

# Status Report

Insurance Institute for Highway Safety | Highway Loss Data Institute

# Near miss

Two all-electric cars fall short of earning an IHS safety award

**ALSO IN  
THIS ISSUE**  
Vol. 52, No. 1  
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- ▶ NHTSA finalizes noise requirement for hybrids, electric vehicles
- ▶ Older driver road tests appear to cut crashes in Illinois but not New Hampshire
- ▶ Requiring treatment for interlock violators reduces re-arrest rates

**T**wo all-electric vehicles fall short of meeting the Institute's awards criteria, but consumers who want to minimize gas consumption while also prioritizing safety can choose from two plug-in hybrids that earn the 2017 *TOP SAFETY PICK+* award.

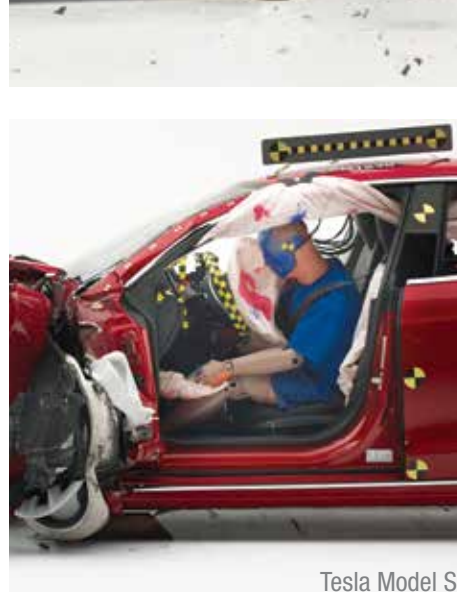
The two recently evaluated 2017 all-electric models are the Tesla Model S and the BMW i3. The plug-in hybrid models are the Chevrolet Volt, whose award was announced in December, and the Toyota Prius Prime.

"There's no reason the most efficient vehicles can't also be among the safest," says David Zuby, IIHS executive vice president and chief research officer. "We hope Tesla and BMW will continue to refine the designs of their electric models to maximize driver protection and, especially in the case of Tesla, improve their headlights."

To qualify for *TOP SAFETY PICK*, a vehicle must earn good ratings in all five crashworthiness evaluations — small overlap front, moderate overlap front, side, roof strength and head restraints — and have an available front crash prevention system that earns an advanced or superior rating. The "plus" is awarded to vehicles that meet all those criteria and also come with good or acceptable headlights (see *Status Report*, Dec. 8, 2016, at [iihs.org](http://iihs.org)).

The Model S, a large luxury sedan, earns good ratings in all IIHS crashworthiness evaluations except the challenging small overlap front crash test, in which it earns an acceptable rating. Despite lengthening the side curtain airbags to improve small overlap protection in the Model S, Tesla ran into problems in the test when the safety belt allowed the dummy's torso to move too far forward. That allowed the dummy's head to hit the steering wheel hard through the airbag. Measurements from the dummy indicated that injuries to the head, along with the lower right leg, would be possible in a real-world crash of the same severity.

The ratings for the Model S apply to 2016 and 2017 cars built after October 2016. Tesla says it made a production change on Jan. 23 to address the head-contact



Tesla Model S



BMW i3

problem, and IIHS will test the updated vehicle for small overlap protection as soon as it can be delivered.

Although the i3, the Volt and the Prius all did better in the small overlap front

evaluation than the Model S, the results can't be compared because the Model S is larger than the others. Since the kinetic energy involved in a front crash depends on the speed and weight of the vehicle, the





Tesla's acceptable rating is based on a more severe crash than the good ratings of the lighter cars.

One version of the Model S, the P100D, also falls short on roof strength, which is important for protecting people in a rollover crash. The rating is based on a strength-to-weight ratio. The P100D has the same roof structure as other Model S versions but is heavier, due to a larger battery, so it earns an acceptable rating.

The current version of the Model S hasn't yet been rated for front crash prevention. While automatic braking equipment comes standard, Tesla hasn't yet activated the software for all vehicles.

The 2017 Model S isn't available with anything other than poor-rated headlights. Tesla says it is working with its supplier to improve the headlights, and IIHS will evaluate the new ones when they are available. »

## How 2017 electric cars rate in IIHS evaluations

		Small overlap front	Moderate overlap front	Side	Roof strength	Head restraints & seats	Headlights	Front crash prevention
<b>TSP+</b>	Chevrolet Volt	G	G	G	G	G	G	Superior
<b>TSP+</b>	Toyota Prius Prime	G	G	G	G	G	A	Superior
	BMW i3	G	G	G	G	A	A	Advanced
	Tesla Model S	A	G	G	G	G	P	Not available

——— crashworthiness & headlights ———      ——— front crash prevention ———  
 Good **G**    Acceptable **A**    Marginal **M**    Poor **P**      Advanced    Superior    Not available



The Chevrolet Volt and the Toyota Prius Prime are 2017 *TOP SAFETY PICK+* award winners. The small cars are plug-in hybrids that can run on battery power or gas.

(« from p. 3) The i3, a small car, fails to reach the winner's circle because it rates only acceptable in the head restraint and seat evaluation, which measures a vehicle's ability to protect against neck injuries in a rear crash. While such injuries are rarely fatal, they are

the most common type of crash injury and can cause debilitating pain.

The i3 earns good ratings in the other crashworthiness tests and is available with an optional front crash prevention system that earns an advanced rating. The system

reduced the impact speed by an average of 9 mph in the 12 mph track test and by 7 mph in the 25 mph test. Its warning component meets National Highway Traffic Safety Administration criteria.

The i3's only available headlight system earns an acceptable rating.

"BMW clearly thought a lot about safety when designing the i3," Zuby says. "It's a shame that it missed the mark on head restraints, which is something most of today's vehicles get right. Among small cars, the i3 is the only 2017 model that doesn't earn a good rating."

The 2017 Volt can be optionally equipped with either an advanced- or superior-rated front crash prevention system. It earns a good rating for headlights when equipped with optional high-beam assist, which automatically switches between high beams and low beams based on the presence of other vehicles. Without high-beam assist, the Volt's headlights are acceptable.

The Prius Prime is the plug-in version of the Prius hybrid, also a *TOP SAFETY PICK+* winner. Its standard front crash prevention system earns a superior rating, and its only available headlights earn an acceptable rating.

While the Volt and the Prius Prime can both run on gas, the Volt has an edge in electric-only driving. It can travel 53 miles in electric-only mode, while the Prius Prime can go 25 miles without using gas, according to EPA estimates. When it hasn't been plugged in, the Prius Prime gets 54 miles per gallon, while the Volt gets 42 mpg.

IIHS plans to test another green car, the all-electric Chevrolet Bolt, once it becomes widely available later this year. ■

## Regulators finalize noise requirement for hybrids, electric vehicles to avert pedestrian crashes

Normally quiet hybrid and electric vehicles will be required to make noise under a new federal rule intended to protect pedestrians.

The National Highway Traffic Safety Administration (NHTSA) announced the rule in November 2016. Manufacturers will have until Sept. 1, 2019, to equip all new hybrid and electric vehicles with sounds meeting the standard.

The announcement comes nearly six years after Congress directed NHTSA to come up with a requirement for adding noise that would warn pedestrians about the approach

of a hybrid or electric vehicle (see *Status Report*, March 30, 2011, at [iihs.org](http://iihs.org)).

Unlike internal combustion engines, electric motors are silent. Quiet vehicles can pose a risk to anyone on foot or bicycle, but advocates for the blind brought attention to the issue.

Under the standard, hybrid and electric vehicles will have to emit a motor-like sound while moving forward or in reverse at speeds up to 19 mph. At higher speeds, the additional sound isn't required because wind and tire noise provide adequate warning to pedestrians. The

vehicles also will have to emit the sound while stationary if they aren't in park.

IIHS supported the requirement, citing in its comment to NHTSA research by HLDI that confirmed the additional danger hybrids pose to pedestrians. The HLDI analysis found that hybrids were about 20 percent more likely to have a bodily injury liability claim without an associated claim for vehicle damage than their conventional counterparts. Such claims are likely to result from pedestrian crashes (see *Status Report*, Nov. 17, 2011). ■





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# Older driver road tests appear to cut crashes in Illinois but not New Hampshire

**A**n Illinois requirement that drivers 75 and older renew their licenses frequently and pass a road test at each renewal has reduced insurance claim rates among the older driver population, a HLDI study shows. However, a now-repealed road-test requirement in New Hampshire failed to have the same effect.

Per mile traveled, older drivers crash more often than middle-age adults, though not as often as young drivers. Concerns about age-related mental, visual and physical impairments have prompted many states to establish shorter license renewal cycles for older drivers and to require eye exams at renewal (see *Status Report* special issue: older drivers, March 19, 2007, at [iihs.org](http://iihs.org).)

Illinois is the only state that currently has a road-test requirement for older drivers. The requirement applies to all drivers age 75 and older. All Illinois drivers 80 and younger must renew their licenses every four years. Drivers 81-86 must renew every two years, while those 87 and older are required to renew annually.

The state's requirements have resulted in fewer older people driving than otherwise would be expected, HLDI's analysis shows. Those older drivers who do remain on the roads are somewhat less risky than older drivers in nearby states.

"The unique mix of regulations in Illinois appears to reduce crash risk, and it seems to do that by getting the riskiest folks

off the road," says HLDI Senior Vice President Matt Moore.

New Hampshire didn't see the same benefit from its road-test requirement, which was in effect for drivers age 75 and older until 2011. Renewal is required every five years for all drivers, regardless of age.

To understand the Illinois policy's effect on the number of older people who »

## License renewal requirements by driver age



### Illinois

- 16-80** renew every 4 years
- 81-86** renew every 2 years
- 87+** renew annually

Road test required for drivers 75 and older



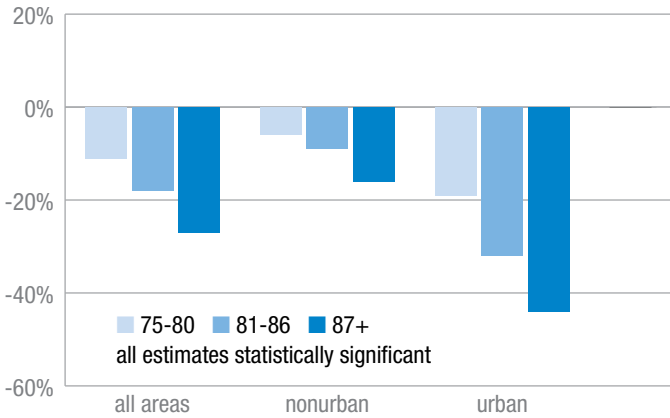
### New Hampshire

All drivers renew every 5 years, regardless of age

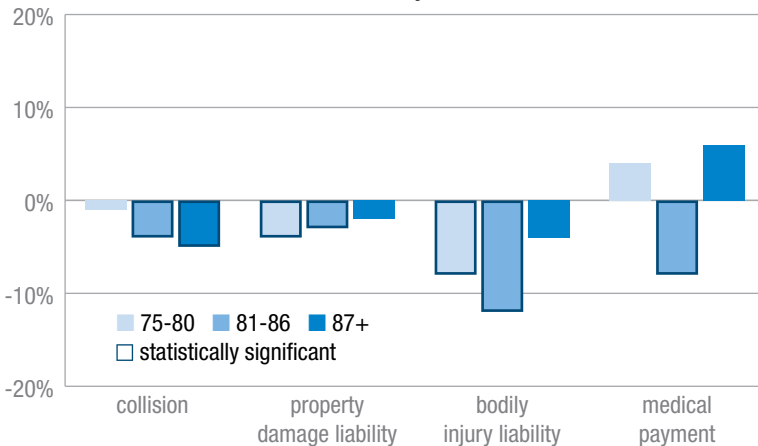
Until 2011, road test was required for drivers 75 and older

## Illinois older drivers

**Estimated differences in bodily injury liability exposure ratio between Illinois and control states**



**Estimated effects of road-test requirement on claim rates**

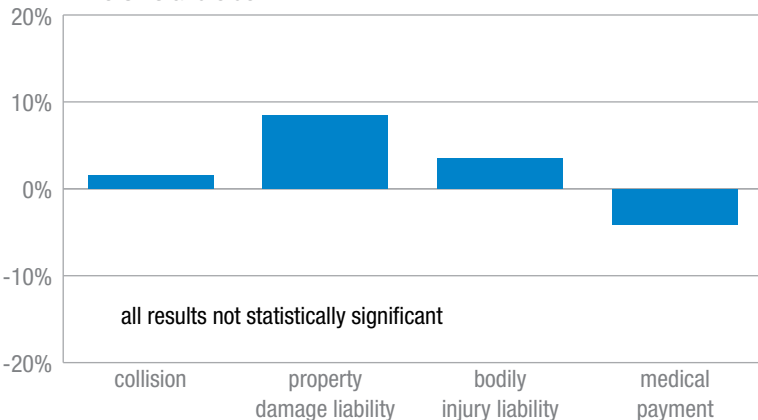


Illinois saw reductions in claim rates among older drivers under its road-test requirement for license renewal, but predominantly rural New Hampshire didn't see the same benefits.

## New Hampshire older drivers

**Estimated effects of road-test requirement on claim rates**

Drivers 75 and older



(“from p. 5) continue to drive, HLDI analysts looked at the number of people covered under bodily injury liability insurance. Unlike other types of coverage, bodily injury coverage is required by law.

Four states bordering Illinois — Indiana, Iowa, Missouri and Wisconsin — were used as controls. Like Illinois, all of them require older drivers to renew in person and provide proof of adequate vision. Renewal cycles vary by state and by age group, but those in Illinois are on the stringent side. The one-year renewal cycle for drivers 87 and older is unique to Illinois.

To find out if the renewal requirements in Illinois reduced the number of older drivers, HLDI calculated the ratio of insured vehicles with older rated drivers to insured vehicles with rated drivers ages 55-74. A rated driver is the driver assigned to a vehicle for insurance purposes, though not necessarily the person behind the wheel at any given time.

For all older drivers, the ratio was smaller in Illinois than in surrounding states. The effect was stronger for drivers 81-86 than drivers 75-80 and stronger still for drivers 87 and older, mirroring the progressively shorter renewal cycles in the older age groups. The effects were stronger in urban areas compared with nonurban ones.

The goal of Illinois' road-test requirement isn't to discourage seniors in general from driving, but rather to get risky drivers off the road. The crucial question HLDI sought to answer was whether there are fewer crashes as a result of the policy.

By comparing claim rates in Illinois with those of the neighboring states, HLDI was able to determine that claims for vehicle damage and claims under bodily injury liability, which covers injuries to people in other vehicles, as well as pedestrians and bicyclists, were lower than would have been expected for drivers 75 and older. Not all the reductions were statistically significant. Medical payment coverage, which pays for injuries to insured drivers and the passengers in their vehicles, showed mixed results.

To study the New Hampshire policy, HLDI analysts compared claim rates there with claim rates in Vermont and Maine. They also compared New Hampshire claim rates during the time the requirement was in effect with claim rates after the repeal.

The analysis showed that New Hampshire had higher-than-expected claim rates for vehicle damage and under bodily injury liability and a slightly lower claim rate under medical payment coverage. None of the results were statistically significant.

Neither the Illinois nor the New Hampshire study could separate the effects of the road test from the effect of the specific renewal cycles, and that may account for some of the differences between the two states.

Another key difference is that Illinois — especially the urban areas that saw the biggest benefits from the older driver policies — has more public transportation than predominantly rural New Hampshire.

“Crash risk in Illinois, with its special licensing requirements, is lower than in the control states, but New Hampshire is sort of a cautionary tale,” Moore says. “Unless there are transportation alternatives for older folks, we may not see the same benefits Illinois has seen.”

For copies of the HLDI bulletins “Illinois mandatory on-road driving test for older drivers” and “New Hampshire mandatory on-road driving test for older drivers,” email [publications@ihs.org](mailto:publications@ihs.org). ■



# Requiring treatment for interlock violators reduces re-arrest rates

**A**lcohol-impaired driving offenders in interlock programs are less likely to reoffend after their interlocks are removed if they have been referred for treatment, a study funded by the Centers for Disease Control and Prevention concludes.

Interlocks are breath-testing units attached to a vehicle's ignition. They prevent a vehicle from starting until a driver blows into the unit and gets a negative reading for alcohol. Requiring offenders to

vehicles after drinking to enter treatment for alcohol use disorder.

Under the law, drivers must enter treatment if they experience three or more interlock violations. An interlock violation is defined as two "lockouts" within four hours. (A lockout occurs when a driver registers a blood alcohol concentration greater than 0.05 percent and is therefore prevented from starting the vehicle.)

Offenders who are referred for treatment must contact a



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install interlocks before they regain full driving privileges has been shown to reduce recidivism (see *Status Report*, March 6, 2012, at [ihs.org](http://ihs.org)). State laws that mandate interlocks for everyone convicted of drinking and driving have been estimated to reduce alcohol-involved crash deaths by 15 percent (see *Status Report*, May 24, 2016).

Currently, 28 states, the District of Columbia and four California counties require interlocks for all offenders. California recently expanded the requirement to the entire state beginning in January 2019.

While an interlock can keep a person from drinking and driving, once it is removed, many people reoffend. The authors of the latest study wanted to see if enrolling people in treatment programs could extend the benefit beyond the interlock period.

The study takes advantage of a Florida law requiring people with court-ordered interlocks who repeatedly attempt to start their

state-certified substance abuse counselor, who develops an individual treatment plan.

The study compared 640 drivers with multiple DUI offenses who were referred to treatment with 806 similar drivers with multiple offenses who experienced one or two interlock violations. The authors looked at the likelihood that the drivers were again arrested for alcohol-impaired driving within one to four years after interlock removal.

The re-arrest rate among the treatment group was 32 percent lower than among the comparison group.

The Florida law doesn't specify a particular type of treatment, and no records about whether a treatment program was successfully completed were available to the authors.

"Mandating treatment based on interlock performance: evidence for effectiveness" by R.B. Voas et al. appears in the September 2016 issue of *Alcoholism: Clinical and experimental research*. ■

**Two all-electric cars fall short of clinching a TOP SAFETY PICK award ▶ 2**

**Quiet hybrids, electric vehicles must make noise under final regulation ▶ 4**

**Older driver license-renewal road tests in Illinois appear to reduce crashes ▶ 5**

**Treatment for interlock offenders lowers re-arrest rates ▶ 7**

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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.

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