

# The Contribution of Illness and Drug Treatment to Crash Fatalities in Older Drivers.

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## **ABSTRACT**

As the population ages, an increase in medical reviews of drivers suffering from age related conditions may be expected. A study was conducted in order to ascertain whether older drivers were over-represented in crash deaths in Victoria and whether the licensing authority medical review process was aware of them beforehand. Coroner's records for drivers aged over 70 who died in crashes during the years 1996 and 1997 were reviewed. The results are presented. While a minority of drivers involved in fatal accidents were known to the authority, it is possible that many drivers not known to the authority may have been suffering from conditions that could have affected their driving. Many of the drivers were taking drugs that could have affected their driving skills and these may not have been known to their doctors. Although the total numbers were small, the proportionately large number of drivers taking the anticoagulant Warfarin suggests that further studies may be worthwhile.

## **INTRODUCTION**

Licensing authorities have a universal responsibility to ensure that licence holders are medically fit to drive. A wide range of medical conditions are known to have an impact on driving skills. While age *per se* is not considered such a condition, many illnesses which can affect driving ability do increase in prevalence with age. Associated with the increased prevalence of illness is an increased likelihood of the driver taking prescription drugs. Ideally, decisions regarding licensing are made on the basis of medical advice interpreted according to the state of knowledge regarding the effect of these conditions on driving. In order to assist Australian doctors in this regard, National Guidelines have been published (1), (2) which attempt to discuss the issues concerning medical conditions and driving in a systematic fashion. These guidelines stress the increasing incidence of various illness and degradation of skills with age and give advice regarding appropriate assessment procedures.

There is no law enforcing reporting of impaired drivers by health professionals in the Australian state of Victoria. There is also no compulsory requirement for medical examination either at the time of initial licensing or with periodic renewal. A recent change to the law has made it compulsory for drivers to report any medical condition that may affect their ability to drive safely. The licensing authority (VicRoads) has a department that has responsibility for the medical review of drivers, and once a person comes to the attention of the department a comprehensive assessment review process may ensue. Any driver known to the Department has a permanent file which is maintained during their driving "career" even in cases where on-going medical review is not required. The Department currently has approximately 40,000

files on record out of a licensed population of 3.2 million in a total state population of 5.5 million. This represents only 1.25% of all licensed drivers.

The clinical division of the Victorian Institute of Forensic Medicine acts as medical adviser to the medical review department of VicRoads in cases where interpretation of medical information in the light of the guidelines is required.

The initial purpose of this study was to determine:

1. what proportion of older drivers involved in fatal accidents were known to the VicRoads medical review department, and
2. whether the known medical condition (including prescription drug use) was involved in the crash (if possible).

A secondary objective was to determine whether medical conditions that could or should have been known to VicRoads were involved in the deaths of those drivers not subject to medical review. However as the study progressed it was found that only a minimal number of drivers involved in fatal collisions were known to VicRoads, the number over 70 years of age being statistically insignificant.

#### **METHOD:**

In Victoria all road deaths are notified to the State Coroner. A search of the Coroner's records for the years 1996 and 1997 identified 409 deceased drivers of which 55 were apparently cases where persons over the age of 70 years had died while driving a motor vehicle. These case files were all individually reviewed and after removing cases according to the exclusion criteria, 42 cases were used for the remainder of the study. The following exclusion criteria were used:

- Deceased person not the driver
- Deceased person unlicensed (VicRoads data not known)
- Deceased person's age not accurately known
- Deceased person under 70 years of age
- Investigation incomplete or inquest pending (only 2 cases)

The following information was extracted from the Coroner's files in all cases (where available).

- Age
- Sex
- Whether an autopsy was conducted
- Cause of death stated in autopsy report or death certificate
- Whether any medical history was available to the Coroner
- Details of pre-existing medical conditions
- Medications taken by the deceased
- Results of post-mortem toxicology
- Whether the collision occurred at an intersection
- Information for responsibility analysis (3)

Personal information from the Coroner's files was used to search the database of drivers known to the VicRoads medical review department in order to determine whether any of these

drivers were known to have pre-existing medical conditions that might affect their driving abilities.

## **RESULTS:**

Characteristics of drivers in the study (n=42)

	Study	Proportion in the licensed population over 70 years	Statistics of the total Victorian licensed population
Male	29 (69%)	59%	53%
Female	13 (33%)	41%	47%
Age range	70-92 (mean: 79.9)	70-105 (mean: 75.96)	18-105 (mean: 42.2)
Autopsy information available	37 (88%)		
Culpability scoring possible	32 (78%)		
Intersection crashes	21 (50%)		

**Table 1**

The 42 drivers aged over 70 represented 10.2% of the total number of drivers killed in the study years. This is slightly less than the proportion of the driving age population over 70 years of age (11.6%) (4), however it is more than the proportion of licensed drivers over 70 years of age (7.6%) (5). Since older drivers with disabilities are thought to avoid difficult driving tasks and drive less than other drivers (6), this represents reduced license holdings in this age group with a disproportionately higher risk of dying behind the wheel. The number of males who died was higher than the proportion of older males holding driver's licenses, perhaps reflecting the fact that men drive more frequently than females. Three of the collisions were double fatalities in which the female spouse of the male driver also died. Older drivers have been identified as being at greater risk of being involved in collisions at intersections. In this study 21 collisions (50%) occurred at intersections (7).

There were 8 drivers in the total population of 409 who were known to the VicRoads medical review department. Of these, only 2 were over 70:

Case 1: An 83 year old man with a past history of diabetes, below-knee amputation, unioocular blindness and hypertensive cardiovascular disease died in hospital after his car was hit by a tram. He was taking evasive action at the time to avoid another car which had entered an intersection incorrectly. While this man suffered from several conditions which were known to VicRoads and under medical review, the coroner did not determine that any of them were involved in causing the collision. None of the conditions alone would have disqualified this man from holding a driver's license.

Case 2: A 76 year old man died in hospital after his car collided with another car at an intersection. An autopsy was not held but on the basis of hospital observations he was thought to have suffered a stroke, possibly while driving. He had been the subject of a notification to VicRoads regarding possible medical problems including cerebrovascular disease and had recently been sent a letter requiring him to have a medical assessment. The assessment had not yet been done at the time of his death.

A major problem that was identified was the paucity of medical information available in the Coroner's files. Of the 41 cases in the study, only 17 had any information on past medical history available. In most cases where some prior medical history was available, there was insufficient information to determine whether the driver would have warranted medical review by VicRoads or have their licence suspended.

The most common pre-existing medical conditions cited in the coroner's files included cardiovascular disease (including myocardial infarction, angina and cerebrovascular disease), diabetes and chronic obstructive airways disease. There were several imprecise references to "dizziness" or "nerves".

Causes of death found by the coroner included acute trauma and multiple injuries in 29 cases. In 7 cases death was due to complications of prolonged hospitalization such as pneumonia, endocarditis or rhabdomyolysis. In 7 cases pre-existing cardiac disease was mentioned as a contributing factor with the possibility of acute myocardial infarction or arrhythmia not able to be excluded. In a further 4 cases myocardial events were given as the primary cause of death. There were no cases in which decline in cognitive function was mentioned as a possible contributing factor.

In order to assess any degree of responsibility drivers may have had for the collision, responsibility analysis was attempted on as many cases as possible. Data was available for responsibility analysis in 32 cases (78%). Of these, 30 cases (94%) had responsibility scores below 13 indicating that the fatality may have been due to driver performance.

### **DRUGS and ALCOHOL**

Only one driver had alcohol in his blood, and the level in that case was 0.115% (the legal limit in Victoria is 0.05%). Toxicological investigations were carried out in 30 cases. Of these, no drugs were detected in 19 drivers (63%). The remainder revealed a range of therapeutic drugs including benzodiazepines, tricyclic anti-depressants and drugs used for the treatment of cardiovascular diseases.

Only 9 files contained details of medications being taken by the deceased, including 2 cases where there was a definite statement that no medication was being taken, and one where the medication was unspecified. No drivers were stated to have been taking psychoactive drugs commonly acknowledged to affect driving ability, although evidence of benzodiazepines, antihistamines, phenothiazines and antidepressants were found in eight subjects (19%). One female had evidence of an anticonvulsant on toxicology but no mention of epilepsy in the medical history. Of the seven drivers known to be taking medication, four (57%) were taking the anti-coagulant warfarin together with a variety of other drugs used to treat cardiovascular disease including aspirin, vasodilators and diuretics. In three of these cases it was not possible to exclude acute driver illness as being a causative factor in the crash. In only one of these drivers was toxicology positive for any therapeutic drugs, none of which were mentioned in the known drug list for that person and all of which were capable of causing sedation.

### **DISCUSSION**

Comprehensive interpretation of these findings is difficult in the light of deficiencies in the available information. The very small number of deaths in drivers known to VicRoads medical review department may be a reflection of an efficient process in removing unfit drivers from the road. An alternative and more likely interpretation is that only a minority of

unfit older drivers are known to VicRoads and that many of the drivers who died may have been suffering from conditions that would have led to their licence being cancelled or suspended had they been known to the system. This problem may not be peculiar to older drivers as there is a very small proportion of the general driving population known to the VicRoads medical review department. Further research is needed to determine whether there are significant numbers of impaired drivers unknown to the system. It is very unlikely that the low proportion of drivers (1.25%) known to the medical review process is a realistic representation of the number of medically unfit drivers.

The large proportion of “responsible” drivers found in the study would suggest that there is a high likelihood of conditions being present in these drivers that may have reduced their fitness to drive. Almost 20% of the dead drivers were found to have drugs potentially capable of affecting driving skills in their bodies. Of particular concern is the relatively high incidence of cases where psychoactive drugs were found, despite not being listed by the treating doctor. There are a number of possible reasons for this including attendances at multiple doctors each of whom may not have knowledge of the others, trying out other people’s tablets or the use of sedating “over-the-counter” medications.

The drug Warfarin was disproportionately represented in the list of drugs being taken by the drivers in this study, being quoted in the list of medications in 4 out of 7 cases where the list was available. In 3 of these 4 cases there was a possibility that acute driver incapacity was responsible for the crash. Although the number of these cases found in this study was insignificant for statistical purposes, a further study following-up of drivers taking anti-coagulants would be worthwhile.

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