

Status Report

Insurance Institute for Highway Safety | Highway Loss Data Institute



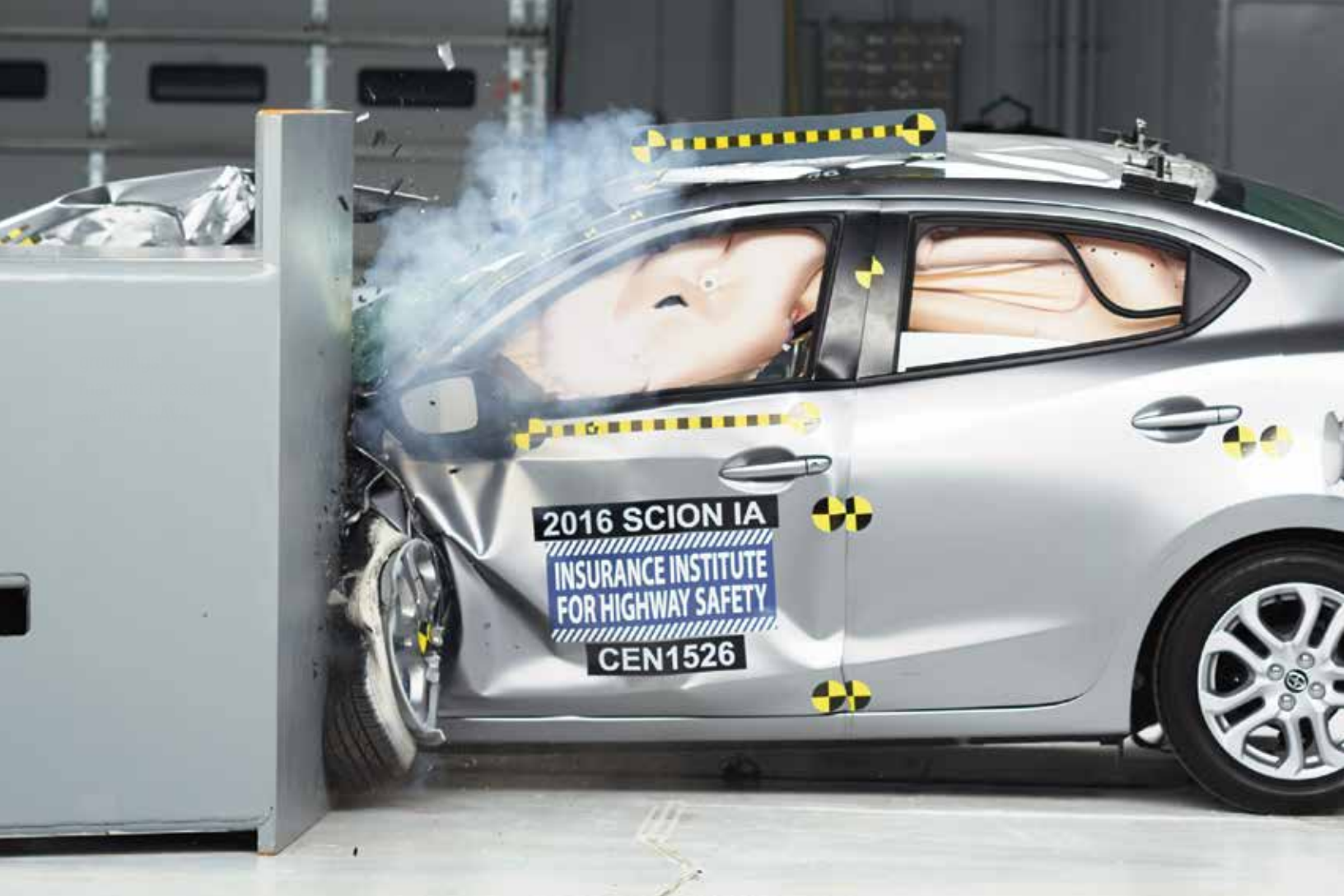
Advancing safety

Winning models offer good protection in small overlap front crashes plus front crash prevention

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December 10, 2015

- ▶ IIHS expands research facilities
- ▶ Naturalistic driving study offers new window on driver distraction
- ▶ Rising crash deaths may be downside to stronger economy



Nearly 50 vehicles meet tougher criteria for 2016 to take home an IIHS *TOP SAFETY PICK+* award, earning good ratings in all five crashworthiness evaluations and an advanced or higher rating for front crash prevention. An additional 13 vehicles qualify for *TOP SAFETY PICK* in this initial group of winners.

“We asked auto manufacturers to do more this year to qualify for our safety awards, and they delivered,” says Adrian Lund, IIHS president. “For the first time, a good rating in the challenging small overlap front crash test is a requirement to win, in addition to an available front crash prevention system. How that system rates determines

whether a vehicle will earn *TOP SAFETY PICK+* or *TOP SAFETY PICK*.”

The baseline requirements for both awards are good ratings in the small overlap front, moderate overlap front, side, roof strength and head restraint tests, as well as a standard or optional front crash prevention system. The 48 winners of the “plus” award have a superior- or advanced-rated



Forty-eight models earn *TOP SAFETY PICK+* and 13 qualify for *TOP SAFETY PICK*. This year’s award crystals have a new look.

front crash prevention system with automatic braking capabilities. These vehicles must stop or slow down without driver intervention

before hitting a target in tests at 12 mph, 25 mph or both. Models with an available basic-rated front crash prevention system, which typically only issues a warning and doesn’t brake, qualify for *TOP SAFETY PICK*.

IIHS inaugurated *TOP SAFETY PICK* in the 2006 model year to help consumers home in on vehicles with the best safety performance. The *TOP SAFETY PICK+* accolade was introduced in 2012 to recognize vehicles that offer an advanced level of safety (see *Status Report*, Dec. 20, 2012, and Dec. 17, 2005, at iihs.org).

Last year when IIHS announced the initial winners of the 2015 awards, 33 models qualified for *TOP SAFETY PICK+* and 38 qualified for *TOP SAFETY PICK* (see *Status Report*, Dec. 23, 2014). The ranks then grew to 51 *TOP SAFETY PICK+* and 48 *TOP SAFETY PICK* winners. IIHS releases ratings as it evaluates new models, adding to the ranks of winners throughout the year.

The 2016 winner’s circle includes some redesigned models with improved frontal crash protection and autobrake features, which help to prevent or mitigate certain frontal crashes.

The 2016 Nissan Maxima and Volkswagen Passat, for example, earn good ratings in the small overlap front test, while earlier models were rated acceptable. Nissan also improved occupant protection in rear crashes and rollovers, boosting the Maxima’s head restraints and seats rating from marginal to good and its roof strength rating from acceptable to good. The Maxima’s optional front crash prevention system is rated superior and the Passat’s is rated advanced. Both midsize cars earn the plus award.

2016 IIHS TOP SAFETY PICK+

Minicar	Scion iA	
Small cars	Acura ILX	Subaru Impreza
	Lexus CT 200h	Subaru WRX
	Mazda 3	Volkswagen Golf 4-door and SportWagen models
	Subaru Crosstrek	Volkswagen GTI 4-door
Midsize moderately priced cars	Chrysler 200	Subaru Outback
	Honda Accord 2-door coupe	Toyota Camry
	Honda Accord 4-door sedan	Toyota Prius v
	Mazda 6	Volkswagen Jetta
	Nissan Maxima	Volkswagen Passat
Midsize luxury/near luxury cars	Audi A3	Volvo S60
	BMW 2 series	Volvo V60
	Lexus ES	
Large family car	Toyota Avalon	

Large luxury cars	Acura RLX	Lexus RC
	Audi A6 built after January 2015	Mercedes-Benz E-Class
	Hyundai Genesis	Volvo S80
	Infiniti Q70 <i>does not apply to V8 4-wheel-drive models</i>	
Small SUVs	Fiat 500X <i>built after July 2015</i>	Mitsubishi Outlander
	Honda CR-V	Subaru Forester
	Hyundai Tucson	Toyota RAV4
	Mazda CX-5	
Midsize SUVs	Honda Pilot	Nissan Murano
Midsize luxury SUVs	Acura MDX	Lexus NX
	Acura RDX	Volvo XC60
	Audi Q5	Volvo XC90

For details on these and other vehicles go to iihs.org/ratings.

2016 IIHS TOP SAFETY PICK

Small cars	Chevrolet Sonic	Nissan Sentra <i>autobrake not tested</i>
	Kia Soul	
Midsize moderately priced car	Chevrolet Malibu Limited <i>fleet model</i>	
Small SUVs	Buick Encore	Nissan Rogue <i>autobrake not tested</i>

Midsize SUVs	Chevrolet Equinox	Kia Sorento
	GMC Terrain	
Midsize luxury SUV	Mercedes-Benz GLE-Class <i>autobrake not tested</i>	
Minivans	Honda Odyssey	Kia Sedona
Large pickup	Ford F-150 <i>SuperCrew</i>	



Hyundai Tucson

To qualify for 2016 *TOP SAFETY PICK*, a vehicle must earn good ratings in five crashworthiness tests — small overlap front, moderate overlap front, side, roof strength and head restraints — as well as a basic rating for front crash prevention. To qualify for 2016 *TOP SAFETY PICK+*, a vehicle must earn good ratings in the five crashworthiness tests and an advanced or superior rating for front crash prevention.



Volkswagen Passat



Nissan Maxima

Several automakers improved performance in the small overlap front test, and some added front crash prevention systems with autobrake.



Toyota RAV4

Toyota Avalon

Toyota added autobrake to the Avalon, a large family car, and the RAV4, a small SUV, to qualify for *TOP SAFETY PICK+*. Both are rated superior for front crash prevention.

In the award count, Toyota leads manufacturers with nine 2016 *TOP SAFETY PICK+* winners, including the popular Camry midsize car, while Honda picks up eight *TOP SAFETY PICK+* awards and one *TOP SAFETY PICK*. Volkswagen/Audi has seven plus-award winners. Six Subaru models qualify for *TOP SAFETY PICK+*.

The Chrysler 200 is the only domestic model to qualify for a 2016 *TOP SAFETY PICK+* award. One other vehicle from Fiat Chrysler Automobiles, the Fiat 500X, earns the Institute's highest award for 2016.

Ford has just one winning model this year, the F-150 SuperCrew, which earns *TOP SAFETY PICK*. The large pickup is the only Ford with a good small overlap rating.

Tougher criteria thwart many vehicles

A number of previous winners are missing from the new lists, including many small and midsize cars. Last year, vehicles with an acceptable small overlap rating could qualify for either award if their other four crashworthiness ratings were good. An available front crash prevention system was required only for *TOP SAFETY PICK+* and not *TOP SAFETY PICK*. More than 20 winners of the 2015 *TOP SAFETY PICK* award and four plus-award winners don't qualify under the 2016 criteria.

The tougher criteria are intended to encourage manufacturers to continue to build safer vehicles, a focus that has helped to dramatically reduce crash deaths during the past two decades.

The small overlap front crash test is based on research showing that about a quarter of the serious deaths and injuries in frontal crashes are in ones that involve just a small portion of the front end of a vehicle. These often are collisions with oncoming vehicles or run-off-road crashes into trees or utility poles (see *Status Report*, Aug. 14, 2012).

"When the Institute introduced the small overlap test, we knew many manufacturers would need to make structural improvements to safeguard people in this common type of frontal crash," Lund explains. "We expected a lot of marginal and poor ratings, and we got them."

At the same time, IIHS wanted to recognize automakers that were already paying attention to this crash configuration.

"As a compromise, we set the minimum ratings bar at acceptable. Now it's time to push ahead to give occupants the best possible protection," Lund says.

The Toyota Highlander and Sienna, for example, are available with an advanced-rated autobrake system, but less-than-good ratings in the small overlap front test put the SUV and minivan out of contention for a 2016 accolade. The pair earned 2015 plus awards.

Lack of an available front crash prevention system is the issue with several vehicles with good small overlap ratings. The Audi Q3, for example, no longer qualifies for *TOP SAFETY PICK* because it doesn't have front crash prevention.

"Consumers who purchased a winning 2015 model that doesn't qualify this year needn't worry that their vehicles are now less safe," Lund says. "As vehicles continue to improve, however, we think it's important to recognize that progress and encourage further advances by making our ratings more stringent."

Autobrake availability to increase

Among the *TOP SAFETY PICK+* winners, there are 31 models with an available superior-rated front crash prevention system and 17 models with an advanced rating.

The Scion iA, a *TOP SAFETY PICK+* winner, is the first low-priced car with a standard autobrake system. With a base price of about \$16,000, the iA is rated advanced for front crash prevention and is the only minicar to earn a 2016 IIHS award. This shows that front crash prevention systems are becoming more affordable. Besides the iA, autobrake is standard on just a few luxury vehicles. These include all Volvo models, some Mercedes-Benz models and the Acura RLX.

More automakers are expected to make autobrake standard equipment in the near future under a voluntary agreement being developed by manufacturers, the National Highway Traffic Safety Administration (NHTSA) and IIHS. NHTSA Administrator Mark Rosekind announced the historic commitment in September at the dedication of the newly expanded IIHS Vehicle Research Center in Ruckersville, Virginia.

Further bolstering the commitment is NHTSA's November announcement that it will add autobrake as a recommended safety technology to the agency's 5-star safety ratings program for consumer information, beginning with the 2018 model year (see safercar.gov).

"Ask for autobrake and forward collision warning features when you're out shopping for a new vehicle," Lund says. "Look for good ratings in IIHS evaluations and at least 4 of 5 stars from NHTSA. And remember that larger, heavier vehicles offer the best protection in a crash." ■



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Room for research

IHS and its member companies this fall celebrated the completion of a \$30 million expansion of the Vehicle Research Center in Ruckersville, Va., which will enable IHS to evaluate crash avoidance technologies year-round.

The centerpiece is a 5-acre covered track, one of the largest fabric-covered structures in the United States. Six fabric panels supported by steel trusses arc over the 700-foot-by-300-foot track and are supported by 18 concrete piers, which weigh a total of 7,000 tons and contain more than 39 miles of steel reinforcement bars.

An existing outdoor track was expanded, bringing the total area of track, including the covered section, to 15 acres. A new office and conference space also was part of the project.

1. Vehicle Research Center
2. Covered test track
3. Thomas C. Morrill center
4. Exhibits in display hall
5. Insurer wall in new lobby
6. Adrian Lund and Mark Rosekind
7. Enlarged test track

Large naturalistic study gives scientists new window on what distracts drivers

Figuring out the role cellphone use and other distracting behaviors play in crashes is a challenge for researchers. While things like driver age and alcohol impairment are fairly easy to establish after a serious crash, distraction is harder to pin down. In most cases, there is no reliable record of what a driver was doing in the moments leading up to a collision.

To get a handle on the role of distraction in crashes, researchers often turn to naturalistic driving studies, in which a group of drivers are continuously monitored over an extended time period. An IIHS analysis of data from a recent large naturalistic study

monitored for up to three years during 2010-13. Footage of normal driving was collected, along with video of all crashes and the moments leading up to them.

SHRP2 is a multifaceted research initiative conducted under the auspices of the American Association of State Highway and Transportation Officials, the Federal Highway Administration and the National Research Council.

The SHRP2 study dwarfs previous sources of naturalistic driving data. An earlier one used in IIHS research monitored 105 drivers for a year during 2003-04. Few crashes were observed in that study, so IIHS

same time, the 1,465 crashes recorded in the SHRP2 study vary in severity. Not surprisingly, the least severe crashes are the most common. And when IIHS researchers looked at the effect of distracting behaviors on crash risk, they discovered there are big differences depending on the severities of crashes included.

“This is a huge trove of valuable data that is adding to our understanding of driver distraction,” says David Kidd, an IIHS senior research scientist and the lead author of the analysis. “However, in all the hours of driving that were monitored, there were no fatal crashes, and most of the crashes that did occur didn’t involve serious injuries. That makes it hard to draw conclusions about the crashes we’re most interested in — the ones that kill and injure people.”

Of the crashes recorded, 42 percent are low-risk tire strikes, which include things like a tire hitting a curb or briefly going up on the curb. Most drivers likely wouldn’t even consider these to be crashes and in some cases might not even notice them. Another 41 percent of the crashes are classified as minor, while 10 percent include sufficient damage to be police-reportable, and 7 percent were classified as “most severe.” The most severe category includes crashes that involve an airbag deployment, injury or a high change in speed at impact.

For all of the crashes and for random six-second snippets of normal driving, researchers looked for the presence of “secondary behaviors” — activities performed by drivers in addition to driving. This allowed IIHS scientists to calculate the odds of crashing while engaged in any secondary behavior and specifically while talking on a cellphone, manipulating a cellphone, eating or drinking, or interacting with an in-vehicle system, such as temperature controls or the radio.

Relative to driving without any secondary behavior, the odds of a crash of any type were significantly higher when drivers were engaged in any secondary behavior, when they were manipulating cellphones and when they were interacting with an



An analysis of the data provides new evidence that using cellphones, eating or drinking, and interacting with an in-vehicle system all increase the odds of a crash.

provides new evidence that using cellphones, eating or drinking, and interacting with an in-vehicle system all increase the odds of a crash. At the same time, the analysis shows the need to consider crash severity when using these data to estimate crash risk.

The data are from the second Strategic Highway Research Program, known as SHRP2. More than 3,000 drivers were

researchers looked at crashes together with “near crashes,” such as hard braking or evasive maneuvers (see *Status Report* special issue: distracted driving, Oct. 24, 2014, at iihs.org).

It’s open to question just how similar near-crash situations are to actual crashes. The SHRP2 data include enough actual collisions that, for the first time, including near crashes isn’t necessary. At the

in-vehicle system. Talking on a cellphone and eating and drinking also raised the odds of any crash, but those results weren't significant.

Excluding low-risk tire strikes made the pattern more obvious. The odds ratios went up for every category of secondary behavior that was examined, and all were significant. Of all activities analyzed, manipulating a cellphone was associated with the biggest crash risk — about 5 times the odds of crashing while driving without any secondary behavior.

Earlier naturalistic studies also found that manipulating a cellphone increased the risk of a crash or near crash. A new finding is that simply talking on a cellphone also significantly increases the odds of a crash when tire strikes are excluded.

The rough odds ratios in this study aren't adjusted for driver characteristics or environmental factors. IIHS researchers plan to conduct follow-up analyses to take those things into account.

The study doesn't address what policies might reduce the types of distraction that lead to crashes. Earlier research by IIHS and HLDI has found that cellphone and texting bans reduce phone use, but not crashes. The researchers hypothesized that drivers who refrained from using their phones manually may have switched to hands-free systems, which also can be distracting, or may have been distracted by something else (see *Status Report* special issue: distracted driving, Oct. 24, 2014).

“Our understanding of the role cellphones play in crashes continues to evolve,” says Anne McCartt, IIHS senior vice president for research and a co-author of the new study. “Although this study shows that manipulating a cellphone is more risky than some other secondary behaviors, it's important to remember that drivers are distracted in many other ways, and putting down the phone does not mean a driver is paying attention to the road. An approach that addresses all kinds of distraction, instead of focusing specifically on cellphones, will be most successful in improving safety.”

For a copy of “The relevance of crash type and severity when estimating crash risk using the SHRP2 naturalistic driving data” by D.G. Kidd and A.T. McCartt, email publications@ihs.org. ■

Stronger economy can be bad news for highway safety

Recent headlines imply that the years of declining traffic fatalities may be over for now. The National Highway Traffic Safety Administration has estimated that crash deaths increased 8 percent during the first six months of 2015. That would put the U.S. on pace for the highest toll since 2008.

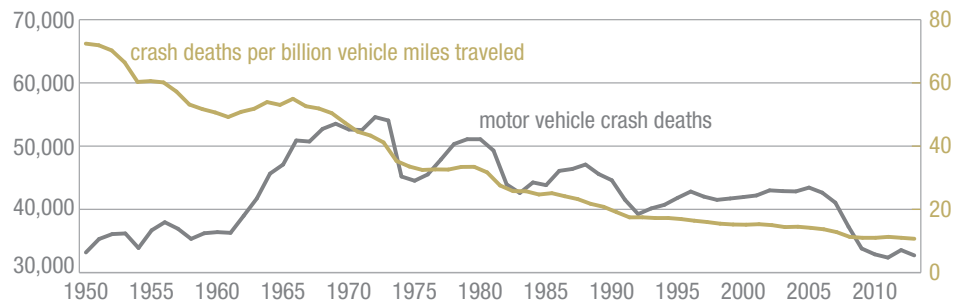
Historical crash data point to the economic recovery as one likely cause of the increase in deaths.

As the first chart below shows, after peaking in the early 1970s, crash deaths have fluctuated quite a bit while generally trending downward. Large dips in crash deaths

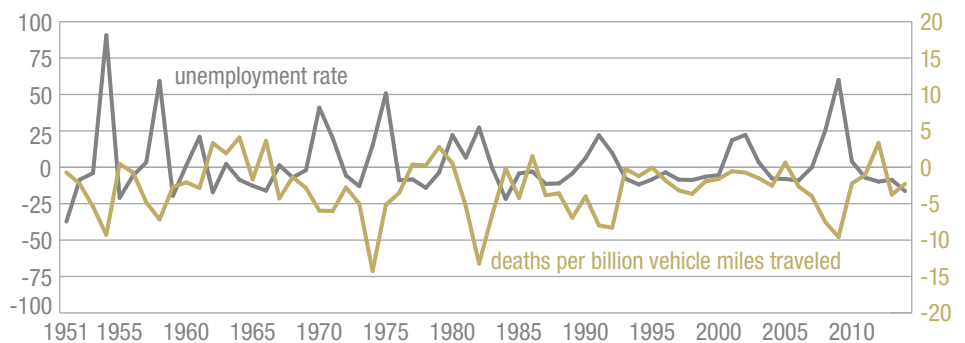
smoother downward trajectory. However, there are dips in that line too, albeit less pronounced. Those probably can be explained by changes in the type of driving people do. Discretionary trips for vacations and evenings out are the things that are likely to be eliminated first, and that type of driving tends to be more risky than daily commuting or trips to the supermarket.

The second chart illustrates the connection even more clearly. It shows the year-to-year percent changes in the unemployment rate, along with the year-to-year percent changes in crash deaths per billion vehicle miles traveled. As the unemployment line

U.S. motor vehicle crash deaths and deaths per billion vehicle miles traveled, 1950-2014



Year-to-year percent changes in crash deaths per billion vehicle miles traveled and in the U.S. unemployment rate, 1951-2014



correspond roughly with shocks to the economy: the oil embargo of the mid-1970s, the recessions of the early 1980s and early 1990s and the more recent downturn that began with the subprime mortgage crisis.

Much of that is due to people driving less. In the chart, the line showing deaths per billion vehicle miles traveled has a

goes up, the crash deaths line goes down, and vice versa.

The U.S. economy has been in a recovery for some time, but growth has been slow until recently, which may explain why deaths are rising only this year. A total of 32,675 people were killed on the nation's roads in 2014. That is 44 fewer than in 2013. ■

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IIHS is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from crashes on the nation's roads.

HLDI shares and supports this mission through scientific studies of insurance data representing the human and economic losses resulting from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle make and model.

Both organizations are wholly supported by the following auto insurers and funding associations:

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| Florida Farm Bureau Insurance Companies | South Carolina Farm Bureau Mutual Insurance Company |
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| Gainsco Insurance | State Auto Insurance Companies |
| GEICO Corporation | State Farm Insurance Companies |
| The General Insurance | Tennessee Farmers Mutual Insurance Company |
| Georgia Farm Bureau Mutual Insurance Company | Texas Farm Bureau Insurance Companies |
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