

# STATUS REPORT

INSURANCE INSTITUTE  
FOR HIGHWAY SAFETY

Vol. 43, No. 9, Oct. 22, 2008

## IF THEY NEED TO **STOP**

on a dime, these riders will enjoy an advantage most others don't because of the antilock brakes on their motorcycle. Two new studies indicate crash reductions associated with anti-



locks. Both the frequency of crashes for which insurance claims are filed and the rate of fatal motorcycle crashes go down among bikes with antilock brakes.

The importance of equipping bikes with antilocks increases as motorcycling proliferates. Motorcycle sales more than tripled from 1997 to 2005. Deaths of motorcyclists have more than doubled since 1997, with some kinds of bikes having much higher death rates than others (see *Status Report*, Sept. 11, 2007; on the web at [ihs.org](http://ihs.org)). About 5,000 motorcyclists died in crashes last year.

The new study of fatal motorcycle crashes was conducted by Institute researchers, while the analysis of insurance claims is by researchers at the affiliated Highway Loss Data Institute (HLDI). Adrian Lund is president of both organizations.

“Even though adding antilocks won’t make motorcycling as safe as going by car, it’s something manufacturers can do to reduce the risk of traveling on 2 wheels instead of 4,” Lund says. “It’s a way to reduce the chances of overturning a bike and crashing, so it can save lives among people who choose motorcycles for their basic transportation, to save on gasoline, or just for fun.”

**When antilocks are needed:** Stopping a motorcycle is trickier than stopping a car. For one thing, front and rear wheels typically have separate brake controls. Both underbraking and overbraking the front and rear wheels contribute to crashes (see *Status Report*, June 21, 1979). In an emergency, a rider faces a split-second choice to brake hard, which can lock the wheels and cause a motorcycle to overturn, or to hold back on the brakes and risk running headlong into the emergency.

This is when antilocks can help. They reduce brake pressure when they detect impending lockup and

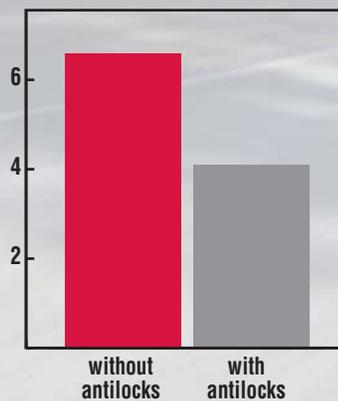
increase the pressure again when traction is restored. Brake pressure is evaluated multiple times per second, so riders may fully brake without fear of locking the wheels.

Antilocks won’t prevent every motorcycle crash. They won’t help a rider who’s

Regression analysis revealed 21 percent lower insurance losses for motorcycles with antilocks, primarily because the claim frequency was 19 percent lower than for bikes without antilocks. These findings are based on a dataset of 72,000 insured years of 2003-

## FATAL CRASHES

PER 10,000 MOTORCYCLE REGISTRATIONS,  
2001-06 MODELS DURING 2005-06



## INSURANCE CLAIMS

PERCENT CHANGE IN COLLISION LOSSES FOR  
2003-07 MODEL MOTORCYCLES WITH ANTILOCKS



about to be struck from behind, for example. But the new studies indicate that antilocks reduce crashes overall and save lives.

**Crash reduction benefit:** The HLDI study compares insurance losses under collision coverage for 12 motorcycle models with optional antilock brakes versus the same models without this option. The researchers evaluated the effects of antilock brakes on both the frequency of insurance claims that are filed for crash damage and the average cost of the damage, after accounting for rider age and gender, motorcycle age, and other factors that influence the likelihood of a crash.



07 model Honda, Suzuki, Triumph, and Yamaha bikes (an insured year is 1 motorcycle insured for 1 year or 2 insured for 6 months each, etc.). BMW models aren't included because it's impossible to determine from vehicle identification numbers which ones have optional antilocks and which don't. Harley-Davidsons aren't included because antilocks were added after the study years.

Antilock brakes "appear to reduce collision claims," says Matthew Moore, HLDI vice president and lead author of the study, "but they don't affect the severity of the crashes for which claims are filed. The cost of these claims doesn't go down."

**Lives are being saved:** In a complementary study, Institute researchers examined rates of fatal crashes of motorcycle models with and without antilocks. Eight models were studied, a subset of the 12 included in the HLDI analysis. The other 4 models were excluded because of sample size limitations.

A main finding is that there were 6.6 fatal crashes per 10,000 registered motorcycles without antilocks during 2005-06. The corresponding rate for the same bike models equipped with optional antilocks is 4.1, or 38 percent lower. Institute statistician Eric Teoh, author of the study, says the findings are statistically significant at the 90 percent confidence level.

#### Antilocks on cars versus motorcycles:

Passenger cars began to be equipped with antilock brakes during the 1970s, after studies conducted on the test track indicated they reduce stopping distances. However, this promise didn't pan out in real-world crashes (see *Status Report*, Jan. 29, 1994). Antilocks didn't reduce relevant collisions.

"It isn't surprising that antilock brakes are more beneficial on motorcycles than they are on cars because the 2-wheelers are so much less stable, and it's this instability that contributes to so many crashes," Lund points out. "By reducing wheel lockup during braking, antilocks keep a lot of motorcycles from overturning."

Antilock brakes are recent additions to motorcycles. They're available almost exclusively as optional equipment (see list), which means shoppers have to find models on which the option is offered and then pay extra for it. Antilocks were on only 18 percent of the motorcycles included in the new studies of effectiveness.

For a copy of "Antilock braking systems for motorcycles and insurance collision losses" by M. Moore and Y. Yan or "Effectiveness of antilock braking systems in reducing fatal motorcycle crashes" by E. Teoh, write: Publications, Insurance Institute for Highway Safety, 1005 N. Glebe Rd., Arlington, VA 22201, or email [publications@iihs.org](mailto:publications@iihs.org).

#### 2008 MODELS WITH ANTILOCKS

Antilocks are optional except as noted; models in bold are included in one or both of the new studies of the effectiveness of antilock brakes

BMW	K1200GT (std)
BMW	K1200LT (std)
BMW	R1200RT (std)
BMW	F800S/F800ST
BMW	G650 Xchallenge
BMW	G650 XCountry
BMW	G650 XMoto
BMW	HP2 Megamoto/HP2
BMW	K1200R/K1200R Sport
BMW	K1200S
BMW	R1200R/R1200S
BMW	R900RT
Can-Am	Spyder
Harley-Davidson	Electra Glide Classic
Harley-Davidson	Electra Glide Standard
Harley-Davidson	Night Rod
Harley-Davidson	Night Rod Special
Harley-Davidson	Road Glide/Road King
Harley-Davidson	Road King Classic
Harley-Davidson	Screaming Eagle Electra Glide
Harley-Davidson	Screaming Eagle Road King
Harley-Davidson	Street Glide
Harley-Davidson	Ultra Classic Electra Glide
Harley-Davidson	V-Rod
<b>Honda</b>	<b>Gold Wing</b>
<b>Honda</b>	<b>Interceptor 800</b>
<b>Honda</b>	<b>Reflex</b>
<b>Honda</b>	<b>Silver Wing</b>
<b>Honda</b>	<b>ST1300</b>
Kawasaki	Concours 14
Moto Guzzi	Norge 1200
<b>Suzuki</b>	<b>Bandit 1250S</b>
Suzuki	B-King
<b>Suzuki</b>	<b>Burgman 650 Executive</b>
<b>Suzuki</b>	<b>SV650/SV650S/SV650SAF</b>
<b>Suzuki</b>	<b>V-Strom 650</b>
<b>Triumph</b>	<b>Sprint ST</b>
<b>Triumph</b>	<b>Tiger</b>
<b>Yamaha</b>	<b>FJR1300 (std)</b>
Yamaha	FJR1300 Electric Shift (std)

## MORE STATES BAN DRIVERS' TEXTING

California and Alaska are the latest US states to ban text messaging by drivers of all ages, not just teenagers. The two states join Connecticut, the District of Columbia, Louisiana, Minnesota, New Jersey, and Washington in banning texting by all drivers amid concern that such distractions increase crash risk. Alaska's law took effect Sept. 1. California's ban begins Jan. 1, 2009. Both states make the use of an electronic device to write, send, or read text messages a primary offense, meaning that police officers can pull over drivers solely for violating the bans. Texting while driving also is a primary offense in Connecticut, the District of Columbia, Minnesota, and New Jersey.

Bans in Louisiana and Washington are secondary, so motorists must be violating another traffic law in order to be stopped by police for texting. Nine states have text messaging bans that apply only to novice drivers. For details on state bans on text messaging by drivers, go to [www.iihs.org/laws/cellphonelaws.aspx](http://www.iihs.org/laws/cellphonelaws.aspx).

There's lots of anecdotal evidence tying texting while driving to crashes, but not much data from real-world collisions. Studies have linked cellphone use with crash risk (see *Status Report*, July 16, 2005, and March 22, 1997; on the web at [iihs.org](http://iihs.org)).

In one of the first published studies on texting and driving, the Transport Research Laboratory in the United Kingdom (on the web at [trl.co.uk](http://trl.co.uk)) found that texting degrades performance in a driving simulator. Researchers found that composing a text message affected driving more than reading one. The 17 drivers in the study — all were 17-24 years old — had slower reaction times, were more likely to drift out of their virtual lanes, and were more likely to reduce their speeds while they were texting.

## CHILD SEAT USE AMONG KIDS IN CRASHES GOES UP

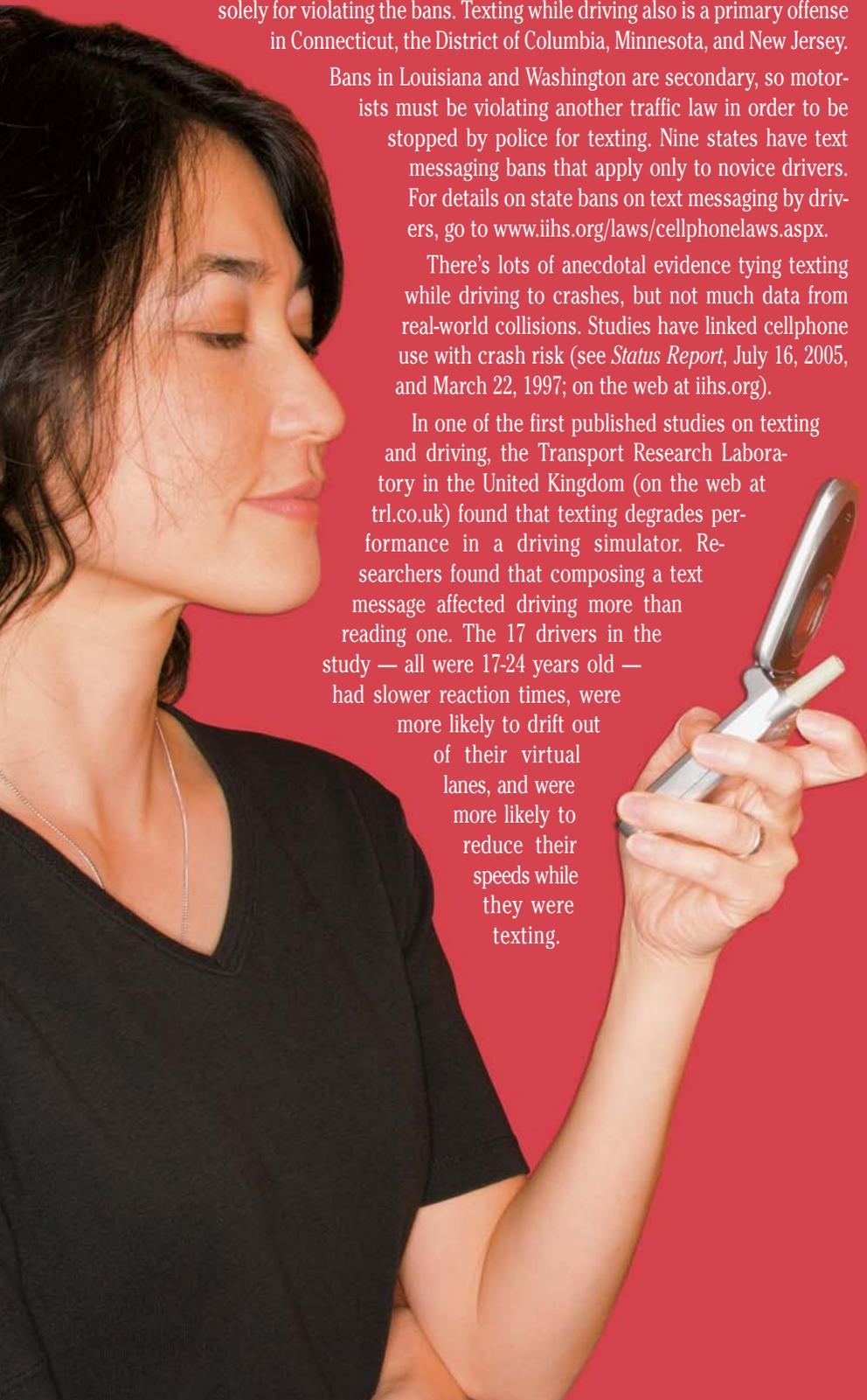
Use of child safety seats has surged since 1999 among restrained children younger than 9 riding in insured vehicles. Restraint types also have changed. These are the main findings of new research from the decade-long Partners for Child Passenger Safety study of the Children's Hospital of Philadelphia (CHOP) and State Farm, with support from the Association of International Automobile Manufacturers. It's based on 1998-2007 insurance claims and phone survey data on more than 875,000 kids in crashes. Overall safety seat use among restrained children 8 and younger rose to 80 percent in 2007 from 51 percent 8 years earlier.

Virtually 100 percent of restrained children 3 and younger in crashes have been in safety seats since 1999. Safety seat use is much lower among older children. Progress has been made, but there's room to improve.

In 1999 only 15 percent of restrained 4-8 year-olds in the CHOP study were in an appropriate restraint — a harness restraint or booster. By 2007 appropriate restraint use in this group had quadrupled to 63 percent. The rest of restrained 4-8 year-olds rode in adult belts alone. Typically, such belts don't begin to fit properly until kids grow to about 4 feet, 9 inches tall.

"Along with the increase in the number of kids riding in child safety seats, we can also see changes in the types of restraints they are using now versus 10 years ago," says Kristy Arbogast, director of engineering at CHOP's Center for Injury Research and Prevention, where the study was conducted. She says more restrained 4 and 5 year-olds ride in boosters now instead of harness restraints.

Only 31 percent of appropriately restrained 4-5 year-olds rode in harness restraints during 2007. Highback boosters are slightly more popular now than backless ones among restrained 4-5 year-olds. But backless boosters are used nearly 3 times as often as highbacks for 6-8 year-olds.



Previous CHOP research shows boosters lower crash injury risk by 59 percent for 4-7 year-olds compared with belts alone. Boosters elevate children so lap and shoulder belts are properly positioned. Earlier this month the Institute released evaluations of 41 booster models, finding that several

Of the states in the study, booster seat use among 4-8 year-olds was lowest in Ohio (18 percent) and Texas (20 percent). Not surprisingly, these states don't have booster seat laws. On the other hand, 2 of the 5 states with the highest use of boosters, Pennsylvania (72 percent) and Illinois (62

Among the study's other findings are that 60 percent of crashes involving children occur within 10 minutes of home, and 84 percent take place within 20 minutes of home. Only 14 percent of crashes are on roads where posted speed limits are 55 mph or higher, but these crashes result in the



don't improve belt fit (see *Status Report*, Oct. 1, 2008; on the web at [iihs.org](http://iihs.org)).

Arbogast attributes the increase in booster use among older kids to education of parents and caregivers plus state laws requiring older kids to ride in safety seats. Laws in 43 states and the District of Columbia include booster provisions (on the web at [iihs.org/laws/restraintoverview.aspx](http://iihs.org/laws/restraintoverview.aspx)).

"More parents than ever now realize that kids need the help of a booster seat to make sure the belt fits properly across the bony parts of their lap and shoulder rather than across the soft belly or the neck, which are more prone to injury," Arbogast says.

percent), do require child restraints or boosters for children through age 7.

CHOP researchers found that parents aren't widely using lower anchors and tethers for children, or LATCH, which are supposed to make it easier to attach infant and child restraints securely to vehicle seats (see *Status Report*, Jan. 16, 1999; on the web at [iihs.org](http://iihs.org)). LATCH has been required in new vehicles and on child restraints since 2002. However, only 43 percent of all children buckled into restraints in vehicles equipped with LATCH in 2007 were riding in seats attached to the lower anchors, the CHOP study reports.

highest rates of injury. Nearly half of all crashes involving children occur on roads with posted speed limits of 25 to 44 mph.

Although the American Academy of Pediatrics recommends that children younger than 13 ride in the back seats of vehicles, about 30 percent of all 8-12 year-olds ride in the front. Positioning children in back seats reduces the risk of fatal injuries in crashes by about one-third among kids 12 and younger (see *Status Report*, June 27, 1997; on the web at [iihs.org](http://iihs.org)).

For a copy of the September 2008 "Partners for Child Passenger Safety: fact and trend report" go to [www.chop.edu/carseat](http://www.chop.edu/carseat).

## **FASTER, HEAVIER GOLF CARTS GET THUMBS DOWN FROM FEDERAL REGULATORS**

The federal government says it isn't willing to trade highway safety for fuel economy in denying 4 petitions that sought to increase the maximum gross vehicle weight for low-speed vehicles and also launch a class of medium-speed vehicles. The September decisions by the National Highway Traffic Safety Administration (NHTSA) mean that the weight and top speed of these golf cart-like vehicles, which don't have to meet all the safety rules that apply to cars, remain capped at 3,000 pounds and 25 mph.

"While NHTSA agrees with the importance of environmental issues, the agency believes that it is neither necessary nor appropriate to significantly increase the risk of deaths and serious injuries to save fuel," the agency said in denying petitions from Environmental Motors, Porteon Electric Vehicles Inc., and Mirox Corporation. The companies asked the agency to create a class of medium-speed vehicles with speed capabilities of up to 35 mph, arguing they'd fill a need for fuel-efficient vehicles for use in fast urban traffic.

They're known as neighborhood electric vehicles, street-legal golf carts, and minitrucks, among other names (see *Status Report*, April 6, 2002; on the web at [iihs.org](http://iihs.org)). These electric or gasoline-powered low-speed vehicles are designed to haul people and cargo on private land, such as retirement communities, farms, amusement parks, and construction sites, but they're often driven on public streets.

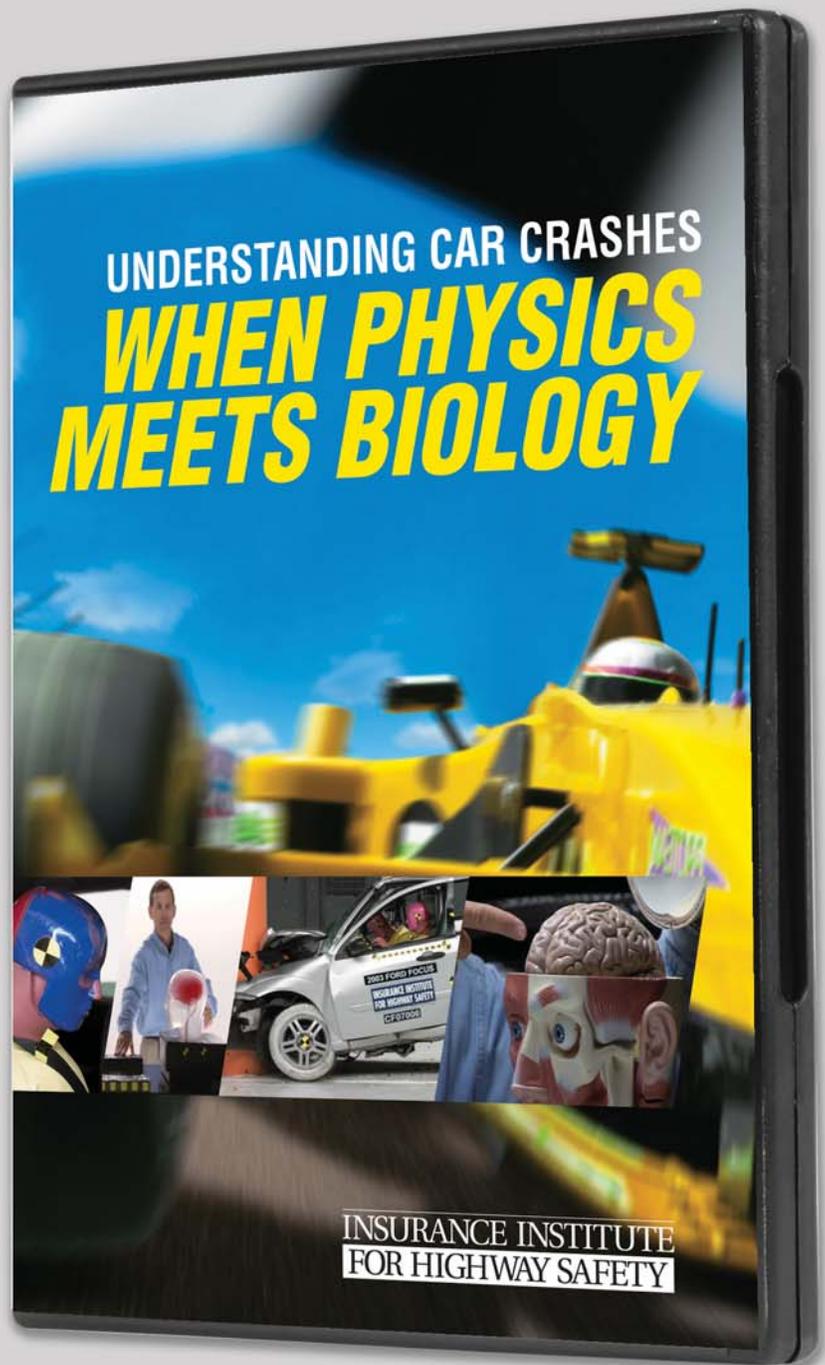
Forty-six states regulate their use, with most limiting their speed to no greater than 25 mph (on the web at [iihs.org/laws](http://iihs.org/laws)) on public roadways with speed limits of no more than 35 mph. They're exempt from most federal safety standards that apply to cars, and they aren't required to meet any criteria for vehicle crashworthiness, so they'd be out of their league in crashes with other vehicles going 35 mph.

Electronic Transportation Applications had sought to increase the maximum allowable gross vehicle weight for electric-powered low-speed vehicles to 4,000 pounds.

In denying Electronic Transportation Applications' petition, NHTSA said, "We believe that vehicles over 3,000 pounds are capable of complying with the full requirements" of the federal motor vehicle safety standards. Increasing the allowable gross vehicle weight, NHTSA said, "would encourage the use of [low-speed vehicles] in circumstances where it could pose an unreasonable risk to safety." The agency noted that some of the smallest passenger cars — Honda Insight and Toyota Echo, for example — have gross vehicle weights of about 3,000 pounds or less and still comply with safety standards. (Read both decisions at <http://edocket.access.gpo.gov/2008/pdf/E8-22736.pdf> and [22737.pdf](http://edocket.access.gpo.gov/2008/pdf/E8-22737.pdf).)

Federal crash databases don't include a specific category for low-speed vehicles so it's hard to track their crashes. News reports frequently chronicle deaths and injuries that result when these vehicles collide with larger passenger vehicles.





## ***NEW 'UNDERSTANDING CRASHES' VIDEO***

Why do some car crashes produce only minor injuries? How can a single crash of a car into a wall involve 3 separate collisions? Award-winning science educator Griff Jones visits the Institute's Vehicle Research Center to answer these and other questions in a 24-minute video that's a follow-up to a previous Institute production, "Understanding car crashes: it's basic physics" (2000). In the new video, Jones examines the laws of nature that determine what happens to the human body in a crash. Order "Understanding car crashes: when physics meets biology" (\$35) online at [iihs.org/videos](http://iihs.org/videos).

# STATUS REPORT

INSURANCE INSTITUTE  
FOR HIGHWAY SAFETY

NON-PROFIT ORG.  
U.S. POSTAGE  
PAID  
PERMIT NO. 252  
ARLINGTON, VA

1005 N. Glebe Rd., Arlington, VA 22201  
Phone 703/247-1500 Fax 247-1588  
Internet: www.iihs.org  
Vol. 43, No. 9, Oct. 22, 2008

**Antilock brakes on motorcycles** reduce both crash frequencies and deaths .....1

**2008 motorcycles** with antilocks .....3

**Text messaging bans** now cover all drivers in 7 states and the District of Columbia .....4

**Child safety seat use** in crashes has increased during the past decade .....4

**Souped-up golf carts** will remain subject to limitations on weight and speed, the federal government decides .....6

**New Institute video** explores what happens to the human body in a car crash .....7

Contents may be republished with attribution.  
This publication is printed on recycled paper.

The Insurance Institute for Highway Safety is a nonprofit scientific and educational organization dedicated to reducing deaths, injuries, and property damage from crashes on the nation's highways. The Institute is wholly supported by auto insurers:

- 21st Century Insurance
- AAA Mid-Atlantic Insurance Group
- Affirmative Insurance
- AIG Agency Auto
- AIG Direct
- Alfa Insurance
- Alfa Alliance Insurance Corporation
- Allstate Insurance Group
- American Family Mutual Insurance
- American National Property and Casualty
- Ameriprise Auto & Home
- Amerisure Insurance
- Amica Mutual Insurance Company
- Auto Club Group
- Auto Club South Insurance Company
- Bituminous Insurance Companies
- Bristol West Insurance
- Brotherhood Mutual
- California State Automobile Association
- Capital Insurance Group
- Chubb Group of Insurance Companies
- Concord Group Insurance Companies
- Cotton States Insurance
- COUNTRY Financial
- Countrywide Insurance Group
- Erie Insurance Group
- Esurance

- Farm Bureau Financial Services
- Farm Bureau Mutual Insurance Company of Idaho
- Farmers Insurance Group of Companies
- Farmers Mutual of Nebraska
- First Acceptance Corporation
- Florida Farm Bureau Insurance Companies
- Frankenmuth Insurance
- The GEICO Group
- Gainsco
- General Casualty Insurance Companies
- Georgia Farm Bureau Insurance
- GMAC Insurance
- Grange Insurance
- The Hartford
- Hanover Insurance Group
- High Point Insurance Group
- Homeowners of America
- ICW Group
- Indiana Farm Bureau Insurance
- Kemper, a Unitrin Business
- Kentucky Farm Bureau Insurance
- Liberty Mutual
- The Main Street America Group
- Markel Corporation
- Mercury Insurance Group
- MetLife Auto & Home
- Michigan Insurance Company
- MiddleOak
- MMG Insurance
- Mutual of Enumclaw Insurance Company
- Nationwide Insurance
- N.C. Farm Bureau Mutual Insurance Company
- Nodak Mutual Insurance

- Norfolk & Dedham Group
- Ohio Casualty Group
- Oklahoma Farm Bureau Mutual Insurance Company
- Oregon Mutual Insurance
- Palisades Insurance
- Pekin Insurance
- PEMCO Insurance
- The Progressive Corporation
- Response Insurance
- Rockingham Group
- Safeco Insurance
- Samsung Fire & Marine Insurance Company
- S.C. Farm Bureau Mutual Insurance Company
- SECURA Insurance
- Shelter Insurance
- Sompo Japan Insurance Company of America
- State Auto Insurance Companies
- State Farm
- Tennessee Farmers Mutual Insurance Company
- Tokio Marine Nichido
- The Travelers Companies
- Unitrin
- USAA
- Virginia Farm Bureau Mutual Insurance
- West Bend Mutual Insurance Company
- Zurich North America

- FUNDING ASSOCIATIONS
- American Insurance Association
  - National Association of Mutual Insurance Companies
  - Property Casualty Insurers Association of America