

Seat belt laws: why we should keep them

In the June 2007 issue of *Significance*, John Adams argued for the repeal of seat belt laws. They have never been demonstrated to save lives, he said; and they increase the number of pedestrians and cyclists killed on the roads. **Richard Allsop, Oliver Carsten, Andrew Evans and Robert Gifford** argue that Parliament should keep the seat belt laws on the statute book and that we should all keep wearing belts whenever we travel in a car, van or coach—and they contest John's statistics.

Everyone in today's society benefits from the use of motor vehicles, and none can escape the accompanying disadvantages, such as the environmental damage and the chances and consequences of collisions. We can debate and try to improve the distribution of these benefits and disadvantages, but we cannot contract out of them. About a quarter of the accidental deaths in Britain are due to motor vehicles, so this particular disadvantage is widespread and severe enough for construction and use of motor vehicles to be highly regulated, which is widely accepted in principle, though details of regulation are sometimes debated. The issue here is whether the requirement to wear a seat belt carries regulation too far.

Common ground

Adams¹ accepts evidence that the use of a seat belt improves a car occupant's chances of surviving a collision. He quotes Evans² estimate that wearing a belt reduces a car occupant's chance of being killed, if involved in a collision, by 41%, on average. A more recent review by Elvik and Vaa³ concludes:

"The use of seat belts reduces the probability of being killed by 40–50% for drivers and passengers in the front seat and by about 25% for passengers in the rear seats. The effect on serious injuries is almost as great while the effect on slight injuries is somewhat smaller, around 20–30%. These figures are average figures for all accident types."

These averages span all collision speeds, from a few miles per hour—at which injury may rarely be fatal but can be badly disfiguring if no seat belt is worn—to speeds on uncongested motorways. And it is at lower speeds that a belt's potential to reduce injury is greatest.

Whether the law requires it or not, it is advisable to wear a belt whenever travelling in a vehicle, however trusted the driver and short the journey, because there is always the possibility of collision resulting from quite unforeseeable circumstances.

Intended and unintended effects of road safety measures

When a safety measure is introduced that reduces the injury in collisions for one group of road users, the intended effect is that fewer road users in that group should be killed or injured and severity of injury should be reduced. There are, however, two potential unintended effects. First, the affected group may have more collisions, perhaps through taking greater risks, realising that the likely consequences of collision have been reduced. Second, there may be an increased risk to other road users not protected by the safety measure. In these ways, the reduction in death and injury in the protected group may be partly offset by extra death and injury caused to others.

In the case of seat belt wearing by car occupants, evidence for the first unintended effect has been found by Janssen⁴, and there is a third effect, which is that belts cause some injuries to their wearers that they would not have suffered

had they not been wearing belts—although it should be noted that such injuries usually occur in the course of preventing more severe injury. For example, you might not get whiplash without a belt, but your head might go straight through the windscreen. Whether belts are worn by choice or by law, these unintended effects could lead to the number of deaths to belted car occupants falling by less than the amount one would expect if they were unbelted, and to extra death and injury among pedestrians, cyclists and unbelted occupants. This applies equally to legislating for belt-wearing and to simply encouraging it: it should rule out neither, but be taken into account when considering either.

Road safety effects of the 1981 Transport Act in Britain

The first law requiring the wearing of seat belts in Britain was included in the 1981 Transport Act on a free vote in the House of Commons. It came into force on 31st January, 1983, and applied to drivers and passengers in the front seats of cars and light vans equipped with belts—as most already were. Publicity campaigns had previously brought the percentage wearing belts in the front seats to about 40%, from which it rose to more than 90% between December 1982 and February 1983. It has remained between 90% and 95% ever since. Such a shift in behaviour throughout a country having over 2000 car occupant deaths a year provided a good opportunity to detect and estimate the effect of the law upon numbers of deaths.



Interpretation of changes in the number of deaths and injuries associated with the seat belt law is complicated by the fact that the 1981 act also made changes, effective from May 1983, to strengthen the enforcement of the drink-driving laws, and changes in the licensing arrangements for learner motorcyclists, which first took effect from February 1983, followed by a progressive effect thereafter.

Adams' interpretation¹ is that:

"The evidence from Britain... suggests that the law produced no net saving of lives, but redistributed the burden of risk from those who were already best protected inside vehicles to those who were the most vulnerable outside vehicles."

Others have reached different conclusions. Harvey and Durbin⁵ applied structural time-series modelling to data for the period January 1969 to December 1984 with an intervention at 31st January, 1983. The intervention coincides with the coming into force of the seat belt law and the changes affecting learner motorcyclists that had immediate effect, and anticipates by 3 months the changes in drink-driving enforcement. They estimated the changes in deaths and in killed or seriously injured (KSI) in the first full year, as reported in Table 1.

The increase in deaths among rear seat passengers, accompanied by a larger percentage reduction among front seat passengers than among drivers, may well be accounted for by some pas-

sengers moving to the rear seats, but it is puzzling that the corresponding percentage increase in KSI was so much smaller. Also puzzling is that the estimated increase in pedestrian deaths is

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not matched by any increase in KSI. The changes in deaths among car occupants are statistically significant, and those among pedestrians and cyclists are on the borderline of significance. The

changes in KSI are significant only for the front seat occupants.

The picture shows a clear reduction in death and injury to car occupants, appreciably offset by extra deaths among pedestrians and cyclists. Harvey and Durbin make no attempt to apportion these changes among the three elements of the legislation.

Broughton⁶, in an extension of his earlier work with Stark⁷, which Adams quotes, and with 4 years more post-1983 data than Harvey and Durbin, investigates changes in 1983 in the course of simpler time-series modelling of monthly casualty numbers from 1979 to 1988. In doing so, he allows explicitly for the changes affecting drink-driving enforcement and new learner motorcyclists. He estimates that the reductions in numbers of deaths and serious injuries to all road users attributable

Table 1. Figures obtained from percentage changes in deaths and killed or seriously injured (KSI), applied to the totals for 1982

Road user group	Change in deaths		Change in KSI	
	Percent	Number	Percent	Number
Car drivers	-18	-267	-23	-4476
Front seat passengers	-25	-165	-30	-2837
Rear seat passengers	+27	+80	+3	+141
Pedestrians	+8	+150	-0.5	-95
Pedal cyclists	+13	+38	+5	+298
Total	-3.6	-164	-12	-6969

over their first year to the three elements of the 1981 Act are as described in Table 2.

The reduction of about 370 in deaths attributed to the seat belt law is estimated to comprise about 470 fewer car occupant deaths offset by about 100 extra pedestrian deaths, but the reduction in KSI includes a reduction of about 620 among pedestrians. Broughton does not report corresponding estimates for cyclists. Subsequent changes in trend up to the end of 1988 indicate that the effect of the changes in the law persisted.

Broughton's work estimates a greater reduction in death and injury in 1983 than does that of Harvey and Durbin and indicates clearly that the bulk of the reduction stemmed from the seat belt law, but contrary to his own conclusions (Broughton⁶, pp. 18, 20) it leaves open the real possibility that an appreciable increase in pedestrian and cyclist deaths also stemmed from it. Various authors have advanced other explanations for there being extra pedestrian and cyclist deaths, and others have used the low level of statistical significance of the estimated increases and the inconsistency between the changes in numbers of deaths and KSI among pedestrians as reasons for setting them aside. But, notwithstanding their standard errors, the best estimates from both the analyses summarised here are that extra deaths to vulnerable road users did accompany the introduction of mandatory wearing of seat belts.

Equity among road user groups

Road safety policy should aim to reduce death and injury to all groups of road user, and it can be argued that all groups of road user should benefit equally from the policy. Some argue further that since most of the death and injury on the roads stems from the use of motor vehicles, we should benefit even more from safety policy when walking or cycling than when using a motor vehicle.

But road safety is made up of many individual safety measures and equity among road user groups across road safety policy as a whole in no way implies that each individual safety measure should in itself benefit all road user groups equitably. Nor does each road safety measure necessarily act only to reduce death and injury: many measures reduce aggregate death and injury by reducing them in incidents of certain kinds by more than they increase them in other

kinds. A case in point is installing central barriers on motorways. These prevent many deaths and injuries by preventing errant vehicles on one carriageway crossing onto the other and then having very injurious head-on collisions. But there are some incidents in which injury or death result from a vehicle striking the barrier and bouncing back onto its own carriageway when the opposing carriageway was fortuitously clear of traffic; had there been no barrier, there would have been no injuries. That is no reason to do away with motorway barriers. The barrier is justified when the deaths and injuries prevented outweigh appreciably the extra deaths and injuries that result from its presence.

It would therefore be a severe constraint on the use of safety measures if any measure were to be ruled out for which the larger number of deaths and injuries saved were differently distributed among road user groups from the smaller number resulting from the measure—the more so because most of us at different times belong to different user groups.

The wearing of seat belts is therefore not exceptional among safety measures in that extra deaths and injuries that may arise from wearing occur in part (only in part because, if wearers drive more riskily, some of the extra deaths and injuries will occur to vehicle occupants) to different road user groups than those among which deaths and injuries are prevented—though the difference is perhaps sharper for belt wearing than for many other measures.

Any increase in death and injury to pedestrians and cyclists that stems from wearing of seat belts should be borne in mind in the formulation of road safety policy as a whole and contribute to prioritising safety measures benefitting pedestrians and cyclists. But so long as wearing of belts saves substantially more death and injury among vehicle occupants than the increase among pedestrians and cyclists, the latter does not rule out the provision and wearing of belts. Nor, therefore, does it rule out laws requiring the wearing of belts.

Why it is right to retain the laws

Having addressed the main objections to seat belt laws, it is time to set out briefly the reasons for retaining them.

- They have resulted in much higher wearing rates than could be achieved by persuasion without a law.
- They prevent many more deaths and injuries than they may cause.
- Wearing of seat belts contributes substantially to the effectiveness of other occupant-protection measures that have become standard in car design over the last two decades, such as crushable front and rear ends.
- Any occupant wearing a belt is prevented from being the cause of injury to other occupants by being thrown against them in a collision.
- In the context of the many regulations concerning construction and use of motor vehicles, the requirement to wear seat belts is a minor intrusion into the lifestyle of vehicle users, and for drivers it is just one of many responsibilities taken on by anyone who decides to acquire a driving licence.
- To require the wearing of seat belts is not merely to require self-protection—it is to require a largely untroublesome contribution to reducing the costs to society, and to victims and their families, friends and associates, of death and injury on the roads.

The wearing of seatbelts has been compulsory in Britain for twenty-five years now. Thanks to those laws thousands of people have been saved from death or serious injury. To dismantle the legislation now would be perverse indeed.

References

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Table 2. Figures obtained from percentage changes in deaths and killed or seriously injured (KSI), applied to the totals for 1982

Measure	Year beginning	Change in deaths	Change in KSI
Compulsory front seat belt wearing	February 1983	–372	–6120
New drink-drive arrangements	May 1983	–65	–2510
New learner motorcyclist arrangements	February 1983	–54	–2760
Total		–491	–11 390

Richard Allsop, Oliver Carsten, Andrew Evans and Robert Gifford are among the leadership of the Pacts, the Parliamentary Advisory Council for Transport Safety, a charity which originated from the campaign of 1979–81 to introduce seat belt laws in Britain, and which recently celebrated its 25th anniversary.