Medical Successes Often Carry ADVERSE SIDE EFFECTS
Air Bags Are No Exception

As expected, air bags are saving lives. As expected, they’re preventing injuries. They’re hugely successful. But there’s a downside, too.

Most successful medical and public health breakthroughs — air bags not excepted — cause some adverse side effects. Penicillin, for example, is part of our front-line approach to bacterial infections but provokes allergic reactions in some people, including rare fatal reactions. Polio vaccine has reduced cases of this disease from about 18,000 in the United States in 1954 to only a handful per year in the 1990s. Yet it has also caused paralytic polio in rare instances.

The most frequent side effects of air bags are bruises, abrasions, and other relatively minor injuries (see photo, p.2). But air bags infrequently cause serious and fatal injuries. These are the subject of a recent call for comments from the National Highway Traffic Safety Administration (NHTSA). Most comments address technological remedies for the problem of injuries induced by air bags.

**Less Aggressive Inflators:** One way to reduce some of these injuries is to use air bag inflators that have lower initial pressure onsets and/or lower overall pressure when a bag is fully inflated. But there’s a possible tradeoff — air bags must inflate rapidly to protect people in severe crashes, but very fast inflation can mean injuries when people contact bags in the early stages of deployment. Such injuries might not have occurred without the air bag.

Most respondents to NHTSA agree that making air bag inflators less aggressive would reduce injury risk when people contact inflating bags. But in
What's Known About Air Bag Effectiveness, Hazards

Air bags have deployed in more than 650,000 crashes and reduced driver deaths in frontal crashes by about 20 percent. NHTSA estimates that about 1,000 lives have been saved since 1987. This is the success against which serious air bag injuries should be assessed. An Institute study of national data found that 96 percent of all injuries induced by air bags — injuries involving about 160,000 people — are minor ones like contusions or abrasions. Only about 1 percent are serious or fatal (see Status Report, Vol. 30, No. 3, March 18, 1995). Who's at greatest risk? Anyone in close proximity to a bag when it deploys. Especially vulnerable are drivers close to the steering wheel, infants in rear-facing safety seats, and unbelted or improperly belted people who move forward early in a crash or during braking just before impact. Recent deaths of some children are of particular concern. Children should ride belted in the back seat. If they have to travel in front, make sure they're in properly installed child restraints with the seat pushed back as far as possible or are using adult belts.

Two Items on Passenger Air Bags, see pp.6-7.

RIDING WRONG

To keep a child from being positioned dangerously if a passenger bag deploys, put her in the vehicle's rear seat — in a special child restraint if possible or buckled with an adult safety belt.

many cars, especially smaller ones, this solution could require regulatory action. Federal Motor Vehicle Safety Standard No. 208 requires air bags to inflate quickly to protect belted and unbelted test dummies in 30 mph barrier crashes. Automakers say they could use less aggressive inflators and design air bags that are optimal for people who use belts if NHTSA were to abolish the unbelted test.

Yet the intent of the federal safety standard is to provide automatic protection in frontal crashes, and the unbelted test is intended to ensure this for the many motorists who still don't buckle up. This is why there's considerable opposition to abolishing the unbelted test.

As an alternative, Ford is asking NHTSA to lower the speed in the unbelted test to 25 mph and, in return, to raise the test speed for belted dummies in passenger cars to 35 mph. The slower speed in the unbelted test would allow automakers to phase in reduced-output inflators starting about nine months after the change.

BMW has another proposal that would permit reduced inflator energy. It favors amending the federal standard to increase the current maximum permissible chest gs of 60 in the unbelted test to 75 gs. Under this proposal, automakers would have to demonstrate a 25 percent reduction in inflator energy before using the higher chest g criterion.

Could less aggressive inflators also reduce protection to people in crashes at higher speeds? No, according to Institute analyses. Inflators that are less aggressive would actually enhance protection over a wide range of crash severities.

In-depth investigations of crashes from the National Accident Sampling System indicate that fatal injuries in air bag-equipped cars aren't happening because the bags fail to fully re-
strain the occupants. Instead, they're happening because of factors unrelated to restraint system performance — total failure of vehicle structure or multiple collisions, for example. Investigations of the National Accident Sampling System cases indicate that, if inflators were less aggressive, air bags could provide even more protection, especially to unbelted people. In several of the crashes of moderate severity, researchers found that the most serious injuries were caused by the bags, and in none of the other crashes did they find evidence that better air bag performance would have prevented the fatal injuries.

Based on this, the institute strongly supports regulatory changes to allow less aggressive inflators. “NHTSA needs to take action,” says Institute Vice President Susan A. Ferguson. “Changing the standard should result in inflators — especially those in smaller vehicles — that cause fewer serious air bag-induced injuries. And, far from reducing protection, there would be enhanced occupant protection in a broad range of crash severities.”

Deployment Thresholds: Some serious injuries have occurred in relatively low-speed crashes in which occupant injuries would have been unlikely without the air bags. NHTSA therefore has requested information about the ease of increasing thresholds for air bag inflation to eliminate some deployments. Most automakers currently choose thresholds equivalent to a 10-12 mph barrier crash.

The Institute points to evidence that people without belts can be seriously injured at speeds just above these thresholds, indicating the thresholds should not be raised for unbelted occupants. But manufacturers can use a higher threshold for belted occupants without increasing the risk of injury. This would eliminate many unnecessary air bag deployments.

The Institute strongly supports the use of dual deployment thresholds, which already are being used by Mercedes and BMW. However, the Institute would oppose any proposal from NHTSA to mandate a minimum deployment threshold regardless of occupant belt use.

Infants and Children: The most serious concerns involve air bag injuries among infants and young children. These concerns won't be resolved by technological fixes in the short term.

NHTSA currently allows manufacturers to install manual cutoff switches for passenger bags in vehicles in which an infant restraint cannot be properly placed in the rear seat, and there are suggestions to allow such switches in all vehicles with passenger bags. The Institute opposes this because there's no reason to expect that adults who fail to understand warnings about infant restraints and air bags or who allow children to ride unrestrained would use such switches correctly.

Confident on Air Bag Injuries

Now that more information is becoming available on the air bag injury problem, various groups are addressing ways to alleviate it in the short and long term. Government representatives joined last month with automakers, air bag suppliers, and representatives from the highway safety and health care communities to focus on this task. Recognizing that using belts plus bags provides the most effective protection and that belts can keep people in positions where the hazards from inflating bags are reduced, conference participants recommended increasing belt use by encouraging and enforcing primary belt laws. They recommended a coordinated effort to spread information through both the media and health care professionals about effective crash protection and the extent of air bag injuries and how to reduce them — for example, by making sure children ride properly restrained in rear seats (see facing page).

The Institute urges NHTSA to work with automakers to develop standard specifications for automatic devices to address the problem of rear-facing infant restraints. For example, BMW has told the agency it plans to introduce in Germany late next year an automatic system that deactivates the passenger bag when it detects a rear-facing infant restraint.

Other Approaches: Most who submitted comments to NHTSA agree that the agency should continue to educate parents about the danger of placing infants and children in the front seats of vehicles with passenger bags and the importance of properly restraining children (see “Parents Know about Danger of Air Bags to Infants in Front Seats,” p.6).

Longer-term solutions will result in “smart” air bags that determine occupant position, belt use, weight, and crash severity, and decide whether an air bag will deploy and when and how (see Status Report, Vol. 30, No. 1, March 18, 1995). Automakers are developing these but Ford, for example, says it anticipates about 10 years before advanced air bags are widely available.
Now that Congress Has Killed National Maximum Speed Limit, More Will Die

With regret, we lay it to rest in peace. Congress killed the national maximum speed limit late last year. Now additional motorists will die because of higher travel speeds on roads in many states.

The 55 mph speed limit wasn't introduced nationwide in 1974 as a safety measure. Its primary purpose was to save gasoline, but it saved lives too. Thousands of them. Despite this, Congress gave states the go-ahead in 1987 to raise speed limits on rural interstate highways to 65 mph, and legislators quickly exercised their power. By year's end, 38 states had adopted higher limits and, in so doing, experienced an immediate jump in both travel speeds and crash deaths (see Status Report, Vol. 22, No. 14, Dec. 26, 1994).

History is poised to repeat itself.

The National Highway System Designation Act of 1995 repeals the maximum
speed limit for the nation, allowing states to set their own limits. The law also repeals federal incentives for state motorcycle helmet use laws (see inset) but retains incentives for safety belt laws.

"In all the talk about it being up to the states to make decisions about these matters, state legislators shouldn't lose sight of the fact that both speed limits and helmet requirements have had highly beneficial effects," says Institute President Brian O'Neill. "These measures have saved thousands of lives and prevented serious injuries. Just because they can, legislators shouldn't rashly jump to abolish such important safety laws."

Higher Speed Limits: Some states already have jumped. As of January 1, six had raised speed limits to 70 mph or higher. Montana doesn't have a daytime speed limit at all. Nevada and Wyoming have adopted 75 mph limits on rural interstates. Oklahoma has raised the speed limit to 70 mph on turnpikes. California has set 70 on most freeways, divided expressways, and certain stretches of interstate, while Texas has adopted 70 on rural highways.

"This means vehicles will be traveling even faster, since many motorists exceed speed limits," O'Neill notes. "They take note of the limits and then travel just a few miles an hour faster, at speeds at which they believe there's little chance of getting a ticket. When speed limits go up, this unofficial upper limit goes up, too."

This was the case in 1987 after states raised speed limits on rural interstates from 55 to 65 mph. "When the limits were 55, most motorists stayed below 65," O'Neill points out. "When the limits were raised to 65, speeds immediately jumped, with many more motorists traveling faster than 70 mph."

Faster speeds resulted in more deaths. In the 38 states that raised speed limits in 1987, fatalities on rural interstate highways increased 16 percent compared with deaths on all other roads. This was the major finding of a 1989 National Highway Traffic Safety Administration report. The following year, fatalities increased by 31 percent. Some of this increase is attributed to more travel, but the increase was 21 percent after accounting for this factor. Institute studies agree there was about a 20 percent increase in deaths resulting from higher speeds on rural interstates during this period.

Highway deaths didn't taper as drivers grew accustomed to traveling faster. In the 40 states where speed limits were raised to 65 mph during 1987-88, deaths on rural interstates were 24 percent higher in 1993, compared with the average on the same roads during 1982-86. Meanwhile, deaths on urban interstates in the same 40 states were 5 percent lower in 1993 compared with 1982-86 (see Status Report, Vol. 29, No. 10, Sept. 10, 1994). The Institute estimates about 400 lives have been lost each year because of higher speed limits.

Zero Tolerance for Young Drivers: Not all aspects of the new highway law reflect a shrinking federal involvement. The law creates an incentive for states to combat alcohol-impaired driving among underage drinkers. States that fail to enforce "zero tolerance" or a 0.02 percent maximum blood alcohol concentration for drivers younger than 21 by October 1, 1998 would lose 5 percent of their federal highway funds — 10 percent thereafter. Thirty-five states and the District of Columbia already have such laws. Among drivers 16-20 years old who were killed in crashes during 1994, 26 percent had blood alcohol concentrations of 0.10 percent or more.

Congressional claims that states should decide safety issues "is contradicted by this incentive for zero tolerance requirements," O'Neill points out. "What's really happening is that issues attracting noisy opposition, like speed limit and helmet laws, are given back to the states while the federal government stays involved in popular issues."

Truck Safety Waivers: The highway law also authorizes the U.S. Department of Transportation to establish a three-year pilot program that could exempt certain motor carriers and drivers of medium weight trucks (10,001-26,000 pounds) from specific federal safety regulations. Motor carriers must apply to be considered for possible exemption from rules on hours of service, driver qualifications, vehicle maintenance/equipment/inspections, and reports/records. Exemptions are to be granted based on past safety records, which often are inaccurate.

A total of 608 people died in 1994 crashes involving medium trucks. Overwhelmingly, it's car occupants who die or are seriously injured when trucks and cars collide.
Parents Know About Danger of Air Bags to Infants in Front Seats

A majority of parents who have infants 12 months or younger and who transport them in vehicles with passenger air bags said they're aware of the dangers of placing infants in rear-facing restraints in the front seat. This is the major finding of an Institute survey of 500 households nationwide.

Seventy-four percent of respondents said they know it isn't safe to travel with a baby in a rear-facing restraint in the front seat if there's a passenger air bag. Seventy percent of this group believe it's a serious danger. The National Highway Traffic Safety Administration warns parents that a deploying air bag can seriously injure infants in rear-facing safety seats (see Status Report, Vol. 30, No. 10, Dec. 2, 1995).

"Parents generally know about the risk and say they're taking steps to reduce the chance of their child being injured," says Institute Senior Vice President Allan F. Williams. "This means the message about the danger of air bags and children is being heard and understood."

Eighty-seven percent of parents — more mothers than fathers — have read warning labels on infant seats, and 74 percent have read warnings on car sun visors.

The media are important. Eighty-one percent of surveyed parents who know of the dangers said they learned from the media. More than half said warning labels were the source of knowledge. Government warnings were noted by 44 percent. Far fewer parents learned from hospital birthing centers (30 percent), childbirth classes (22 percent), or pediatricians' offices (27 percent).

Most parents reported placing infants in rear-facing restraints in the back seats of cars with passenger bags. Only 23 percent reported ever placing a baby in a rear-facing restraint in front with a passenger bag. Reported travel in rear-facing restraints in front is more common among parents who said they're unaware of the danger.

Until now, most information on air bag performance in crashes has been based on driver-side bags. As late as 1993, only 500,000 new cars came with air bags for passengers, but this figure has escalated. By 1995, the number was up to 15,000,000.

People on both sides of the seat agree they don't want to be without air bags. After being in crashes in which their bags deployed, 92 percent of drivers and passengers want their next cars to have air bags. About 8 of 10 believe the bags protected them from injury.

Some differences have to be taken into account when evaluating passenger air bags specifically. One is that passengers come in a wider variety of sizes than drivers — including small children — and their seating positions vary more. Studies suggest that belt use isn't as high among passengers compared with drivers, so there's a greater chance of being out of position in a crash.
An Institute survey of both drivers and passengers in air bag crashes in Maryland, North Carolina, South Carolina, and Virginia found that about one-fifth in both groups didn’t remember anything particular about the crash. Smoke was the most frequently remembered aspect followed by odor, noise, and dust. One passenger remembered “smoke and a strong odor like sulfur…. I thought the car was on fire.” A few respondents were startled by the air bag inflation.

Crashes involving air bag deployments are relatively severe — sensors are set to deploy when crash forces are equivalent to hitting a solid wall at 10-12 mph and, even with air bags, injuries still occur. Some are caused by the air bags. When asked whether they were injured, about three-fourths of both drivers and passengers said they were. Most of the injuries were minor — bruises, abrasions, soreness, and lacerations.

About 15 percent of the crash injuries among surveyed passengers and drivers involved fractures or dislocations, but the location of injuries differed. Passengers more often cited facial injuries followed by lower extremity injuries. Drivers more often cited upper extremity and torso injuries.

When asked if they experienced any problems with the air bag deployment, 81 percent of drivers and 67 percent of passengers said they didn’t. About 15 percent of passengers and 10 percent of drivers said they were coughing or had trouble breathing after the deployment. Very few among either drivers or passengers said they were injured by the air bag. Three percent in each group reported skin abrasions or burns. About 1 percent reported burning eyes.

About a third of both passengers and drivers reported wearing glasses, with a greater proportion of passengers (53 percent) than drivers (23 percent) citing problems with glasses during air bag inflation. No one reported eye injuries from contact with the bag, but more passengers than drivers said their glasses were knocked off — 33 percent compared with 11 percent.

“There are a few early indications in the differing pattern of injuries for passengers and drivers and in the greater prevalence of glasses being knocked off or broken among passengers” that these two groups are interacting differently with deploying air bags, the researchers say.

A total of 135 passengers and 145 drivers in dual air bag crashes of 1991 or newer cars were interviewed for the survey. The findings parallel those of an earlier driver-only study (see Status Report, Vol. 28, No. 11, Oct. 9, 1993). For a copy of “Survey of Passenger and Driver Attitudes in Air Bag Deployment Crashes” by S.A. Ferguson et al., write: Publications, 1005 N. Glebe Rd. #800, Arlington, VA 22201.
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