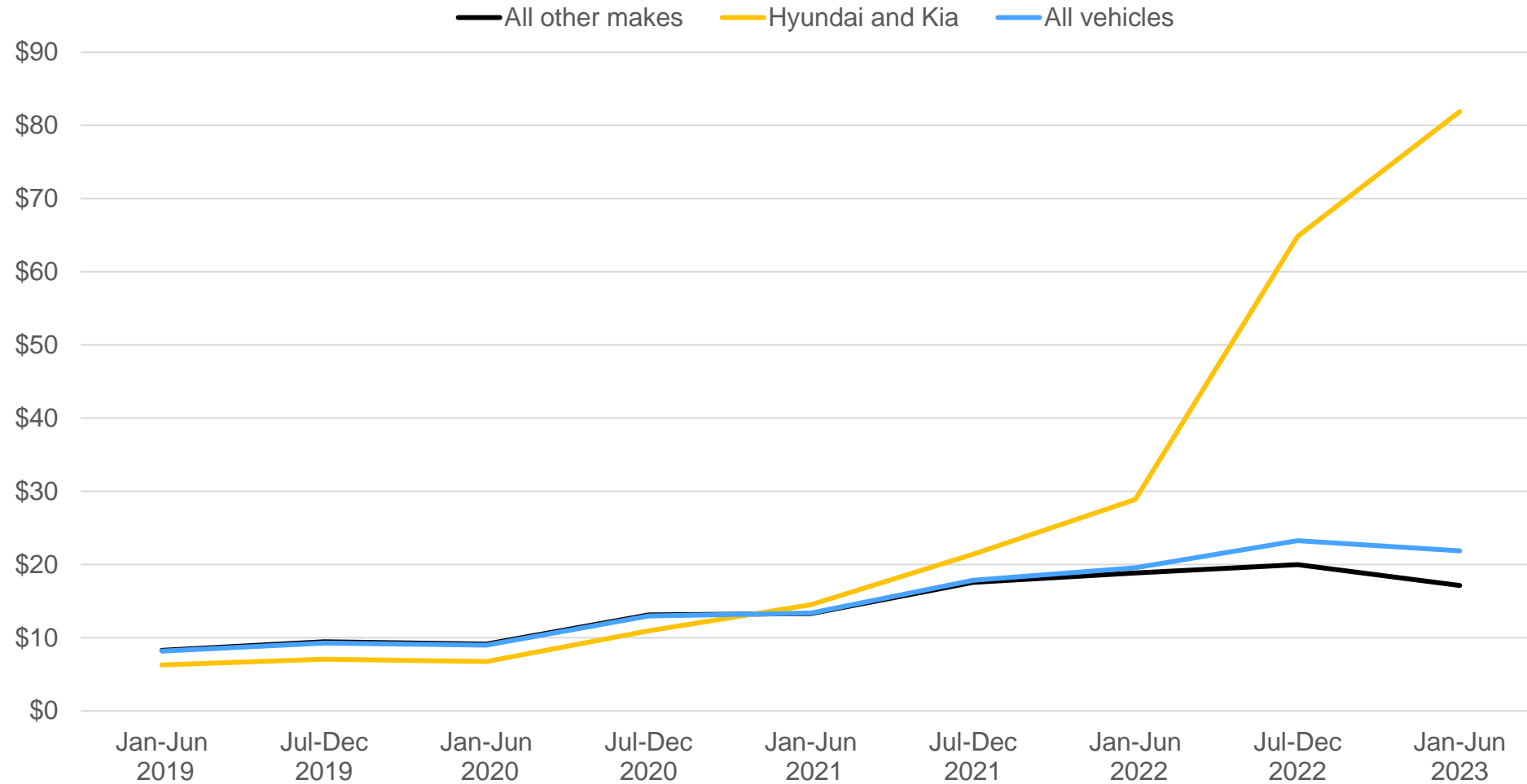
Claims per 1,000 insured vehicle years



Theft claim severities by calendar period for 2003-23 model years



Theft overall losses by calendar period for 2003-23 model years



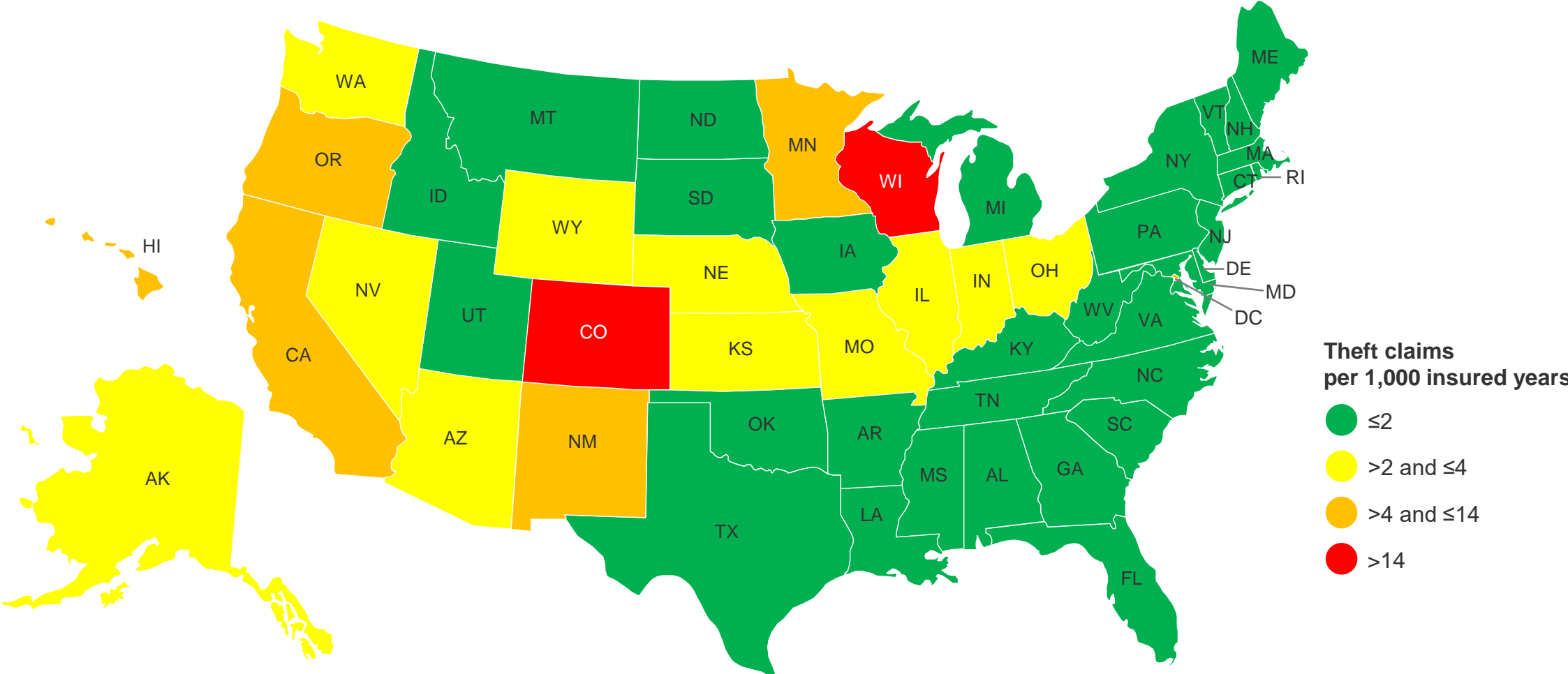
Theft claim frequency ratio by model year and calendar year

Hyundai and Kia vs. other makes

	CY 2019	CY 2020	CY 2021	CY 2022	CY 2023
2003	51%	58%	87%	111%	103%
2004	66%	50%	80%	126%	141%
2005	74%	40%	133%	200%	190%
2006	65%	64%	111%	162%	156%
2007	70%	51%	100%	142%	146%
2008	68%	49%	102%	140%	181%
2009	87%	57%	98%	169%	202%
2010	88%	79%	117%	155%	244%
2011	107%	116%	162%	284%	708%
2012	106%	113%	171%	302%	691%
2013	108%	126%	177%	364%	927%
2014	116%	121%	168%	344%	901%
2015	123%	139%	216%	437%	1035%
2016	103%	125%	182%	416%	1198%
2017	99%	114%	185%	432%	1238%
2018	91%	114%	170%	435%	1249%
2019	79%	106%	171%	411%	1197%
2020	79%	84%	123%	280%	781%
2021		90%	106%	201%	493%
2022			113%	107%	158%
2023				115%	117%

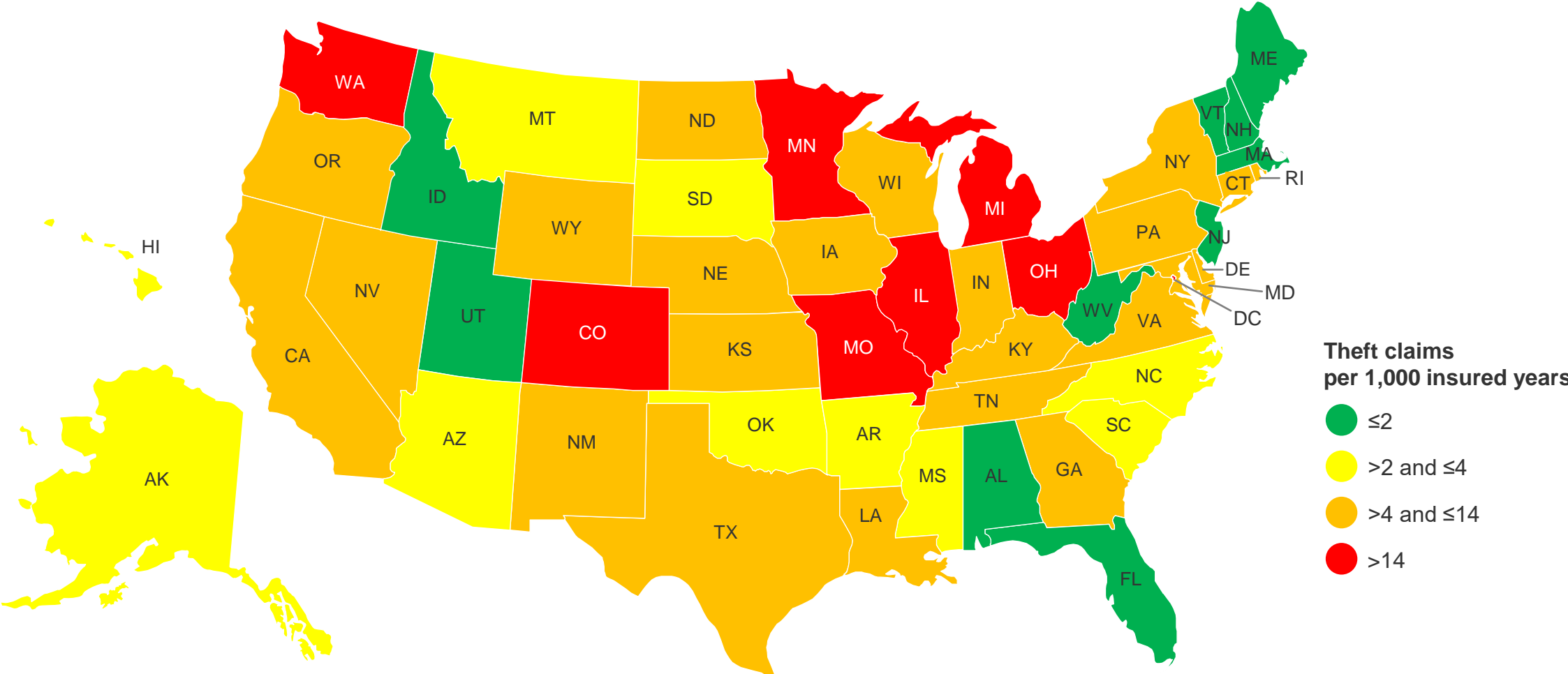
Hyundai and Kia theft claim frequency

July-December 2021, model years 2003-23



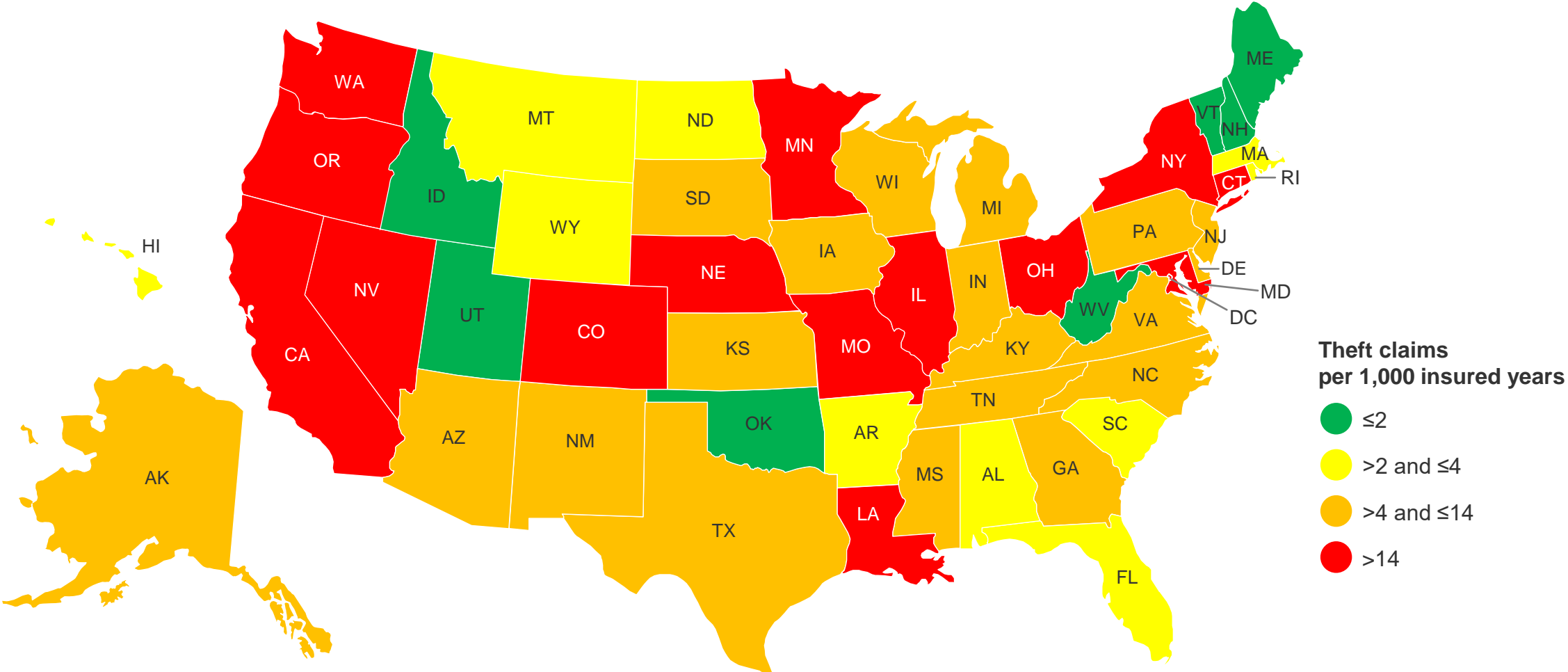
Hyundai and Kia theft claim frequency

July-December 2022, model years 2003-23



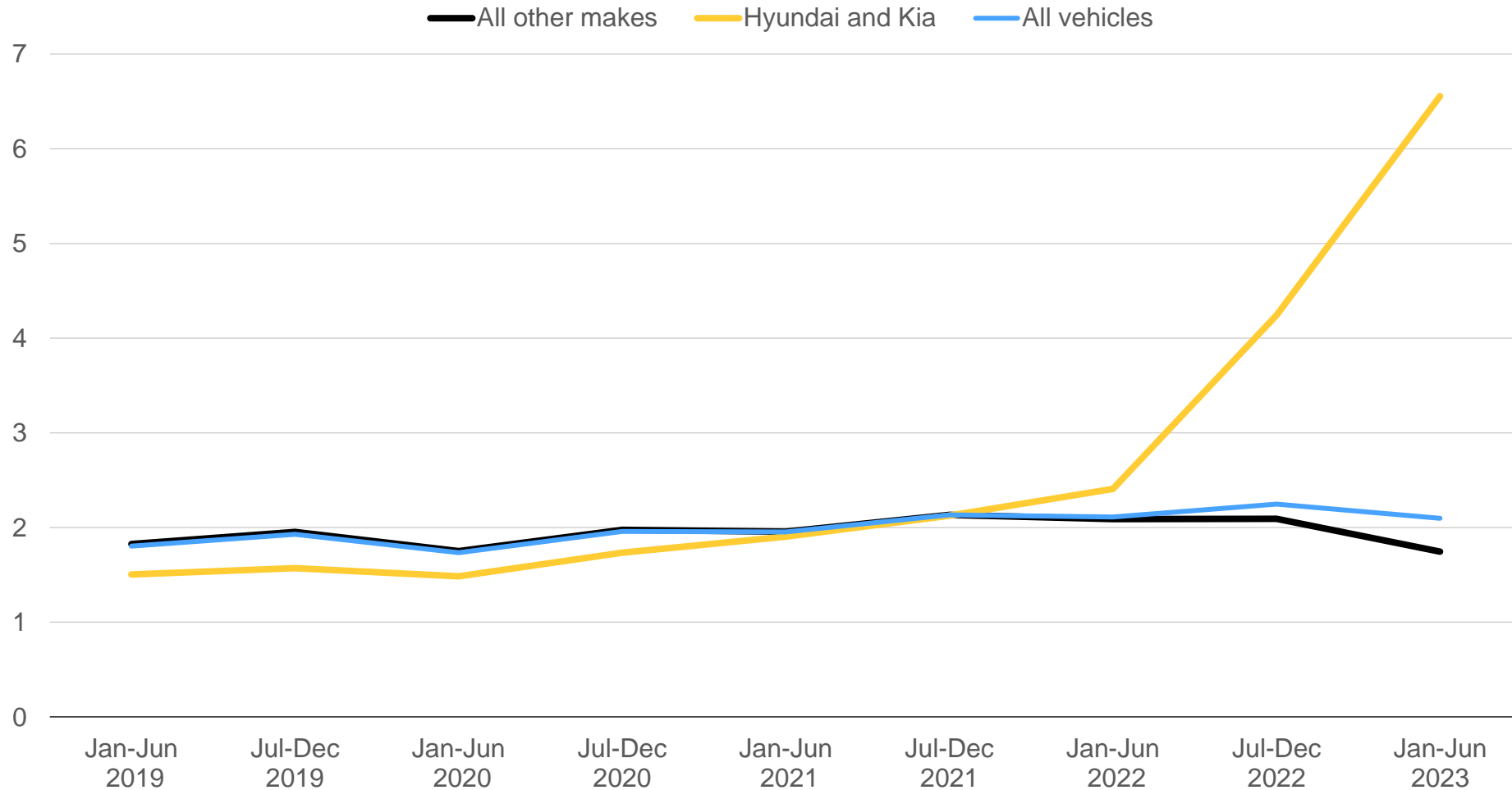
Hyundai and Kia theft claim frequency

January-June 2023, model years 2003-23

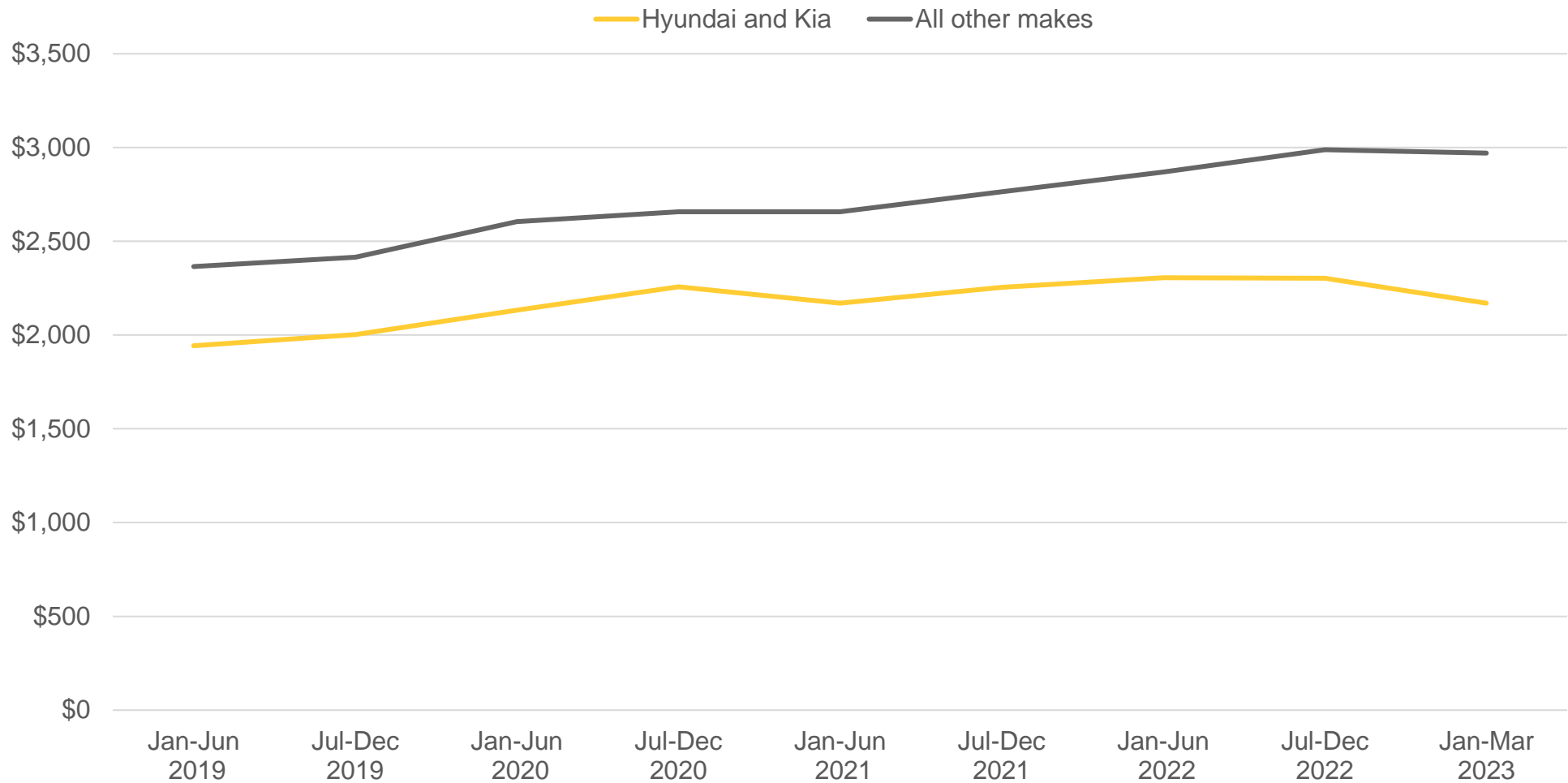


Vandalism claim frequency by calendar period for 2003-23 model years

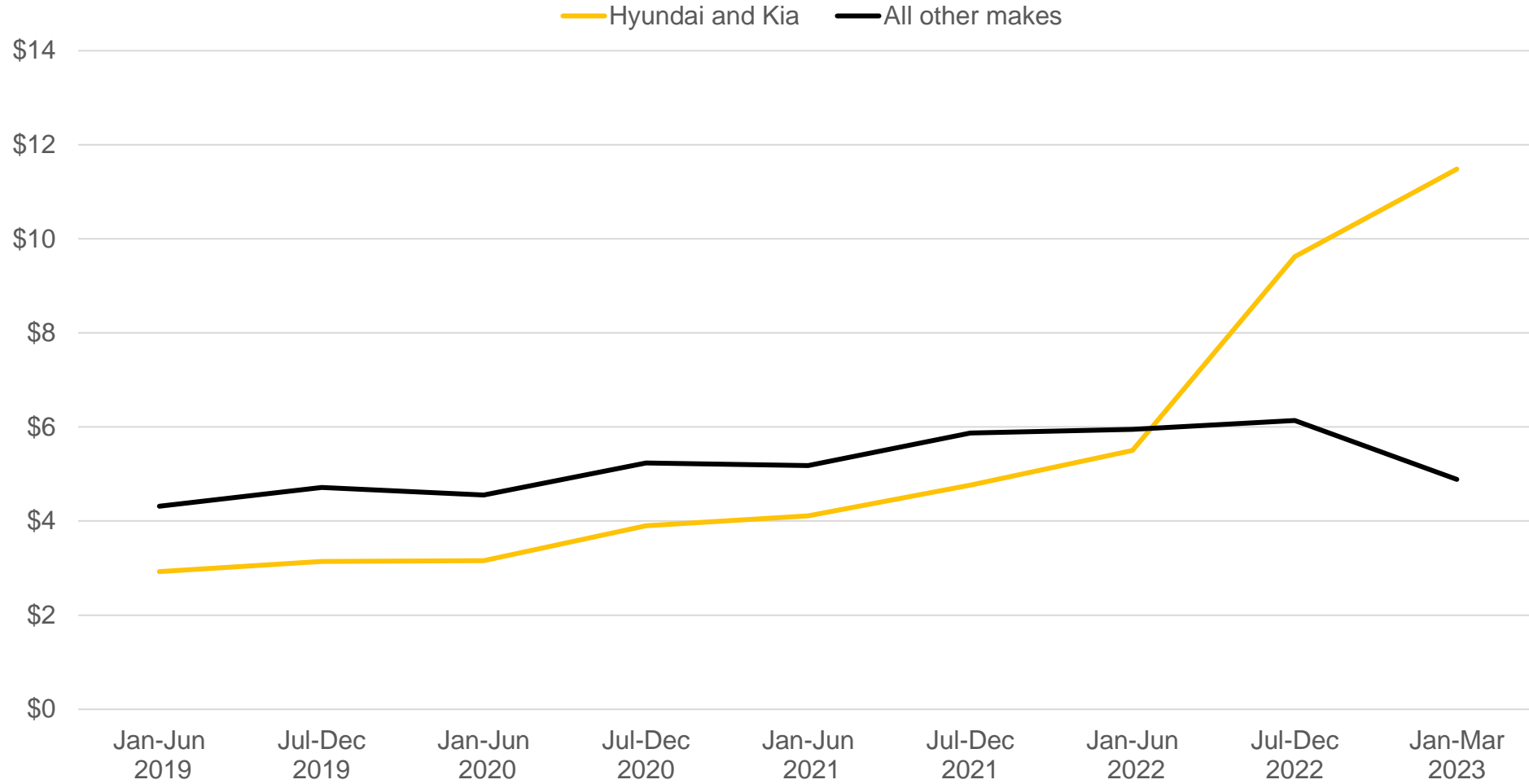
Claims per 1,000 insured vehicle years



Vandalism claim severities of 2003-23 models by calendar year



Vandalism overall losses of 2003-23 models by calendar year



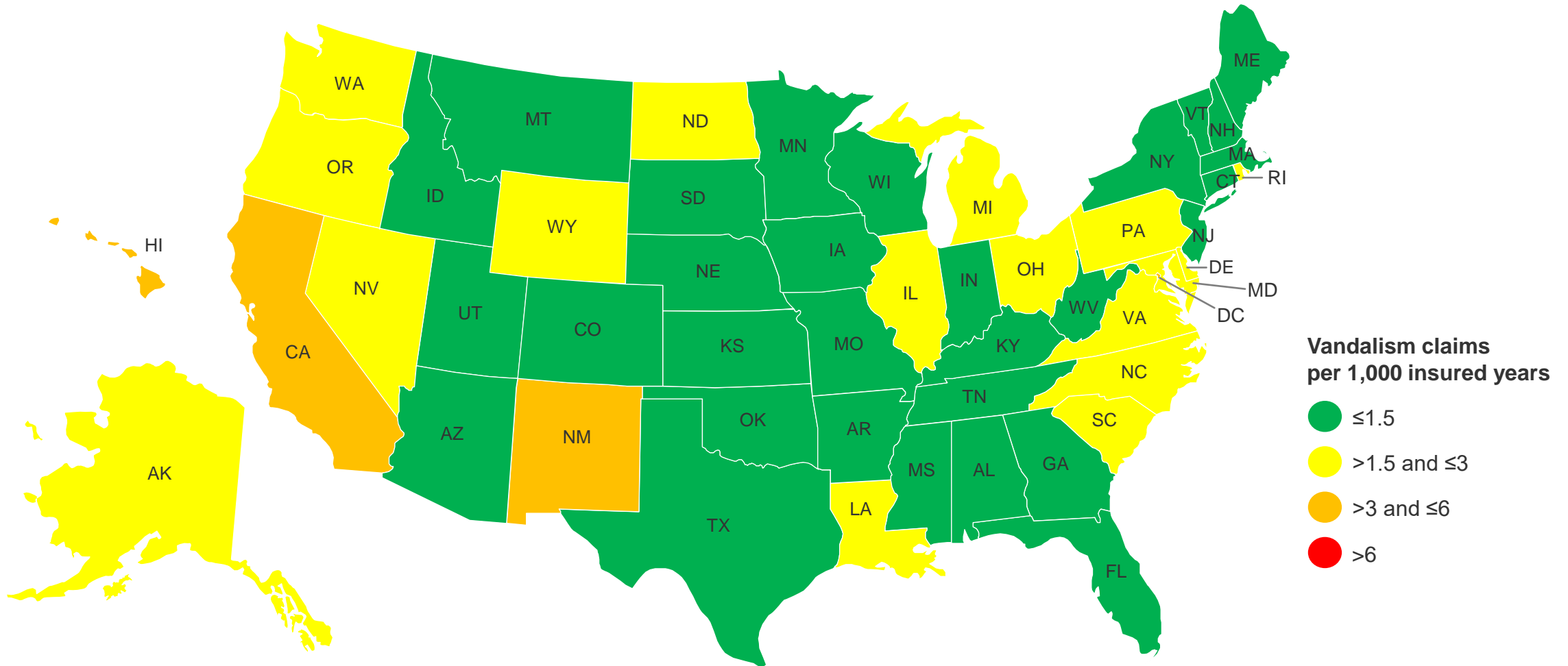
Vandalism claim frequency ratio by model year and calendar year

Hyundai and Kia vs. other makes

	CY 2019	CY 2020	CY 2021	CY 2022	CY 2023
2003	59%	58%	81%	83%	118%
2004	56%	56%	80%	109%	126%
2005	70%	48%	102%	129%	129%
2006	70%	57%	95%	137%	154%
2007	58%	53%	87%	117%	152%
2008	60%	57%	86%	115%	183%
2009	68%	62%	83%	135%	209%
2010	72%	77%	93%	163%	402%
2011	82%	93%	112%	189%	454%
2012	87%	94%	117%	188%	476%
2013	82%	92%	109%	198%	530%
2014	81%	91%	100%	187%	516%
2015	84%	98%	111%	192%	506%
2016	84%	87%	97%	189%	510%
2017	77%	86%	96%	173%	461%
2018	76%	81%	97%	164%	457%
2019	80%	86%	93%	156%	396%
2020	73%	86%	89%	133%	314%
2021		110%	99%	122%	255%
2022			96%	121%	197%
2023				199%	199%

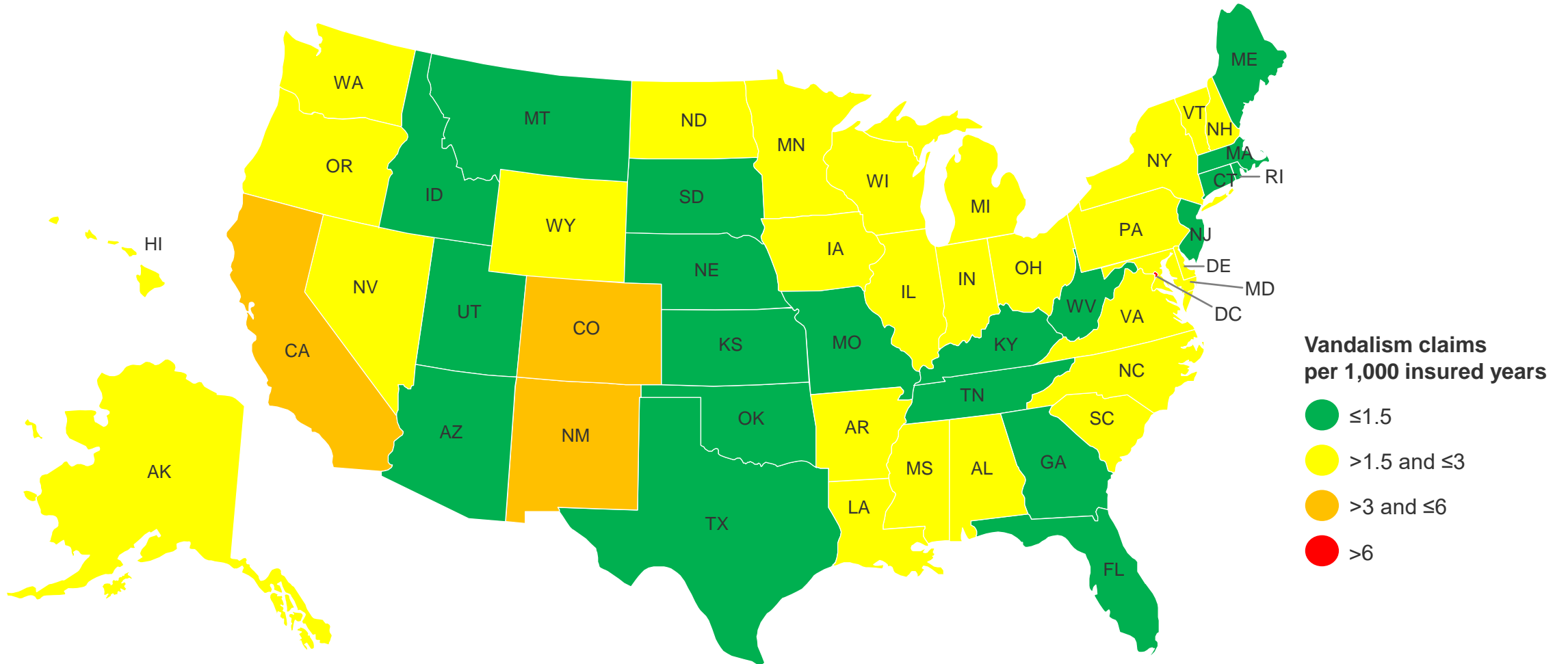
Hyundai and Kia vandalism claim frequency

July-December 2019, model years 2003-23



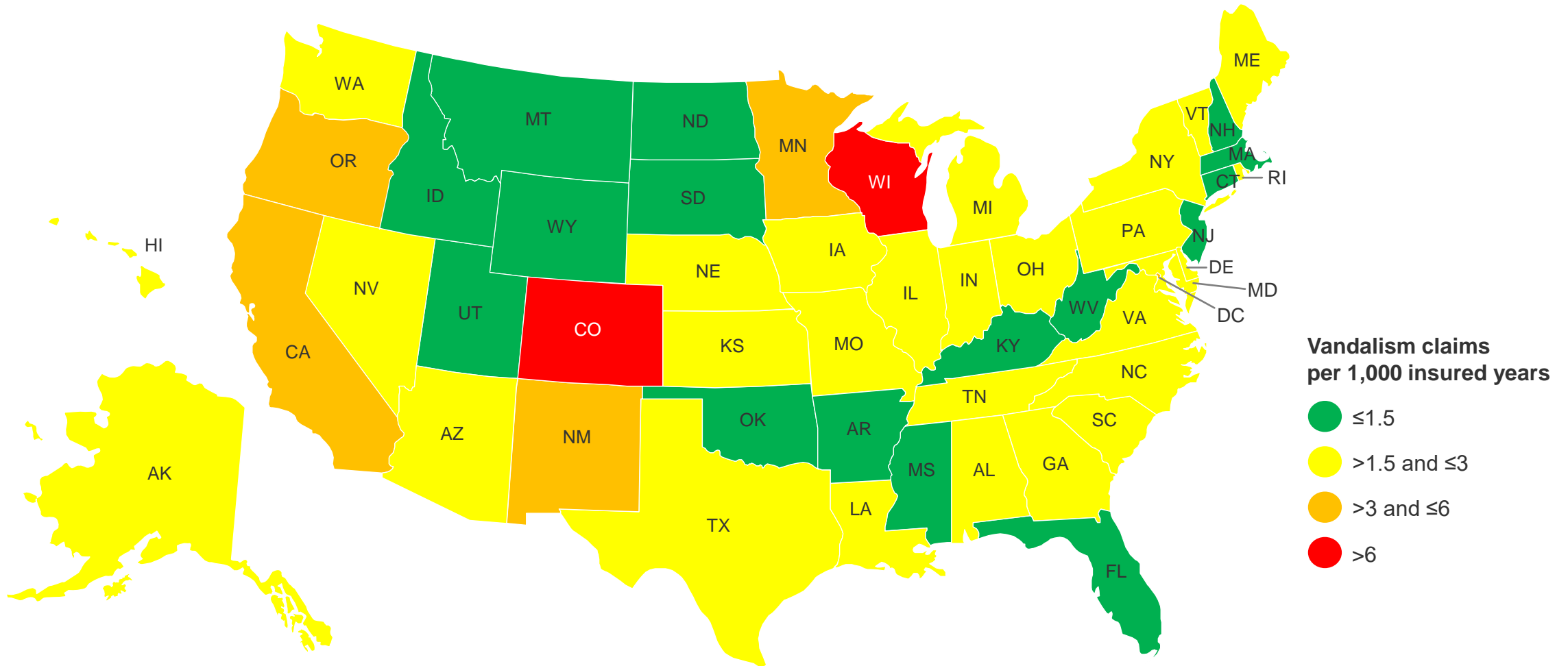
Hyundai and Kia vandalism claim frequency

July-December 2020, model years 2003-23



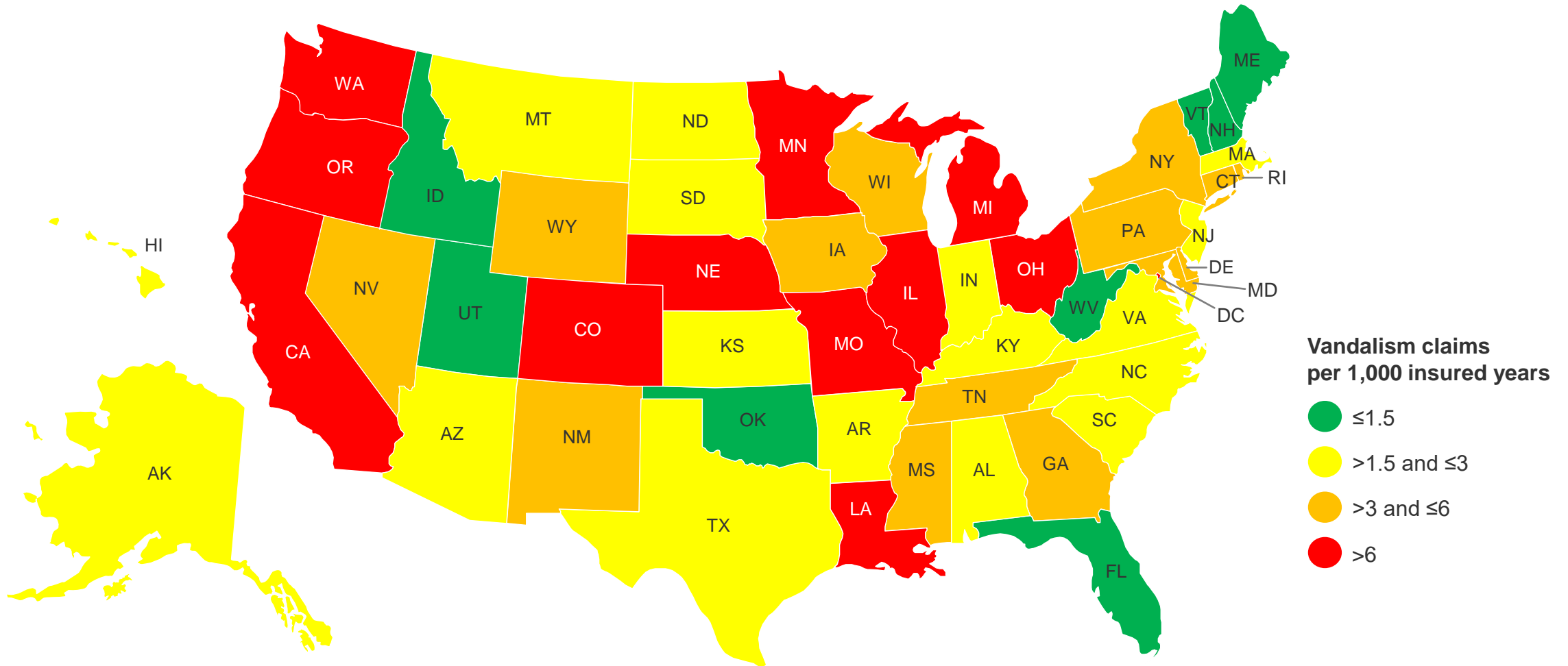
Hyundai and Kia vandalism claim frequency

July-December 2021, model years 2003-23



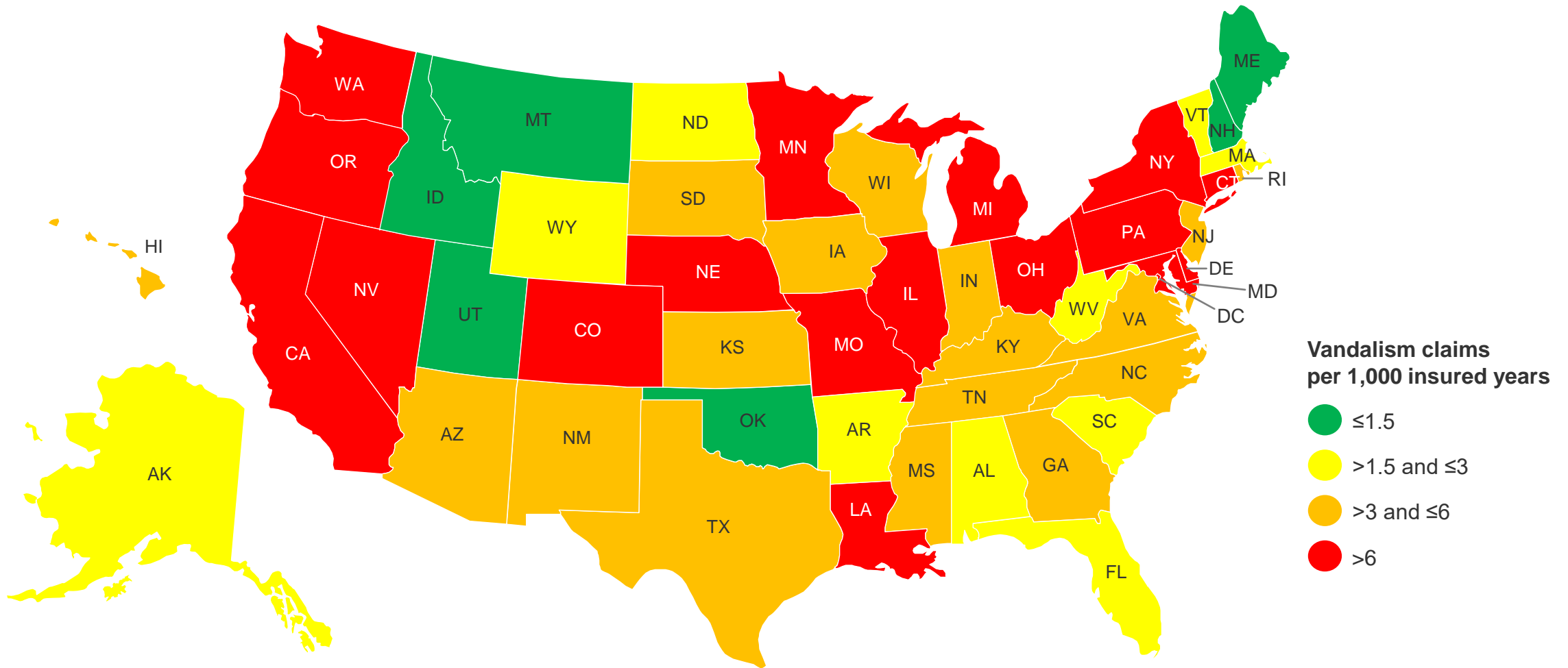
Hyundai and Kia vandalism claim frequency

July-December 2022, model years 2003-23



Hyundai and Kia vandalism claim frequency

January-June 2023, model years 2003-23



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THANK YOU



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