OLDER DRIVERS: WHAT RISK DO THEY POSE TO OTHER ROAD USERS?

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1 A BRIEF STATEMENT OF THE ISSUE

Mass media tend to highlight crashes involving older drivers that result in death or injury to others. This publicity is often followed by the call to restrict older drivers especially because of the perceived threat that they represent to other road users. In this paper, Australian and other crash data have been used to determine whether older drivers represent a heightened safety threat to other road users.

2 AN ASSESSMENT OF THE ROAD SAFETY ISSUE

On July the 16th 2003, an 86-year-old man drove his car the length of an open air market in Santa Monica, California at a speed estimated as high as 80 miles per hour. The immediate result was at least eight reported deaths and nearly fifty other people requiring hospitalisation. On the 5th of May 2006 in Sydney, Australia, a young girl – at the time recovering from an earlier serious road crash – was critically injured when struck by an elderly driver at a pedestrian crossing.

Both incidents were accompanied by a high level of press coverage and subsequent widespread calls for tighter assessment of older drivers' fitness to drive. For example, a subsequent report to the National Highway Traffic Safety Administration (NHTSA) in the US recommended that all drivers reaching a designated age threshold – notionally in the range 70 to 75 years – be required to undergo vision testing, knowledge testing and functional abilities screening every two years (Lococo and Staplin, 2005). Greater scrutiny of older drivers has also been suggested for Australian jurisdictions: for example, the New South Wales Roads Minister in explicit response to the above incident, requested a Road Safety Taskforce in that State to consider lowering the age threshold for the mandatory assessment programs already in place (Australian Associated press General News, 2006).

This paper addresses the issue of whether or not older drivers as a group represent a heightened threat to other road users.

3 A REVIEW OF THE RESEARCH: OLDER DRIVERS AS A RISK TO OTHERS

3.1 Overseas research

Zhang, Lindsay, Clarke, Robbins and Mao (2000) analysed fatal and serious injury crashes involving drivers aged 65 years or older which occurred on Ontario public roads between 1988 and 1993. They found that approximately 80% of fatalities and serious injuries occurred to the older drivers themselves, with the remaining 20% involving their passengers and other road users. The study design did not allow comparison with the outcomes of other driver age groups.

Dulisse (1997) used 1991 police and hospital data from two-unit crashes in Wisconsin to investigate whether older drivers posed a heightened risk to others, 'others' defined as persons outside of the driver's vehicle. Deaths and injuries arising from crashes involving older drivers occurred mostly to the occupants of older drivers' vehicles: older drivers and their passengers collectively had 2.5 times the number of deaths and 40% more hospitalisations than the occupants of the other vehicles in the crashes. The extent of risk to others is shown in Table 1.

Table 1: Older drivers' crash risk to others

Crash outcomes affecting others in crashes with drivers of the specified age groups	Age of driver (years)			
	16-64	65-74	75-84	85+
Number of deaths	388	21	8	3
Deaths per 100 million driver miles	0.96	0.82	1.0	3.58
Excess number of deaths (relative to the 16-64 years age group)	0.0	-3.66	0.26	2.19
Number of hospitalisations	2321	130	76	21
Hospitalisations per 100 million driver miles	5.76	5.08	9.44	20.0
Excess number of hospitalisations (relative to the 16-64 years age group)	0.0	-17.4	29.6	11.9

Note: 'Others' has been defined as those outside the older driver's vehicle, in two-vehicle crashes.

Table 1 shows that on a per-distance basis and relative to younger drivers, drivers aged 65-74 years posed less risk to other road users in terms of both deaths (0.82 deaths per 100 million driver miles compared to 0.96 deaths for 16-64 year-old drivers) and injuries (5.08 hospitalisations compared to 5.76). Drivers aged 75-84 imposed a slight excess risk of death to others (1.0 deaths compared to 0.96 deaths for 16-64 year-old drivers) and approaching a doubled risk of injuries (9.44 compared to 5.76). Drivers aged 85 years and above imposed broadly a four-fold excess risk of both deaths and injuries to others (3.58 excess deaths compared to 0.96, and 20.0 excess injuries compared to 5.76).

However in interpreting these raised death and injury rates for the oldest driver groups, it needs to be recognised that these groups in practice drove relatively few miles. When the excess deaths and injuries arising from their crashes were considered in absolute terms, their impact on road crash casualties was at most, modest. Drivers aged 75-84 years were associated with one excess death every four years and with roughly 1% of all hospitalisations arising from two-vehicle crashes. The heightened excess death and injury rates for drivers aged 85 years and above, given their even lower mileages, represented only 0.5% of all deaths and injuries arising from two-vehicle crashes.

The author recognised that these straightforward analyses may be obscuring other crash factors capable of distorting older drivers' true risk to others – in particular, sex of driver, types of vehicles in the crash, type of road, whether at an intersection and the speed limit at the crash scene. When these factors were controlled through statistical modelling, 'it is reasonable to conclude that … crashes involving older drivers are not more probable than crashes involving drivers under age 65 to result in (deaths or) serious injuries to other road users' (Dulisse, 1997, p.579).

Dellinger, Kresnow, White and Sehgal (2004) used 1992-94 data also from Wisconsin, taking the crash outcomes of drivers aged 35-59 as the standard. The authors looked only at two-vehicle crashes and defined 'others' as all road users other than the target drivers involved in each crash. Since fault information was not available in regard to these crashes, the injury outcomes were divided equally between the two drivers involved in each crash. The death and injury outcomes per driver age group are shown in Table 2.

Table 2: Older drivers' crash risk to others (1992-94 data)

Crash outcomes affecting others in crashes with drivers of the specified age groups	Age of driver (years)					
	16-19	20-34	35-59	60-74	75-84	85+
No. of deaths over 3 years	76.0	251.0	240.5	47.5	29.0	3.5
Deaths per 100 million driver miles	0.60	0.18	0.13	0.12	0.37	0.41
Excess deaths (relative to the 35-39 years age group)	60.1	76.2	0.0	-2.5	19.1	2.4
No. of A&E transfers over 3 years	5737.5	14312.0	12313.5	3209.5	1282.5	215.0
A&E transfers per 100 million driver miles	45.64	10.33	6.44	8.09	16.34	25.29
Excess A&E transfers (relative to the 35-39 years age group)	4927.4	5390.9	0.0	654.2	771.1	160.2

Note: Fractional deaths and injuries are due to casualty outcomes being 'divided' between the drivers involved in crashes. The shaded column represents the control group (drivers aged 35-39 years).

The authors concluded that the per-distance death and injury rates pertaining to others, were higher for drivers aged 75 years and above, relative to drivers aged 35-59 years – but were substantially lower than the rates for drivers aged 16-34 years. At the same time, older drivers' excess contribution to crash-related mortality and morbidity affecting others was low, representing 3.3% of fatalities and 2.5% of accident and emergency transfers. The authors suggested that older drivers' per-distance crash rates may be at least partly due to the frailty of their passengers and their higher use of riskier roadways, as distinct from being automatically attributable to reduced fitness to drive.

Braver and Trempel (2004) have used multiple crash databases in the US (the Fatality Analysis Reporting System, the General Estimates System for non-fatal crashes and a comprehensive collection of insurance claims databases for both injury and non-casualty crashes) to estimate the per-driver risk to four categories of road users: the drivers themselves, their passengers, the occupants of other vehicles involved in two-vehicle crashes and non-occupants in one-vehicle crashes. Drivers aged 35-59 years were used as the reference group in the calculation of rate ratios (RRs). Looking specifically at older drivers (aged 75 years and above) and on a per-driver basis, the results were as follows:

- Fatalities – for drivers aged 75 and above, significantly raised RRs were observed only for driver deaths (RR=3.02) and for their passengers (RR= 2.52) – with around three-quarters of the latter themselves being 75 years or older. The RRs for other vehicle occupants and for non-occupants were significantly lower (RR = 0.62 and 0.9, respectively).

- Non-fatal injuries (crashes reported by police) – for drivers aged 75 and above, there was a slight but significantly raised per-driver RR for driver injuries (RR=1.16). The RRs were not significantly different from the reference group for their passengers, for other vehicle occupants and for non-occupants, (RRs = 0.86, 1.1 and 0.93, respectively.
- At-fault insurance claims – for drivers aged 75 and above and based upon insured vehicle years, there were significantly raised RRs for others' injury claims and property damage claims (RRs = 1.2-1.8 and 1.3-2.09, respectively).

The authors were unable to explain the difference in non-fatal risk to other road users, when comparing police and insurance data. However they concluded from the data overall, that drivers aged 75+ years posed the greatest risk of death or injury to either themselves or their passengers – with frailty being a major likely contributor in both cases. At the same time, their risk to other road users was either no higher or only somewhat higher than expected, depending on the data sources used.

3.2 Australian research

In a study commissioned by VicRoads, (Langford and Bohensky, 2007), the National Fatalities Database was analysed to provide fatal outcomes by age of driver for all Australian jurisdictions combined, for the most recent available ten years (1990, 1992, 1994 and 1996-2001). These outcomes were further analysed by the categories of road users killed and expressed as fatality rates based on (a) population numbers for each driver age group, (b) licence holder numbers and (c) distances driven. The results are given in Tables 3-5.

Table 3: Fatality rates (per 100,000 population) in target road crashes by age of driver for the most recent 10-year period.

Age of driver	Average annual no. in population	Annual fatality rate: target drivers	Annual fatality rate: target driver's passengers	Annual fatality rate: all road users not in target drivers' vehicles	Annual fatality rate: all road users, excluding target drivers	Annual fatality rate: all road users, including target drivers
17-24	2156427.8	10.79	6.65	9.59	16.25	27.04
25-29	1415114.6	6.68	3.67	9.55	13.22	19.91
30-39	2893150.6	5.32	2.36	7.52	9.89	15.21
40-49	2627857.2	4.13	1.77	6.65	8.43	12.55
50-59	1864479.6	4.3	1.74	5.78	7.52	11.82
60-69	1409075.2	4.35	2.25	3.04	5.29	9.64
70-79	1028124.2	5.64	2.81	1.87	4.68	10.32
80+	483327.8	5.71	1.99	1.26	3.25	8.96
Total	13877557	5.88	2.98	6.56	9.54	15.42

Note: The 'most recent 10-year period' refers to the most recent 10 years for which fatality data are available, stretching over the fourteen-year period 1988-2001.
'Target fatal road crashes' relates to all road crashes resulting in at least one fatality and involving at least one driver of a motorised vehicle with four or more wheels.
'Target driver' refers to the driver age specified in column 1.
Some estimates have been made about unknown/missing cases.

Considering the per-population fatality rates, the older the driver the lower the fatality rates for all other road users. At a national level, drivers aged 80-plus years had an other-road-user fatality rate of 3.25, compared to the highest fatality rate of 16.25 for drivers aged 17-24 years. In particular, older drivers posed relatively little threat to road users external to their vehicle: drivers aged 80-plus years had an external-road-user fatality rate of 1.26, compared to the highest fatality rate of 9.59 for drivers aged 17-24 years.

Table 4 Fatality rates (per million licences) in target road crashes by age of driver for the most recent 10-year period.

Age of driver	Annual no. of licences	Annual fatality rate: target drivers	Annual fatality rate: target driver's passengers	Annual fatality rate: all road users not in target drivers' vehicles	Annual fatality rate: all road users, excluding target drivers	Annual fatality rate: all road users, including target drivers
17-24	1609804	144.49	89.14	133.12	222.26	366.75
25-29	1249537	75.71	41.62	109.96	151.58	227.28
30-39	2663544	57.82	25.64	83.16	108.80	166.62
40-49	2384566	45.46	19.54	74.02	93.56	139.02
50-59	1606697	49.85	20.23	67.90	88.13	137.98
60-69	1071939	57.19	29.57	40.30	69.87	127.06
70-79	646983	89.65	44.67	29.99	74.65	164.30
80+	184873	149.29	51.93	33.00	84.92	234.21
Total	11752351	69.48	35.15	78.92	114.07	183.55

Note: The 'most recent 10-year period' refers to the most recent 10 years for which fatality data are available, stretching over the fourteen-year period 1988-2001.
'Target fatal road crashes' relates to all road crashes resulting in at least one fatality and involving at least one driver of a motorised vehicle with four or more wheels.
'Target driver' refers to the driver age specified in column 1.
Some estimates have been made about unknown/missing cases.

Considering the per-licence fatality rates across the different driver age groups, the older the driver the lower the fatality rate for all other road users – except for those fatalities associated with drivers aged 80-plus years. The increased rate for this age group however was modest: drivers aged 80-plus years had an other-road-user fatality rate of 84.92, which was lower than the rates for all drivers up to 59 years of age. A different situation was found for fatality rates of road users external to the target vehicles. At a national level, drivers aged 80-plus years had an external-road-user fatality rate of 33.0, representing the second-lowest rate of all age categories (the lowest rate being for drivers aged 70-79 years).

Table 5 Fatality rates (per 100m km distance travelled) in target road crashes by age of driver for the most recent 10-year period.

Age of driver	Annual distance traveled ('000 kilometres)	Annual fatality rate: target drivers	Annual fatality rate: target driver's passengers	Annual fatality rate: all road users not in target drivers' vehicles	Annual fatality rate: all road users, excluding target drivers	Annual fatality rate: all road users, including target drivers
17-24	8918707	26.1	16.1	23.2	40.1	66.2
25-29	12498205	7.6	4.2	10.8	15.2	22.7
30-39	30611782	5.0	2.2	7.1	9.5	14.5
40-49	36569321	3.0	1.3	4.8	6.1	9.1
50-59	19847836	4.0	1.6	5.4	7.1	11.2
60-69	10880492	5.6	2.9	3.9	6.9	12.5
70-79	4618722	12.6	6.3	4.2	10.5	23.0
80+	686600	40.2	14.0	8.9	22.9	63.1
Total	124631665	6.6	3.4	7.3	10.7	17.2

Note: The 'most recent 10-year period' refers to the most recent 10 years for which fatality data are available, stretching over the fourteen-year period 1988-2001.
'Target fatal road crashes' relates to all road crashes resulting in at least one fatality and involving at least one driver of a motorised vehicle with four or more wheels.
'Target driver' refers to the driver age specified in column 1.
Some estimates have been made when fitting travel data to the age categories used in the table.
Some estimates have been made about unknown/missing cases.

Older drivers emerged as a substantial risk to both other road users and road users external to their vehicles, only for fatality rates per distance driven (see Table 5). Drivers aged 80-plus years had an other-road-user fatality rate of 22.9, the second-highest rate of all age groups (the highest rate, 40.1, being for drivers aged 17-24 years). Drivers aged 80-plus years had an external-road-user fatality rate of 8.9, the third-highest of all age groups. However to a large extent, these rates are misleading in that older drivers as a group greatly reduce their amount of driving. Because their driving distances are low, the high per distance fatality rates exaggerate their association with other road user fatalities and the extent to which they contribute to the road crash casualties.

The above findings notwithstanding, older drivers consistently posed an increased threat to one category of other road users: their passengers. This was true for all three different measures for calculating fatality rates and based on overseas findings, is most likely to be attributable to the frailty of older drivers' passengers rather than to any intrinsic risk posed by the older drivers themselves.

4 POLITICAL, SOCIAL AND OTHER FACTORS

On the one hand, transport jurisdictions have a legitimate concern to manage the safety of their transport systems, which includes the development of policies and programs aimed at producing safe road users. When any particular road user group is perceived as posing an unacceptable crash risk, there is often the push for greater control of this group. This may include an expectation that individual users – in this context, older drivers – demonstrate at regular intervals their continued fitness to drive, regardless of what the empirical evidence might be about their overall safety. Authorities need to respond to this concern, be it through a licensing policy or otherwise.

On the other hand, authorities also need to weigh up other factors when deciding on licensing policy. A licensing policy that threatens the mobility of older drivers needs to be carefully considered, particularly if the policy cannot be associated with safety benefits. A licensing policy that threatens to increase older people's use of other, riskier transport modes by preventing access to cars is also difficult to justify, given the same caveat. Society is likely to rely upon ageing baby boomers as one of its main economic mainsprings and this source of expenditure will be reduced if they do not have mobility. In addition, the disadvantages of losing a driver licence (including reduced quality of life and increased depressive and psychiatric symptoms) have to be weighed up against alleged safety advantages.

Perhaps most telling of all, there is the very real possibility that jurisdictions maintaining age-based mandatory assessment programs will need to defend their position in the law courts. Sisely (2006) and in reference to the Victorian Equal Opportunity Act 1995, viewed a hypothetical requirement that all people over the age of 75 needing to undergo annual driver licence checks, as constituting unlawful indirect discrimination.

5 CONCLUSIONS

Older drivers have been shown not to pose a substantial threat to other road users. Once involved in a crash, older drivers are likely to be the ones either killed or injured. The next largest group consists of older drivers' passengers, themselves likely to be elderly. There is some (but not consistent) evidence that older drivers pose some excess threat to other road users especially when death and casualty outcomes are calculated on the basis of driver miles: even here however, the excess deaths and injuries to others typically account for only a minute proportion of the total road crash casualties, given older drivers' low driving distances.

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