

# STATUS

# REPORT

INSURANCE INSTITUTE  
FOR HIGHWAY SAFETY

TOO BIG FOR HER CHILD  
RESTRAINT, SHE NEEDS A

## **BOOSTER THAT FITS**

Many aren't up to the job because they don't make adult safety belts fit kids better. In fact, 13 of the 41 boosters the Institute evaluated with the University of Michigan Transportation Research Institute did such a poor job of this that they aren't recommended at all. Ten models are best bets and 5 are good bets. These evaluations are the first to

*— Alexandra 4 years, 40 inches*



tell US consumers how well belt-positioning boosters improve belt fit for booster-age children in cars, minivans, and SUVs.

“We evaluated the safety belt fit boosters provide, not crash protection,” says Institute president Adrian Lund. “This is because unlike child restraints, boosters don’t restrain chil-

### **PROPER BELT FIT**

**Boosters elevate children so that safety belts designed for adults will fit better. The lap belt should fit flat across a child’s upper thighs, not across the soft abdomen, which is more likely to be injured in a crash than bony structures like the pelvis.**

**The shoulder belt should cross snugly over the middle of a child’s shoulder. Then it’s in position to provide effective protection in a crash. Plus it’s comfortable to use, so a child won’t be as likely to move it behind the back or under an arm. See [iihs.org/research/topics/child\\_restraints/default.html](http://iihs.org/research/topics/child_restraints/default.html).**



dren in crashes. They simply position kids so lap and shoulder belts are in the right place to restrain them.” Good boosters route belts across a child’s bony parts, not soft parts like the abdomen, which is more vulnerable.

Two booster types — backless and highback — were assessed under conditions representing a range of 2001-06 model vehicles. Some highbacks convert to backless, and some boosters, called combination seats, can be used as child restraints. Highback and backless modes were evaluated separately because each mode affects how belts fit. More importance was assigned to lap belt fit. All of the best-bet boosters locate this belt on the upper thighs. The main problem for the boosters that aren’t recommended is they leave the lap belt on the abdomen. Fit is important because

a correctly positioned lap belt loads pelvic bones during a crash, not the abdomen. A good booster also positions the shoulder belt at midshoulder, keeping the webbing away from the neck so it won’t chafe and reducing the likelihood that kids will endanger themselves by putting the belt behind their back or under an arm.

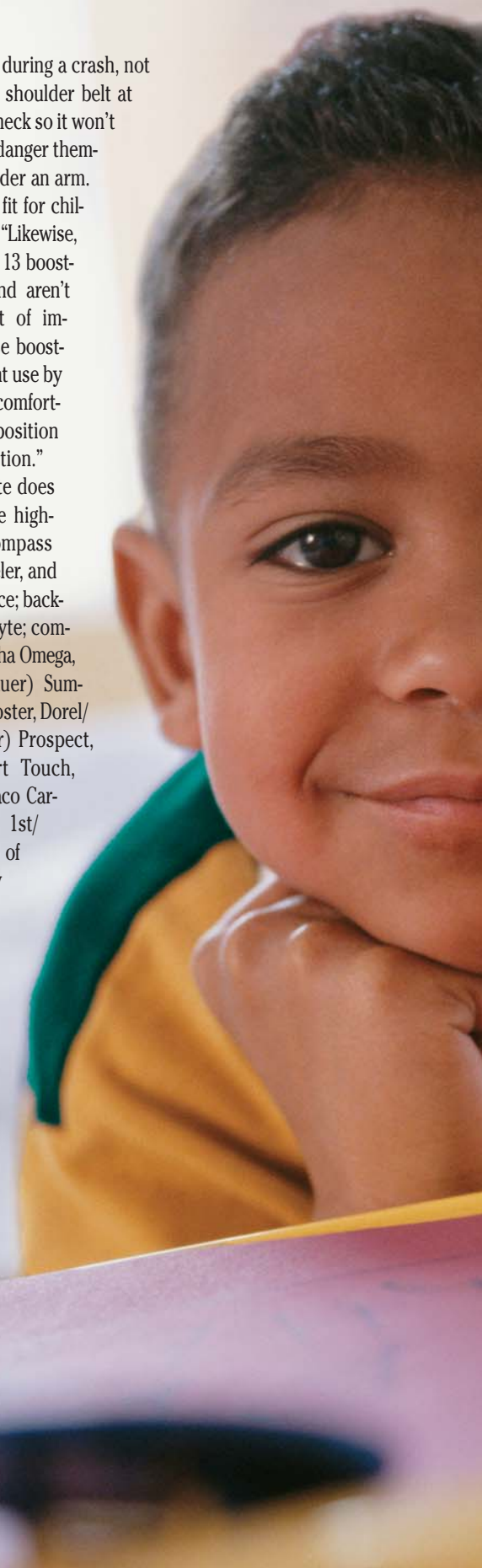
“We’d expect the 10 best bets to improve belt fit for children in almost any car, minivan, or SUV,” Lund says. “Likewise,

it’s clear that kids in the 13 boosters we don’t recommend aren’t getting the full benefit of improved lap belt fit. These boosters may increase restraint use by making children more comfortable, but they don’t position belts for optimal protection.”

Boosters the Institute does not recommend are the highback Compass B505, Compass B510, Cosco/Dorel Traveler, and Evenflo Big Kid Confidence; backless Safety Angel Ride Rytte; combination Cosco/Dorel Alpha Omega, Cosco/Dorel (Eddie Bauer) Summit, Cosco Highback Booster, Dorel/Safety 1st (Eddie Bauer) Prospect, Evenflo Chase Comfort Touch, Evenflo Generations, Graco Car-Go Zephyr, and Safety 1st/Dorel Intera. At least 2 of

these models have been discontinued, hopefully replaced by better designs. Booster makers sometimes reuse names and even model numbers for new seats, so manufacture dates and model numbers are important. Go to [iihs.org](http://iihs.org) for the full list of boosters in this evaluation.

“Our data show it’s possible to design a booster with good lap and shoulder belt fit,” says Matt Reed, the study’s lead author and research associate professor at the University of Michigan Transportation Research Institute. “Boosters that can’t do that should be redesigned.” The 10 best-  
*(continues on p.6)*



## **NEXT STEP AFTER CHILD RESTRAINTS**

When children outgrow child restraints, parents may wonder if booster seats are necessary. They are, because safety belts are designed to fit adults, not young children. For most kids, belts usually don't fit properly until they're 4 feet, 9 inches tall. Boosters do what their name implies — elevate children so 3-point belts are positioned to provide effective restraint during a crash.

About 350 children ages 4-7 die in crashes each year in the United States. An additional 50,000 are injured. Because half of the fatally injured children in this age group ride unrestrained, the first step is to get them belted. Belt-positioning boosters can help by improving the fit, effectiveness, and comfort of adult belts.

There's convincing evidence that boosters, used with lap/shoulder belts, offer the safest way for kids to ride in vehicles once they outgrow child restraints, usually at age 4. Using boosters lowers injury risk by 59 percent compared with belts alone, a 2003 study by the Center for Injury Research and Prevention at the Children's Hospital of Philadelphia found. None of the 4-7 year-olds in boosters had any injuries to the abdomen, neck, spine, or back. Such injuries did occur among children using belts alone. A 2006 study by the same authors found that boosters reduce fatality risk among booster-age children by about 28 percent compared with belts alone.

Boosters don't work like child restraints. Rear-facing restraints for infants and forward-facing ones for toddlers and younger preschoolers are designed with built-in harnesses, sturdy structures, and foam padding to protect and restrain children in crashes.

Boosters themselves don't restrain kids.

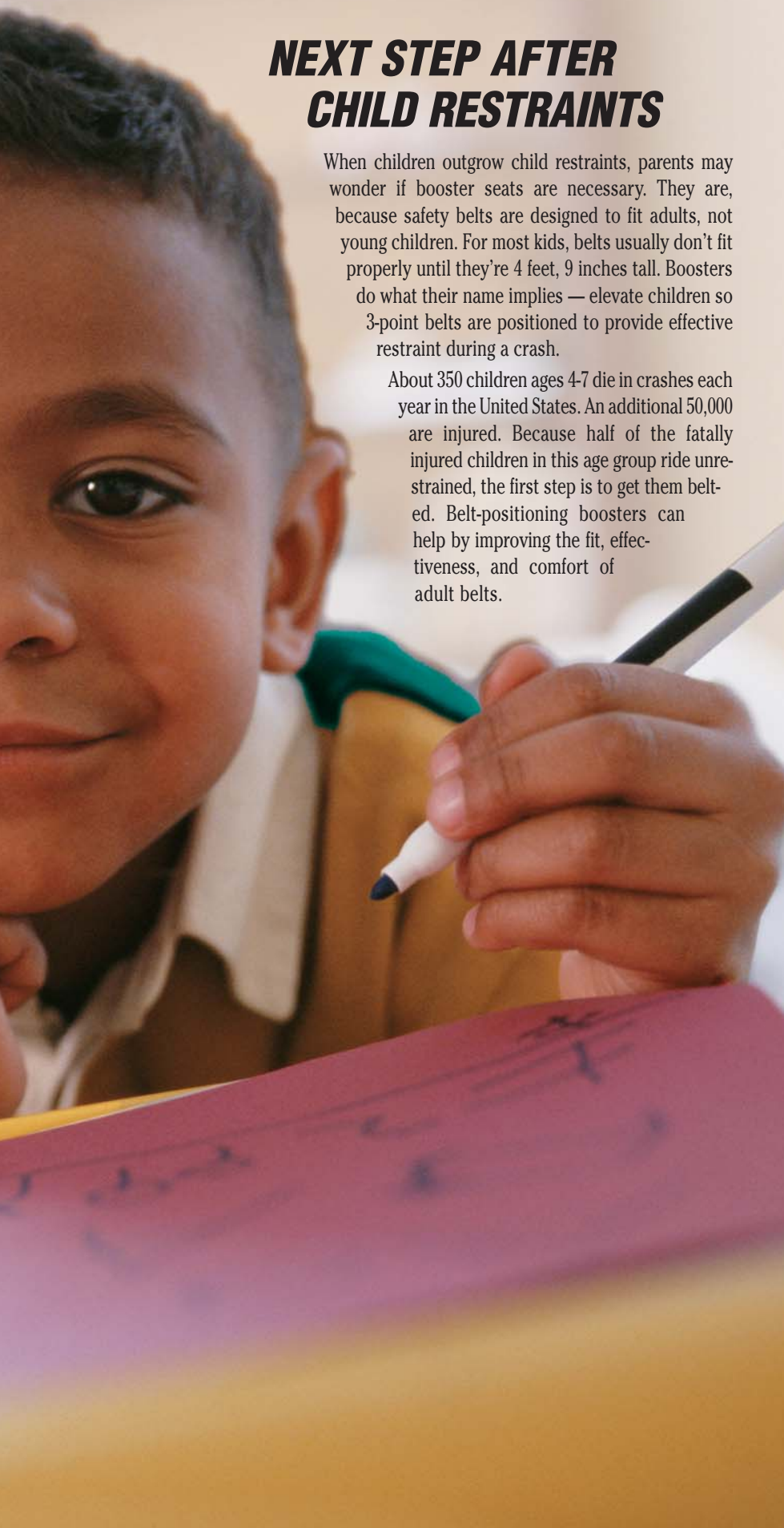
A vehicle's safety belts do. Boosters position the belts so they'll work best. Some manufacturers claim their boosters provide extra protection in certain crashes like side impacts. Because there's no government or independent verification of these claims, parents are left to decide on their own if such features will help or are marketing gambits.

### ***BOOSTERS ELEVATE CHILDREN***

***so 3-point belts are positioned  
for effective restraint in a crash.***

***It's possible to design a booster with  
good fit of both lap and shoulder belts.***

***Boosters that can't do it should  
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## USE A BOOSTER, BUT WHICH ONE?

The federal government and American Academy of Pediatrics recommend boosters for kids who've outgrown child restraints and are at least 4 years old and 40 pounds, until they're 4 feet, 9 inches tall. What kind to choose?

Highback boosters have built-in guides to position shoulder belts as well as lap belts and offer some head support. Highbacks are especially recommended in vehicles without head restraints in back seats. Some highbacks, including many the Institute evaluated, can convert to backless boosters.

Backless boosters have built-in lap belt guides but may need a plastic clip to properly position shoulder belts in many vehicles. These boosters are the least expensive and may be more popular with older children.

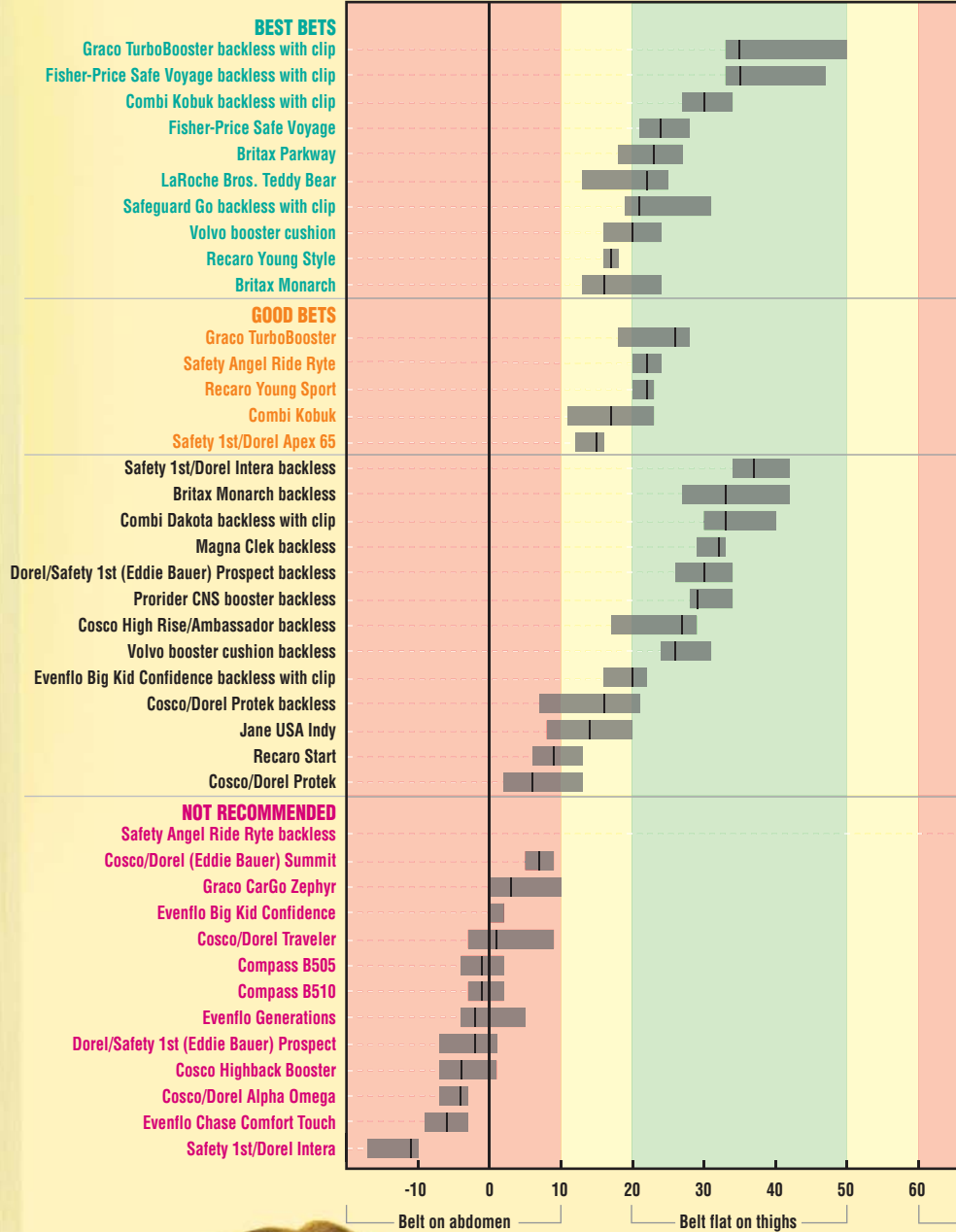
Combination seats function as forward-facing child restraints or boosters. An internal 5-point harness restrains children when the seats are used as child restraints. In booster mode, the harness is removed and vehicle lap/shoulder belts restrain children.

Three-in-1 seats, like combinations, adapt as kids grow. With a 5-point harness, this kind of restraint can be used in rear-facing mode for an infant and then as a forward-facing child seat. Removing the harness turns a 3-in-1 into a booster for use with a lap/shoulder belt.

## BOOSTER ALTERNATIVE

Manufacturers don't recommend using boosters in the back seats of vehicles with lap belts only. Using boosters this way leaves a child's upper body unrestrained. But if this is your only option, it's better to use a booster with a lap belt than no booster at all. An alternative to a booster is a child restraint with a higher weight limit to accommodate children who weigh as much as 80 pounds. Built-in 5-point harnesses, not adult lap/shoulder belts, provide the restraint. These seats are good options for all children and types of vehicles and can be used by parents who prefer to keep their children in harness restraints as long as possible (see [ihs.org/research/topics/child\\_restraints/summary/html](http://ihs.org/research/topics/child_restraints/summary/html)).

## LAP BELT: RANGE OF FIT



**NO MATTER HOW A  
IN THEIR CAR. THE  
THE TOP SEATS  
RIDE RESTRAIN**

## SHOULDER BELT: RANGE OF FIT



**BOOSTER RATES, PARENTS STILL NEED TO SEE HOW IT FITS THEIR CHILD. THEY SHOULDN'T RUSH TO BUY A NEW BOOSTER IF THEIRS ISN'T AMONG THE BEST. CHECK HOW IT FITS, AND REMEMBER IT'S BETTER FOR CHILDREN TO RIDE IN ANY BOOSTER THAN TO LET THEM RIDE UNBUCKLED.**

(continued from p.2) bet boosters are the most likely to position not only lap belts but also shoulder portions correctly on many children in many vehicles. Best bets include 3 backless seats: Combi Kobuk, Fisher-Price Safe Voyage, and Graco TurboBooster. These may require plastic clips to correctly position shoulder belts. Six highbacks are best bets: Britax Monarch, Britax Parkway, Fisher-Price Safe Voyage, LaRoche Bros. Teddy Bear, Recaro Young Style, and Volvo booster cushion.

Another best bet is the combination seat Safeguard Go when it's used as a backless booster. Combination seats convert to boosters by removing their built-in harnesses. At least 5 of the best-bet boosters have been discontinued but still are sold.

The 5 good bets provide acceptable belt fit in almost as many vehicle belt configurations. They are highbacks Combi Kobuk, Graco TurboBooster, and Safety Angel Ride Ryte, and combinations Recaro Young Sport and Safety 1st/Dorel Apex 65, when used as highbacks.

"Parents don't have to spend a lot of money for a booster that provides optimal fit," Lund points out. The Graco TurboBooster, for example, isn't the priciest. The highback version converts to a backless booster retailing for about \$50, and the backless-only seat is about \$20.

Child safety seat laws in 43 states and the District of Columbia include booster seat provisions, but until now there has been little information on how to pick one that provides proper belt fit. The government's dynamic tests don't measure what a booster is meant to do, which is to improve belt fit (see *Status Report*, Feb. 8, 2003; on the web at [iihs.org](http://iihs.org)).

Congress in 2002 told the National Highway Traffic Safety Administration to evaluate a belt fit test, but the agency decided to forgo testing. Instead, it only rates boosters by how easy they are to use (see *Status Report*, Sept. 28, 2005; on the web at [iihs.org](http://iihs.org)). Manufacturers crash test boosters, but these simulated tests don't tell parents how boosters will fit kids in their cars.

**How they're evaluated:** The booster evaluations (see pp.4-5) begin with lap belt fit. Researchers positioned a Hybrid III crash test dummy representing a 6 year-old, the average size of a booster-age child, in a booster in a second-row seat from a car. They assessed lap/shoulder belt fit under 7 conditions spanning a range of belt positions in 31 vehicles.

Backless boosters generally provide better lap belt fit. Only 1 of the 15 backless boosters evaluated, the Graco TurboBooster used with a belt-positioning clip, provides optimal fit for both the lap and shoulder belts across all the belt configurations. On other backless boosters, the shoulder belt often falls too close to the neck or too far off the shoulder. When researchers evaluated the TurboBooster, they obtained the best shoulder belt fit when they used the clip the manufacturer provides for routing. Lund says parents with children in backless boosters should use the clips if needed to get good shoulder belt fit.

Because of built-in guides, highbacks generally do a better job of positioning shoulder belts in all vehicle configurations. However, 12 of the 26 evaluated fail to correctly position lap belts. Good boosters have belt-routing features that hold lap belts down and forward.

**Combination seats and 3-in-1s:** Six of the 12 highbacks in the not-recommended group are combination seats that can be used as forward-facing child restraints with 5-point harnesses, and 2 highbacks, the Cosco/Dorel Alpha Omega and Safety 1st/Dorel Intera, are 3-in-1 seats that can be used rear-facing for infants. The Intera also converts to a backless booster. The Safeguard Go, which converts to a backless booster but not a highback, is the only combination seat that's a best bet.

"Combination and 3-in-1 seats are marketed as the last child seat parents need to buy," Lund says, "but most of these seats aren't the best choice as boosters. Parents need to be careful. These seats should be fine when their harnesses restrain younger children, but many of these designs compromise the ability to provide children with good belt fit as booster seats."

**Child, booster, vehicle affect belt fit:**

The evaluations reflect the fit of a lap/shoulder belt for an average size 6 year-old in many belt configurations. Some boosters might fit bigger or smaller children better in vehicles with different belt setups. And unlike dummies, kids fidget and slouch in their seats, so the real-world fit boosters provide will vary.

"No matter how a booster did in our evaluations, parents still need to see how it fits their child in their car," Lund advises. He urges them "not to rush to

buy a new booster if theirs isn't among the top seats. Check how it fits and remember, it's better for kids to ride restrained in any booster than to let them ride unbuckled."

Since boosters frequently change, several newer ones weren't evaluated. The Institute plans to continue these assessments.

For a copy of "Evaluation of the static belt fit provided by belt-positioning booster seats" by M. Reed et al., write: Publications, Insurance Institute for Highway Safety, 1005 N. Glebe Rd., Arlington, VA 22201, or email [publications@iihs.org](mailto:publications@iihs.org).



## **NOT READY FOR ADULT SAFETY BELTS ALONE**

Using a safety belt greatly reduces the risk of injury to children in crashes, but belts often aren't as effective as they could be for young children who have outgrown child restraints. These kids need booster seats to elevate them so lap and shoulder belts are properly positioned. Yet lots of 4-7 year-olds aren't riding in boosters. Last year, 35 percent of children in this age group rode in adult belts compared with 37 percent in boosters and 13 percent in child restraints. This is about the same percentage in boosters as in 2006.

These are the findings of the National Survey of the Use of Booster Seats, conducted by the National Highway

Traffic Safety Administration (see [www.nrd.nhtsa.dot.gov/pubs/810895.pdf](http://www.nrd.nhtsa.dot.gov/pubs/810895.pdf)). This survey also found that 15 percent of 4-7 year-olds were unrestrained. Twenty-five percent of 6 and 7 year-olds were in boosters during 2007, while 55 percent used safety belts, and 16 percent weren't restrained at all. A new report on trends in child safety seat use is just out from the Children's Hospital of Philadelphia (see [www.chop.edu/carseat](http://www.chop.edu/carseat)).

The problem of premature graduation into the next level of restraint isn't confined to booster-age children. Some infants are moved too soon out of their rear-facing restraints, and some toddlers are moved out of front-facing child seats before they're big enough for boosters. The survey notes that 21 percent of children weighing 20-40 pounds rode in boosters in 2007, even though most child restraints can accommodate kids heavier than 40 pounds. Some of these children were as young as 1 year. Ten percent of children in this weight group were restrained by belts alone.

Some boosters are designed for children weighing as little as 30 pounds. However, this doesn't mean a child this small automatically should move into a booster. Some child restraints are made for kids weighing 65 and even 80 pounds.

There also are boosters for kids up to 100 pounds.

"A forward-facing child restraint with a 5-point harness generally offers a better fit and more protection for children at the younger and smaller end of the booster-age group," says Anne McCartt, Institute senior vice president for research. "Some parents may rush to trade up to the next level because their children resist riding in restraints they consider babyish.

The kids would prefer a more grown-up booster or even an adult safety belt, but they'll be safer if parents wait to move them."

All children 12 and younger should ride in back seats. Infants should stay in rear-facing restraints until they're at least 1 year old or weigh 20 pounds. Some newer models can accommodate babies up to 30 pounds, so parents can keep using rear-facing restraints even after the first birthday. Then children graduate to forward-facing seats until they're about 4 years old and weigh 40 pounds. Only then does a booster become an appropriate option.

Children should ride in boosters until they're 4 feet, 9 inches tall, usually around age 8. They need to be big enough to sit firmly against the seatback, with knees bent at the edge of the cushion. The lap belt should cross the upper thighs, and the shoulder belt should be on the middle of the shoulder.

***CHILDREN OF ALL AGES, from infants to grade schoolers, tend to move to the next step of restraint sooner than they need to. They'd be safer if parents wait to make the switch.***



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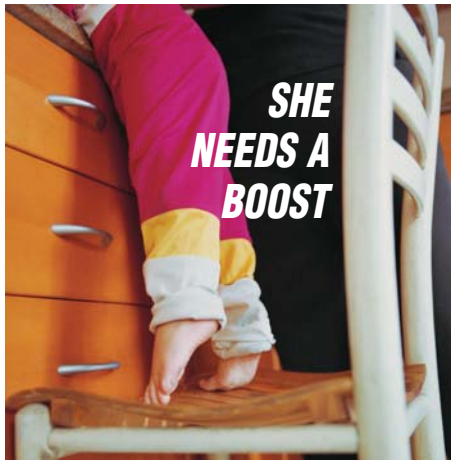
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This special *Status Report* focuses on booster seats. Recent special issues have included:

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