

sleep through the global road trauma pandemic it will be accountable for many millions of avoidable deaths and injuries.

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Ensuring the safety of school age passengers

Booster seats are necessary for optimal protection

The article by Halman et al (p 1123) in this issue indicates that children of school age involved in motor vehicle crashes were less severely injured if they were wearing a seat belt, irrespective of the type of restraint or seating position in the motor vehicle.¹ The authors report that school age children (4-14 years old) restrained with a seat belt were 2-10 times as safe as unbelted children and were at least as well protected as adults wearing seat belts. The findings, however, do not answer the question about whether the degree of protection afforded children by standard seat belts is sufficient, according to the authors' discussion of the limitations of the data. The national safe kids campaign in the United States and the child passenger safety community recommend that children be protected in an appropriate child restraint or booster seat rather than in a safety belt at least up to the age of 8 years. Premature graduation to a safety belt from a forward facing child safety seat is potentially dangerous.

Booster seats lift a child up and make the adult safety belt fit correctly. These seats position the lap belt low over the upper thigh (not riding on the abdomen) and the shoulder belt snug across the center of the shoulder (not crossing the neck or face). They also allow a child to sit back against the vehicle seat with knees bent comfortably, ensuring that correct positioning of the belt is maintained. Booster seats—either with a high back when the vehicle does not provide head support, or backless—are recommended as a transition from child restraints with harnesses (usually limited to 40 pounds or 18 kg) to the time that adult belts fit properly (around the age of 8 years). Adult safety belts fit children properly only when their knees bend over the seat while they sit as far back as possible without slouching; the shoulder belt fits snugly across the chest and the centre of the shoulder; and the lap belt fits low across the upper thighs.

Failure to use a booster seat in a crash can result in seat belt syndrome, a pattern of intra-abdominal and

spinal injuries caused by the improper fit of seat belts.² Recent data from the crash injury research and engineering network indicate that children inappropriately restrained in a seat belt are nearly three and a half times as likely to suffer a severe injury than their peers appropriately restrained in a booster seat.³ Broken jaws and noses are among other less severe, but usually disfiguring, consequences of premature use of safety belts among children of school age.

Use of booster seats among children aged 4-8 has increased in recent years, especially among the youngest children. Among 4 year olds, use of booster seats increased from 14% in 1998 to 34% in 2000.⁴ Yet placing children in the correct seat for their age and size continues to be a challenge. According to an observational interactive study of over 9300 children in nearly 6300 cars, more than 63% of children who should have been in belt positioning booster seats were inappropriately restrained, most often in adult safety belts.⁵

Although it is true that safety belts are better than no restraint at all, parents should be encouraged to provide the optimal level of protection for their children of school age. The strategy for improving the use of booster seats is multifaceted and well understood by safety advocates in the United States and other nations.

One highly effective measure is to close gaps in existing laws for the protection of child occupants. In 2001 the national safe kids campaign analysed such laws throughout the United States and rated them woefully lacking.⁶ Since then, at least 10 states have improved their laws protecting child occupants in some fashion, and an additional 23 states have introduced improvement bills, although only six of these specifically legislate booster seats; all aim to close gaps requiring restraints for older, "forgotten," children.

Other recommended techniques include informing parents better about the importance of correct and consistent use of booster seats, continuing targeted outreach to populations at risk by using culturally

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appropriate messages and materials, and supporting more distribution programmes for booster seats in communities in need. Working together, society can make the use of booster seats normative so that future researchers into the safety of child passengers won't be compelled to eliminate from data analysis the "fewer than 1% of the sample" who had used a booster seat.¹

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Protecting pedestrians

Politicians must put public interest before that of the car industry

Education and debate
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Road crashes are the leading cause of death and hospital admission for people under the age of 45 years in the European Union. There are 40 000 road deaths a year, and the European Commission has recently set an ambitious target to reduce road deaths by 50% by 2010.¹ But meeting this goal requires the European Union to perform better as a whole than any one member state has to date.

Few road safety measures are better researched than those for safer car fronts to protect pedestrians and cyclists² (p 1145). This results from a 22 year old research and development programme coordinated by the European Enhanced Vehicle-safety Committee. The committee originally proposed car tests in 1991 and updated them in 1994 and 1998.^{3,4} These tests are an integrated package of four tests for impacts to parts of the body that are injured most often. The European new car assessment programme (www.euroncap.com) has already used the tests and provides information to consumers on the crash performance of new cars. None of the cars tested, however, has performed well enough to have passed the tests.⁵ Once the tests are adopted universally, it is estimated that up to 2000 lives and around 17 000 serious injuries will be saved annually across the European Union—at an additional development cost of only €30 (£19, \$28) a car.⁶

Just as the European Commission was preparing legislation, following pressure from the European Parliament and Council of Ministers, Europe's car industry produced an alternative proposal for a voluntary agreement. As a result, the European Commission is consulting the Council of Ministers and the European Parliament on whether to accept the car industry's proposal to introduce legislation.⁷

The car industry's proposal comprises two phases of pedestrian protection tests and several other measures assessed by safety experts to be peripheral to the safety of pedestrians. The phase 1 tests—the only definite pedestrian tests in the agreement—have been roundly criticised by experts as non-scientific.⁸ The phase 2 tests air the possibility of adopting the safety committee's measures, or their equivalent, by 2010,

subject to a review in 2004. But the safety content of this proposal has been closely scrutinised by experts in the leading research and non-governmental organisations and rejected for several reasons.

Firstly, there is no guarantee that the safety committee's tests will be fully implemented. Secondly, the car industry's own phase 1 tests are fewer in number and less useful than the safety committee's, and they offer a 75% lower level of protection against fatal injury according to the United Kingdom's transport research laboratory.⁹ Independent experts involved in the protection of pedestrians told the European Commission and the European Parliament that, in addition to providing substantially lower levels of protection, the phase 1 tests were not scientific. Neither were they a natural first step towards the safety committee's proposals, steering car design in the wrong direction for effective protection as well as being potentially hazardous.⁹⁻¹¹

The car industry's proposal even fails to implement current best practice. The Honda Civic, for example, fulfils over 70% of the safety committee's requirements (without using new technology) at an additional cost, according to the transport research laboratory, of only £6.50 (€10)—three times the level of protection that the industry has offered to fully implement in 11 years' time. Any initial savings would be offset by compromising long term safety.

Finally, non-governmental organisations in Europe argue that removing the opportunity for member states or the European Parliament to influence the detail on this key safety measure would be a backward step at a time when the European Union has promised more transparent policy making.

Opportunities to save lives have been missed for many years—around 20 000 lives in the 10 years since the safety committee's tests were ready. Twenty two years of public investment since 1978 have cost an estimated €10m. Even the United Kingdom, which has traditionally been progressive in such matters, has backtracked from its support of the safety committee, which it stated in a national road safety plan.¹²