OLDER DRIVERS AND THE GREYING OF AUSTRALASIA

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1. A BRIEF STATEMENT OF THE ISSUE

Older drivers are perceived to have a heightened crash risk. This, together with a projected growth in their number over the next thirty or so years, has produced a call for improved road safety countermeasures to prevent the threatened increase in older driver crashes.

2. AN ASSESSMENT OF THE ROAD SAFETY ISSUE

Statistically, older drivers do not constitute a major road safety problem. In 1998, people aged 65 years or more accounted for 8.0 per cent of all drivers in serious casualty (including fatal) crashes in Australia[1], while comprising 12.2 per cent of the population[2].

However, compared with other age groups, older people are less likely to be licensed and, if licensed, are likely to drive shorter distances[3]. Once distance driven is taken into account, older drivers are over-represented in serious injury crashes, and the U-shaped curve shown in Figure 1 has been repeatedly confirmed in Australia, New Zealand and elsewhere.

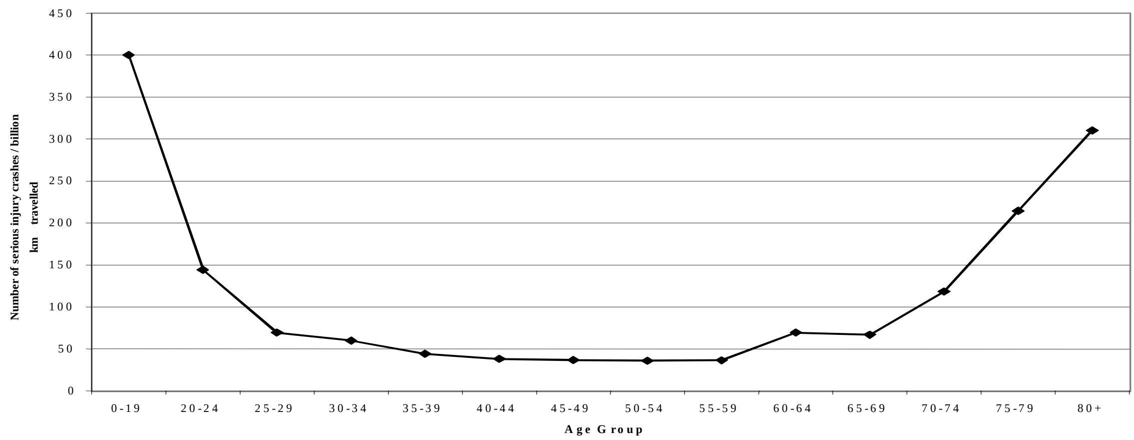

Figure 1: Age of driver and fatal and serious injury crashes per distance travelled, Australia, 1996[3].

It is worth noting that the U-shaped curve in relation to driving is also pertinent to other travel modes. Older people, whether as drivers, passengers in private vehicles, or as pedestrians, are at increased risk of injury while travelling relative to middle-aged adults[4].

This heightened injury risk is given additional urgency by the fact that Australia and New Zealand, in common with most Western countries, are experiencing a major demographic shift, due predominantly to the ageing of the post World War Two 'baby boomer' generation. This, in combination with greater longevity and declining birthrates, will result in one in every four people in Australasia being 65 years or older by 2050[4].

Table 1 shows the expected growth in the numbers of older people over the next fifty years for Australia and New Zealand.

Table 1: Growth in the percentage of the population aged 65 years and over and 80 years and over for Australia and New Zealand.

	Percentage of Population Aged 65 and over					
	2000	2010	2020	2030	2040	2050
Australia	12.6	14.3	18.4	22.1	24.5	25.2
New Zealand	11.6	12.6	15.6	18.3	21.8	23.8
	Percentage of Population Aged 80 and over					
	2000	2010	2020	2030	2040	2050
Australia	3.1	4.2	4.8	6.6	8.4	9.7
New Zealand	2.8	3.5	3.9	5.2	6.6	8.0

Current trends suggest that the emerging cohorts of older drivers are more likely to be licensed and to drive longer distances. These factors may produce a three-fold increase in older driver fatalities by 2025, with around the same proportional increases at other levels of injury severity[3].

3. A REVIEW OF THE RESEARCH

Current research suggests that that there are three general factors to consider when interpreting older drivers' apparent over-involvement in serious casualty crashes.

3.1 The older drivers' casualty crash risk curve is partly a function of frailty

The risk curve, based on serious casualty data, exaggerates older drivers' crash involvement because of the 'frailty bias'. Because older people are more readily injured by a given physical impact, proportionally more of their total crashes have serious casualty outcomes[5]. Both international[6] and Australian[7] research suggest that around one-half of the heightened fatality risk of drivers aged 75 years and more might be due to frailty rather than to unsafe driving practices. The same correction can be made to older drivers' involvement in non-fatal serious injury crashes[3].

3.2 The older drivers' casualty crash risk curve is partly a function of distance driven

Secondly, it has been claimed that high-distance drivers have lower crash rates per kilometre than short-distance drivers. Because older drivers make shorter trips than other age groups, risk estimates based on distance driven also exaggerate their crash rates[8].

The role of the short-distance bias is problematic and may be at least partly counterbalanced by other exposure factors. For example, the fact that older drivers do relatively more of their driving on urban roads rather than on higher-speed open roads or motorways[9], suggests the need to control for the safer conditions represented by urban roads in any comparison of per-distance crash rates. At the very least, there is a need for caution in interpreting commonly reported associations between old age and crash risk per distance driven.

3.3 Normal ageing does not automatically mean increased crash risk

The relationship between ageing, driving and crash risk has been described thus:

> The weight of the evidence…appears to indicate…a reduction in elders' driving skills resulting from various declines that come with age… . However, this reduction in skills does not necessarily translate into a higher crash rate over any given period of time for elderly drivers as a group, because of the group's characteristic compensatory behaviours and voluntary limitations of their driving.[10]

There is a strong argument that many older drivers compensate for the usually gradual decline in their driving abilities by avoiding driving in darkness, on wet roads, during rush hour or in other stressful situations. Further, their behaviour becomes more conservative: they drive more slowly, seek longer time gaps for merging at intersections and avoid simultaneous activities such as smoking or handling the radio while driving[5].

Although self-regulation does not entirely prevent older driver crashes, it is effective in that the 'moderate functional changes related to normal ageing do not appear to lead to a discernible increase in crash risk'[10].

3.4 Some older drivers have an increased crash risk

Much of the risk that has hitherto been generalised to all older drivers is now being attributed to specific sub-groups, for example older patients suffering from dementia[11], epilepsy or insulin-treated diabetes[10]. This represents a shift from a general approach ("*why* do older drivers have higher crash risk?") to a differential focus on high-risk sub-groups ("*which* older drivers have higher crash risk?")[12].

Research effort has been, and is being, expended to identify the various high-risk sub-groups of older drivers[10 13 14]. Attachment 1 lists the medical conditions that, so far, have either empirically or otherwise been linked to higher crash risk. As may be seen from the risk estimates, the magnitude of the relationship between a condition and crash involvement is usually small, not necessarily precise and in many cases, unknown. Further research is also required into the road safety implications of medications frequently prescribed for older people.

4. POLITICAL, SOCIAL AND OTHER FACTORS ASSOCIATED WITH OLDER DRIVERS

The likely increase in the absolute number of older driver casualties in the fairly immediate future has led to many road safety countermeasures being proposed. Generally, the measures may be categorised thus:

- safer roads – in particular, the development and use of road design standards that will more clearly reflect the changing functional abilities of older drivers[15];
- safer vehicles – in particular, improved occupant protection devices and crashworthiness features;
- safer people – in particular, more effective licensing requirements[16].

In implementing any of these countermeasures, it is essential that older people be allowed to retain maximum mobility to ensure accessibility and social equity.

The 'urban sprawl' has led to a wide dispersal of essential services, commercial enterprises and social networks and the car remains a major option for tackling these distance problems. For older people (as for others), driving cessation can result not just in access difficulties but also in considerable distress and a lowering of self-esteem and dignity[17 18].
There is also a compelling economic argument for ensuring that older people remain as mobile as is compatible with basic safety. Ageing baby boomers, in terms of appetite and capacity, have the potential to be a major economic mainstay in future years. Restricted access to their cars means that their contribution to the economy will diminish appreciably[4].

If mobility for some older people is to be restricted for safety reasons, the restrictions should target only those who show evidence of having an unacceptably high crash risk. Restrictions which impact on all older drivers are likely to be not just unpopular but also counter-productive from a safety viewpoint, given the high risk of walking relative to driving[5].

In balancing mobility and safety, it needs to be recognised that older drivers do not represent an excessive risk to other road users[19 6]. Relative to other drivers, they are more likely to be their own victims, largely because of their greater physical frailty.

5. CONCLUSIONS

Demographic factors mean that there will be a substantial increase in the absolute number of older drivers in the immediate future, with a likely commensurate increase in older driver casualties. In implementing countermeasures to limit this increase, the following points warrant emphasis:

- many older drivers adequately compensate for any diminution of driving skills
- assessment procedures should target only those sub-groups of older drivers suffering from conditions which place them at high risk of a crash
- it is important that the older drivers be able to maintain maximum mobility consistent with acceptable safety levels.

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Attachment 1: Medical Conditions That May Serve as “Red Flags” Regarding Driving Safety

General Condition	Details	Evidence Relating to Driving	Crash Risk
Visual Impairments / Illnesses	Low vision (20/200 to 20/50)	The crash rates of restricted / unrestricted drivers with visual impairments were compared with controls. Research details relating to acuity not provided.	RR = 2.38* (without restrictions) RR = 1.31* (with restrictions) Dynamic visual acuity said to be a more reliable predictor of crashes than static visual acuity.
	Cataracts	Compared past 5 year crash history of older drivers with / without cataracts with controls.	RR = 2.2*
	Colour Vision Defects	Compared crash risk / driving ability of red, green colour-blind drivers with controls. Questionnaire to individuals with congenital colour blindness.	Red colour blind twice as many rear-end crashes. Those with colour vision defects reported general difficulty when driving.
	Contrast Sensitivity	Compared those with cataracts pre-surgery <u>and</u> impaired contrast sensitivity with controls.	RR (one eye impaired) = 2.70* RR (two eyes impaired) = 5.78*
	Diabetic Retinopathy	Proliferative diabetic retinopathy can result in reductions in the visual field. Pan retinal photocoagulation said to reduce the risk of severe visual loss.	Unknown
	Glaucoma and field loss	Compared peripheral field loss and crash rates in individuals with glaucoma and controls.	Field loss in both eyes had double the crash and conviction rates (per person per 160,000km).
	Monocular Vision	Compared crash rates of individuals with monocular vision with controls (research from the 1970s and early 1980s).	Those with monocular vision have nearly double the number of crashes and have more reckless driving violations.
	Macular Degeneration	Compared self-report and official records of those with macular dystrophies (MD) and controls.	No difference in crash rates except those with MD who don’t restrict driving to night time are more likely to be involved in night time crash.
Hearing	Hearing impairment	Compared crash rates of those with hearing impairment with controls.	Equivocal results.
Cardiovascular disease	Coronary Heart / Artery Disease	Considered injury to others as a result of ‘sudden death at the wheel’.	Early research suggested little risk to other drivers. More recent studies suggest there may be a slight increase in risk to others.

General Condition	Details	Evidence Relating to Driving	Crash Risk
	Disturbances of Cardiac Rhythm	No direct crash research. Used an equation to estimate risk of harm to other road users.	Unknown. Estimated annual risk of harm to other road users to be 1 in 45,000.
	Congestive Heart Failure	No direct crash research. Considered associated cognitive impairment and inferred impact on safe driving ability.	Unknown. Unknown.
	Abnormal Blood Pressure	No direct crash research. Considered associated cognitive impairment and inferred impact on safe driving ability	Unknown. Unknown.
Cerebrovascular disease	Transient Ischaemic Attacks	No direct crash research.	Unknown.
	Cerebrovascular Accident (CVA) (Stroke)	No direct crash research. Considered acute neurological events. Considered chronic neurological impairment versus controls (not CVA's alone) Post CVA.	Unknown. Very low risk. RR (unrestricted drivers) = 4.21* RR (restricted drivers) = 2.18* RR = 0.8*
Peripheral Vascular Diseases	Peripheral Vascular Diseases	No direct crash research.	Unknown.
Diseases of the Nervous System	Seizures	Compared the crash rates of those with epilepsy to that of controls (however methodological problems with these studies).	An increased risk from 1.5-1.95 times that of controls.
	Narcolepsy	No direct crash research. Compared self-report crashes of those with narcolepsy and controls or simulator study.	Unknown. Higher rate of self-reported and simulator crashes.
	Sleep Apnoea	Compared crash rates (over varying periods) of those with sleep apnoea and controls (however methodological problems with these studies).	An increased risk of crashing from 2-7 times that of controls.
Respiratory Diseases	Asthma	No direct crash research.	Unknown.
	Chronic Obstructive Pulmonary	No direct crash research. Considered associated cognitive impairment and inferred impact on safe driving ability.	Unknown. Unknown.
	Other Pulmonary Conditions (not specified)	The crash rates of restricted / unrestricted drivers with pulmonary conditions were compared with controls.	RR = 1.96* (without restrictions) RR = 0.65 ns (with restrictions)

General Condition	Details	Evidence Relating to Driving	Crash Risk
Metabolic Diseases	Diabetes Mellitus	Compared crash rates of drivers with diabetes and controls (however methodological problems with these studies).	Equivocal results.
	Thyroid Disease	No direct crash research. Considered associated cognitive impairment and inferred impact on safe driving ability.	Unknown. Unknown.
Renal Disease	Chronic Renal Failure	No direct crash research. Considered associated cognitive impairment and inferred impact on safe driving ability.	Unknown. Unknown.
Musculoskeletal Disabilities	Musculoskeletal Disabilities	The crash rates of restricted / unrestricted drivers with musculoskeletal abnormalities were compared with controls. Examined the crash rate of individuals with foot abnormalities (based on self-report).	RR = 4.02* (without restrictions) RR = 3.07*(with restrictions) RR = 2.2 (3 or more abnormalities) RR = 2.9* (impaired knee flexion)
Psychiatric Disease	Psychiatric or Emotional Conditions	Compared the crash risk of individuals with a psychiatric disorder with controls (however methodological problems with these studies). The crash rates of restricted / unrestricted drivers with psychiatric or emotional conditions were compared with controls.	May have higher crash risk. RR = 1.74* (without restrictions) RR = 2.42* (with restrictions)
Medication / Drugs	Anti-depressants	Compared crash rates of older drivers using tricyclic antidepressants with controls.	An increased risk of crashing of 2.2-2.3 times.
	Anti-histamines	Compared crash rates of drivers using older anti-histamines with controls.	Possible increase in crash rates.
	Benzodiazepines	Compared crash rates of drivers using benzodiazepines with controls.	Crash rates up to 2.4 times more (when considering higher doses and higher half-life compounds).
RR = relative risk * = the relative risk is statistically significant ns = not significant			

SOURCE: Dobbs B (2001). *Medical Conditions and Driving: Current Knowledge*. Technical Report, National Highway Transportation Safety Administration and The Association for the Advancement of Automotive Medicine Project, USA.