

## Sports utility vehicles and older pedestrians

### *A damaging collision*

Two independent trends in the developed world are likely to reverse some of the hard won improvements that have been made in road safety. One is the ageing of the population; the other the increase in the use of sports utility vehicles (SUVs, high performance four wheel drive cars capable of off-road driving). The first trend produces a growing number of vulnerable road users; the second produces a likelihood of more severe injuries when vehicles and pedestrians collide. Public health professionals will need to work with transportation and road safety agencies to avoid the inevitable consequences of more vulnerable road users and more lethal vehicles.

Among road users, pedestrians are already a group at high risk, and elderly pedestrians are particularly at risk. People over 60 are more than four times as likely to die if injured by a car than younger people<sup>1</sup>; in a pattern repeated around the developed world, older people in Ireland account for 30% of pedestrian deaths but only 11% of the population.<sup>2</sup> The World Health Organization has recognised protection of older pedestrians as a key safety measure for this age group.<sup>3</sup> Pedestrian protection is an even more pressing problem in the developing world. Pedestrian injuries and deaths from collisions with vehicles represent about 20% of automotive casualties in the European Union,<sup>4</sup> but they rise to nearly 50% of casualties in developing countries, which have poorer roads and more travel by foot.<sup>1</sup>

Pedestrian protection is achieved in several ways. These include separation of vehicles from pedestrians, reduction of vehicle speeds,<sup>5</sup> w<sup>2</sup> w<sup>3</sup> the development of "smart vehicles" to avoid collisions, and improved vehicle design to reduce injuries to pedestrians.<sup>4</sup> The proliferation of sport utility vehicles represents a backwards step in safer vehicle design.

In Europe sales of SUVs have increased by 15% in the past year, while sales of standard cars have dropped by 4%.<sup>w5</sup> In Ireland, SUVs now represent almost 8% of new registrations. In the United States 40% of new vehicles purchased are classified as light trucks or vans (many of which are SUVs).<sup>6</sup> Gabler and Lefler have used the US fatal accident reporting system database (FARS) to analyse the relative dangers posed to pedestrians by these high fronted vehicles. Their results show that, for the same collision speed, the likelihood of a pedestrian fatality is nearly doubled in the event of a collision with a large SUV compared with a passenger car.<sup>6</sup> Other studies have consistently showing higher rates (up to four times greater) of severe injury and death for pedestrians in collisions with SUVs.<sup>7-9</sup>

A common misconception is that the increased vehicle mass of SUVs is responsible for the increased hazard to pedestrians. In fact, although vehicle mass is important in car to car collisions, it is a minor factor in vehicle-pedestrian collisions given the disparity between the weights of the pedestrian and of the vehicle.<sup>w6</sup> The increased mortality and morbidity from SUVs arises primarily from the geometry of the front end structure. In a typical collision between a car and an adult, the bumper strikes the lower legs and the leading edge of the bonnet strikes the femur/pelvis, causing the pedestrian to rotate towards the bonnet. This results in the bonnet or windscreen hitting the shoulders or head. After this further injuries often occur through impact with the ground. A key mitigating factor in injury severity is the relatively peripheral nature of the primary impact of the bumper to the lower legs.<sup>w7-w9</sup> This affords some protection to the critical upper body regions in the primary impact, and the resulting body rotation on to the bonnet tends to further diminish the impact—a characteristic often called "wrap and carry." The principal pedestrian injuries from cars are predominantly fractures of the tibia and fibula and knee injuries from the primary impact with the bumper<sup>w10</sup> and head injuries from the secondary impact with the bonnet or windscreen.<sup>w11</sup>

SUV bonnets are higher than those of cars and this results in a more severe primary impact on the critical central body regions of the upper leg and pelvis.<sup>w12</sup> Also, there is less rotation as the impact is closer to the body centre of mass, resulting in a more efficient transfer of energy. For example, raising the bonnet leading edge height from 600 mm to 850 mm increases the impulse by a factor of about two.<sup>w13</sup> This results in a doubling of injuries to vulnerable regions such as the head, thorax, and abdomen.<sup>9</sup>

Another group of vulnerable road users are small children, and a well described risk with SUVs are accidents in driveways, in which SUVs and light trucks are over-represented.<sup>w14</sup> w<sup>15</sup> This is probably a result of the increased height of the SUV and the driver's reduced ability to see things around the vehicle.

Thus the evidence shows that SUVs represent a significantly greater hazard to pedestrians than ordinary cars—and those pedestrians are getting older and more vulnerable. Addressing this threat requires an integrated approach from public health and

transportation and road safety agencies (including vehicle designers). One measure should include changing crash investigation processes to identify SUVs in vehicle-pedestrian impact statistics. Given the increasing economic importance of the SUV market to car manufacturers, traffic safety activists in the health professions will need to keep pressure on governments to make sure they don't put economic and industrial interests ahead of effective safety strategies.<sup>10</sup>

In the meantime, informing consumers of the increased risk to pedestrians from SUVs may represent a useful first step in raising public awareness. The Irish Medical Organisation has recently called on motor manufacturers and distributors to display warning notices on SUVs that advise potential purchasers of the increased risk of severe

injury and death to pedestrians associated with these vehicles. Resistance from the industry to such initiatives is likely to be strong, just as it has been from the tobacco industry for warnings on cigarettes.<sup>11</sup> Nevertheless, healthcare advocates should take heart from previous successful traffic safety initiatives.<sup>12</sup> Addressing the hazards posed by SUVs to pedestrians is an emerging and real traffic safety challenge in the developed world.

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## Do get in touch

*Postcards from the hospital may lead to fewer episodes of self harm*

England and Wales's recent national guideline about the early care of people who have deliberately harmed themselves<sup>1</sup> was launched to the media with the sorry admissions that "170,000 people a year attend emergency departments because they have self-harmed, of those an estimated 80,000 never receive a psychological assessment or follow-up even though the risk of committing suicide after self harming one or more times is 100 times greater than the average risk in the population" and "few people providing care in casualty understand why people self harm and don't know how to help them effectively." People who harm themselves also have an increased morbidity and mortality not related to suicide.<sup>2</sup>

The report by Carter and colleagues in this issue (p 805) describes one of the largest trials in self harm so far carried out.<sup>3</sup> In a largely unselected sample of people attending the emergency department because of self poisoning in Newcastle, Australia, the researchers randomly allocated half to a simple, low cost procedure—sending them a series of postcards over the next year inviting further contact with the hospital. They found significantly fewer episodes of self harm overall, but the postcard intervention did not significantly lower the proportion of participants who went on to harm themselves again.

There is room for caution about the validity and generalisability of the findings. Firstly, a few women accounted for all of the difference in repeated episodes—and confounding may have occurred, as the

groups contained unequal numbers of participants with a history of multiple episodes and hence a greater likelihood of repeated self harm during follow-up. Multiple repetitions of self harm was a planned outcome of the trial, hence stratification by number of episodes during random allocation might have been a good idea.

Furthermore, the patients in this trial had poisoned themselves rather than inflicting any other kind of harm. Although poisoning accounts for around 85% of episodes of documented self harm in the United Kingdom and elsewhere, we know of nowhere in the United Kingdom where all patients who attend an emergency department because of self poisoning are admitted to a single specialist inpatient unit, as in this Australian trial. In the United Kingdom, hospitals allow many such patients to go home after assessment in an emergency department.<sup>4,5</sup> And young people frequently change addresses, making no arrangements for forwarding mail, thus follow-up may be poor in studies of postal interventions in deliberate self harm.

This trial is welcome nevertheless. Those trying to improve services for people who deliberately harm themselves are hampered when guidelines, whether from the United Kingdom,<sup>1</sup> New Zealand,<sup>6</sup> or elsewhere consist entirely of recommended good practice that is based on the experience of the guideline group or the opinions of expert committees. This consistently low level of evidence reflects a lack of rigorous and directly applicable clinical studies.<sup>7</sup> The Cochrane review of interventions to decrease the repetition rate