

patient waiting hall. In practice this has not been possible, principally because of the continuous movement of the parents as they are called to see the doctor. Unlike parents in developing countries, the mothers attending our hospital will not wait once they have seen the doctor, and the one-to-one interview has therefore proved more valuable. This means that a unit need not necessarily be sited in the outpatient or casualty department but could be in any convenient room of a hospital, though it is desirable to be near to the waiting areas. An outside telephone is essential.

We feared resentment from community medical, nursing, and social work colleagues lest they saw the establishment of the unit as a sort of takeover bid, but the reverse has been the case. We explained our aims carefully before we began, and the warm reception encouraged us not only to continue but to write this account in the belief that others may wish to adapt these ideas to their particular area. The scope for community and hospital research is considerably broadened and we hope to develop this further. The unit has already helped in evaluating oral electrolyte solutions for the outpatient treatment of gastroenteritis.<sup>3</sup>

The work of the unit grows and must expand. For example, all types of accidents constituted only 11% of the unit's referrals during its first 18 months, but there were probably many more accident cases that were not referred. In Great Britain 200 000

children under 5 years and another 144 000 aged 5 to 14 have accidents in the home each year.<sup>4</sup> We recognise that we are not coping with this problem and are looking for ways of doing so.

This project could not have started without the encouragement and help of Miss B M Barchard, chief nursing officer of the Hospitals for Sick Children, and Miss B S Beech, senior nursing officer of the Queen Elizabeth Hospital for Children, whom we thank most warmly. Many others have co-operated and advised, especially Dr J Richards, Dr L Fry, Dr A Brown, Dr J Davies, Miss S Mowat, Miss S Preston, Miss V Packer, Mr G Peters, and Miss I Tauber.

We also gratefully acknowledge gifts towards the projector from Messrs Cow and Gate and J Wyeth and of accident prevention equipment from Mothercare Ltd.

Miss O'Neill kindly typed the manuscript.

## References

- <sup>1</sup> Schneiderman, I, Bennett, F J, and Rutishauser, I H E, *Journal of Tropical Pediatric and Environmental Child Health*, 1971, **17**, 25.
- <sup>2</sup> Jivani, S K M, *Archives of Disease in Childhood*, 1978, **53**, 69.
- <sup>3</sup> Hutchins, P, et al, *Lancet*, 1978, **1**, 1211.
- <sup>4</sup> *British Medical Journal*, 1978, **1**, 1561.

(Accepted 14 September 1978)

# A Modern Epidemic

## Road accidents and the unfit driver

BY A SPECIAL CORRESPONDENT

*British Medical Journal*, 1978, **2**, 1471-1473

### Illness and disability

In 1957 a London bus driver fainted at the wheel and killed nine people at a bus stop, and in 1963<sup>1</sup> a driver known to have coronary artery disease drove his bus into a river in New York City, drowning six passengers. Such events are, however, exceedingly rare. In 24 years (406 000 man years) only 127 London Transport drivers became acutely ill at the wheel, causing 59 accidents.<sup>2</sup> London Transport, of course, has a rigorous surveillance system; even so, few conditions were picked up at medical examinations that would have made private motoring unsafe. And even private drivers have a good record.

Sudden illness is a cause of 1-2 per 1000 accidents in most detailed studies.<sup>3 4</sup> Chronic conditions contributed to perhaps 5 per 1000 serious accidents in one survey,<sup>3</sup> but there is evidence that such people may more than compensate for disabilities by taking extra care and even have a better accident record than healthy drivers.<sup>4</sup>

Thus illness appears to contribute little to road accidents. Even with heart disease (the commonest cause of collapse at the wheel) the driver usually has time to stop and usually injures no one else.<sup>5</sup> On the other hand acute illness is a difficult cause to assess in accident studies as it may be masked by severe injury; an American study of drivers dying within 15 minutes

of a single-vehicle accident showed that 15% had coronary heart disease or other serious illness.<sup>1</sup> But as sudden illness is often quite unforeseen such accidents could not always be prevented. Epilepsy, however, clearly one of the conditions most hazardous for driving and the only absolute "bar" disability for driving heavy goods and public service vehicles, is sometimes concealed from licensing authorities, especially by professional drivers.<sup>5</sup>

### DECLARING DISABILITY

The GP or consultant has a particular responsibility for urging patients to declare disabilities, especially now we have licences valid to the age of 70 and three-yearly declarations of health for driving licence renewal have ceased; for the driver now has a statutory duty to notify the Driver and Vehicle Licensing Centre of any relevant and prospective disabilities. (These are fully discussed in *Medical Aspects of Fitness to Drive*.<sup>6</sup>) A doctor who has failed to tell a patient not to drive could be held negligent in law if there is an accident. Prospective disabilities (which may become relevant disabilities that preclude driving) are difficult for the doctor, and if he does not wish the patient to know that he is likely to develop a disability or get worse he must watch carefully for the time when driving should stop. Is it, however, expecting too much of human nature to leave the initiative entirely with the driver to notify the Licensing Centre—especially when he may depend on his car?

### "DO NOT DRIVE IF YOU ARE UNWELL"

Any temporary indisposition that reduces alertness clearly could also help to cause accidents. The Berkshire "on-the-spot" survey<sup>6</sup> found illness of some sort as a factor in 1%. The new *Highway Code* says, "Do not drive if you are unwell"—advice which many may think unrealistic in their crowded lives, but which should be more publicised. Moreover, an apparently minor condition may become less minor. West<sup>1</sup> tells of a man on his way to consult his doctor about chest pain who drove himself and his wife into a lake when he collapsed with myocardial infarction.

### VISUAL DEFECTS

Spot checks of drivers with the number plate test have given disparate results, with failure rates of 5% and 33%.<sup>3</sup> This test, however, was recently shown to be more stringent than had been thought,<sup>7</sup> and visual defects in any case do not appear to be an important cause of road accidents.<sup>8</sup> But the recent report of a large proportion of middle-aged people in a screening survey who were unaware of their impaired vision for distances is worrying.<sup>9</sup>

### Aging

A 70-year-old driver about to cross a road junction noted that he had to wait for seven vehicles to pass. He counted them and after the seventh he proceeded, only to collide with a motor cycle that had earlier been hidden.<sup>10</sup> This case well illustrates both a strength and a weakness of elderly drivers. Conscious of slower reactions they may adopt strategies for avoiding last-minute decisions; but when the unexpected happens they may not be able to act in time to avert an accident.

The results of many studies have suggested some increase in accidents with age, but there tend to be uncertainties of interpretation.<sup>4</sup> McFarland *et al*<sup>10</sup> found disproportionate numbers of accidents in relation both to the population of licence holders and to the distance driven. The old, moreover, like the youngest drivers, were more often blamed. On the other hand, they tended to have less serious accidents—because,

in particular, speed was not usually a factor. A recent survey showed a slightly increased accident rate in old age (perhaps partly but not entirely explained by more injury, or at least more reporting), but a greatly increased rate at junctions (R L Moore, personal communication). In a detailed study of crossroad accidents older drivers had proportionately more accidents than younger drivers when emerging from the minor road.<sup>11</sup>

### ERRORS AND LIMITATIONS

The main errors found by McFarland *et al* were at junctions and in pulling out from the side of the road, turning, giving right of way, and starting; "stop" signs were ignored, and other road users were often disregarded. These can all be explained by a slowing down in complex tasks depending on total perception and on judgment—that is, information processing rather than neural transmission. Irrelevant information may also confuse the elderly driver more than younger ones and he is less able to attend to simultaneous tasks (conversation or listening to the radio may therefore be a dangerous distraction). Observers travelling with elderly drivers reported that all near-accidents seemed to be due to unawareness of a change in the traffic.<sup>12</sup> But a small behaviour and attitude study showed equal numbers of safe, injudicious, and unsafe drivers in 17-20 and 60-70 year-old motorists.<sup>13</sup>

### ASSETS

Nevertheless, the elderly driver has two great assets: caution and experience. Certainly the over-hesitant and slow driver causes considerable ill feeling,<sup>14</sup> and may be prone to have accidents<sup>15</sup> and cause them because frustrated drivers behind him may try to overtake; but the risk-taking of younger age groups is a greater hazard. In general, the elderly seem to avoid traffic conditions where conflicts are likely.<sup>12</sup> Ysander<sup>1</sup> even found a lower rate of accidents and offences in drivers starting to drive at 58 or more than in younger inexperienced drivers. He also suggested that the elderly have better accident rates than might be expected because many do give up driving of their own accord. A study of London bus drivers over 65

## If preventable why not prevented?

In February 1977 a Morris 1100 was crushed between two heavy goods vehicles. A woman and her daughter were in the front seats but, incredibly, survived uninjured. This was undoubtedly because both were wearing seat belts. A vast amount of published work now attests to the effectiveness of seat belts in reducing death and injury rates and making injuries less severe in accidents. But British drivers had a seat-belt wearing rate of little over 30% in the country as a whole earlier this year, even after a publicity campaign. With legislation to make wearing mandatory, however, some countries have achieved rates of 80-90%. Would the rate be higher in Britain if the police themselves were seen to be wearing belts more often?



Photograph reproduced by kind permission of the Chief Constable for Sussex from his annual report for 1977.

(admittedly a highly selected group) showed that they had a better accident rate than younger groups with fewer years' experience.<sup>16</sup>

## REDUCING THE RISKS

Can we reduce the risks that go with aging? Firstly, old people and those who deal with them should be more familiar with the advice<sup>5</sup> on consulting the doctor about fitness to drive; taking particular care with drugs; and avoiding as far as possible difficult traffic conditions, unfamiliar routes, over-long journeys, night driving, and fatigue. Secondly, the specific limitations of elderly drivers and the errors to which they are prone should be widely publicised so that they can take special care or avoiding action when appropriate. Moore (personal communication) proposes a way of coping with right-hand turns at junctions—namely, turning left, crossing the road at a suitable point, and returning; we could perhaps develop other simple strategies. Special driving courses for the elderly might be worth trying.

Finally, doctors must take seriously their responsibility for warning against driving when their elderly patients continue in spite of disabling illness or infirmity.<sup>5</sup> But these will not always heed warnings, or even be in touch with their doctors. Is it enough to leave the initiative in stopping driving, or in reporting disability to the Driver and Vehicle Licensing Centre, with the driver when he may have so much to lose? Some in fact are reported to the authority by the police or by relatives, a sad last resort that may strain relationships. The Licensing Centre has an advisory service for discussing cases anonymously with the GP. A safety net is provided by most insurance companies, which ask for a regular doctor's certificate requiring a medical examination over the age of 75. Should there also be a periodic driving test? This is required in New Zealand and has a high pass rate, the less competent drivers being deterred from taking it. In Britain the elderly are especially liable to have a driving test imposed on them after an accident or conviction, and with the relatively small numbers still driving, and the shorter distances usually driven, this may well suffice.

## Fatigue

"Do not start a journey if you feel tired," advises the latest edition of *The Highway Code*. But is this exhortation realistic or helpful when so many people live highly organised lives that seem to have no margin for flexibility?

In the Transport and Road Research Laboratory's "on-the-spot" survey in Berkshire<sup>6</sup> fatigue was the most frequent cause of impairment apart from drinking, being reported in 159 of the 2211 drivers at fault. Although this study had no controls, there are plenty of reasons for supposing that fatigue, with its combination of physical and mental elements, does contribute to accidents. Up to a point the increasing vigilance that goes with increasing arousal during the day means that driving performance may actually improve after several hours at the wheel, but eventually fatigue will offset this process. Disproportionately more accidents occur after seven hours' driving<sup>17</sup>—and there is a particular risk of accidents after midnight, when arousal is at its lowest.

## EXPERIMENTAL EVIDENCE

Experimental work has pinpointed possible hazards of prolonged driving. Risky overtaking appears to increase even while the driver is still vigilant, possibly because his standards slacken.<sup>18</sup> Complex perceptual skills, including speed in reacting to unexpected demands, and courtesy to other road users deteriorate;<sup>19</sup> and the capacity for selective attention (which anyway varies between different times of day and between

individuals) diminishes.<sup>20</sup> Uneventful driving, such as on a motorway, is particularly apt to reduce the level of perception—especially for extreme extraverts, who seem to need more external stimulation than do introverts.<sup>5</sup> Clearly the various effects may be compounded by disturbance of sleep or emotional factors. Older drivers (aged 45 or more) are more prone to fatigue than are the young, and their level of arousal falls off sooner.<sup>5</sup>

## PRECAUTIONS

An important rule for the private driver is to avoid as far as possible driving during the troughs of the circadian rhythms—that is, during his normal hours of sleep<sup>5</sup>—and indeed try to avoid holiday marathons. He should also try to get enough rest beforehand. During a prolonged journey there should be regular breaks of at least 20 minutes, with some vigorous exercise if possible. This is essential for everyone, and crucial for anyone who is unwell or tired for other reasons, for the elderly and the extravert, and in any monotonous environment (including darkness and fog.) Pills such as caffeine preparations sold at motorway service stations to combat fatigue are a dangerous substitute for having a rest. Rest breaks are less restorative, however, after four or five hours and ineffective after about nine hours' driving. Not only drinking but also heavy meals and muscular exercise should be avoided before driving as they make for drowsiness; psychoactive drugs may also cause fatigue. An uncomfortable or tense posture, which produces unnecessary tiredness, calls for adjustment of the seat; aggressive driving, through postural changes, also increases static muscular fatigue. These simple facts should surely be more widely known by the general public.

I am grateful to the following for helpful discussion and comment: Professor R E Allsop and R L Moore, transport studies group, University College London; Dr I D Brown, MRC Applied Psychology Unit, Cambridge; Dr J D J Havard, British Medical Association; Dr P A B Raffle, London Transport Executive; Dr J F Taylor, Driver and Vehicle Licensing Centre.

## References

- West, I, et al, *Journal of the American Medical Association*, 1968, **205**, 68.
- Raffle, P A B, *Proceedings of the Royal Society of Medicine*, 1977, **70**, 240; and unpublished data.
- Grattan, E, and Jeffcoate, G O, *British Medical Journal*, 1968, **1**, 75.
- Ysander, L, *Acta Chirurgica Scandinavica*, 1970, suppl 409.
- Raffle, A (editor), *Medical Aspects of Fitness to Drive*, 3rd edn. London, Medical Commission on Accident Prevention, 1976.
- Storie, V J, paper presented to fifth international conference of the International Association for Accident and Traffic Medicine, London, 1975.
- Transport and Road Research Laboratory, Leaflet LF676. Crowthorne, TRRL, 1977.
- Hills, B G, and Burg, A, *A Reanalysis of Californian Driver Vision Data: General Findings*, Laboratory Report 768. Crowthorne, TRRL, 1977.
- Stone, D H, and Shannon, D J, *British Medical Journal*, 1978, **2**, 859.
- McFarland, R A, Tune, G S, and Welford, A T, *Journal of Gerontology*, 1964, **19**, 190.
- Russam, K, and Sabey, B E, *Accidents and Traffic Conflicts at Junctions*, Report LR514. Crowthorne, TRRL, 1972.
- Moore, R L, *Traffic Engineering and Control*, 1978, **19**, (2), 5.
- Quenault, S W, Golby, C W, and Pryer, P M, *Age Group and Accident Rate—Driving Behaviour and Attitudes*, Report LR167. Crowthorne, Road Research Laboratory, 1968.
- Parry, M, *Aggression on the Road*. London, Tavistock Publications, 1968.
- Munden, J M, *The Relation Between a Driver's Speed and His Accident Rate*, LR 88. Crowthorne, Road Research Laboratory, 1967.
- Cornwall, C J, *Annals of Occupational Hygiene*, 1962, **5**, 69.
- Harris and Mackie, cited in Raffle,<sup>5</sup> p 60.
- Brown, I D, Tickner, A H, and Simmonds, D C V, *Ergonomics*, 1970, **13**, 239.
- Brown, I D, *Psychonomic Science*, 1967, **7**, 131.
- Brown, I D, in *Transport Ergonomics*, special edition of *Ergonomics*, in press.