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The Seat-Belt Solution

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A Car-Seat Crash Test

On a recent Monday morning, nearly 20 police officers gathered in Clarkstown, N.Y., for a four-day seminar. They had assembled to fight one of modernity's great scourges: child deaths in motor-vehicle crashes. Each officer was given a 345-page training manual issued by the National Highway Traffic Safety Administration (NHTSA). At seminar's end, each would be certified as a "child passenger safety technician," which primarily means that they would be experts in the installation and use of child car seats.

Why does it take four days to learn about car seats? Because any given seat is a tangle of straps, tethers and harnesses built by one of dozens of manufacturers whose products must be secured by the diverse seat-belt configurations of any passenger vehicle sold in the United States. According to the NHTSA manual, more than 80 percent of car seats are improperly installed.

So over the course of those four days, there were many questions to be answered. But one question about car seats is rarely even asked: How well do they actually work?

They certainly have the hallmarks of an effective piece of safety equipment: big and bulky, federally regulated, hard to install and expensive. (You can easily spend \$200 on a car seat.) And NHTSA data seem to show that car seats are indeed a remarkable lifesaver. Although motor-vehicle crashes are still the top killer among children from 2 to 14, fatality rates have fallen steadily in recent decades -- a drop that coincides with the rise of car-seat use. Perhaps the single most compelling statistic about car seats in the NHTSA manual was this one: "They are 54 percent effective in reducing deaths for children ages 1 to 4 in passenger cars."

But 54 percent effective compared with what? The answer, it turns out, is this: Compared with a child's riding completely unrestrained. There is another mode of restraint, meanwhile, that doesn't cost \$200 or require a four-day course to master: seat belts.

For children younger than roughly 24 months, seat belts plainly won't do. For them, a car seat represents the best practical way to ride securely, and it is certainly an improvement over the days of riding shotgun on mom's lap. But what about older children? Is it possible that seat belts might afford them the same protection as car seats?

The answer can be found in a trove of government data called the Fatality Analysis Reporting System (FARS), which compiles police reports on all fatal crashes in the U.S. since 1975. These data include every imaginable variable in a crash, including whether the occupants were restrained and how.

Even a quick look at the FARS data reveals a striking result: among children 2 and older, the death rate is no lower for those traveling in any kind of car seat than for those wearing seat belts. There are many reasons, of course, that this raw data might be misleading. Perhaps kids in car seats are, on average, in worse wrecks. Or maybe their parents drive smaller cars, which might provide less protection.

But no matter what you control for in the FARS data, the results don't change. In recent crashes and old ones, in big vehicles and small, in one-car crashes and multiple-vehicle crashes, there is no evidence that car seats do a better job than seat belts in saving the lives of children older than 2. (In certain kinds of crashes -- rear-enders, for instance -- car seats actually perform worse.) The real answer to why child auto fatalities have been falling seems to be that more and more children are restrained in some way. Many of them happen to be restrained in car seats, since that is what the government mandates, but if the government instead mandated proper seat-belt use for children, they would likely do just as well / without the layers of expense, regulation and anxiety associated with car seats.

NHTSA, however, has been pushing the car-seat movement ever further. The agency now advocates that all older children (usually starting at about age 4) ride in booster seats, which boost a child to a height where the adult lap-and-shoulder belts fit properly. Could this be a step in the wrong direction? In 2001, the Insurance Institute for Highway Safety sent NHTSA a memo warning that its booster-seat recommendations were

"getting ahead of science and regulations" and that certain booster seats "did not improve belt fit, and some actually worsened the fit."

If car seats and booster seats are shown in the FARS data to be no more effective than seat belts, might it be because so many of them are improperly installed? To find out, we contacted an independent lab that conducts crash tests. The idea was simple: compare properly installed car seats with properly used standard seat belts. We commissioned two crash tests: a 3-year-old-sized dummy in a car seat versus a 3-year-old dummy in lap-and-shoulder belt; and a 6-year-old-sized dummy in a booster seat versus a 6-year-old dummy in lap-and-shoulder belt.

The conditions of the test ensured that the seats would perform optimally: they were strapped to old-fashioned bench-style seats (which give a flush fit) by an experienced engineer (who is presumably more competent than the average parent). The dummies in the seat belts were also positioned optimally, sitting upright and flush.

The chore was gruesome, from start to finish. Each dummy, dressed in shorts, T-shirt and sneakers, had a skein of wires snaking out of his body to measure head and chest damage. The pneumatic sled was fired backward with a frightening bang, simulating a 30 m.p.h. frontal crash; on impact, the dummy's head, legs and arms jerked forward, fingers flailing in the air, and then the head recoiled.

Within minutes, we had some data. Though the lap-and-shoulder belts rode too high on the 3-year-old dummy, the head- and chest-impact data were only nominally higher than that for the 3-year-old in the car seat; according to federal standards, most likely neither child would have been injured. In the second test, the 6-year-old in the booster and the 6-year-old in the seat belt produced virtually identical numbers. Again, most likely neither one would have been injured.

These tests don't actually prove much. The sample was too small, the circumstances were too controlled and the sensors didn't measure neck or abdominal injuries, which child-safety advocates say are worse with seat belts. What matter are the crash data from the real world, where one 4-year-old in a lap-and-shoulder belt may find the shoulder belt so irritating that he puts it behind his back and another 4-year-old may be in a poorly installed car seat. And when it comes to real-world situations, the FARS data are extremely compelling.

So if car seats and booster seats aren't the safety miracle that parents have been taught to believe, what should they do? The most important thing, certainly, is to make sure that children always ride with *some* kind of restraint -- and, depending on your state, a car seat or booster seat may be the only legal option. On a broader level, though, it might be worth asking this question: Considering that Americans spend a few hundred million dollars annually on complicated contraptions that may not add much lifesaving value, how much better off might we be if that money was spent to make existing seat belts fit children? Some automakers do in fact make integrated child seats (in which, for example, the car's seat back flips down for the child to sit on); other solutions might include lap-and-shoulder belts that vertically adjust to fit children, or even a built-in five-point harness.

It may be that the ultimate benefit of car seats and booster seats is that they force children to sit still in the back seat. If so, perhaps there is a different contraption that could help accomplish the same goal for roughly the same price: a back-seat DVD player.

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