
NTDB™ data points

It's in the bag

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The air bag is an amazing feat of engineering that puts Newton's laws of motion to the ultimate test. As a moving car hits a stationary object and abruptly stops, it is the unabated forward motion of the driver into the steering wheel and windshield that causes significant morbidity and mortality.

In the instance of a driver having the luxury neither of distance nor time, the air bag was designed to evenly reduce the forward momentum of a motor vehicle driver over the short distance in front of the steering wheel in one-twentieth of a second. To accomplish this task, a sensor consisting of a mechanical switch is tripped by a frontal impact that is comparable to running into a brick wall at 8 to 14 miles per hour (mph). A microchip with an accelerometer translates this motion and sends a signal to the air bag inflation system.

This system is similar to a solid rocket booster, where solid propellant ignites, resulting in the production of a large volume of gas. The gas causes rapid deployment of the air bag from the steering wheel at a rate of 200 mph, and over the next one second, gas quickly dissipates through vent holes, allowing the driver to move. Deployment is often accompanied by the release of a dust



consisting of cornstarch or talcum powder, which is used to lubricate the air bag.

Air bags have come a long way from their initial use in World War II as inflatable crash landing devices for airplanes. Production cars first offered air bags as an option in 1974. By model year 1998, all new passenger cars (1999 for light trucks) were required by law to have driver and passenger air bags and safety belts.

According to the Insurance Institute for Highway Safety, 52 percent of the over 207 million cars and light trucks on U.S. roads today have driver air bags. Even though we are only halfway there, air bags have saved over 15,000 lives in the past 20 years. Furthermore, statistics show that passenger cars fitted with airbags have approximately a 30 percent reduction in fatalities over comparable cars without air bags.

Correction notice

In the May 2005 "NTDB data points" column (page 44), the colors in the graph were inadvertently switched. The "seat belt used" portion of the pie chart should be the lighter

color, indicating that 21 percent of the total number of teenage driver fatalities wore seat belts, as opposed to 79 percent who did not wear seat belts.

The editors regret the error.

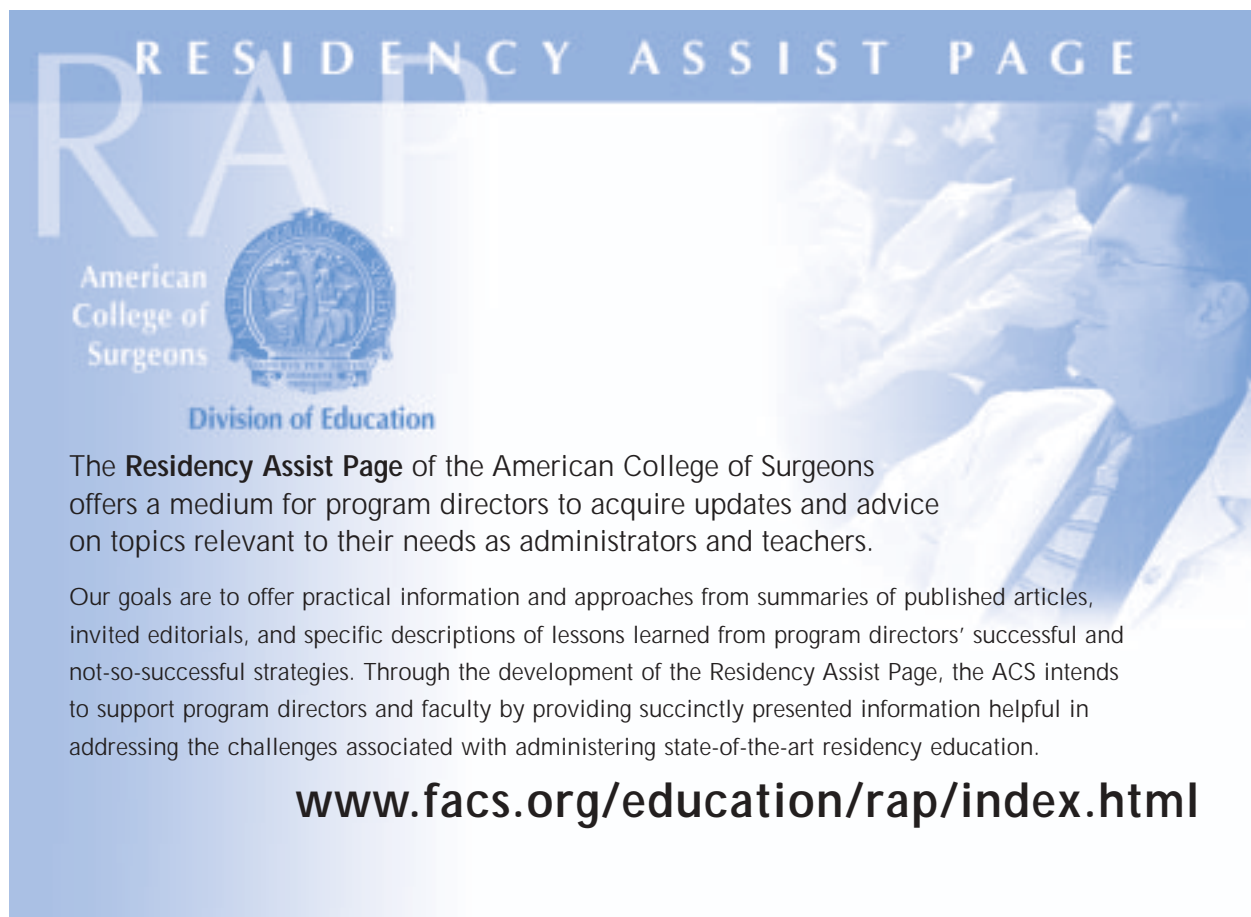
When looking at the records contained in the National Trauma Data Bank *Annual Report 2004*, there are close to 70,000 records of drivers involved in motor vehicle crashes where air bag deployment data are available. There are 435 deaths (2.54%) out of 17,101 drivers with air bags deployed, versus 2,276 deaths (4.38%) out of 52,009 drivers without air bags. This represents roughly a 40 percent improve-

ment in survival for drivers involved in a motor vehicle crash when an air bag deployed. These data are depicted in the graph on the previous page.

The goal of any restraint system is to help save lives. The air bag falls into the category of supplemental restraint system. In order to maximize their effectiveness and reduce air bag related injury, seat belts must be properly worn. After all, it's in

the bag only after the belt is on.

Throughout the year, we will be highlighting these data through brief monthly reports in the *Bulletin*. The full NTDB *Annual Report Version 4.0* is available on the ACS Web site as a PDF file and a PowerPoint® presentation at <http://www.ntdb.org>. If you are interested in submitting your trauma center's data, contact Melanie L. Neal, Manager, NTDB, at mneal@facs.org.



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