

Older Driver Risks and Countermeasures: Source Book

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For
The Federal Office of Road Safety

CR 163

September 1995

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ISBN 0 644 46019 9

ISSN 0810-770X

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**DEPARTMENT OF TRANSPORT
FEDERAL OFFICE OF ROAD SAFETY
DOCUMENT RETRIEVAL INFORMATION**

Report No.	Date	Pages	ISBN	ISSN
CR. 163	February 1995	171	642 51373 2	0810-770x

Title and subtitle

OLDER DRIVERS RISKS AND COUNTERMEASURES: SOURCE BOOK

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Performing Organisations

ELLIOTT & SHANAHAN RESEARCH

Available from

Federal Office of Road Safety
GPO Box 594
CANBERRA ACT 2601

Price

No Charge

Project Officer.

MJ Smythe

Abstract

This report describes the results of a research project undertaken to investigate older driver risks and countermeasures. The literature on crash involvement of older drivers has been reviewed, crash statistics from the Federal Office of Road Safety database and elsewhere have been analysed, and qualitative research has been carried out with older drivers themselves as well as other relevant stakeholders. The report discusses the physical changes relating to aging and how this affects driving skills, including the type of crashes that old people are involved in. A number of countermeasures that may help reduce older driver crashes are canvassed, as well as communication strategies appropriate to this group.

Keywords

Older driver, crashes, injuries, mobility, licence testing, countermeasures

Notes

- (1) FORS research reports are disseminated in the interests of information exchange
- (2) The views expressed are those of the authors and do not necessarily represent those of the Commonwealth Government.

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Executive Summary

Various research techniques were used in the older driver study, including:

- reviewing overseas and Australian literature on older drivers and their crash involvement;
- detailed analysis of the Federal Office of Road Safety's (FORS) crash statistics as well as statistics from other data bases;
- development of scenarios based on an analysis of the FORS Fatal File case studies;
- qualitative methods to understand the situation from the older drivers' perspective, ascertaining barriers to communication and reaction to countermeasures; and
- interviewing stakeholders and experts in the field about their insights and experiences of older drivers.

The report is divided into three major sections:

- A: A situation analysis
- B A discussion of older driver perceptions on driving
- C: Suggestions for possible future activities

A. A Situation Analysis

Developed countries around the world are experiencing increased growth in the proportion of older people in their populations. Associated with the ageing of the population is an increase in the number of older drivers which means the mobility needs of older people will become even more important in the future

Older drivers are not a problem in terms of the actual number of crashes in which they are involved, since they do not drive far enough to record high accident levels. The Federal Office of Road Safety's Serious Injury database for 1990-92 reveals that drivers of cars and light commercial vehicles over 65 years account for only ten percent of serious injuries.

By examining the incidence of fatalities and serious injuries according to population size and gender, it becomes clear that males have a higher level of risk across all age categories. The U-shape trend which occurs shows that older male drivers (65 plus) report risk levels approaching those of younger male drivers (15-24 years). Female drivers in contrast show little deviation in risk according to age

Older drivers are however, a major problem in terms of their risk of crashing while driving. When the distance travelled by certain age groups is taken into account (that is, exposure data) the older driver's fatality rate escalates to levels equivalent to, and for females higher than, the levels of the 15-24 age group. The older driver's accident risk also tends to increase with increasing age.

The high fatality rate amongst older drivers is thought to relate to their increased frailty and consequently a greater risk of crash injuries resulting in fatalities.

Older drivers are also more at risk of being responsible for causing a crash (Torpey and Francis 1992). Using FORS Fatality File data it can be shown that the odds are more than five to one (5.7 to 1) that an older driver (aged 80-84 years) involved in a fatal crash will be responsible for that crash. This figure is high compared to drivers aged 45-49 years (0.75 to 1) and teenage drivers (2.2 to 1).

Older drivers tend to be involved in crashes with the following characteristics:

- multi-vehicle crashes;
- crashes occurring during the daylight hours of weekdays;
- occurring at intersections and other complex traffic situations like roundabouts;
- while travelling at lower speeds; and

- involving failure to give way, improper turns, disregarding traffic signals or angle collisions.

In contrast to younger drivers, older drivers are underrepresented in crashes involving:

- loss of control, for example, high speed, skidding, rollover crashes;
- alcohol use; and
- night time driving.

Factors thought to contribute to the accident involvement of older drivers relate to the physical changes associated with ageing. These physiological changes can affect vision, hearing, physical mobility and cognitive processes. Thus older drivers perform worse than other drivers on manoeuvres, vehicle handling and observing due in part to a reduction in flexibility (mobility of neck and trunk). As people age, their ability to process information declines in terms of capacity and speed. Older drivers are therefore more at risk in novel situations. The literature on older drivers also cites certain conditions, such as diabetes mellitus or depression and medication use as impacting on driving abilities. Our review found no comparisons with teenage drivers in this regard.

The environmental conditions influencing older driver crash involvement include weather conditions and the time of day in which a journey is undertaken. Older drivers tend to avoid inclement conditions and driving during peak times.

Over time, not only is the incidence of holding a licence increasing amongst the older ages, more importantly their vehicle usage rates (kilometres driven) are also increasing substantially. If the amount of travel undertaken is a reflection of driving skill (i.e. more experience better able to avoid crashes) this may help in the years ahead to compensate for the physiological decrements associated with the ageing process.

B. Target Group Perceptions

Elliott & Shanahan Research conducted group discussions and indepth interviews with older drivers to discover their views and attitudes towards driving. The key findings include:

- the car is important to older drivers for mobility and independence and is used mostly everyday;
- Being able to drive has come to be seen as a right by older drivers, rather than a privilege;
- Older drivers are reluctant to admit that ageing may affect their driving skills. This is clearly a sensitive issue with some;
- Although unwilling to admit changes in driving ability, older drivers do modify their behaviour by:
 - ⇒ leaving longer gaps between themselves and the car in front of them,
 - ⇒ driving more slowly and cautiously;
 - ⇒ planning the route for a trip into unfamiliar territory;
 - ⇒ taking extra time and more breaks on longer trips;
 - ⇒ avoiding driving at night, during peak hour and bad weather conditions when visibility is poor;
- Any driving problems experienced are attributed to other drivers or changes in the road environment (for example, roundabouts, road rule changes, multi-lane highways);
- Older drivers do not consider themselves to be “at risk” road users. They believe their careful attitude and experience compensate for any physical limitations that may occur;
- Deciding when to relinquish ones licence is seen as a personal decision. Factors impacting on this decision, include:
 - ⇒ poor health;
 - ⇒ lack of confidence in driving ability; and
 - ⇒ based on the advice of a trusted friend or family member.

C. A Variety of Possible Future Activities

Countermeasures

Response to a number of countermeasures by older drivers and stakeholders was sought during the study and following is a brief overview of the findings.

The overall response by older drivers to the countermeasures suggests that barriers exist which will need to be overcome in order for initiatives to be adopted by this group.

Education and Training

- The role of older driver education and training is to further encourage self regulation.
- A range of educative techniques are suggested in the literature, including, specialised programs, leaflets and booklets.
- Specialist older driver programs should provide participants with information on road rules and discuss the possible impact of age on physical and mental abilities which could affect driving skills.
- Opinions differ regarding the age at which older driver education should begin. Some programs target drivers from 50 years of age (e.g: SafeDrive) while others target 75 year old drivers (e.g: Older Driver Handbook).

Licence Testing Procedures

- These fall into three categories.
 - ⇒ practical driving tests;
 - ⇒ knowledge test of road rules; and
 - ⇒ assessment by health professionals.

- Views differ in the literature concerning the appropriateness of these three assessment methods.
- There appears to be little support for knowledge tests among the target group. Older drivers believe their driving experience is more important than the results of a knowledge test.
- Participants perceived that medical examination is an appropriate method of assessing driver suitability. Some stakeholders questioned the ability of the medical test to highlight functional or cognitive impairment.
- There was a mixed reaction to conditional or restricted licences. The fact that drivers could maintain some mobility and independence (under certain conditions) was viewed positively, although such a system was believed difficult to police.

Changes to the Road and Vehicle Design

- A number of changes to vehicle design were also suggested in the literature. Vehicle design changes that may improve older driver safety include changes to.
 - ⇒ seat belts;
 - ⇒ mirrors;
 - ⇒ dash boards; and
 - ⇒ seats.
- Better road signage, lighting and traffic signals are also recommended in the literature to enhance the road environment.
- Participants questioned the economic feasibility of implementing such initiatives.

Communication

Regardless of whatever countermeasure is chosen to target older drivers, effective communication is integral to the success of any strategy or campaign.

The following insights were gleaned from our older driver study and are offered as guidelines for countermeasure development.

- Any initiative should be:
 - ⇒ carefully planned;
 - ⇒ influenced by an understanding of the older drivers' environment (what they want, their knowledge, attitudes and beliefs),
 - ⇒ relevant to the target group;
 - ⇒ appropriate and acceptable in content for older drivers;
 - ⇒ designed to encourage participation and acceptance of the message(s);
 - ⇒ presented in a meaningful way for the older driver audience, and
 - ⇒ able to be monitored and evaluated.

A. Older Drivers and Road Safety: A situation Analysis

1.0 Introduction

1.1 Background

Research on older drivers was undertaken to:

- describe the target population;
- quantify the problem/s encountered by this group;
- identify and as far as is possible, assess existing and potential countermeasures and education strategies.

The primary objective of the study was to provide background information to aid in the planning of a education campaign targeting older drivers.

The project objectives were extended in order to gain a more comprehensive understanding of the target group. The re-defined objectives of the study were to:

- (i) gain a better knowledge of the key elements involved in the increasing incidence of older drivers in road crashes now and in the future; eg:
 - what age does the problem become most apparent?
 - how should we define the older driver?
 - what problems are manifested?
 - what situations are associated with increased risk?
- (ii) provide quantification from Australia and overseas as to problems encountered by this group (and key sub-groups identified in (i) above).

- (iii) move from the knowledge gained in (i) and (ii) to an understanding of what needs to be done, what can be done, what barriers exist on the way and clues to overcoming any barriers.
- (iv) identify and understand how older drivers modify their driving behaviours to cope with the increased risk and what triggers the onset of any coping mechanisms.
- (v) recommend a range of strategies (countermeasures) designed, over time, to reduce the incidence of older drivers in road crashes.
- (vi) provide a sound set of guidelines for "public education" strategies including whether to target older drivers directly or to target them earlier in their driving history, and/or indirectly via facilitating agents such as medical practitioners (optometrists, eye surgeons, other specialists etc), or even immediate family members.
- (vii) recommend specific "public education" activities aimed at the chosen targets (either directly or indirectly) including tonal aspects, key messages, key devices for capturing attention and media (not necessarily main media).

The research was conducted in six stages:

Stage I: Reviewing existing literature about older drivers and their crash involvement.

Stage II: Understanding the situation from the older drivers perspective, ascertaining barriers to communication and reaction to countermeasures.

Stage III: Understanding older drivers by talking to stakeholders and experts in the field.

Stage IV: Developing scenarios based on analysis of Federal Office of Road Safety (FORS) Fatal File case studies.

Stage V: Detailed analysis of the FORS crash statistics.

Stage VI: Development of a range of strategies as a result of Stages I-V.

2.0 Existing Knowledge: A Literature Review

- 2.1 Nature of the Problem
- 2.2 Crashes Involving Older Drivers
- 2.3 Factors Contributing to Older Driver Crash Rates

The following chapter attempts to review the available literature on older drivers. Although some Australian studies are reviewed, later sections of this report will focus exclusively on older drivers in Australia.

Analysis of the literature is useful in providing an understanding of the older driver and identifying salient issues in the topic area. It enables the recognition of limitations to existing knowledge and identification of priority areas for future research. An awareness of these factors is important in identifying effective countermeasures and strategies for older drivers in the decades ahead.

The chapter begins by discussing the difficulties involved in defining "older drivers" as a group. The ageing of the population is viewed as significant in increasing the number of "older drivers" which has implications for how the situation is handled in the future. The next section outlines the characteristics of crashes in which older drivers are involved, followed by a discussion of the factors believed to influence their accident involvement.

2.1 Nature of the Problem

2.1.1 Introduction

Mobility is important to people of all ages, but for older people, a driver's licence may hold special significance. Waller (1991, p 499) describes the importance of a licence to the older driver as a *"symbol of the freedom to come and go as one pleases, of independence and of self-sufficiency"*.

Driving a car is central to many older people's way of life. It is not only important for essential tasks such as shopping and accessing health services, but for maintaining social links with family and friends. Older people also have a preference for driving themselves as opposed to being driven by others or using alternative methods of transport such as public transport or walking (Boyle 1990).

Older drivers are however, overrepresented in particular types of crashes. This problem is likely to become even more significant in the future as the world population ages and the number of older drivers on the road increases. The challenge is how to ensure older people meet their own transport needs safely, as well as guaranteeing the safety of the travelling public.

But who are these "older" drivers?

2.12 "Older" Drivers Defined in Many Ways

Ageing is a complex function of social, psychological and biological changes (Hakamies-Blomqvist 1993). There are a number of ways in which "older" people are defined in the literature

In some studies older drivers are defined in terms of chronological age. Sixty five (65) years is often taken as the age at which people are considered old, since 65 has traditionally represented the age of retirement. McKelvey and Stamatiadis (1989) also point out that around 60 years is when accident overinvolvement begins to occur.

Waller (1991), recognising that age-related deficits can occur at an earlier age which could impact on driving, classified older drivers as: the young-old (55-64 years), the middle-old (65-74 years), the old-old (75-84 years) and the very-old (85 plus) (Waller 1991). Other studies divide older people into three categories: the young-old (60-69 years), the middle-old (70-74 years) and the old-old (greater than 75 years) (Stamatiadis, Taylor and McKelvey 1990). Although such classification may be useful when conducting research, it is important to remember that older people are not an homogenous group and individual differences are likely to occur within groups.

Although the probability of deteriorating performance increases with age, chronological age may not be the best indicator of a person's ability to drive. Functional age, which is a measure of the level at which an individual appears to be acting at, may be a better indicator of driving. Functional age is normally measured in terms of a person's ability to undertake daily living skills (such as personal care, cleaning, washing etc.) and includes an assessment of motor function, cognitive functioning and mental state. In terms of older drivers, the testing of motor, cognitive and mental functions becomes especially important (in addition to vision and reflex testing)). It would seem impractical however, to use functional age as a measure in large scale research projects or as a way of categorising drivers in the driving population because of the extensive testing needed and the expense incurred.

2.13 The Growth of The Older Population

Developed countries around the world are experiencing increased growth in the proportion of older people in their populations. This growth is a result of declining fertility rates, improvements in mortality rates and the ageing of the post war baby boomers (Population Issues Committee 1991).

In the European Community for example, there are currently more than 60 million people aged 60 years and over, representing just under twenty percent of the population. By the year 2020, the 50 plus segment of the population will comprise more than one quarter of the European Community's population (Walker, Alber and Guillemard 1983)

In 1991, the 65 plus age group in the United States represented 12% of the population and by the year 2030, this section is expected to increase to 21% (Stutts and Martel 1992).

In 1991, Australia had a population of 17.3 million of which 1.9 million (9%) were aged 65 plus. By 2001, it is projected that this segment will grow by 22% to reach 2.4 million which means older people will account for 12% of the Australian population (Ageing in Australia 1982-1992, Office for the Aged Commonwealth Department of Health, Housing and Community Services 1992).

Associated with the increasing population is an increase in the number of older drivers. Stamatiadis et al (1990) highlight the increase in older drivers using an American example. In 1965, American drivers aged 65 plus accounted for 7.6% of the driving population. By 1985, this figure had grown to 11.9%.

Another characteristic of an ageing population is that females tend to live longer than males. In Australia for example, life expectancy for men is 74.99 years, while for women it is 80.86 years (ABS Catalogue number 3101.0, 1993). Thus, there will ultimately be more older female drivers on the road which may be an important consideration in policy development.

One direct consequence of the ageing population is that the mobility needs of older people will become increasingly important. At present, older drivers are overrepresented in certain types of road crashes, and with increasing numbers it becomes even more important to address their driving issues.

2.2 Crashes Involving Older Drivers

2.21 Methodological Problems

2.211 Problems in Reporting Accidents

One of the problems in conducting any analysis using accident data, is the variety of methods used by different institutions to collect and report on accidents (Elliott 1985).

Some studies report accident statistics per 100,000 or per 10,000 of the population. While population estimates have well established reliability and are regularly updated, this method does not account for the fact that *"different population groups have different rates of exposure to risk"* (Transportation in an Ageing Society Volume 1 1988, p38)

Miles or kilometres driven by each age group provides a better basis for comparing actual exposure to risk and some studies utilise this method. Even this type of analysis however, does not provide a perfect measure of exposure as not all miles driven are of equal risk, for example, miles travelled during the day are much safer than miles travelled at night (Transportation in an Ageing Society Volume 1 1988, p39).

Difficulties also arise when comparing data across countries. It is important to ensure for example, that similar measures have been used in order for valid comparisons to be made.

Some countries also differ in their definition of a "fatal accident" which makes comparisons difficult. According to the OECD report "Traffic Safety of Elderly Road Users" (1985), most countries including Australia apply the "died within 30 days of the accident" as the definition of a fatal accident. The report notes however, that not all OECD countries have adopted this definition and use a limit of less than 30 days, for example:

Austria	3 days
France	6 days
Greece	3 days
Italy	7 days
Spain	24 hours
Japan	24 hours

Just as differing definitions of "fatal accident" make comparisons difficult, so too do classifications of "injuries" sustained in road crashes. It is really the consequences of injuries sustained by older drivers which are not reflected in the statistics. For example, a younger driver and an older driver (65-75 years) are injured in a car crash and are recorded in the statistics as being injured. The older driver is more likely however, to experience long term problems resulting from the crash (due to increased physical vulnerability) than the younger person. This fact is not reflected in the injury crash statistics (OECD, 1985).

Accident Underreporting

Some studies use accident records to examine the relationship between driver age and accidents. The type of records used might include those kept by Police Departments or insurance companies. Ball and Owsley (1991) however comment on omissions or errors which may arise in how accident data is collected. Examples of accidents which might not appear in the statistics include: an accident not reported to the Police or not considered severe enough by the Police to be reported, or a hit and run accident.

According to a study in the United Kingdom nearly 30% of all road accident casualties admitted for treatment at hospitals were not reported by the Police (Hobbs et al 1979). The underreporting was found to vary depending on injury severity and road user type (ie whether the accident victim was a driver, pedestrian or cyclist).

In a Swedish study, it was reported that 65% of road accident casualties were not counted in police statistics. The Swedish research estimated that the deficit in official road accident statistics was:

- 6% in the case of fatally injured people;
- 52% in the case of seriously injured people; and
- 62% in the case of slightly injured people. (Traffic safety - problems and countermeasures 1980).

Another method used to collect accident data is to conduct studies using older driver volunteers who either verbally or through written questionnaires report their accident behaviour. Waller (1991, p 504) comments that *"it is likely that those older persons volunteering for a driving study are fairly confident of their driving ability and therefore probably not representative of older drivers in general"*.

Lerner (1991) also discusses the artificial effects of the experimental environment on participant behaviour. Better than average results were believed to reflect the older driver's desire to do well in the experimental situation rather than above average driving skill.

The design of older driver studies was also criticised as "unreal" because of the absence of complicating factors such as distractions, complex traffic patterns and fatigue, which were believed to affect the driving ability of older drivers under non-experimental conditions (Lerner 1991).

It may also be the case that underreporting occurs because older people are reticent to report accidents (Ball and Owsley 1991).

Assigning Responsibility for Accidents

Monforton, Pumala, Yanik and Richiter (1988) suggest that the practice of using police to assign blame in an accident could result in discrimination against the older driver. In their study which analysed the accident experience of 3,301 AAA insured drivers in Michigan in 1985/1986, accident data was taken from the AAA Michigan claim files. The only claim files used in the study were those supported by police reports which verified both the accuracy as well as the determination of blame. Monforton et al (1988) found there was some disagreement with Police regarding accident responsibility, for example, 5.1% of those under 55 disagreed with the police report, 5.4% of the 55 to 64 years group disagreed, while 5.7% of the 65 to 70 year olds disagreed with the police report. The over 70 year old group disagreed with the police 9.7% of the time. In half these cases, eye witnesses did however, verify the blame assigned by the Police.

Hakamies - Blomqvist (1993) also agrees that older people may be cited more often as causing a road accident. Reasons given include:

- older drivers may have fewer possibilities of defending their viewpoint before authorities; and
- authorities may be biased against the very young or the very old.

2.212 Problems in Calculating Risk

According to Elliott (1985, p45) *"the primary purpose of exposure data is to compute an estimate of risk for target groups and target situations"* It may be difficult however, to obtain exposure data.

Some studies use the number of licensed drivers as a basis for roughly estimating exposure McKelvey, Maleck, Stamatiadis and Hardy (1988) point out that if driver safety is measured by the number of accidents per licensed driver then it would appear that older drivers have a good safety record. Distortion of the data may occur using this method however because while some older people may hold a licence they may never drive. In addition, those who do drive, do not drive as often or as far as other drivers.

McKelvey et al (1988) believe a more accurate method in accident analysis is to calculate the number of accidents per mile driven. By using this method, McKelvey et al (1988) describe **how older drivers have a below average safety record.**

Maleck and Hummer (1986) show that when crash risk per mile driven is considered, then **older drivers may constitute the most hazardous group of drivers in the population.**

Concept of Induced Exposure to Accidents

An alternative method of determining accident exposure is to use the induced exposure method. Stutts and Martel (1992, p218) explain this method in the following way.

"The induced exposure concept assumes that the not-at-fault driver in a two vehicle crash is reflective of what is "on the road" at that point in time, and that the sample of all not-at-fault drivers can be used to predict the characteristics of all non-accident involved drivers on the roadway."

2.22 Accident Risk of Older Drivers

The accident risk of older drivers has three specific characteristics:

- (i) older drivers have a higher accident rate when measured as a function of exposure (Evans 1987; Mortimer and Fell 1989, Cerrelli 1989);

- (ii) accidents involving older people have more severe consequences and are more often fatal (Evans 1988; McKelvey and Stamatiadis 1989, Cerrelli 1989), and
- (iii) older people are more often judged as legally responsible for causing an accident (Verhaegen, Toebat and Dalbeke 1988; Cooper 1990).

2.221 Older Drivers: A High Risk Group

According to Torpey and Francis (1992) older drivers are not a problem in terms of the actual number of accidents in which they are involved, since they do not drive far enough to have high accident levels. They are however, a major problem in terms of their risk of crashing whilst driving, and are also at risk of being responsible for an accident.

The Relative Accident Involvement Ratio (RAIR) is a measure of the relative frequency of accident causation for various age groups of drivers. If the RAIR is less than 1, the driver is less likely to be responsible for the accident than their exposure (that is, underinvolvement), while a RAIR greater than 1 indicates overinvolvement.

Previous studies (Torpey 1986; Moore, Sedgley and Sabey 1982; Koltzow 1985) have shown that the distribution of the RAIR with respect to driver's age, follows a "U" shaped distribution. Thus, young drivers (aged less than 25 years) and older drivers (over 60 years) have a RAIR of greater than 1 which indicates an accident overinvolvement.

In addition to overinvolvement, studies have also shown that the rate of accident risk accelerates with increasing age (Cerrelli 1989; Maleck and Hummer 1986, McKelvey and Stamatiadis 1989).

In a study across five states in America, Cerrelli (1989) concluded that the rate of accident involvement on a mileage exposure basis increases after the age of 70, and then rapidly increases after the age of 80. Stamatiadis, Taylor and McKelvey (1991) conducted a study involving older drivers and intersection accidents and in agreement with Cerrelli (1989), found that middle-old (70-74 years) and old-old (75 years) people are overinvolved in accidents.

2.222 Older Drivers: Injuries and Fatalities

In a study reported by the OECD (1985), the risk of being in a fatal accident was compared for a control group of 25-64 year olds and a group of over 65 year olds in a number of OECD countries. The results showed that over the same driving distance, the older driver (65 plus) is 2 to 5 times more likely to be involved in a fatal accident than the younger driver (25-64 age group).

Cerrelli (1989) also reported that the older driver has a much higher probability of being fatally injured when involved in a crash. In Cerrelli's study, over 25% of the older drivers (80-89 years) involved in the most severe accidents did not survive, compared to less than 10% of the younger group (16-24 years).

Sjögren, Bjoernstig, Eriksson, Sonntag-Oestroem and Oestroem (1992) also found in a study analysing fatal accidents in Northern Sweden that the fatal injury rate in those over 60 years was almost twice as high as drivers aged under 60 years of age

Although older drivers are increasingly more likely to be killed in an accident than younger drivers, Evans (1991) suggests this may result from their increased risk of death when an accident occurs.

Cerrelli (1989) for example, attributed the older driver's increased risk of fatality in a road accident to the physiological effects of ageing. Thus, an 80 year old may sustain fatal injuries in a crash which would not seriously injure a younger person. It is therefore the older person's physical vulnerability which makes them more likely to be killed in a car accident.

Viano, Culver, Evans, Frick and Scott (1989) further highlights this point by concluding that human tolerance to impact forces decreases with age over 40 years. In research conducted in 1989, Viano et al comment that the general health of older accident victims must also be considered in accident analysis. Poor health prior to an accident for example, may be the principal factor in the older driver's death rather than injuries sustained in the accident (Viano et al 1989)

In terms of injuries sustained in crashes, the OECD study conducted across a number of OECD countries found that the older driver is 1 to 2 times as likely to be involved in an accident resulting in injury (OECD 1985).

Cushman, Good, Annechivico and States (1990) conducted a study which looked at the effect of safety belt use on the injury patterns of hospitalised and injured drivers over 55 years. The results showed that the overall percentage of mortality for drivers over 55 was higher than that of drivers aged under 55 years. The study also found that drivers over 55 tended to sustain certain types of injuries more frequently than young drivers, for example chest injuries, especially those involving the ribs or sternum.

2.223 Accident Responsibility

Studies have been conducted which analyse driver responsibility in crashes. As mentioned earlier in section 2.211, "responsibility" is often determined by the use of autopsy (eg. in the case of a heart attack), Police or insurance company reports. It is important to note that the assignment of blame may not always be correct.

Studies have shown that older drivers tend to be responsible for accidents more often than younger drivers. Cooper (1989) for example, conducted a study in British Columbia with two groups of drivers (55 plus and 36-50 years) involved in accidents during 1986. The study found that while 51.8% of the 36-50 year old drivers were probably at least 50% responsible for the accident in which they were involved, 68.2% of the 65-74 year olds and 80.1% of those aged 75 plus were found to be responsible.

The study also assigned a relative responsibility index to the results. This index or ratio is represented by the percent of "responsible" drivers in each age group divided by the percent of all "not responsible" drivers in each age group. Age group ratios less than or equal to 1 mean drivers in that age group are less likely to be responsible for an accident, while a ratio greater than 1 suggests a pre-disposition towards responsibility.

Cooper (1989) found that young drivers aged less than 25 years had a ratio of over 1 in contrast to all other age groups up to age 65 which were less than 1. Beyond 65 years, older drivers like younger drivers had a ratio greater than 1 which suggests they were responsible for the accident. Cooper (1989) described this phenomenon as an "*exponential-looking increase in accident responsibility from age 65 up.*" These results are similar to those presented by McKelvey et al (1988) and Verhaegan et al (1988).

Yanik (1991) conducted a study using AAA Michigan auto insurance claim files to assign accident responsibility. The study showed that the percent of accidents in which AAA Michigan drivers were at fault, increased with age. For example, drivers aged 55-64 years were found responsible for 33% of the accidents, 65-70 year olds were responsible for 42.5% of accidents and drivers over 71 years were responsible for over half the crashes in which they were involved.

2.224 Older Drivers: A Caveat

Although the previous sections have outlined the risks of older drivers, it is important to view this risk in relation to other risk factors experienced by older people (Evans 1991).

According to Evans (1991, p39) *"although risks in traffic increase with age, they do so much less rapidly than does the risk of death from all other causes combined"*. Thus, if an 18 year old dies, the probability that it is due to a traffic accident is almost 50%. By age 65, the probability that death is due to a traffic accident is significantly reduced, less than 1%. By 75 years of age, the probability drops to below half a percent (Evans 1991).

This should not however inhibit attempts to reduce the number of older people involved in fatal accidents. With the ageing of the population and increasing incidence of older licensed drivers, older drivers are expected to contribute significantly to the future road toll. It is therefore necessary to understand both the nature of accidents in which older drivers are involved and possible methods of reducing their accident involvement.

2.23 Accident Characteristics of Older Drivers

Older drivers tend to be overrepresented in multi-vehicle accidents which occur during the daylight hours of weekdays, at intersections and at lower speeds

2.231 Type of Accidents

Many studies highlight the incidence of older drivers in **multi-vehicle crashes** (Baker, O'Neill, Ginsberg and Li 1992; Cerrelli 1989; McKelvey et al 1989, Sjögren et al 1992). McKelvey et al (1989) for example, in a study looking at highway accident patterns in Michigan found that when older drivers are involved in accidents, there is an 83.1% chance it is a multi-vehicle accident. This figure is in contrast to all drivers who have a 25.4% chance of involvement in a multi-vehicle accident.

Older drivers are believed to experience high involvement in these types of accidents because of differences in their ability to judge the velocity and distance of approaching vehicles. McKelvey et al (1988) also examined the relative accident involvement of both male and female drivers for all multi-vehicle accidents in Michigan during the 1983 to 1985 calendar years. They found that men were involved in about 2.5 to 3 times as many multi-vehicle accidents as women. **Beyond 50 years of age, the relative accident involvement of female drivers was found to be considerably higher than for male drivers** for multi-vehicle accidents in Michigan between 1983 and 1985.

Older drivers are also typically involved in accidents in which they **fail to yield the right of way, make improper turns and disregard traffic signals** (Allgier 1965, Huston and Janke 1986, Harrington and McBride 1970, in Kanouse 1988).

Romanowicz and Gebers (1990, p22) found that *"failure to yield the right of way increases in importance as a primary collision factor as driver age increases"*. They found right of way violations to be the primary collision factor in fatal accidents of female drivers aged 60 and above and male drivers over 70 years.

Stamatiadis et al (1990) also reported that one of the predominant violations in which older drivers are involved was failing to yield the right of way. Like Verhaegen, Toebat and Delbeke (1988), Stamatiadis et al (1990) discussed how this violation was related to the older driver's problems of perception and decision making.

Older drivers were also found to be involved in crashes involving **improper turns**. Cooper (1990a) for example, found that older drivers have difficulties making left turns at intersections. This was the case regardless of whether intersections were controlled by a stop or give way sign or were uncontrolled intersections.

Cooper (1990) analysed over 5,000 accidents involving older drivers (aged over 55 years) which occurred in British Columbia during 1986. Results showed that drivers aged 36-50 years only had 10.9% of their crashes while turning left at uncontrolled or sign-controlled intersections. In contrast, those aged 55-64 years had 13% at these intersections, those aged 65-74 years had 15.4% and those over 75 years had 19.5% of their crashes while turning left at an uncontrolled or controlled intersection. Cooper (1990a, p106) concluded that *"the importance of turning as a prelude to the accident regardless of location increased significantly with age"*.

Linked with making improper turns, is the older drivers' high incidence of **angle collisions**, including side impact collisions. Hakamies-Blomqvist (1993) in a Finnish study, found that older drivers (aged 65 plus) collided most often (54.9%) with a vehicle in a crossing direction. For 26-40 year olds in the study, crossing accidents only represented 16.6% of accidents

Mortimer & Fell (1989) reported that older drivers were overrepresented in **angle collisions**, in a study which looked at older drivers' fatal crash involvement **at night**. The older driver was for example, struck in the side while pulling out of an intersection. The researchers believed the incidence of angle collisions at night may be due to the older drivers' inability to judge other cars' speed or to perceive the presence of vehicles on their left or right.

Monforton et al (1988) used accident information from insurance claim files in Michigan to look at involvement of older drivers in certain types of accidents. With respect to **changing lane collisions**, they found that men from age 55 onwards were increasingly responsible for these types of accidents. Women on the other hand, were not overly represented in changing lane collisions until they reached their 70's.

Other studies also highlight the difficulties experienced by older drivers in the following driving situations: merging, leaving from a parked position (Waller 1991) backing (Brainin 1980) and complex traffic situations (Ranney and Pulling 1989).

2.232 Type of Crashes in which Older Drivers are Not Involved

In contrast to younger drivers, older drivers are underrepresented in crashes involving:

- loss of control (eg: high speed, skidding, rollover);
- use of alcohol; and
- night time driving (Viano et al 1989; Evans 1991; Yanik 1991; Romanowicz 1990; and Moore et al 1982)

According to Moore et al (1982, p20) older drivers *"have a more mature and restrained approach to driving"*.

2.24 Location of Accident

Older drivers are reported in the literature as experiencing a high proportion of accidents at **intersections**. Faulkner (1975) conducted a study which looked at age characteristics of drivers involved in intersection accidents. Results revealed when comparing accident involvement with estimated car travel, that drivers aged 65 years and older (when approaching intersections from minor roads) had 5 times the number of accidents per vehicle kilometres. For drivers aged 55-64 years the accident rate was twice the average for all ages.

Moore, et al (1982) examined the age distribution of drivers in various types of accidents and concluded in agreement with Faulkner (1975) that older drivers are more liable to junction or intersection accidents. The study found that drivers over 65 years had a higher than average accident involvement rate at intersections for turning manoeuvres in urban areas (1.28 times the average for all aged drivers). They also found that the incidence of junction collisions for older drivers increased in rural intersections (1.5 times the average) as did the rate for turning manoeuvres in rural intersections (2.59 times the average).

Moore et al (1982, p 21) explain why they believe older drivers have problems at intersections:

"A reason may be that in many driving situations the rate at which information is received and processed is under the driver's control. He can adjust the information rate by altering speed to match his ability. But on reaching a major road at a junction, particularly at a rural junction without signals, he has to accept the speed of traffic on the major road and the rapidity with which the whole situation changes. Nothing the older driver can do can modify it and he has to do his best to cross or merge with the traffic; but his best may not be good enough".

Despite evidence which suggests older drivers experience problems at intersections, an American study found that older drivers have confidence in their ability to safely cope at intersections. The 1988 study, conducted by the AAA Foundation for Road Safety Research (in Morris 1992) discovered that older drivers did not consider intersections a problem as demonstrated by the following:

- busy intersections were only avoided by 12 percent;

- only 7 percent felt their decision making time had slowed in situations such as deciding when to turn out of an intersection, and
- 90 percent rated themselves as "good" or "excellent" on reaction time at intersections.

Studies have also been conducted to investigate how traffic signals impact on older drivers at intersections. McKelvey et al (1988) calculated involvement ratios for different types of traffic control devices involved in accidents that occurred on highway intersections in Michigan. Results showed that the highest accident involvement occurred at intersections with flashing lights (especially for drivers aged 75 and over) followed by unsignalised intersections, and intersections with signals operating on cycles.

Garber and Srinivasan (1991a) studied accident data for drivers (aged 50 plus) involved in intersection and non-intersection accidents in Virginia between 1986 and 1988. They found that older drivers are more likely to commit a traffic violation at intersections controlled by stop signs than any other type of traffic control.

Stamatiadis et al (1990) conducted a study which focused exclusively on accidents involving older drivers and intersection control devices. In contrast to the findings of McKelvey et al (1988), Stamatiadis et al (1990) found no difference between accident patterns at signalised and non signalised intersections. They concluded that the presence or absence of the signal had no effect on accident and violation patterns. They did find however, that older people experience difficulties at intersections with multi phase signals. In a 1991 study, Stamatiadis et al again found that older drivers caused a similar percentage of accidents at signalised and non-signalised intersections (Stamatiadis et al 1991a).

In terms of accident patterns in urban and rural areas, Cerrelli (1989) found there is a greater proportion of urban crashes across all ages. This proportion increases as the age of the driver increases. Cerrelli (1989) notes however that such a trend may only indicate that older people are more likely to live in cities or towns rather than in country areas.

2.25 Summary

Older drivers tend to:

- have a high risk of crashing while driving;
- be responsible for an accident occurring;
- have an increased accident risk with increasing age; and
- be involved in accidents resulting in injury or death due to increased physical vulnerability

The characteristics of older driver crashes include:

- multi-vehicle crashes;
- during daylight hours of weekdays;
- occurring at intersections;
- while travelling at lower speeds;
- may involve failure to give way, improper turns, disregarding traffic signals or angle collisions.

2.3 Factors Contributing to Older Driver Crash Rates

2.31 Physiological Effects

It is widely accepted that there is a certain degree of physiological deterioration as a person ages. The ageing process results in deterioration in vision, hearing, physical mobility, and cognitive processes. Older drivers can therefore be affected by a decrease or *"loss of static and dynamic visual acuity, contraction of visual field, deterioration in dark adaptation, increase in glare sensitivity, increase in auditory threshold, and slower perception and reaction times"* (Kline and Schieber 1985, Olsho, Harkins and Lenhardt 1985, Salthouse 1985 in Kanouse 1988, p136). Many older drivers also suffer from a decrease in flexibility resulting in *"reduced mobility of the neck and trunk"* (Kanouse 1988, p136).

2.311 Visual Changes

Kosnik, Sekuler, and Kline (1990) surveyed 121 people over the age of 70 about general visual problems in day to day life. They found that many older persons complained about a decrease in the overall quality of vision, a slowing in the rate at which visual tasks are performed, problems with reading signs in cluttered areas, problems with reading small print and

advertisements on moving vehicles, and difficulties seeing in dim light or at night. The survey also found *"that older people who had given up driving do not experience any unique visual problems - they simply experience the problems common to their generation with greater frequency and intensity"* (Kosnik et al, 1990, p605).

As a person ages there is a browning of the lens of the eye and a reduction in pupil diameter, resulting in a decrease in the amount of light reaching the retina (Mortimer and Fell 1989). This causes a decrease in visual acuity particularly under conditions of low light intensity. While all drivers experience a reduction in acuity at night, older drivers are affected to a much greater extent and therefore require a greater illumination on an object to see it. A loss of visual acuity also means that older drivers have more difficulty with signs and traffic lights than younger people.

There are also a number of eye-diseases such as glaucoma and macula degeneration that are age related and cause a decline in acuity and visual field (Klein 1991). Klein (1991) looked at a number of ocular diseases and their possible effects on drivers. He noted that a cataract can cause an older person to be sensitive to the glare of bright sunlight and to the headlights of oncoming vehicles. A loss of central vision due to macular degeneration results in difficulty reading signs and seeing cars, whereas people suffering from open-angle glaucoma lose some of their visual field and may have trouble seeing cars or pedestrians approaching from the side. Johnson and Keltner (1983) discovered that drivers with visual field loss in both eyes have accident and conviction rates twice that of drivers with normal visual fields.

2.312 Auditory Changes

Age related hearing loss is well documented and can result in being cut off from environmental sounds that are informative. Hearing loss therefore has emotional and safety impacts on the individual.

Ballas and Barnes (1988) studied forty seven people aged 60-89 who were asked to identify a subset of everyday sounds used in previous identification studies. Their results were compared with previous results from younger participants. Although the older group's ability to identify sounds did not differ significantly from the younger group, they did differ on specific sounds which are consistent with the loss of ability due to ageing.

2.313 *Flexibility Changes*

As a person ages it is common to experience a decline in mobility due to stiffening of the joints and a general weakening of the body. These changes may restrict movements associated with driving and can result in an inability to manoeuvre a car effectively (Stamatiadis et al 1990). Kanouse (1988) indicated that older drivers frequently have difficulties in manoeuvring quickly and monitoring traffic conditions to the side and rear because of a reduction in mobility of their neck and trunk areas.

Rheumatism and arthritis may also affect steering, causing an older person to be unable to drive in a confined lane space. The sudden reactions needed when driving may therefore be difficult for some older drivers due to joint stiffness (Thompson-Perry, Wheeler and Schiflett, 1992)

Shaffron and McPherson (1989, p11) conducted a study in the United States to investigate the differences between *"young adults and older adults on various measures of physical fitness and driver performance"*. Forty three subjects aged 20-35 and sixty three subjects aged 60-75 were administered a modified version of the Automobile Driving On-Road Performance Test (ADOPT).

This study found that **older drivers performed significantly worse in a number of areas including manoeuvres, vehicle handling and observing**. Shaffron and McPherson (1989, p12) felt that **on-street instruction** and *"exercise programs leading to more flexibility/range of motion"* could be of benefit in helping older drivers overcome these deficiencies. They also believe that flexibility training has the potential to improve older drivers' vehicle manoeuvring and observation

2.314 *Cognitive Changes*

Cognitive deterioration occurs as people age. This may begin in the late fifties and the probability of it occurring increases at an increasing rate with advancing age (Torpey and Francis 1992).

Romanowicz (1990) noted that a number of studies have found **as people age their ability to process information declines in terms of capacity and speed**. Strawbridge (1988) also indicated that ageing has a number of effects on cognitive processes including: difficulties with memory input/retrieval, susceptibility to perceptual interference due to central nervous system

changes, and information filtering difficulties. Older drivers therefore often have difficulties perceiving and reacting to hazardous driving situations.

When investigating medication compliance problems among the elderly, Strawbridge (1988) concluded that the presentation of information affects an individual's ability to understand prescription information. Correct interpretation is influenced by the number of mental operations required to answer questions about medication use.

Korteling (1992) conducted a study to investigate older driver performance in single and dual-task situations. The results indicated that:

- age effects were absent in single automated control tasks;
- negative age effects in manoeuvre tasks increase when the task becomes unfamiliar; and
- older people cannot maintain optimal control performance when the manoeuvre task is unfamiliar

Korteling (1992, p55) concluded; *"the results suggest that the problems older drivers encounter may not be caused by the invariant components of the driving task, which usually are well learned long before old age. These problems may merely occur in novel situations..."* The study found that most older drivers therefore compensated for these problems by driving more slowly.

A study by Cooper, Tallman, Tuokko and Beattie (1993) investigated the relationship between cognitive deficit and crash involvement and found that cognitively impaired drivers were involved in accidents about two times more frequently than drivers in the control group. They concluded that cognitively impaired drivers would be involved in an accident about once every seven years, whereas drivers in the control group would be involved about once every seventeen years. The impaired drivers were also found to be *"judged responsible in 92% of the accidents in which they were involved as compared to 66% for the matched controls"* (Cooper et al 1993, p26). The *"results suggest a link between cognitive impairment and accident involvement frequency for older drivers"* (Cooper et al 1993, p26)

In a critical review of research on dementia and driving, Kaszniak (1991) concluded that when compared with normal people of similar ages, people with Alzheimer's disease or other forms of dementia have an increased risk of accidents and episodes of getting lost while driving.

Further review of research into Alzheimer's disease and driving has been conducted by Parasuraman and Nestor (1991), who looked at the correlation between different types of attentions, such as selective, divided and sustained, and accident rates. They found that older drivers suffering from dementia are involved in more accidents than healthy older drivers. They also concluded that selective attention (especially the shifting of selective attention) is related to accident risk, and the switching of selective attention is impaired in efficiency in the early stages of Alzheimer's disease.

Torpey and Francis (1992) in reporting the findings of the *"Functionally Impaired Drivers Working Party"* mentioned the amount of evidence pointing to the importance of selective attention to safe driving. They found that a *"driver's general mental status and 'useful field of view' (UFOV) are strongly associated with crash risk"* (Torpey and Francis 1992, p18). A decrease in UFOV is related to decreased speed of visual information processing, problems with divided attention, and selective attention difficulties

Torpey and Francis (1992, p18) also reported that *"older drivers with poor UFOV and poor mental status had a 3-4 times higher total accident rate, and 15 times higher intersection accident rate, than older drivers with normal visual attention"* A general conclusion from the working party report was that *"specific impairments will affect driving safety to the extent that they affect cognitive performance, particularly the ability to allocate attentional resources appropriately in a complex environment with high information load and processing demands"* (Torpey and Francis 1992, p20).

Stelmach and Nahom (1992) reviewed literature on the effects of age on motor performance. They specifically looked at movement initiation and movement execution with respect to the driving task. By looking at reaction time studies, Stelmach and Nahom (1992, p63) concluded that all aspects of movement initiation - *"including response preparation, response selection, response programming, and response complexity"* - showed age-associated slowing. They also mentioned that response selection was probably the most age sensitive facet of movement initiation

2.32 Medical Conditions, Medication Use and the Older Driver

It is important to recognise the difficulties involved in attempting studies with older drivers focussing on the relationship between driving ability, motor vehicle accident risk and medical conditions. The problem not only arises because of the diverse range of medical conditions experienced, but also the possible permutations of these diseases.

It is also relevant to note that driving ability may be influenced by symptoms of the illnesses, such as: incontinence, leg pains which are worsened by activity, itching or chafed skin (Wallace and Retchin 1992).

Waller (1992) suggests that it is not the type of medical condition per se which influences driving ability, but the level of functioning the individual is capable of achieving while driving.

Simpson, Warren and Page - Valin (1977 in Rosenbloom 1988) concluded in a Canadian study that although medical conditions among older drivers increased driver risk, the adoption of less risky driving patterns more than offsets this risk (for example, daytime driving under good weather conditions rather than night time driving in wet conditions).

2.321 Cardiovascular Disease

The literature is unclear on how cardiovascular disease impacts on motor vehicle crash rates. Some studies have found that older drivers with heart disease exhibit reduced capability to deal with more demanding driving tasks due to altered oxygenation or cardiac conduction (Waller, 1992). In contrast, Naughton, Pepler and Waller (1982) found that older drivers with heart disease showed no increase in crash risk.

2.322 Diabetes Mellitus

There are two types of Diabetes Mellitus - type 1 where patients are insulin dependent and type 2 where patients are non-insulin dependent. Some epidemiologic studies have shown an increased rate of crashes among diabetic drivers (De Klerk and Armstrong 1983, McPherson, Perl, Starmer and Homel 1984; Songer, La Porte, Dorman, Orchard, Cruikshanks, Becker and Drash 1988; Waller 1965 in Ray, Gurwitz, Decker and Kennedy 1992), while others have not found this to be the case (Hansotia and Broste 1989; Stevens, Roberts, McKane, Atkinson, Bell and Hays 1989 in Ray et al 1992).

Among older persons type 2 diabetes is more common. A significant proportion of type 2 sufferers are treated with insulin. A common complication of insulin treatment is hypoglycaemia (decreased blood sugar levels) and it is the symptoms of hypoglycaemia which could adversely affect driving ability including: decreased co-ordination, impaired judgement, confusion, disorientation and loss of consciousness (Ray, 1992)

2.323 Depression in Older Populations

Teshuva, Stanislavsky and Kendig (1994, p71) highlight some of the difficulties encountered in assessing the emotional well-being of older people. These include:

- the belief that depression is "normal" for older people; and
- the fact that older people may cover up the symptoms of depression due to social stigma.

Depression can have the following consequences which may impair driving: inattention, poor judgement, confusion and side effects resulting from medication (Wallace et al 1992). Older drivers whose spouse has recently died or those who have experienced financial or emotional setbacks are believed to be "*particularly distractable and subject to near misses and accidents*" (Malfetti and Winter 1991, p6).

2.324 Medication Use

Studies have shown that medications can interfere with the functioning of the central nervous system (CNS) which may adversely affect driving and thereby increase crash risk (Cowart and Kandela 1985; Polen and Friedman 1988; Seppala, Linnoila and Mattila 1979).

Medication use is common among people aged over 65 years and the types of drugs which may be used include, benzodiazepines, antipsychotics, cyclic antidepressants, antihistamines, narcotic analgesics and hypoglycaemics (Ray et al 1992, p33).

The 1983 and 1989/90 Australian *National Health Surveys* provide data on the number of persons who took prescribed or non-prescribed medication over a two week period prior to the interviews (Australian Bureau of Statistics 1991, Cat. No. 4364.0). In 1989/90, the rate of taking one or more medication for the total population was 703.6. The rate was considerably higher in the oldest age groups - 880.6 per 1000 population aged 65 to 74 years and 912.2 per 1000 aged 75 years and over (in Teshuva et al 1994).

Older people are also likely to use several drugs simultaneously which means there is an increased danger of pharmacological reactions and interactions among drugs which may adversely impact on the older person's driving ability (Julien 1985 in Rosenbloom 1988).

2.33 Alcohol Use and the Older Driver

Alcohol use tends not to be a feature of accidents involving older drivers. In a study by Mortimer and Fell (1989) 88% of drivers aged 65 plus involved in night time fatal crashes had no alcohol in their blood which was far more than among the younger age groups in the study (16-24 years: 55% no alcohol; 25-64 years: 64% no alcohol)

According to American data, older drivers involved in fatal crashes during 1992 had the lowest proportion of intoxication of all adult drivers. They had blood alcohol concentrations (BAC) of 0.10 grams per decilitre (g/dl) or greater (Traffic Safety Facts 1993).

While alcohol consumption patterns may change as a result of changing life circumstances, Ekerdt, De Labry, Glynn and Davis (1989) suggest that retirement generally holds no great shift in alcohol consumption or drinking behaviour. It is therefore hypothesised that alcohol consumption relating to retirement has little impact on the older drivers' risk of accident.

2.34 Environmental Factors

There are a wide variety of environmental conditions that affect the ability of older drivers to drive safely including, weather conditions, time of day in which the journey is undertaken and road signage. These environmental factors are more significant to older drivers than younger drivers because of their declining mental and physical abilities.

2.341 Weather Conditions

Cooper (1990) surveyed 904 elderly drivers on their views of self and driving, and compared this to actual accident data. He found there were a number of weather conditions that elderly drivers avoid. Sixty three to sixty eight (63-68%) percent of all elderly driver age groups mentioned that where possible they would avoid snow, sleet and slush conditions. It appeared that older drivers were more comfortable with driving in rainy conditions or forced to deal with the situation out of necessity. Cooper (1990) later concluded that as age increases elderly

drivers are more likely to avoid inclement driving conditions. This was confirmed by the accident data which showed that *"weather or road conditions was less of a factor with elderly drivers than with middle-aged 'control' group"* (Cooper 1990, p112).

2.342 Time of Accident

Older drivers tend to be involved in accidents during non peak times of days during the week. Sjögren et al (1992) in a Northern Swedish study, found that over half (56%) of car occupants (including drivers and passengers) were injured in the winter months from October to March. Results in this study also showed that older drivers are less likely to be involved in fatal accidents on weekends.

It is well documented in the literature that older drivers compensate for their decreased driving ability by reducing the incidence of night time driving and by not driving in peak hour traffic (Cerrelli 1989). Cooper (1989) for example, describes how the off-peak daytime period between 9am and 3pm assumes more importance in terms of accidents, as age increases. Off peak accident rates across age groups in his study were 36.7% for the 36-50 age group, 44.6% for those aged 55-64 years, 52.6% for 65-74 year olds and 56.6% for drivers aged over 75 years.

In a South Australian study which looked at the involvement of the young and old in road crashes (Involvement of the younger and elderly in road crashes in South Australia 1990), older drivers were found to experience two peak times for accidents per day. The morning peak time occurred between 10 and 11am while the afternoon time was between 3 and 4pm.

Although older drivers have been found to reduce the incidence of night time driving, studies have been conducted which focus exclusively on the accident rate of drivers at night. Mortimer and Fell (1989) for example, analysed fatal crash data in America and found that fatal crash rates for all age groups were substantially greater in the time period from midnight to 6am.

Older male drivers (65 years plus) in the study had a fatal crash involvement rate of 34.1% during the night time period, (Midnight-6 am), compared with 17.3% for male drivers aged 25 to 64 years and 64.3% for the youngest group of drivers aged 16 to 24 years. The rate for older male drivers is over seven times greater than for their female counterparts.

A study conducted by Lerner and Ratte (1991) found that although older drivers do not avoid freeways per se they do try and avoid certain freeway situations. Older drivers did report limiting freeway travel at night and during rush hours. They concluded that freeway use for most older drivers could hardly be considered restricted even though *"there is some selectiveness in the time and place of freeway use"* (Lerner et al, 1991, p5)

Cooper (1990, p108) looked at accident data and found that *"for drivers age 64 to 74 and 74 plus combined, the proportion of accidents under poor road conditions at night greatly exceeded those during the day."* It therefore appears that older drivers' abilities may be stretched under the combined conditions of low light levels and wet roads. Through the survey questionnaire older drivers indicated their aversion to driving in the dark or heavy traffic. In fact there appeared to be a greater aversion to driving in heavy traffic than there was to driving at night or in the rain.

2.343 Road Signage

Due to the problems with vision as age increases it would be reasonable to assume that older drivers have difficulties with some road signs. In fact Cooper (1990) discovered a number of problems encountered by the elderly with respect to road signage. A number of older drivers under the age of 75 (43.5%) mentioned that sign placement caused them difficulties. The sign size or size and clarity of lettering was also mentioned by a similar number of older drivers (46.4%). A larger proportion of drivers aged 75 and over mentioned size and clarity (53.9%) than mentioned sign placement (38.1%).

Lerner and Ratte (1991, p6) also found *"a variety of complaints about freeway and non-freeway signing, including failure to provide adequate advance warning and confusion or inappropriate sign content"*. The majority of older drivers involved in Bishu, Foster and McCoy's (1991) survey of driving habits valued design changes such as "larger signs" that would aid safe driving.

A study by Kline et al (1990) investigated the difference in visibility distances for icon and text signs among young, middle-aged, and older drivers. The study found that *"the visibility distances of icons were generally much greater than those for text signs for young, middle-aged, and elderly observers. The superiority of icons was even greater in dusk than in day illumination conditions"* (Kline et al 1990, p616-7). However there were no significant age differences observed in visibility distances. Kline et al (1990) felt that the lack of significant age

differences may have been due to the older group being a visually select one with a better eye acuity than average for their age group. *"In fact, their best eye acuity was comparable to that of the younger participants in this study."*

2.35 Summary

Section 2.3 has attempted to highlight the factors thought to contribute to older driver crashes. These include physiological changes to the visual, auditory and cognitive systems as well as changes in flexibility. The literature also cites certain conditions, for example diabetes mellitus or depression and medication use as impacting on driving abilities.

The environmental conditions influencing older driver accident involvement include weather conditions and the time of day in which a journey is undertaken. Older drivers tend to avoid snow, sleet and "slush" conditions and driving during peak hour times.

3.0 Analysis of Older Drivers Statistics

- 3.1 Introduction
- 3.2 Overview
- 3.3 Ratio of Fatalities to Total Injuries
- 3.4 Ratio of Risk to Population Size
- 3.5 Ratio of Risk to Distance Travelled
- 3.6 Responsibility for Crashes
- 3.7 Major Crash Types
- 3.8 Timing of Crashes
- 3.9 Conclusions

3.1 Introduction

This section of the report attempts to analyse crash data and other related data from both Australia and overseas. While the emphasis is on older drivers, the provision of data from other driver age groups is included for analysing and drawing conclusions about the older driver population.

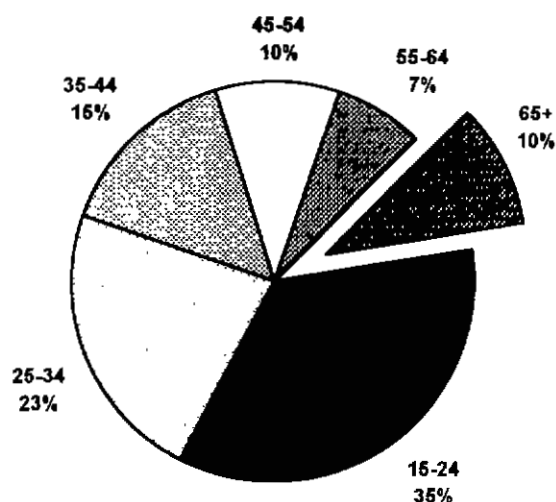
As discussed in section 2.21 (see Methodological Problems, pages 7-11), there are various ways of collecting and analysing crash statistics. The following analysis utilises a range of techniques (for example, relative risk according to population size, distance travelled and responsibility for the accident) and provides an explanation of older driver behaviour.

The Federal Office of Road Safety (FORS) provided much of the data, and detailed analysis used in this section.

3.2 Overview

Looking at the incidence of motor vehicle injuries (including hospital admissions and fatalities) it appears that older drivers account for only a minor proportion of total injuries. The Federal Office of Road Safety's Serious Injury database for 1990-92 reveals that drivers of cars and light commercial vehicles over 65 years of age account for some 10% of driver serious injuries (see Figure 1).

Figure 1: Serious injuries of passenger vehicle drivers by age, 1990-92



This finding needs to be considered in the light of two emerging factors:

- projections of Australian population data which indicate an increase in the size of the older age group (ABS, 1994), and
- changes in the driving culture, particularly the increasing proportion of females driving and the greater reliance of young and middle-aged people on motor vehicles, which is likely to inflate future participation rates of older drivers.

Recent data from the US shows an increase in vehicle miles travelled between 1983 and 1990 (Massie, Campbell and Williams, 1995). This data enabled researchers to compare travel estimates and crash rates between 1983 and 1990. What they found was *"a large increase in the amount of travel in passenger vehicles"* (p82). In fact they reported a 41% increase in the total number of miles driven in passenger vehicles. Massie et al (1995) also found that drivers aged 75 and over recorded the single greatest increase in mileage with a 90% increase over the seven years. Figure 2 (adapted from Massie et al, 1995, p82) shows the difference in the total number of vehicle miles travelled by age group in 1983 and 1990.

Massie et al (1995) also looked at the difference in licensure rates between 1983 and 1990. They found an increase of almost 7% in the proportion of people with a driver's licence. They also reported *"increases in the licensure rate were especially apparent*

among older persons. Only 61% of people 65 and over held licences in 1983, and this increased to 75% in 1990" (p82). Interestingly the percentage of males aged 65+ holding a license increased by 80% to 88%, whereas the percentage of females aged 65+ holding a license increased from 48% to 66%. Figure 3 (adapted from Massie et al, 1995, p83) shows the increase in licensure rate for all ages 1983 to 1990

Thus, there are more older U.S. drivers in 1990 who are travelling greater distances. Linked with these changes was an overall decrease in the number of fatal crashes per mile driven which decreased by 21%. Overall injury involvements also dropped by 34%.

If this trend were also to occur in Australia, it would suggest that over time, older Australian drivers would also enjoy lower crash rates. There is however, no room for complacency since current Australian data shows a problem still exists with older driver crash rates which we must seek to improve.

Figure 2 Total Vehicle Miles Travelled by age group, 1983 vs 1990

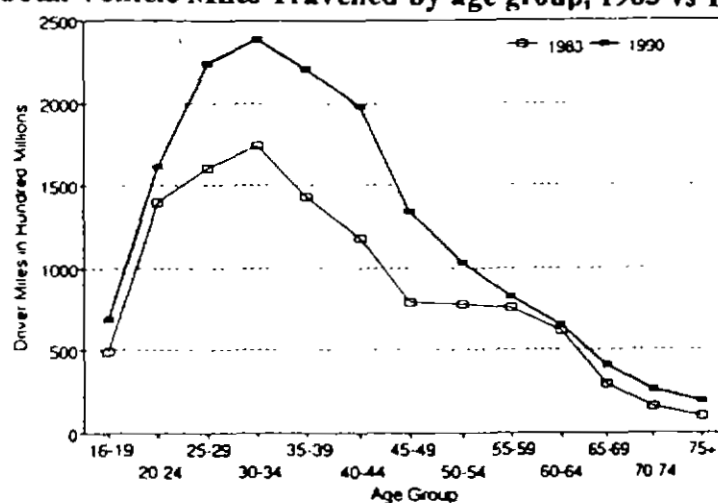
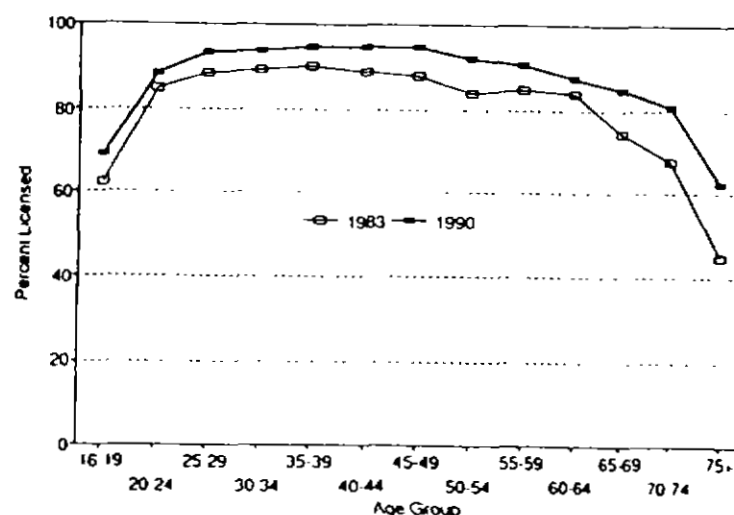


Figure 3 Licensure rate by age group, 1983 vs 1990



3.21 International Motor Vehicle Death Rates

A quick glance at motor vehicle death rates (per 100,000 population) from various countries around the world reveals that older people (65+) have one of the highest motor vehicle death rates of any age group. In many countries, people aged 65+ have a motor vehicle death rate second only to that of the 15-24 age group, while in Japan the 65+ age group has the highest motor vehicle death rate of any age group(see Table 1).

**Table 1: Comparison of Death Rates in 1990 based on motor vehicle deaths
(Average annual rates per 100,000 population)**

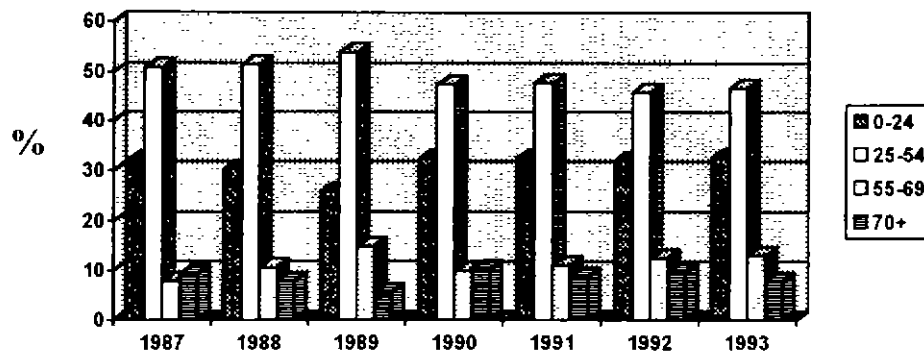
Country	0-14 yrs	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65+ yrs	All Ages
New Zealand	6.6	53.0	25.6	13.0	13.2	12.2	17.4	21.3
France	4.6	37.9	26.6	18.1	18.1	16.1	20.8	19.9
Germany	4.4	28.4	16.4	11.1	9.8	10.5	16.8	14.0
<i>Australia</i>	<i>4.8</i>	<i>26.6</i>	<i>16.5</i>	<i>9.0</i>	<i>10.3</i>	<i>11.0</i>	<i>19.0</i>	<i>13.6</i>
Japan	2.9	22.4	8.6	7.2	9.3	13.0	22.8	11.8
Sweden	2.3	15.9	9.9	6.0	8.0	9.8	12.6	9.1
UK	3.6	17.8	9.6	7.0	6.3	7.1	13.8	9.4

(Source: Adapted from New Zealand Ministry of Transport data, 1992)

3.3 Ratio of Fatalities to Total Injuries

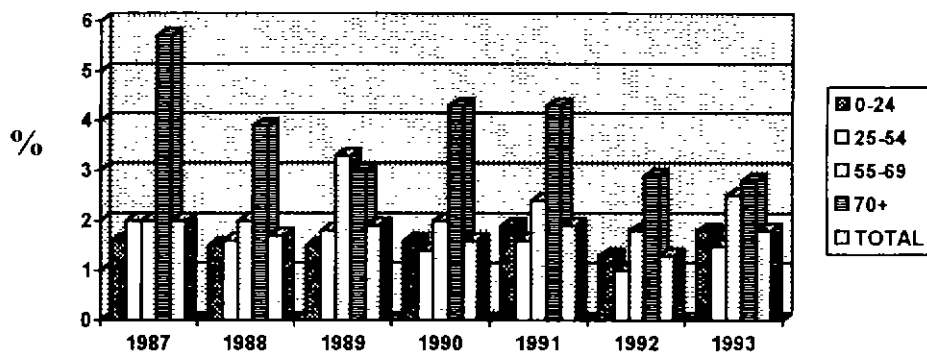
We have already seen that as a proportion of all serious motor vehicle injuries, older drivers are a relatively insignificant group (Figure 1). The Victorian data in Figure 4 also shows that compared with other age groups older drivers do not make up a significant percentage of motor vehicle fatalities. However, if we look at the various age groups and compare the number killed to the total number injured (including fatalities) we begin to get a better picture of the older driver. Figure 5 reveals that older drivers have the highest ratio of fatalities to injuries (including fatalities) of any age group. This indicates that when older drivers (aged 70+) are involved in motor vehicle accidents they have a greater likelihood of being killed than do other age groups (as documented in section 2.0).

Figure 4: Percentage of Total Driver Fatalities in Victoria



(Source: TAC Planning & Research)

Figure 5: Ratio of Driver Fatalities to Total Injuries (including Fatalities) in Victoria



(Source: TAC Planning & Research)

3.4 Ratio of Risk to Population Size

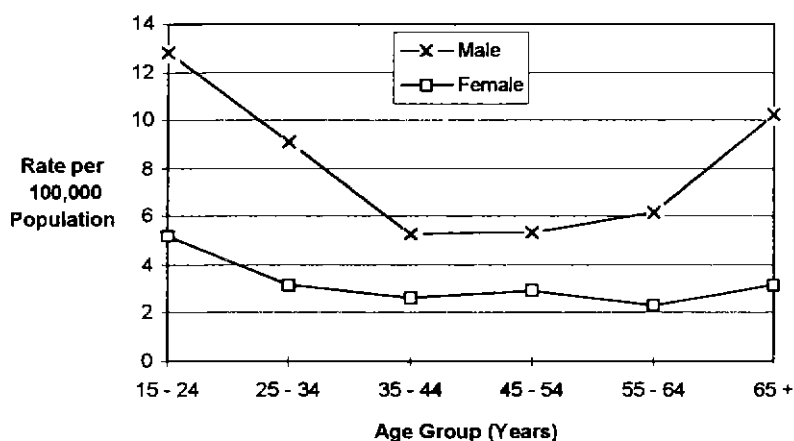
In order to clarify the risk facing older drivers, the incidence of fatalities and serious injuries was examined according to population size (ABS 1993a). This was further split by gender to account for any differences in driving behaviour

The FORS Serious Injury database for 1990-92 was used in the analysis with only drivers of passenger vehicles (ie. cars, vans, 4 wheel drives, and utes) being included. For purposes of inclusion within the Serious Injury database, fatalities are defined as those resulting within 30 days from injuries sustained in the accident. Serious Injuries include both fatalities and hospital admissions.

3.41 Driver Fatalities

The ratio of fatalities to population size is greater for males across all age categories, with the risk level exhibiting a U-shape trend (see Figure 6). This highlights that older male drivers report risk levels approaching those of the highest risk group, young drivers. Female drivers in contrast show little deviation according to age, with a minor peak in risk apparent only for the 15-24 age category. Figure 6 demonstrates that the incidence of fatalities varies according to age and gender

Figure 6: Average passenger vehicle driver fatality rate by population, 1990-92



3.42 Number of Older Drivers Involved in Fatal Crashes Over Time

Over the three years 1988, 1990 and 1992, a total of 5,053 car drivers were involved in fatal crashes. Of these drivers, 707 (14%) were aged 60 or older and 388 (8%) were 70 or older

The total number of drivers involved in fatal crashes decreased markedly over the three years sampled, but the number of drivers aged 70+ remained roughly constant. Thus, older drivers formed an increasing percentage of the total group (Table 2).

Table 2: Drivers Involved in Fatal Crashes in 1988, 1990, and 1992.

Year	Total Drivers Involved in Fatal Crashes	Involvement of Drivers Aged 70+	% of Drivers Aged 70+ Involved
1988	2,049	128	6.2%
1990	1,611	128	7.9%
1992	1,393	132	9.5%
Percentage change 1988 to 1992	- 32%	+ 3%	

There was no statistically significant change in the percentage of drivers aged 60-69 (5.8% in 1988 and 6.3% in 1992) involved in fatal crashes.

Figures 7 and 8 detail the number of older driver (aged 60+) fatalities for each State and Territory. These two figures show that while most States and Territories have had little or no increase in the number of older driver fatalities between 1989 and 1994, NSW recorded an increase and Victoria recorded a decrease. The overall trend however, is quite stable.

Figure 7: Fatalities for Drivers Aged 60+ in NSW, Vic, Qld and S.A.

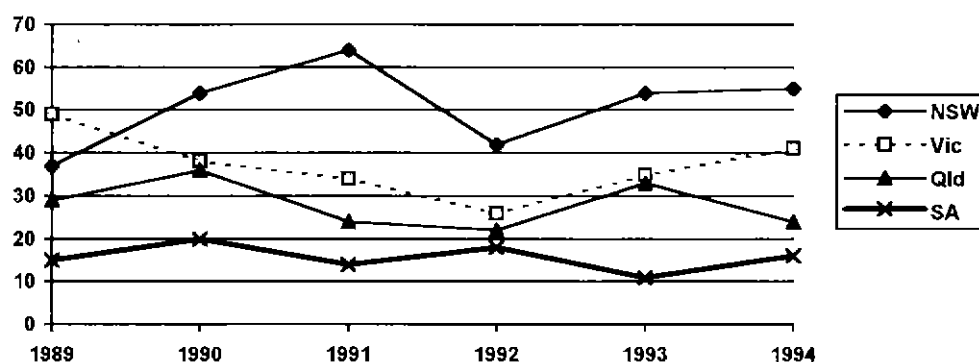
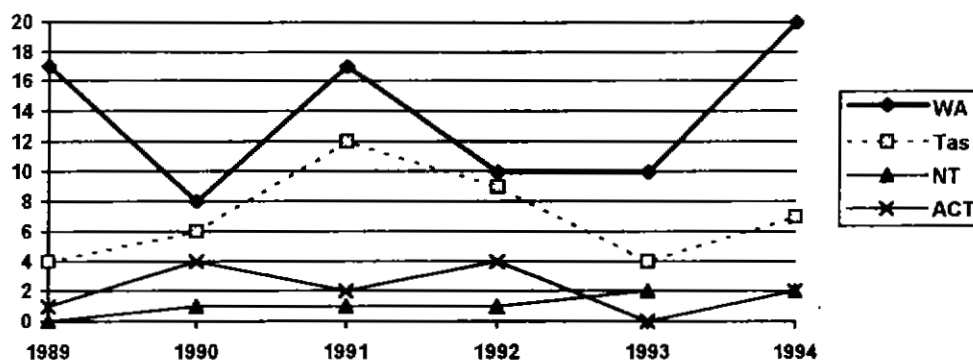


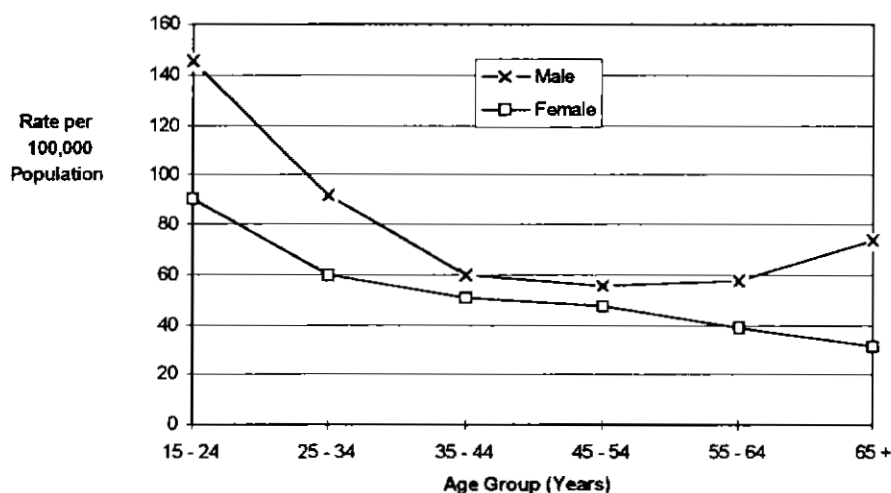
Figure 8: Fatalities for Drivers Aged 60+ in W.A., N.T., A.C.T. and Tasmania



3.43 Drivers Seriously Injured

The ratio of serious injury to population size (see Figure 9 below) is again greater for male drivers in all age categories. However, the differences in serious injury rate for males and females are minimal for the 35-54 age groups. The greatest divergence between genders occurs in the younger and older age groups. As can be seen in Figure 9 the trend for serious injury rate in both genders (by age) is similar to that presented in Figure 6, although males aged 65+ display a less marked increase in injury rate and females aged 65+ record a further dip in injury rate.

Figure 9: Average passenger vehicle driver serious injury rate by population, 1990-92

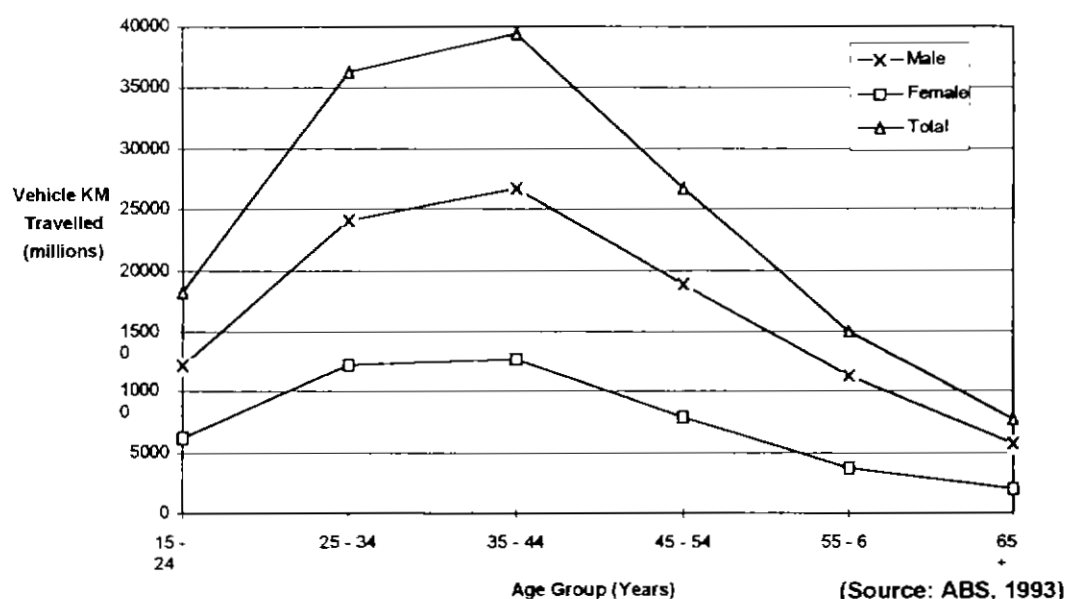


3.5 Ratio of Risk to Distance Travelled

Plotting the number of motor vehicle injuries against population size provides a pattern of incidence by age (as shown in Figure 9). However, this method fails to account for any differences in the amount of driving done by the different age groups. The lower fatality and serious injury rates observed for females may simply reflect a lower participation level (i.e. females may not drive as far as males). Similarly, the risk levels of older drivers need to be examined in conjunction with exposure measures that control for differences in driving involvement.

An analysis of distance travelled from the Australian Bureau of Statistics Survey of Motor Vehicle Use (1993)¹ illustrates a trend for distance travelled that varies by age. Figure 10 reveals a consistent pattern for both genders, with drivers in the 15-24 age group recording a lower amount of travel than the 25-54 age group and drivers aged 65+ recording the lowest level of all age groups.

Figure 10: Passenger vehicle driver distance travelled, 1991



By plotting accident involvement from the Serious Injury database against distance travelled a different risk profile emerges (see Figures 11 and 12).

¹ Total figure adjusted in accordance with BTCE, 1995 Adjustment pro-rata by age per Survey of Motor Vehicle Use.

Figure 11: Passenger vehicle driver fatality rate by distance travelled, 1990-92

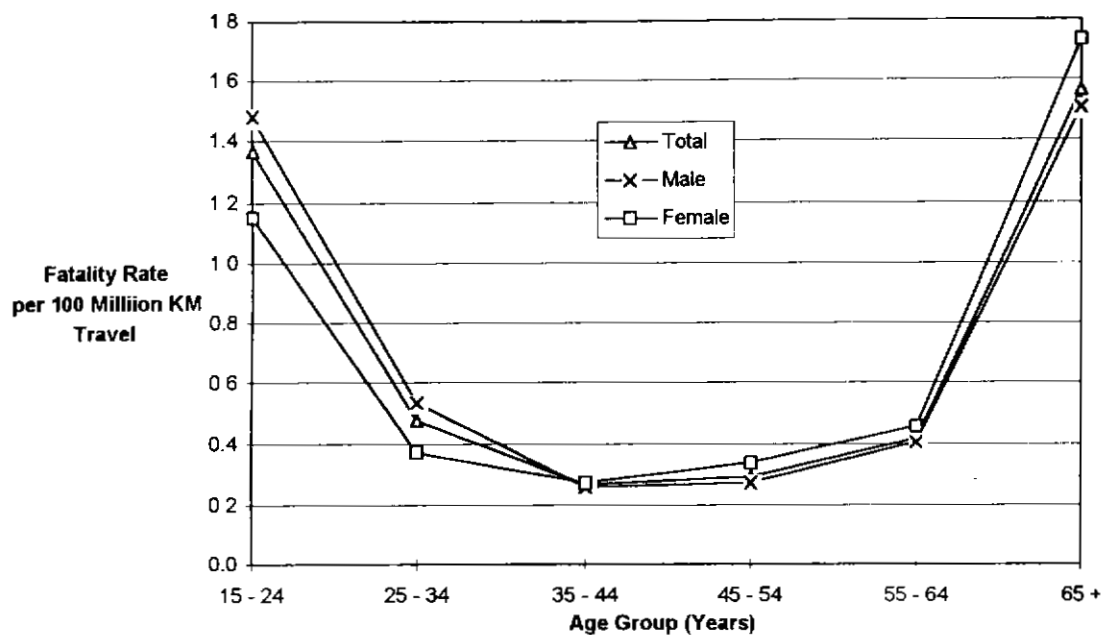
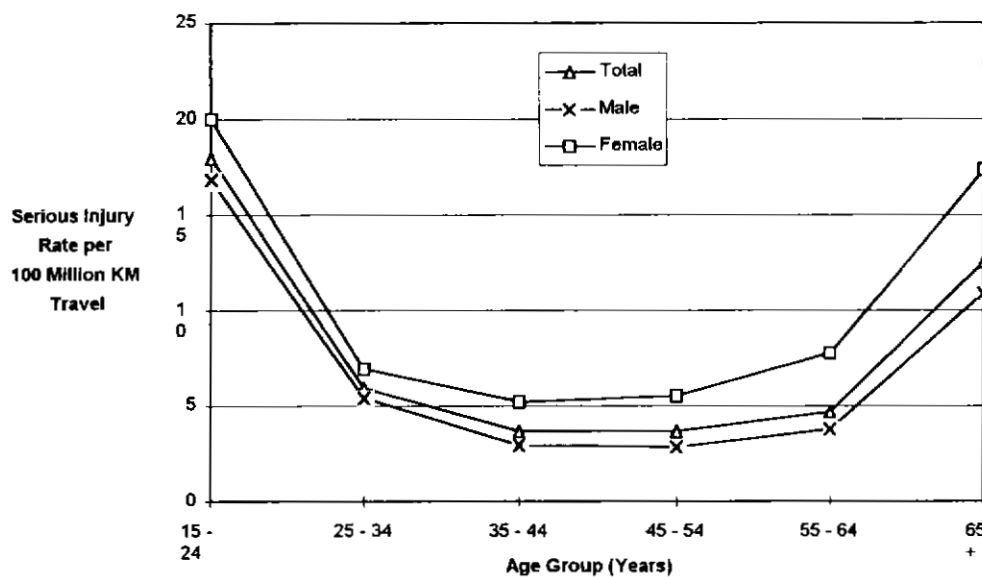


Figure 12: Passenger vehicle driver serious injuries rate by distance travelled 1990-92



For both fatalities and serious injuries the level of driver risk is shown to vary by age in a typical U-shape fashion. These two figures highlight that:

- the younger drivers' fatality rate is three to five times higher than for drivers aged 25-54 years (see Figure 11). Beyond age 65, however, the rate escalates to levels equivalent to, and for females higher than, the levels of the 15-24 age group. Gender differences are less distinct across the age groups;
- the pattern of risk level is similar for fatalities and serious injuries. However, there are two notable differences: the increase in risk observed for the 65+ age group in Figure 12 is less than that observed for the fatality data in Figure 11; and, female drivers represent the highest risk gender across all age groups for serious injuries, which becomes more distinct as age increases

The differences observed between the risk levels of older drivers for fatalities and serious injuries is consistent with previous findings. Both international data (Massie, Campbell & Williams 1995) and local data (FORS 1994a) demonstrate that the increase in risk levels for older drivers is greater for fatalities than for serious injuries. This difference has been postulated to arise from the increased frailty of older drivers and consequently a greater risk of accident injuries resulting in fatalities (as discussed in section 2.0)

The second finding that female drivers report a greater risk of involvement in serious injury accidents is consistent with comparative US data. Massie et al (1995) postulate that other risk factors influence the observed levels of risk. While rates per distance travelled provide an overall measure of the risk of crash involvement they do not take into account where and when that travel occurs. For example, females tend to travel relatively more during weekdays and during daytime hours (FORS 1994b)

An explanation for the higher risk rates for female drivers may be related to the lower amount of travel they record (see Figure 10). It has been suggested that the crash rate per distance travelled decreases as the distance travelled increases (Burg 1973, Spolander 1983, Stewart 1972, cited in Massie et al 1995). Massie et al, (1995) present the argument that distance travelled per year is an index of the amount of practice drivers are getting, as well as their exposure to risk. More practiced drivers may be more proficient in the driving task and in avoiding crashes.

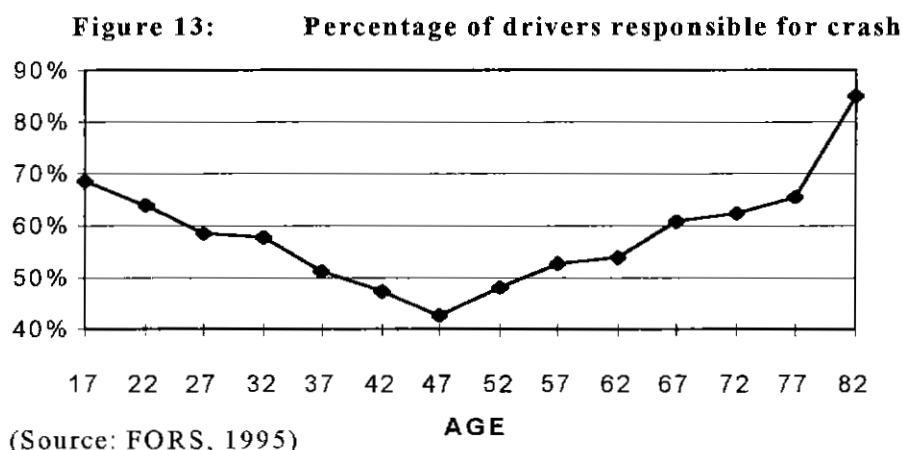
Massie et al (1995) examined whether higher annual travel is associated with lower rates of involvement. By using linear regression they obtained results which showed there was

an association consistent with the idea that females' higher rate of involvement in nonfatal crashes is related to the fact that females drive less, relative to males.

3.6 Responsibility for Crashes

The Fatality File records whether each driver involved in a fatal crash was "responsible" (at fault), "partly responsible" or "not responsible" for the crash.

As Figure 13 shows, young drivers and older drivers were significantly more likely to have been coded as responsible or partly responsible for a fatal crash than middle aged drivers.



Note:

- data points represent the midpoints of 5-year age bands: eg 22 represents ages 20-24 and 27 represents 25-29. Drivers aged below 16 (all of whom would be unlicensed) were excluded.
- "responsible" includes "partly responsible"

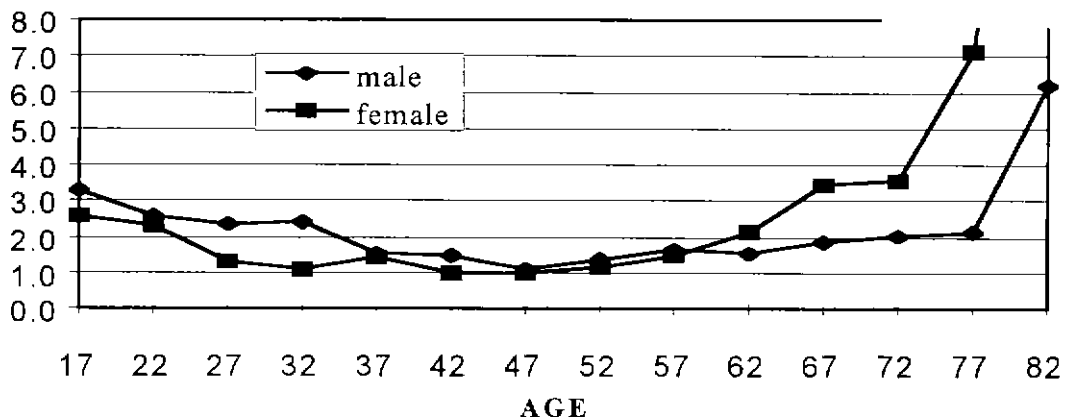
The same data can be expressed in terms of relative odds, rather than percentages, giving a measure of the *"relative risk of involvement as the responsible driver"*.

The odds are almost six to one (5.7 to 1) that a driver aged 80-84 who is involved in a fatal crash will be responsible for that crash. This compares with 0.75 to 1 for drivers aged 45-49, and 2.2 to 1 for teenage drivers.

So the odds that a driver will be at fault are roughly three times higher for teenagers than for drivers aged 45-49 ($2.2/0.75 = 2.9$), and for drivers aged 80-84 the ratio of odds (relative risk) is $5.7/0.75 = 7.6$

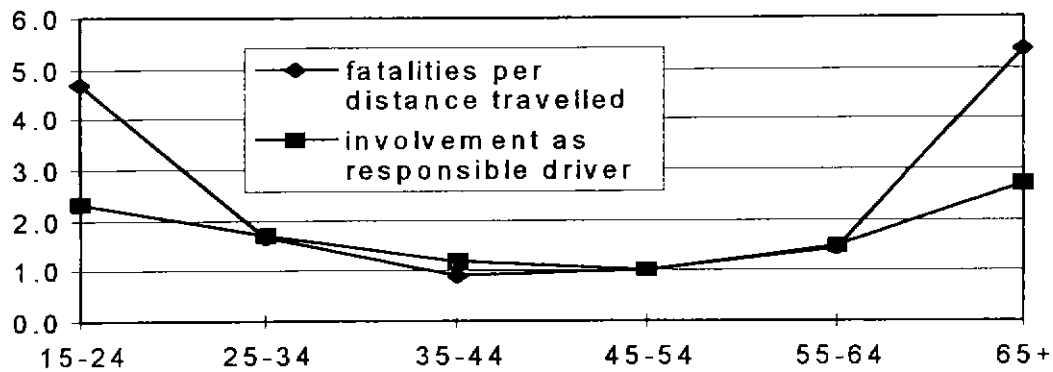
Figure 14 shows the resulting ‘relative risk’ curve for both genders across all ages. As might be expected females aged 60 and over are at a greater risk than males of being responsible for a fatal crash, whereas males aged under 45 are more likely to be responsible.

Figure 14: Risk of involvement as responsible driver



Interestingly the data on risk of involvement as the responsible driver shows a similar pattern to the data on driver fatalities per distance travelled. Figure 16 compares the two measures, with drivers aged 45-54 used as the reference group for relative risk in both curves.

Figure 15: Relative risk (fatal crashes)



Note:

- both risk curves relate to drivers of cars, vans, four-wheel-drives and utilities
- *fatalities per distance travelled* based on 1990 - 92 driver fatalities (FORS Serious Injury file) and ABS Survey of Motor Vehicle Usage for 1991
- *involvement as responsible driver* based on FORS 1988, 1990 and 1992 Fatality Files

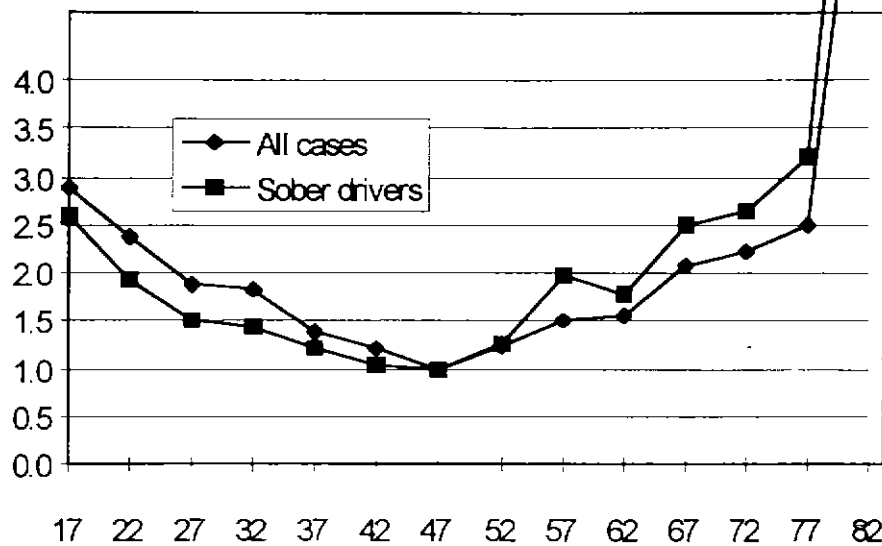
3.61 Alcohol and Older Drivers

Compared to young and middle-aged drivers, relatively few older drivers involved in crashes have illegal blood alcohol contents (BACs). Removing intoxicated drivers from the risk estimates, gives a higher relative risk for elderly drivers as Figure 17 and Figure 18 show. Note that Figure 18 is identical to Figure 17 except for a change of scale to show more detail.

For sober drivers:

- risk doubles in the decade between the late forties and the late fifties, with drivers in their late fifties having a risk level equal to drivers in their early twenties; and
- the relative risk for drivers in their seventies is comparable to that of teenage drivers, with drivers aged 80-85 having much higher relative risk levels.

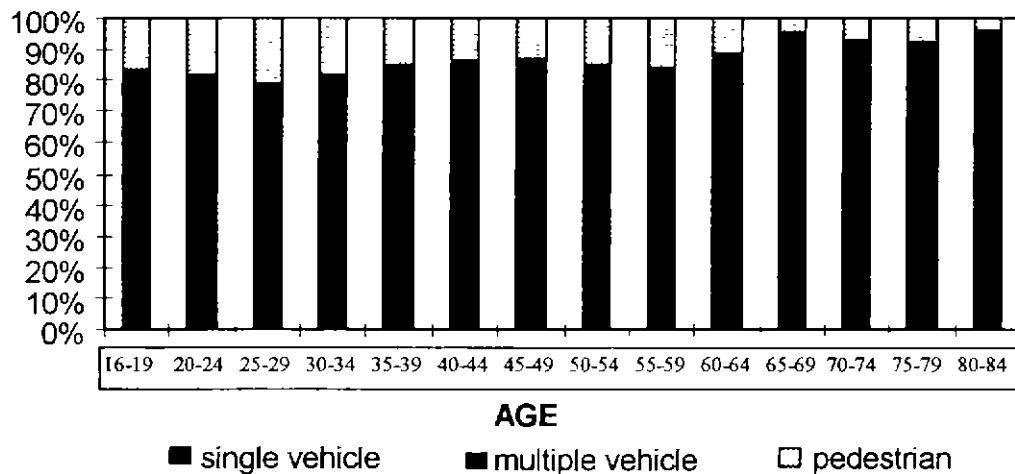
Figure 16: Risk of involvement as responsible driver



3.7 Major Crash Types

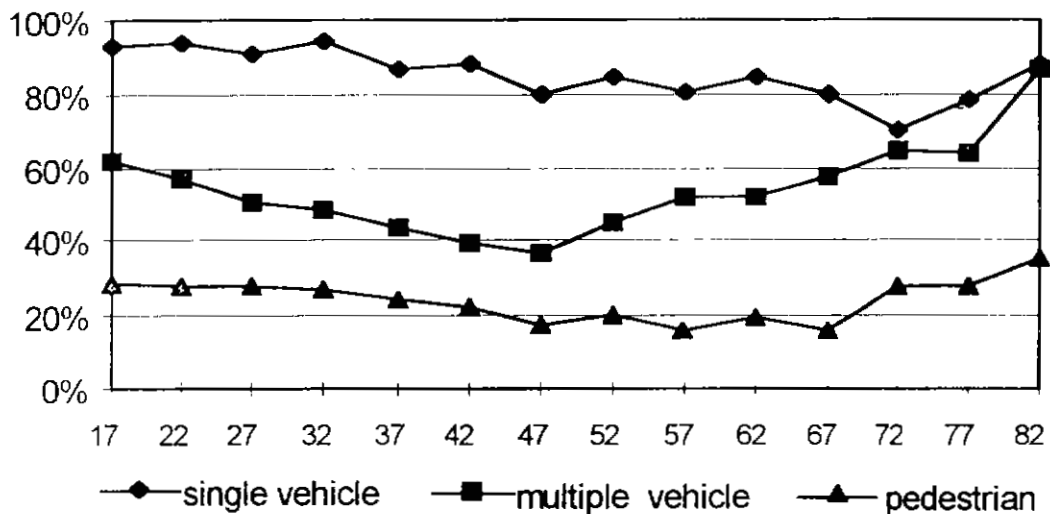
Figure 19 below details the percentage of single vehicle, multiple vehicle and pedestrian fatal crashes for drivers of all ages. This data is consistent with a number of studies that have highlighted the incidence of older drivers in multiple vehicle crashes (Baker et al 1992; Cerelli 1989; McKelvey et al 1989; Sjögren et al 1992) as mentioned earlier in section 2.0.

Figure 17: Car drivers in fatal crashes: age and crash type



A more distinct comparison of responsibility for the various types of fatal crashes is given in Figure 20. It clearly shows that as driver age increases above 49 the likelihood of being responsible for a multiple vehicle fatal crash also increases. For example, drivers aged over 70 are responsible for more than 60% of the fatal multiple vehicle crashes in which they are involved, whereas drivers aged 45-49 are responsible for under 40% of their fatal multiple vehicle crashes. Interestingly, drivers aged 24 and under are similar to older drivers, in that they are also responsible for close to 60% of the fatal multiple vehicle crashes in which they are involved.

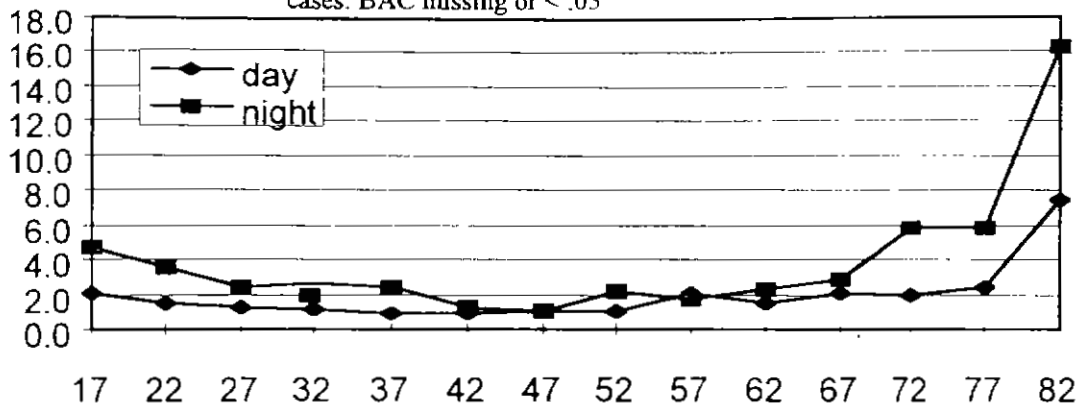
Figure 18: Percentage of drivers responsible for crash



3.8 Timing of Crashes

The visual changes that occur with ageing often make it difficult for older drivers to see in dim light or conditions of low light intensity (see section 2.0). It is well documented that older drivers often have difficulties with night driving due to such things as a decrease in their visual acuity (Kosnik et al 1990; Mortimer and Fell 1989; Klein 1991). Figure 21 shows that older drivers have an increased risk of involvement as the responsible driver under night time conditions.

Figure 19: Risk of involvement as responsible driver
cases: BAC missing or < .05



(Reference group is age 45-49 in the same day/night condition. NB does not reflect overall day/night risk difference)

3.9 Conclusions

Although the number of motor vehicle serious injuries/fatalities is relatively minor for older drivers, the changing nature of Australia's population suggests that this category may grow in significance. This theory is supported when one examines accident involvement in relation to population size where older drivers exhibit a rate of involvement approaching that of younger drivers (see Figure 6).

A different risk profile emerges when the incidence of motor vehicle injuries is examined relative to distance travelled. In terms of fatality involvement, older male drivers have risk levels as high as younger drivers, while for female older drivers their risk exceeds that of the corresponding 15-24 age group by 40%. This finding may reflect the greater frailty of older drivers which increases their risk of a fatality whenever they are involved in an accident. In regard to serious injury involvement, older drivers report a crash involvement risk greater than all but the 15-24 age group. The risk of crash involvement is higher for females of all ages and particularly for the older age groups.

The growth of the older age group in Australia, together with the flow on effects of a changing driving culture, highlight the importance of examining the risks of older age drivers. Paradoxically, this risk will need to be assessed in light of any changes to travelling regimes; the risk of injury involvement per distance travelled may actually be lessened somewhat by the projected increase in travel by older drivers.

4.0 Indepth Analysis of Case Records Across Australia

- 4.1 The Methodology
- 4.2 Analysis of Individual Case Records
- 4.3 Accident Scenarios
- 4.4 Summary of Scenario Analysis

This section of the report begins with an overview of the methodological approach utilised in extracting and analysing data connected with fatal road crashes involving older drivers (aged 65 and over). The majority of the data comes from NSW, Victoria and Queensland, with a small number of cases being from S.A., W.A., N.T. and Tasmania. Seventy one accident records were examined indepth, involving 78 older driver (or passenger) fatalities. By analysing the records and examining contributing factors, crash scenarios were developed. *These scenarios represent hypothetical models suggesting situations in which older drivers or their passengers (also aged 65+) are killed.*

4.1 The Methodolgy

4.11 Development of Scenarios

In an attempt to acquire a richer understanding of the situations in which older drivers are killed, individual case records were analysed and gathered together to form typical scenarios. These serve to compliment statistical analysis of driver deaths. In this way it becomes possible not only to see how many older drivers are killed in a particular way, on the roads, but to also identify some of the circumstances surrounding the fatality.

4.12 The Data Base

The data presented in this section of the report summarises an analysis of case records involving older drivers (and their passengers) aged 65 and over, during 1992 in NSW, Victoria, Queensland, S.A., W.A., N.T. and Tasmania.

All of the records involved an older driver fatality or the fatality of an older driver's passenger (also aged 65+). The data comprised the Federal Office of Road Safety (FORS) Fatal File. In all cases the relevant information could be gained from the crash, vehicle, and personal files contained in each accident file. Police reports and coroners reports were also available in most cases, although the quality of the police reports was dependent on which state was involved.

A total of 71 useable case records were investigated and subsequently categorised into scenarios

4.2 Analysis of Individual Accident Case Records

4.21 A Caveat

As mentioned earlier, the data presented in this section of the report should be regarded as 'hypotheses' only, as the process of data collection was more related to the methodology of a 'search' than that of a 'test'.

The approach used was, through necessity, primarily qualitative. It is exploratory, and explanatory, relying heavily on the calibre of the source data and the ability of the analyst to search thoroughly and hypothesise. The validity of any generalisations formulated is largely dependent upon the nature of the sample of cases being analysed

As this search was qualitative in nature, the quality of the data was far more important than the availability of vast quantities of cases. A small number of complete cases are more useful than substantial numbers of incomplete cases. Although all of the available data can be accessed through the Federal Office of Road Safety's Fatal File there was some degree of variation in the quality of data supplied by the different states.

4.22 Methodology

This section details the procedures employed in gathering and analysing the 1992 Federal Office of Road Safety Fatal File data used in this part of the report. The first step was to define the target group, 'older drivers', as men and women aged 65 years and older. By initially

sorting through the records it was evident that many of the fatal accidents involving older drivers resulted in the death of an elderly passenger and/or an elderly driver. It was therefore decided that the sample would include fatal accidents in which an older driver or an older driver's passenger (also aged 65+) was killed. As a result of this determination, accidents involving elderly pedestrians were excluded unless of course an older driver was involved. It should also be noted that due to another study being carried out by FORS at the time, accident cases involving trucks were unavailable

We initially searched the fatal file database for a list of files/accidents involving people 65 years and older. From this list we obtained a random sample of files. The final sample of files involving older driver (or passenger) fatalities was then extracted. Each state is represented in the sample as are both rural and metropolitan accidents.

Once the sample of case studies was obtained the information required to build sample scenarios of the circumstances surrounding each accident was ascertained from each case record. A general description was formed of each accident regarding the factors, circumstances, behaviour prior to the accident, other people involved, reason for journey, carelessness, fatigue etc. A number of specific factors were also examined including; sex, age, road type, site of crash, alcohol involved, traffic conditions, weather conditions, time of day/month, registration and year of manufacture of vehicle, number of passengers, speed of vehicle, etc.

4.23 Development of Scenarios by Main Contributing Factors

The following analysis categorises accidents into a number of scenarios. Each scenario is an attempt to typify the circumstances in which older drivers (and their passengers) are involved when killed on the roads. For the purpose of formulating the scenarios, the emphasis was placed on the **main contributing factors**.

Analysis of the individual accident records has resulted in the development of 8 scenarios. These scenarios are as follows:

- I. Ignoring traffic control signals/signs
- II. Loss of Control
 - single vehicle
 - multiple vehicle

- III. Myocardial infarction
- IV. Errors of judgement
 - basic
 - compounded by speed
- V. Other driver
- VI. Right hand turn at intersection (vehicles from opposite directions)
- VII. Fatigue
- VIII. Hit animal (unavoidable)

Each of these scenarios will now be described in more detail

4.3 Accident Scenarios

4.31 Ignoring Traffic Control Signals/Signs

This scenario is typified by an older driver alone in the car or with a single passenger. The accident occurs at an X or T intersection where the older driver has disobeyed a stop sign, give way sign or traffic lights and collided with another vehicle or in two instances collided with a train. Most of the drivers involved were males aged 75 and over, however a number of the drivers were females aged 70 and over.

There appears to be little influence attributed to weather conditions or light conditions as most of the accidents occurred during the day, in fine conditions and dry roads. The majority of these accidents also occurred in urban settings.

There were a total of 16 fatal crashes in this category, making it a statistically typical scenario.

4.32 Loss of Control

Single Vehicle

This scenario is typified by an older driver losing control of his/her vehicle on a **rural** road. The driver loses control of the vehicle, either on a straight section of road or on a curve, then the vehicle leaves the road and hits a tree or other object. The driver is usually a male aged 65 years or older, travelling alone or accompanied by a single passenger. On the few occasions when a female driver was involved she was aged 70 and over.

There appears to be no influence exerted by the external conditions as all of these accidents occurred during the day, and most were in fine weather on dry roads. The reason for loss of control, according to the police reports, is more often than not, unexplained.

There were 9 cases in this single vehicle sub-category.

Multiple Vehicle

This scenario is typified by an older driver, usually travelling alone, losing control of his/her vehicle on a bend or straight and colliding with another vehicle coming in the opposite direction. Both male and female drivers appear to be involved in these type of accidents. The male drivers were aged 65 and over while the female drivers were aged 69 and over. There also appears to be an equal involvement of rural and urban roads in this sub-category.

Again there appears to be no causal involvement of the external conditions as most of these accidents occurred during the day, in fine conditions, and on dry roads. The loss of control was unexplained in all cases according to the police reports

There were 6 cases in this sub-category and a total of 15 cases in the 'loss of control' category.

4.33 Myocardial Infarction

The typical scenario for this category is that of a male driver who has a heart attack (or similar episode) whilst at the wheel, causing him to lose control of the vehicle. The vehicle then leaves the road and hits a tree or power pole, as most of these accidents occur on urban roads and involve only one vehicle. The driver is most often aged 70 and over and may have died as a result of the heart attack rather than the crash as was the result in 3 of these cases.

These accidents usually occurred under conditions of fine weather, dry roads and daylight

There were a total of 9 accidents in this category.

4.34 Errors of Judgement

Basic

This scenario is typified by an older driver misjudging the speed of or not seeing another vehicle whilst attempting to negotiate an intersection or a U-turn. The driver is usually male and aged 66 and older. If it was a female driver she was aged 69 and over. The majority of these accidents occurred on urban roads, with the remainder being on rural highways.

There appears to be no causal involvement of the external conditions as each accident occurred under fine conditions, on a dry road, and during the daytime.

There were 6 cases in this sub-category.

Compounded by Speed

This scenario is typified by an error of judgement on behalf of the older driver which was compounded by one of the vehicles involved speeding. One of these accidents occurred at an urban intersection when the older driver pulled out, after having stopped, and was hit by another vehicle which was speeding. The other two cases involved older drivers being stopped on a rural highway or an urban main road and being hit by a speeding vehicle. Two of the drivers were male and 65 years of age and over, while the other was a female aged 82.

Two of the accidents occurred in fine daylight conditions on dry roads while the other occurred in heavy fog, at night, on a dry rural highway.

There were 3 cases in this sub-category and a total of 9 cases in the 'errors of judgement' category.

4.35 Other Driver

This scenario is far more diverse than the other scenarios. There are very few common aspects among these accidents. However the typical scenario appears to involve a male driver under 40 years of age whose vehicle strikes that of an older driver head on or at an intersection. The

accidents were mostly on urban roads and during the day. Rain and wet roads may have contributed to some of these accidents, although most occurred during fine weather, and on dry roads.

The causes of these kinds of accidents are wide ranging. According to the police reports, the major factors that contributed to these accidents were; fatigue, speed, alcohol, faulty traffic signals, and loss of control of vehicle.

There were 8 accidents assigned this classification.

4.36 Right Hand Turn At Intersection (vehicles from opposite directions)

This scenario is typified by an older driver failing to see or misjudging the speed of an oncoming vehicle while attempting a right hand turn at an X or T intersection. The older driver is usually male aged 70 years and over and alone in the vehicle or accompanied by a single passenger. As these accidents happen at intersections it is not surprising that they all occurred on urban roads.

All of these accidents occurred during the day, while most were in fine and dry conditions.

There were 7 cases included in this category.

4.37 Fatigue

The typical scenario for this category involves a female driver aged 70 and over who, due to fatigue, loses control of her vehicle on a curve or straight section of road. The vehicle then leaves the road and hits a tree and/or rolls down an embankment by the side of the road. These accidents were more likely to occur on rural roads and highways and the female driver is usually alone or accompanied by a single passenger.

Again there seems to be no causal involvement of the external conditions as all of these accidents occurred in fine, dry, daylight conditions.

There were 5 cases that fell into this category.

4.38 Hit Animal (Unavoidable)

There are only 2 cases that could be placed into this category. What the typical scenario consists of is therefore difficult to say. However, it is likely to involve an older driver (male 65+) hitting or swerving to miss an animal (probably a kangaroo) on the road and having a subsequent collision with another vehicle or with a tree off to the side of the road. The accident is also most likely to take place on a rural road.

4.4 Summary of Scenario Analysis

The indepth analysis of case records leads to the conclusion that older driver accidents consist of many different accident patterns which vary by age and by sex.

Males accounted for more than two thirds (70%) of the cases studied. However as only a limited number of cases were included this figure is unlikely to give an accurate representation of actual crash trends

The most common accidents causing the death of an older driver (or an older passenger) were those that occurred as a result of the older driver ignoring the traffic control signals or signs at an intersection. Almost as common a cause of death on the roads for older drivers was that of losing control of the vehicle and colliding with an oncoming vehicle or an object off to the side of the road.

B. Target Group Perceptions

5.0 The Older Driver's World

- 5.1 The Methodology
- 5.2 A Car Is Very Important
- 5.3 Driving Habits
- 5.4 Changes in Driving Habits
- 5.5 Ageing and its Affect on Driving Skills
- 5.6 Problems Faced
- 5.7 Are Older Drivers An "At Risk" Group
- 5.8 Factors Contributing to Older Driver Accidents
- 5.9 Giving Up Driving

5.1 The Methodology

Qualitative research was conducted with older drivers across three States (New South Wales, Victoria and Queensland) and with community stakeholders. The Stakeholders or "Key Influencers" included: Doctors, Occupational Therapists, representatives of traffic authorities, motoring organisations, the aged press and people who work for organisations catering for older people. Neither ex-drivers nor non-drivers were interviewed. Qualitative research is essentially exploratory and diagnostic in its approach and attempts to "search out" and uncover reactions relevant to the topic.

The aim of this stage of the research was to gain an understanding of the older drivers' perception of the world as it impacts on them as a driver. The study also explored a number of risk reduction strategies with both older drivers and Key Influencers. This chapter reports the results of an exploratory study of older drivers and also includes comments by the stakeholders interviewed.

5.11 Group Discussions

Unlike other qualitative studies quoted in the road safety literature, Elliott and Shanahan Research employed a very flexible approach in their study. Other researchers (eg. Rothe and McGregor 1994) have used a more structured technique, for example, the focus group

interview rather than focus group discussion. In a study by Rothe and McGregor (Senior Drivers At Intersections 1994) for example, the focus group interviews contained a minimum of one to a maximum of six participants (in contrast to Elliott and Shanahan's 8-10 participants). Rothe and MacGregor (1994) used a series of predetermined questions in every interview which moved to a less structured format towards the end of the interview

In contrast, Elliott and Shanahan Research used the flexible group discussion technique in this study. The benefits to the group discussion are that.

- it provides participants with a *relaxed and friendly atmosphere*, in which they can discuss their attitudes and opinions in their own terms,
- it allows them to reveal those aspects of the topic which are *of interest or importance to them*;
- it permits a *deeper and more thorough exploration* of attitudes and reactions than do traditional question and answer techniques;
- it is, in essence, an extremely *flexible* technique allowing for the input of stimulus material in the most appropriate manner for any particular group;
- it permits the group moderator to focus the attention of participants on those *specific areas* in the objectives which require detailed probing.

A series of ten (10) group discussions were conducted by Elliott & Shanahan Research with older drivers. The group discussions were conducted between October 1994 and March 1995. Each group session contained between 8-10 participants and represented a range of socio-economic strata. Both single sex and mixed groups of older drivers were included in the study. All group discussions and interviews were audiotaped with the consent of participants and transcribed for analysis. A number of the interviews were conducted by telephone, in which case detailed notes of the interview were made.

The ten groups with older drivers were conducted as follows:

Age	Sex	Location
65+	Male/Female	Sydney
70+	Male/Female	Sydney
70+	Male	Sydney
70+	Female	Sydney
70+	Male/Female	Melbourne
70+	Male/Female	Melbourne
70+	Male	Ballarat
70+	Female	Ballarat
70+	Male/Female	Brisbane
70+	Male/Female	Gold Coast

Each group discussion began with a general consideration of older people's driving habits. The older drivers were also encouraged to talk freely about their

- perceived driving ability;
- awareness of any problems/risks;
- how they cope with specific problems and risks;
- attitudes to giving up driving;
- their perception of older drivers and their jargon.

In order to recommend a range of strategies, designed over time to reduce the incidence of older drivers in road crashes, group participants and interviewees were asked to comment on a range of countermeasures suggested in the literature, (see Appendix). Response to the content and presentation styles of the countermeasures was monitored to provide guidance on how best to communicate with older drivers.

A study probe list was developed by the researchers. Thus, while there was some structure to the proceedings, each discussion was unique and participants were encouraged to raise those issues of importance to themselves (see Appendix).

The moderator's role in the group discussions was to ensure that there was coverage of all relevant issues, and where points were not raised spontaneously, to put them forward for consideration. Participants were encouraged to raise those issues *most salient to them* and to discuss them in their own terms of reference. This enabled researchers to gain *an understanding of the attitudinal context* in which any public education campaign would operate, whilst allowing further and deeper probing and exploration of the issues, when and where needed.

5.12 Individual Interviews

Like the group discussion technique, the individual in-depth interview is very much participant-directed, giving the individual the opportunity to raise those concerns and issues which he or she believes are relevant and important.

Ten (10) in-depth interviews were conducted with older drivers (5 males and 5 females) and five (5) interviews with couples, in which either or both partners were drivers.

A total of twenty (20) "Key Influencers" were interviewed who had some contact with older people and who were thought to have some insight into the situation with older drivers. Four of these interviews were conducted with health professionals including, three Doctors and an occupational therapist.

A total of seven (7) representatives from Roads and Motorists Associations and Transport Departments were interviewed. The organisations represented included the.

- New South Wales Road and Motoring Association (NRMA),
- Royal Automobile Club of Victoria (RACV);
- Royal Automobile Club of Queensland (RACQ);
- Vic Roads;
- Queensland Department of Transport; and
- Roads and Traffic Authority (RTA) in NSW.

Interviews were also carried out with organisations which were believed to represent the views of older people, for example, Pensioner associations, Ethnic organisations, and adult education groups. Three (3) people involved in communicating with older people via the aged press were also interviewed.

5.2 The Car Is Very Important

The car plays a very important role in the life of older people because it influences their degree of mobility and therefore their level of independence. Most older drivers in the study indicated that taking away their licence would be like taking away their independence. Many participants mentioned knowing someone who is unable to catch buses because of the steps while others spoke of the inadequacies of the public transport system in their area. Few people appear to be happy to rely solely on taxis

"I couldn't imagine life without a car."

"The transport difficulties without a car are enormous."

"It's a necessity to have a car these days."

"A car is a necessity where I live because the buses aren't reliable."

Stakeholders also believed that being able to drive is integral to the older person's lifestyle and vital to their independence. Lack of mobility was seen as resulting in isolation.

5.21 The Car is Used Most Days

The majority of participants indicated that they use their car several times a week if not every day. A car is used by older drivers for essential everyday duties such as, shopping, visiting doctors, paying bills etc. Without a car, duties such as shopping can be very difficult for older people, particularly if public transport is the only alternative

"Sometimes I might use it (the car) for three or four days and then you mightn't use it for two days."

"If I don't use it (the car) everyday well it might be 6 out of 7 days or something like that."

"The car is very handy for doing the shopping and visiting relatives. If it wasn't for the car, you wouldn't get around as much, especially if you're a long way from the public transport."

"Well I've been to the airport this morning, shopping and banking in the middle of the day, and now I'm here. I'm going out again this evening to Sandford, but there's no way public transport's going to get me to Sandford."

Older people also use the car for a wide range of leisure activities such as; transport to and from golf courses and bowling clubs, visiting friends and relatives, and for holidays. For instance all of the golfers spoken to indicated that without their car they would have to rely on taxis, which they see as an expensive alternative.

"The car is very convenient for short trips. I've got a daughter in the next suburb, if she wants me I can fly over and I'm there in five minutes."

"It's my life. I drive to tennis and golf. Public transport's good but not for things like that."

One of the major outcomes of retirement is 'time'. As a result many older people spend substantial amounts of time travelling around the country by car, often with a caravan in tow. They have plenty of time so choose to travel by car. By utilising this form of transport they can see what they want to see and travel at their own pace. To take another form of transport would change the whole structure of their holiday. In fact a major change in lifestyle would occur for these people if they were to lose access to a car. Their trips/holidays would be shortened substantially, if taken at all. They prefer the relative low cost of travelling by car and the freedom that it affords them.

"It's practically essential to have a motor car. I find that if we're going away on holidays or something like that it's far more convenient to take the motor car."

"I've been driving up to Queensland for 18 years. I take 5 days to get up to Burleigh Heads...we just look around and only travel so far each day. ... Time is my own, I can please myself as to when I get there. There's so much to see on a trip like that. Why would you want to do it any other way?"

5.22 Reluctance to Rely On Alternatives

The alternatives available to people without access to a car are very dependent on where those people live. There is a general perception in both city and country areas that the public transport system is inadequate particularly for the needs of older people. The alternative to public transport is taxis or reliance on friends and family. Because of the convenience of the car, stakeholders believed it is hard to convince older drivers they can find alternatives to driving.

There are a number of problems faced by older people who use public transport. Many of the older people mentioned the inadequacies of the system in their area such as; limited routes and times, long walking distances to bus stops or stations, and concerns about safety. Others complained that it is simply impossible for them to physically get on a bus or unrealistic to expect older people to carry all their shopping etc home on the bus. There is genuine reluctance among older drivers to rely on public transport, except for those who live close to a stop/station in a well serviced area or who choose to take public transport into the city centre in preference to finding parking for their cars.

"Public transport doesn't suit us very well because I think most of our journeys are across suburbs rather than in and out of town."

"The trains and buses don't go on the round where you're going, so you've got to take your car."

"Sunday public transport is absolutely dreadful because you don't move till 10 o'clock and they finish at 5."

"... old people have been to the Performing Arts and they don't want to walk back over the bridge, down there to Myers and go down there into the car park to wait for a bus to go home, no fear."

"I often use the train but you can't do that at night, it's too dangerous, you've got to use your car or else stay at home."

"The buses are hopeless on the Gold Coast."

"That's the point we've got no public transport of any value. At the moment we still haven't got a bus line that does the whole Gold Coast or interlinks it."

Another alternative available to older people is to use taxis, which are available at special reduced rates. Most indicated they would prefer not to rely on taxis as it becomes expensive if used frequently, even though discounts apply for the elderly.

"Taxis become a bit expensive for people who are on a pension."

"Unless you've got the money for taxis you have to stay in the confines of your home."

The other option available to those without access to a car is to use lifts from friends and family. Constantly relying on other people, however, is something that most of those interviewed were reticent to do. Friends and family can be relied on occasionally, but more than this constitutes a substantial inconvenience for both driver and passenger.

5.23 Driving: 'Right' or 'Privilege'?

Each group of participants was asked whether they considered driving as a 'right' or a 'privilege'. Most considered this a very difficult question to answer, and as a consequence the answers given were quite varied. Many mentioned that being able to drive was a privilege, although this often meant *"being healthy enough to drive"* is a privilege or *"owning a car is a privilege"*.

As this generation has grown up and watched the car become part of everyday life they have changed from seeing driving as a 'privilege' to seeing it as a 'right'. This is evidenced by the fact that many of them initially see driving as a 'privilege' but after some thought they modify this view. It was mentioned that if you have a licence, you have the right to drive and maintain driving until you cease to be competent. Many of those in the study have been driving for most of their lives and thus they see it as their 'right'.

"It's a right if you've got the qualifications for it."

"I think driving is a right. If it's a privilege who decides who should and should not drive?"

"It's a right until you cease to be competent, but I'm not quite sure how you determine that."

Most stakeholders interviewed believed older drivers view driving as their right and not a privilege. One stakeholder in particular believed all drivers (including older drivers) should be re-educated to the belief that driving is a privilege. She believed that re-education may result in all drivers taking more responsibility for their driving behaviour and result in older drivers recognising when it is time to relinquish their licences.

5.3 Driving Habits

5.31 Description of Own Ability

When participants were asked to describe their driving ability, the vast majority answered they were at least *"average"* or *"good"*. Most seemed to base their assessment on things such as; years of driving experience, the careful and cautious manner in which they say they drive, their accident free (or limited accident) record, lack of points lost on their licence, and their respect for the road laws and other drivers.

"Average but careful."

"I reckon I'm just as good as average. I drive in here, I drive up the coast, down the coast, in town, out of town, everywhere..."

"I've got a maximum no claim bonus that I've had for many years and I think that says I'm a reasonably safe driver."

"We have more respect for the rules and other drivers."

"Well I've never had an accident."

Participants also commented that their self assessment is influenced by how others perceive their driving ability. Especially important was whether other people (particularly friends) are willing to be passengers in cars driven by the older driver

5.32 Avoidance Times

There are certain times of the day and certain driving conditions that most, if not all, older drivers try to avoid. The most common of these avoidance times are night, peak hour, the start and end of the school day, and wet weather (particularly at night).

The majority of older drivers indicated they either avoid night driving or they do it as little as possible. The main complaint about driving at night from this group of drivers is **glare** from the oncoming headlights. This is a common problem with ageing as mentioned in section 2.311. Glare can often lead to other problems for older drivers; for example; many of the participants mentioned that glare can be bad enough to cause them to slow right down, when a vehicle approaches from the other direction. This in turn can lead to frustration, impatience and abuse from anyone driving behind the older driver. Another problem with glare is that it can accelerate fatigue in older drivers. The strain of concentrating on the road can be accelerated by the additional strain of headlight glare.

"I can't drive at night because of eye problems... I really need daylight."

"I had problems with glare at night so I got a special pair of glasses."

Another time at which older drivers avoid driving is during **peak hour**. It is unclear how much of this avoidance behaviour is due to a lack of necessity or due to declining ability. It may well be that they don't have to drive during peak hour so they don't. Why sit in traffic and put yourself under all that stress if you don't need to? It is also likely that older drivers avoid peak hour because it is a very busy, stressful, and difficult time to drive. However there was a genuine reluctance to admit this fact, particularly from the male participants

"I don't like to drive at 5 o'clock, when you're all coming home from work, or in the morning."

"I keep away from the peak hours."

"I don't have to drive in peak hour but if I had to it wouldn't worry me."

For those who live near schools, the **start and the end of the school day** are also times to be avoided. These are times when there are "*children running around everywhere*" and mothers picking up their children. This can turn a quiet suburban street into a busy, stressful road particularly in the eyes of an older driver. So these streets are avoided at these times whenever possible.

Wet Weather is also something that older drivers avoid when possible. This point was more likely to be raised by the female participants than the male participants. Again the problems caused by inclement weather are mostly visual although the older drivers' strategy of slowing down can often lead to problems with other drivers. Wet weather can also intensify the problems experienced due to glare at night. Of those who were reluctant to admit they had problems driving at night, most were quite willing to admit they had problems with glare on a wet night.

"I don't like driving in heavy rain, a lot of accidents happen in the rain."

"I prefer not to drive in heavy blinding rain storms because it is much more tiring."

"I find I avoid night-times unless it's necessary or naturally heavy rain or traffic."

"On a wet road at night the lights dazzle you."

Stakeholders believed that older drivers compensate for any age related changes in their driving by choosing not to drive at particular times under certain conditions. This "self monitoring" was seen as the older drivers way of recognising that their driving ability may not be what it once was.

5.4 Changes in Driving Habits

5.41 A Reluctance to Admit Driving Has Changed

When participants were asked if there were any differences in the way they drive now compared with 10 to 15 years ago it was immediately obvious that there is some reluctance to admit any differences. Many, particularly the males, indicated they do not drive any differently to how they have always driven. This is clearly a sensitive issue with some

"When I get in the car I don't react any differently now to when I was driving constantly."

However it did become clear at later stages in the discussion that these drivers have changed their approach to driving as they have aged. When confronted with the direct question they were unwilling to admit any differences, but as the discussion progressed these differences became apparent. For example, some participants told of their preference for driving in familiar areas during the day in good weather conditions and acknowledged their reflexes were not as good as before. This would indicate a certain degree of reluctance to admit any changes in driving habits with increasing age.

5.42 Externalising the Changes

Another point that was immediately evident was the tendency of the older drivers to distance themselves from the area of changes to driving habits. Many participants quickly responded with *"there's a lot more traffic now"*. They felt that if there were any changes in the way they drive it was because of changes to the driving environment and not because of personal or physical changes.

"Ten, fifteen years ago we didn't have the traffic that is on the roads today and it was a devil of a lot easier to drive."

"The roadways have changed a lot and cars are more manoeuvrable."

A large number of participants indicated that because there are a lot more cars on the roads today you have to be more cautious/careful and concentrate all the time. They were adamant that these were changes brought about by influences external to themselves. They believed they are changing their driving as the environment changes, not because they themselves are changing.

"You're more cautious now, you have to be with all the traffic."

"Fifteen years ago you could do it standing on your head, now you've got to concentrate on your driving."

5.43 Changing Driving Habits Became Evident

As mentioned above, although participants were reluctant to admit changes to their driving, it became evident later in the discussion that they do in fact drive differently to when they were younger. Many of the changes are strategies that older drivers implement consciously or unconsciously to compensate for decreasing physical abilities. Changes implemented by older drivers include:

- **leaving longer gaps between themselves and the car in front** to compensate for slower reflexes and an increase in reaction time;

"I like to keep a couple of car lengths between me and the next guy."

"I'm very religious about leaving big enough gaps."

- **driving more slowly and cautiously**, including relying on experience to evaluate and anticipate the traffic environment;

"We've got the experience and we're more careful."

"I don't drive as quickly as I used to."

"We can read the signs as you go along, where the dangers are and you take action to avoid them."

- **planning the route for a trip into unfamiliar territory;**

"I don't mind driving in the city but I've got it all worked out in my head before I leave...you can work it all out before you go."

"You need to come into the city about twice a month to know where you can go and where you can't go, and do that on foot..."

- **taking more time and more breaks on long trips to combat fatigue.** This includes sleeping over to avoid driving after a certain time in the afternoon (eg: 3-4 pm) when fatigue is likely to take effect; and

"When I was young I would leave 4 hours to get to Grafton, whereas now I'd be looking at 4 and a half to 5 hours because I don't drive as fast and I take regular breaks."

"One of the things I've found, if I'm going for a longer drive, I must every 2 hours at least have a stop otherwise I fall asleep."

"When you're driving up north (up to Queensland) you don't drive after 4:30 in the afternoon."

- **avoiding driving at night, during peak hour, and bad weather conditions when visibility is poor.**

5.5 Ageing and Its Affect on Driving Skills

5.51 Getting Old Doesn't Mean Bad Driving

There was a general reluctance among older drivers in the study to acknowledge that the ageing process can affect their driving skills. They feel they are experienced drivers and their skill level is unaffected by ageing. Older drivers perceive that experience allows them to cope with any physical changes that may occur thus ensuring their skill level is not affected.

"I don't think it affects your skills, I think it just affects your reflexes."

"We probably don't have the reactions you have but we've got the experience, we're probably more careful."

5.52 Declining Eyesight

All participants recognised the effect that declining eyesight can have on driving ability. In fact, many believe that this is the main, if not the only, physical change that can have serious implications for driving. Unfortunately this is the only very obvious physical change that older drivers overall appear to recognise as potentially dangerous, particularly as most of them are familiar with the problems caused by glare.

5.53 Other Physical Changes Don't Affect Your Driving

A variety of physical changes associated with ageing were mentioned by study participants including:

- slower reflexes/longer reaction time;
- decreased hearing ability;
- early onset of fatigue;
- arthritis and joint stiffness.

Most participants acknowledged the effects of these changes but failed to link these to their driving ability. The argument of the older driver is that they are aware of any medical problems they have and they compensate for these by implementing the driving strategies mentioned in section "5.3" above. They know their reflexes are slowing so they drive more slowly and leave bigger gaps. They know their eyesight is declining so they do not drive at night. Some of their physiological processes are declining so they implement strategies to compensate. Most older drivers in the study firmly believed that a decline in their physical ability does not affect their driving ability, because they have the experience and the knowledge to compensate for such changes.

"I think our reflexes are not what they used to be but we adjust for that."

"Well I think our reflexes slow down, but as you say we become more cautious, more careful of what you're doing because you've got to think about it more."

"We know our limitations as we get older. We know what we can do and we don't do what we think we can't do."

5.6 Problems Faced by Older Drivers

According to older drivers, the majority of problems experienced are caused by the driving environment or by other drivers. Again there was a clear tendency to externalise the problems they face and believe that the problems are beyond their control.

5.61 The Ever-Changing Road Environment

Older drivers believed that many of the problems they face are due to the constantly changing road environment. Most participants complained about the difficulty of keeping up with all the changes to the roads and the road laws. In fact a large number of older drivers expressed problems with innovations such as roundabouts and multi-lane highways.

"Road rules change and people don't know about it."

"I don't think they (older drivers) really keep abreast of the times, as much as from time to time, road rules change and they don't read them, or they don't understand them."

One of the most common problems for older drivers is using roundabouts. Older drivers have problems entering roundabouts because of what they describe as a lack of knowledge of the road rules and a lack of courtesy on the behalf of other drivers. Others mentioned that larger roundabouts can make it difficult for them as they are unsure which lanes to enter and exit from. In fact there were a number of stories of older drivers becoming confused and going the wrong way around a roundabout.

"...there is not enough emphasis or headlines about the rules of roundabouts. Especially on a 5-way roundabout where you have a point of entry and you've got to go to the third point of exit. Now a lot of people get in the outside lane and follow it around and cut off the exit of 2 other lanes... The things that do happen on roundabouts are enough to make your hair curl."

"A lot of people when they come up to the roundabout, they don't stop and see if there's a car already on the roundabout. You are supposed to give way to a car already on the roundabout. If it's a main road they'll come straight through and it doesn't matter whether you could be sitting there on the road and trying to get on. They just go one after the other and they don't slow down. So you sit there waiting, when really you should be able to go on before the next car coming up even hits the roundabout. But some people don't realise that."

"Roundabouts, they think they've got the alien right to approach a roundabout from the right at 100 and they think they can go straight through. But the roundabout is supposed to slow you down and courtesy should come into it. People should give way and merge."

Multi-lane highways are also a source of difficulty for the older driver. Concern was expressed about entering and exiting multi-lane highways, particularly by women. The problem is most often caused by uncertainty and a lack of confidence.

"I have to use one of those highways every Saturday. You come in on the lane there and you've got to get right over to the other side. I've got to cross over four lanes and they won't let you into that lane very often."

"I think that the most important thing is to know where you're going and where you want to get off and what lane to be in, if they'll let you into it."

5.62 Other Drivers

In the eyes of the older driver many of the problems they face are due to the intolerance of other drivers on the road. They feel constantly under attack from younger, impatient and discourteous drivers. Each of the problems mentioned above in section "5.61" are exacerbated by the impatience of other drivers waiting behind the older driver.

Older drivers believe they are careful, law abiding drivers, and as such they are constantly being abused by impatient and intolerant drivers. They often complained of young people overtaking them then turning off just in front of them, or of people "tailgating" them. As far as older drivers are concerned the biggest problem they face on the roads is caused by "other drivers"

"They dive in and out, in and out of the lanes, and if you don't take your foot off the accelerator you run into the back of them... They dive in front of you, in the space you've left behind the car in front, then next thing goes on the light to say I'm turning here."

"You have to keep to the left the whole time and let them go past, let them speed."

"I think sometimes they're a little bit slow on the take-off and people become rather impatient, especially younger ones that are behind you,... they get a little angry. That gets older people a little confused."

"They fight each other to get to us first. Who's going to bash the old guy first."

"I get intimidated by other drivers... they really are rather rude sometimes and they are inclined to shout at women "

"I think Australians are very rude drivers."

5.7 Are Older Drivers An “At risk” Group?

The answer to this question was a resounding “no!”. The immediate reaction from most participants was that they are not an “at risk group” - *“young drivers are the ones you should be worrying about”*. Their evidence for this assessment comes from the fact that insurance companies offer discounts to drivers over 50 and further discounts if the car will not be driven by someone under 30. If they are such a risky group why are their car insurance premiums so low?

“I think the teenagers are the worst”

“They say the under 25's are the worst, just look at the amount of insurance they have to pay.”

“... insurance companies don't charge you any extra and they charge accordingly don't they.”

Older drivers argue that although their physical capabilities may be slowly declining, they are fully aware of their limitations and implement strategies to overcome any deficiencies. They believe that their careful attitude more than compensates for any physical limitations.

When told the statistics regarding older driver fatalities participants were genuinely surprised. They did not want to believe the figure was so high (20% of drivers killed were aged 60 plus) and questioned its validity. This reluctance to accept that older drivers are “at risk” appears to be linked to an inability to accept age related changes in driving behaviour. In their attempts to discredit the statistic, older drivers in the study questioned:

- if the statistics were representative of city or country areas,
- whether accidents where the older driver was not at fault were included in the statistic. Older drivers believed the fatality rate should only reflect older drivers killed in crashes when they are responsible for the accident.

Interestingly among older drivers there was greater acknowledgment of the dangers of being a pedestrian than those of being a driver. It is unclear how much of this is due to recent road safety campaigns focussing on pedestrian safety.

"I think they're (older people) more at risk as a pedestrian than a motorist."

The majority of stakeholders (see Section 5.1) did not perceive older drivers to be "at risk". Like study group participants, younger drivers were seen as being the most "at risk" group.

Of those stakeholders who believed older drivers were at risk, the reasons given included:

- their frailty means that they are likely to be severely injured in an accident;
- they have a higher incidence of problems involving eyesight, hearing and cognition which were seen as factors in accident causation;
- they have difficulty in making driving decisions (eg. judging distances, changing lanes) and were felt to be particularly at risk in terms of causing other drivers to have accidents involving the older driver or others

Stakeholders also believed that older drivers often have little insight into problems relating to their driving. Because they feel they drive with caution at reduced speeds they believe they are driving safely. It is because of their lack of insight, that stakeholders agreed countermeasures are necessary to prompt older drivers to consider possible driving problems.

5.8 Factors Believed Associated With Older Driver Crashes

5.8.1 Older Drivers Aren't Often Involved In Accidents

Participants were asked about factors they felt contributed to accidents involving older drivers. The first reaction by most was that they do not hear of many accidents involving older drivers. Their belief is that if accidents involving older drivers are not often reported in the media they must not be occurring very regularly.

"Really, when you come to think about it, you don't hear many accidents reported on the TV or the radio where older people have been the driver. It's usually younger people in their twenties or thirties."

"Among the people our age, that we know, accidents are very rare."

5.82 Other Drivers Cause Accidents

One of the most common beliefs among this age group is that if they were to be involved in an automobile accident it would most probably be the other driver's fault. They believe that other drivers' "impatience" is the most likely cause of an accident that would involve them. Many of those in the study related stories of younger drivers' impatience with their careful driving. According to the older driver, this impatience can lead to dangerous situations and accidents.

"Other drivers can be very impatient and that makes them do things they wouldn't usually do, it makes them take unnecessary risks."

5.83 Three Main Causes Of Accidents Involving Older Drivers

When participants focussed specifically on older drivers there appeared to be three main factors they believe contribute to accidents. The first cause is due to "**heart attacks**". Many participants mentioned the possibility of having a heart attack while driving and believed that little else could go wrong for the older driver.

"Well they say heart attacks at the wheel don't they. What else can happen if you're fit enough to drive."

The second factor mentioned by participants was "**lack of concentration**" which was often related to fatigue. Older drivers believed that a lack of concentration can be responsible for them not seeing other vehicles or not obeying traffic signals. A number of drivers commented on how they, or people they knew, had been driving without concentrating properly and drifted over to the other side of the road or gone straight through an intersection.

"I do find myself not paying attention. I've driven through a red light and only realised because my wife told me. We were lucky there was no traffic coming through the intersection."

"I was driving with a friend from America... and he said to me 'don't you have to stop at the red light'. I said 'of course you do'. Then he said 'well you just drove through one'. That's a year ago now."

"It's very necessary to keep your eyes on the road all the time and I think that some people don't. I've seen 1 or 2 of the older people... you know they'll sort of look around and then, bang!"

The other major contributing factor in the mind of the older driver is **"an inability to react quickly"** in certain situations. They feel that this may cause them to run into the back of other cars or be involved in accidents that younger drivers could avoid. Many of the participants were quick to point out that this factor is more likely to contribute to an accident which is primarily caused by the "other driver".

"We might have had experience, but experience doesn't always save you if something happens and you have to react quickly. Before you know it you're into the back of the car in front."

5.9 Giving Up Driving

5.91 It Should Be The Older Driver's Decision

The vast majority of older drivers believed they should make the decision about when to give up driving and their driver's licence. They see themselves as cautious, law abiding citizens who are sensible enough to know when they are a danger to themselves and others on the road. As a consequence, most participants felt that they will *"know when it is time to give up"*. After all they have not got this far in life by taking unnecessary risks. Providing their health and eyesight are good older drivers see no reason why they should relinquish their right to drive.

"When you get to our age you learn how to live life to the best of your ability without taking unnecessary risks."

"I'd like to think that I could make up my own mind. I prefer not to have someone else do it for me, but please God give me the intelligence to recognise it, and if I haven't got the intelligence to give it up I hope someone will tell me."

"I'll take myself off the road when I know it's time, when I think I shouldn't be driving."

"I'd like to think it was an independent decision."

"I hope I have the common sense to hand my driver's licence in when I feel that my reflexes are going to let other people down."

As evidence of self regulation a number of people mentioned friends or relatives who had voluntarily given up their licences because they no longer felt capable or confident of driving safely.

"I know someone who surrendered her licence at 90 and she was well into her eighties when she drove herself to Sydney and into the metropolitan area down in Sydney."

"I know one lady who was sixty when she learned to drive and she was terribly slow. She thought if she went slowly she was alright and she'd have people lined up behind her and she was also hard of hearing. She soon realised it was time to stop driving so she sold her car."

A number of stakeholders told of personal experience with couples, where the male was the older driver and his wife the passenger. In their experience, the male was reluctant to relinquish his licence because he believed he was "letting down his wife" by no longer performing his role as driver. An ability to drive was felt to be a reflection on the older drivers "maleness" and hence the reluctance to admit any driving problems.

5.92 Health Is Important

As mentioned earlier, older drivers see their health as the main barrier to continued safe driving. When asked what would make them give up driving, most said *"if your eyes go"* or *"if you no longer have your health"*. It appears that among this group of drivers "health" equates with good eyesight, good reflexes and a healthy heart.

"If my reflexes or my physical condition causes me problems... I'll give up driving."

"I'll give up driving if I feel my eyesight is not as good as it ought to be or my health."

"You must be able to see and you must be able to react quickly if the need arises."

"If you've got to hit the brake quickly you've got to make sure there is plenty of pressure on that pedal. No good a weak pressure on the pedal you want to stop in a hurry. Yes, so I would say physical condition is important"

As a consequence, **most older drivers see doctors as someone they are willing to involve in the decision of whether or not to give up driving.** Doctors are professional people who are aware of the driver's health and medical condition as well as their lifestyle and day to day requirements. Participants indicated that if their doctor told them to give up driving they would do so, or at least seek further advice

"So you depend on the man (the doctor) to say 'I'm sorry but you just can't do it', if you fight him you only prove your mistake."

"You build up a trust with your doctor and you hope that they advise you accordingly."

"If one day the doctor was to say to me 'I don't think you should drive', well I'd listen. I mightn't like it but I'd do it."

5.93 Lack of Confidence

Confidence in one's own driving ability also appears to play an important role in the decision making process of the older driver. There were a number of statements made by participants that the time to give up driving is when you no longer feel confident in your ability to handle a car. Considering the safety of others is another important part of this

process. Many of the older drivers in the study believed they must consider the safety of others on the road as well as their own safety. The thought of killing someone else (a passenger, pedestrian or driver) on the road appears to be a potent stimulus to many older drivers particularly the older female driver.

"I would think of somebody else or somebody else's kids that I could harm on the road. I would stop and think that I could cause harm to a lovely family coming the opposite way or something and that's what would put me off the road."

"I'll give up driving when I don't enjoy it any more and when I consider that I'm a danger to other people on the road."

"I feel that once I get in the traffic and don't feel comfortable at driving at 60 km an hour that's when I've got to surrender my licence."

"I think if you've got a lack of confidence you must give it away, mustn't you."

"When I don't think I'm capable I would give it up, rather than risk it."

"Most of the people I associate with have come to the agreement that when we can't handle an automobile safely on the road we will give up."

"I think if you're worried while you're out driving, or if you get tense because you're not quite sure of yourself, I think that's a good sign to give up."

5.94 Listen To Family and Friends

Most older drivers believed that it may be important for family and friends to become involved in the decision to give up driving. The opinion of family and friends can be very important in circumstances where the older driver is oblivious to any problems or reluctant to admit any problems he or she may have with driving.

"The fellow who lives next to me, his son said 'Dad I watched you driving down the street the other day and I think you're dangerous'. Bob turned in his licence, he listened to his son."

"I'd expect my family to tell me if I didn't find out for myself, particularly since my medical adviser is my nephew. No way he'd be letting me drive if he thought I was too big a risk."

"I would listen and I'd say 'what do you think I'm doing wrong'. I believe it's important to listen to others."

"If they say it, you should listen and act."

There were however a number of older drivers who said they would be reluctant to listen to their family, especially regarding an area as sensitive as driving. They feel that their families are often over cautious where they are concerned. A number of participants also mentioned they are likely to resent younger people telling them what to do. In both cases the older driver feels that the others are simply interfering in something that is of no concern to them.

"If you've got a daughter, say that you've brought up and taught them to drive, and then all of a sudden they start telling you what to do, you would feel resentment."

"Suddenly they love telling the older people what to do."

"You would be offended if you were criticised by your family. They should look after their own driving."

"I don't think old people would like to be told by young people what they're doing wrong."

"Well you don't usually listen to your family. I'm not kidding, you don't take a lot of notice."

It appears that most of the older drivers would listen to family or friends if approached in the 'correct' manner. It is clear they do not want to be 'told what to do' and that they are unlikely to take kindly to blunt 'criticism'. However in most cases, older drivers are reasonable people who, if approached correctly, realise that their friends or family are genuinely concerned about them.

"You're going to feel that resentment against them and say 'alright I was driving before you were born'... but if they were genuinely concerned... you should be sufficiently mature to listen to them and give consideration to it."

5.95 An Interesting Paradox

An interesting paradox arose between the beliefs of the older drivers and the real life experiences of many of these drivers. As indicated previously (Section 5.91), the vast majority of older drivers believe they should be the ones who decide when to stop driving. However, in every group discussion and in many of the single and couples interviews it was evident that **many older drivers knew someone who they believed should not be driving**. It is simply more of the 'it applies to them but not to me' mentality. They know people who should not be driving, but are certain they themselves will give up when or if they ever get to that stage.

Some of the stories of people who should not be driving are trivial while others are quite alarming as can be seen by the following quotations.

"... an inability to think. Unfortunately he is 83 years of age and should surrender his licence and he won't. He'll back straight out of a driveway into a busy street and if the traffic don't give way to him he doesn't care about his old car."

"I know a chappy and he'll straddle a white line and I've seen him cut corners. I said to him 'hey you better be careful' and he said 'oh it's alright'. As far as he's concerned it's alright."

"We had a terrible time trying to stop my husband's father from driving, he was determined he wasn't going to stop."

"My wife's cousin drives a taxi and he's getting close to seventy. He has vision in only one eye and he drives simply because he memorises all the eye charts."

"Old Sid, when he wants to stop the car he has to lift this leg over on to the brake because the other one doesn't work."

"I know a lady who was 80 and she was absolutely hopeless on the road... do you think she would surrender her licence, no way! They (her family) ended up taking parts out of her car so she wouldn't drive it."

"We live in a small cul de sac and there are old ladies that often come up to my husband and say 'would you please get me out of this street', because they can't. We've seen one lady knock a wall down."

"We know someone who had early Alzheimer's and his wife had a hell of a job to get the car away from him, that's all he had left."

C. A Variety of Possible Future Activities

6.0 Suggested Countermeasures Aimed at Reducing Older Driver Crashes

- 6.1 Overall Response to the Notion of Countermeasures
- 6.2 Education and Training
- 6.3 Leaflets Targeting Older Drivers
- 6.4 Licence Testing Procedures
- 6.5 Changes to Road and Vehicle Design
- 6.6 Additional Countermeasures

The following chapter outlines countermeasures found in the literature targeting older drivers. Response to these countermeasures was sought during the group discussions and interviews and reactions are recorded in this section.

6.1 Overall Response to the Notion of Countermeasures

6.11 Why Us?

Older drivers were reluctant to believe that as a group, they required specifically targeted countermeasures to improve their driving ability. In response to a number of approaches given, older drivers perceived that suggestions would benefit all drivers, not only older drivers. There was a sense that older drivers were being singled out unfairly for problems experienced by drivers of all age groups. Younger drivers were perceived as having the highest accident involvement and therefore older drivers believed resources should concentrate on decreasing the road toll amongst younger drivers instead of focusing on older drivers.

6.12 Communication Must Be Subtle

Confidence in driving ability is very important to older drivers. Any messages therefore need to be communicated in a way which neither frightens older drivers nor causes them to doubt their driving ability. It is essential, older drivers believed, to try and ensure that any communication is not interpreted as suggesting older drivers per se can't be good or safe drivers.

6.13 Inability to Reach All Older Drivers

Regardless of whatever is implemented, study participants said that some older drivers would not be influenced by the countermeasures. Older drivers believed that some people would deny any problem exists and ignore information they may be given.

6.2 Education and Training

6.21 Brief Overview

The aim of older driver education and training is to help older drivers identify their individual limitations and overcome any difficulties which cause accidents (Stamatiadis et al 1990). There is a great deal of evidence to suggest that older drivers already place certain restrictions on their driving such as travelling at lower speeds, making shorter trips and reducing driving at night and during peak hour periods. Other compensatory measures include: avoiding unfamiliar roadways and increasing the distance between vehicles (Winter 1988, Thompson-Perry et al 1992). It is suggested that education therefore could lead to further self regulation by older drivers (Yanik 1991, Sjögren et al 1992, Ball & Owsley 1991; Deacon 1988; Ernszt & O'Connor 1988; Jette & Branch 1992; Barakat & Mulinazzi 1987, Boyle 1990, Lerner & Ratte 1991; Cooper 1990).

Boyle (1990) reports that older drivers are not prepared to be told to give up their licences, however they do look to GPs and medical advisers for advice and guidance. It has also been found that *"older drivers are very receptive to retraining to update their driving knowledge and skills"* (Barakat & Mulinazzi 1987, p202).

6.22 Principles of Adult Learning

In order to promote meaningful learning for older drivers, it is suggested in the literature that any education initiative should:

- take place in an environment which is comfortable, and which allows mutual trust and respect;
- encourage older drivers to participate in the learning experience;
- provide information which is meaningful and relevant to the audience;

- present information in an uncomplicated way;
- ensure information is presented at a pace which is easily understood by all participants; and
- incorporate a combination of teaching methods, for example, films, pamphlets, handouts, discussion, lectures etc. (Winter 1985, Milone 1985, Davis 1981).

6.23 Programs Designed Specifically for Older Drivers

An important consideration for older driver improvement programs is that they be developed on the basis of **helping older drivers improve their performance, rather than restricting older drivers** (McKnight, Simone and Weldman 1982).

Stamatiadis et al (1990) suggest that any education and training of older drivers needs to concentrate on two main areas. Firstly, older drivers can be unfamiliar with changes to the highway system and therefore may need to be informed about new changes. Secondly, older drivers are often aware of how the ageing process impacts on physical and mental abilities but not on how these affect their driving abilities. Therefore *"the physical and mental problems should be explained, and then the performance problems associated with them should be outlined"* (Stamatiadis et al 1990, p110). It is also important to explain how traffic violations occur due to the effects of ageing on vision, attention, information processing and stimuli reaction (Stamatiadis et al 1990).

It has been reported that the Norwegian Society of Traffic Safety has developed teaching materials for a voluntary elderly driver training program (Solvi, publication date unknown). Solvi (publication date unknown, p55) suggests that the course should be *"run privately by the driving schools, voluntary education organisations, traffic safety organisations, large companies and the motoring organisations that the potential participants already know."* The aim of the program is *"to extend the period that senior citizens can drive safely, with less fear and uncertainty"* (Solvi, year of publication unknown, p56). The program includes:

- information on new rules, regulations and measures;
- review of road use theory;
- raising awareness *"of the risk conditions that cause difficulties in traffic and the situations where the elderly are most accident prone"* (p54), and

- indicating how ageing can effect eyesight, hearing, skills, reaction time etc., and the impact these changes can have on driving ability.

Milligan and Hull (1993, p2) believe there are three important aspects to consider when developing an effective education program for older drivers. Firstly, many of the older drivers may not have studied road law for quite some time so it is important that an effective way of explaining road safety issues is established. What they suggest is a system that provides the *"opportunity for discussion of various aspects of the material, and the linking of this material to the participants personal driving situation"* (Milligan and Hull 1993, p3)

The second important aspect to cover is that of functional disability. Older drivers need to be aware of how disability can affect driving ability and safety (Milligan and Hull 1993).

The third aspect is due to the fact that although most older drivers are aware of how functional disabilities can affect driving, they are often unwilling to admit that a disability could be the cause of their driving mistakes. Therefore an effective education program must be able to change the attitudes of the functionally impaired driver (Milligan and Hull 1993).

Milligan and Hull (1993, p3) hypothesised that after completion of the pilot road safety program in Croydon (Victoria) *"participants would (i) have a greater knowledge of the current road law, (ii) be more aware of functional disabilities which might affect their ability to drive safely, and (iii) be more prepared to accept that the right of the functionally impaired to drive on the road may need to be limited."*

The study found:

- participants reacted positively to the course, although the ergonomics component received ratings of "not very useful";
- no significant increase in road law knowledge;
- an increase in awareness of how functional disability can affect safe driving;
- *"a change in attitude to be more accepting that the right of the functionally impaired to drive on the road may need to be limited"* (p7), and

- *"Presentations need to be kept as simple as possible limiting the use of technical jargon. Some sessions, although helpful, became too technical and hence too difficult for participants" (p8)*

6.231 55 Alive/Mature Driving Course

The 55 Alive/Mature Driving course aims to assist older drivers improve their knowledge and road skills in order to remain driving longer (Seaton 1979). The course was developed in 1979 by the National Retired Teachers Association (NRTA) in association with the American Association of Retired Persons (AARP). It involves drivers over 55 years of age participating in a six session course held over a minimum 2 day period. **Older volunteers who are graduates of the course are trained as instructors of the 55 Alive/Mature Driving program**

The topics covered in the course include:

- accident characteristics;
- accident experiences of older drivers,
- physical changes related to driving performances,
- common hazards encountered;
- emergency driving techniques;
- characteristics of other road users;
- local problems;
- auto maintenance;
- licence renewal;
- checklist for purchasing car insurance.

The course is usually conducted with 18-25 people and a range of teaching methods are used including; slides, tapes and group discussions. Seaton (1979, p236) believes *"older adults learn best and have the greatest retention rate when the opportunity to participate in the learning process is maximised."*

An American evaluation of the 55 Alive/Mature Driving program revealed positive results for participants who showed an increase in driving knowledge and a reduction in the number of accidents (Milone 1985, p41).

Reaction to the 55 Alive/Mature Driving course was also sought in the present study. While participants reacted quite positively to the concept they did not believe attendance at the course would be high. **Participants reacted favourably to the idea of having a trained volunteer conduct the program.** It was found to be especially appealing because the trainer would be speaking from years of experience to which they could relate, rather than being taught by an inexperienced, younger person

Participants believed attendance at the course would only be ensured if.

- (a) attendance was compulsory (eg., as a requirement for licence renewal) or
- (b) if the course was offered to older drivers having failed their practical examination

Overall, most participants believed attendance at such a course would be unnecessary because of their driving experience. Participants were critical that the course targeted drivers 55 years of age as they felt such drivers were too young, still likely to be employed and using their cars regularly. Participants believed there would be little incentive for 55 year olds to attend the course because they do not classify themselves as older drivers

Other weaknesses of this approach were that participants felt the course content was too theoretical and there were too many sessions. The number of people suggested for each group (18-25) was seen as too large for effective discussion of the issues involved. Smaller groups were seen as preferable (ie. ten to fifteen people per group).

Group participants believed that the course would mainly attract those drivers who were already aware of the potential changes which occur with ageing. They believed it would not attract "most at risk" drivers because these people would not acknowledge they have a problem, therefore the course would seem irrelevant.

On a conceptual level, 55 Alive/Mature Driving was widely accepted by stakeholders as a positive initiative because older drivers were considered unlikely to discipline themselves to read information booklets targeting older drivers. Stakeholders did however question the cost benefit of the program based on the perceived lack of enthusiasm on behalf of older drivers to attend

Like group participants, stakeholders were critical of the number of sessions (6) in the 55 Alive/Mature Driving course as they believed older drivers would be unwilling to make time to attend. The University of the Third Age in Melbourne has found that older drivers will attend three (3) sessions on older driver education but four (4) sessions are considered too much.

Most stakeholders believed 55 years was too young to begin older driver training. Various explanations were given including:

- the course would have little relevance to drivers of 55 years as they do not consider themselves old;
- most drivers at 55 are still actively involved in the workforce and in life and would have limited time for attendance.

One positive aspect of beginning older driver training at age 55 was based on the possibility of declining health. At age 55, drivers were believed to be fit and living independently and therefore able to attend a course. If left until an older age, poor health was felt to result in one partner being dependent on the other and therefore unable to attend an older driver education program.

The concept of "peer teaching" was positively received by stakeholders in the study. They believed that the information would be viewed as more credible if taught by a trained older volunteer. They also felt that on an emotional level, older drivers would feel more comfortable receiving information about possible driving faults and the ageing process from someone who is also experiencing similar changes.

The Combined Pensioners Association have found peer teaching to be effective in their Medicine Information Project (MIPS). Older volunteers who are graduates of the program discuss issues of medication and pharmaceutical use with other older people in the community.

Often the trained volunteers are actively involved in a range of groups for older people such as leisure clubs, service organisations, or groups in Ethnic communities. Thus they have access to many older people which offers great opportunities to increase awareness about medication use. The peer educators are able to offer a powerful message because they

- are just like the people they are talking to,
- have already established communication with older people through their activities,
- understand the community; and
- for NESB trainers, they speak the language and understand the culture

There may be potential to incorporate information for older drivers through the MIPS program

6.232 *The Safe Seniors Program*

In 1990, the Roads and Traffic Authority (RTA) launched a program called "Safe Seniors" in NSW. The program targeted road users aged 60 years and over (drivers and pedestrians) and aimed to decrease the involvement of this age group in serious road crashes.

The program was run using a group discussion format and facilitators were trained in using the Safe Seniors education package. The package included:

- a video with 2 x 10 minute skits:
 - (1) "Driving for Keeps"
 - (2) "Walking to Live"
- a brochure

The Market Research Company, Yann Campbell Hoare Wheeler was commissioned by the RTA in 1991 to evaluate the Safe Seniors Program. The evaluation focussed on comments by both group participants and facilitators. The findings from the evaluation are contained in an unpublished consultants report for the RTA. It should be noted that the views expressed in the report may not necessarily be those of the RTA

The evaluation found that despite enjoying the program, participants' beliefs and attitudes did not change as a result of the information contained in the program. Group leaders were enthusiastic about the program materials and believed the program generated a high level of involvement amongst the target audience.

The consultants concluded that "there is no evidence of participant behaviour or attitude change as a result of exposure to the program" (Yann Campbell Hoare Wheeler 1991, p (ii)). The RTA no longer operate the Safe Seniors program.

In the current study, two groups were shown an excerpt from the "Driving for Keeps" section of the Safe Seniors video. It must be stressed that the present study did not attempt do an in-depth analysis of the Safe Seniors program. The video was shown as one example among many, of the types of countermeasures which could be used in Australia with older drivers.

The limited sections of the video shown were positively received by the two groups and seemed to reinforce information already known. Participants could identify with the scenarios, for example, problems in a carpark, and the video certainly generated discussion amongst the groups. As a teaching tool, the video was found to be appropriate, although there was some concern regarding the ability to understand the characters from Non English Speaking Backgrounds.

6.233 *The SafeDrive Program*

The SafeDrive Kit was produced by VicRoads in 1995 and is available throughout Victoria on loan from the VicRoads library. The Kit is made up of 9 volumes, each contained in a separate folder and is designed to be used by professionals in the community to instruct older drivers over the age of 50 years.

The following topics are covered by the SafeDrive program:

- | | |
|---------------------------------|------------------------------|
| 1. Road Safety Introduction | 6. Important Road Rules |
| 2. Fatigue and Driving | 7. Keeping Cars in Condition |
| 3. Health and the Senior Driver | 8. Improving Your Driving |
| 4. Prescribed Drugs and Driving | 9. Manual for Organisers |
| 5. Vision and Older Drivers | |

Each volume contains a lecture plan and associated overheads. The idea is for SafeDrive to be presented to older drivers as a one day session lasting approximately 6 hours (with a lunchbreak) or over a two day period.

SafeDrive is designed to be used by community organisations who would then arrange local professionals to deliver the volume relevant to their area of expertise, for example, a doctor, optometrist, pharmacist, or road safety specialist. Scope is also provided for the professionals to incorporate additional information into the program if they desire.

Elliott and Shanahan Research did not have access to the SafeDrive Kit when conducting the fieldwork for this study. Indeed, one potential drawback of the kit is its limited availability, only six kits have been prepared. The following analysis of SafeDrive is therefore based on the accumulated knowledge researchers have gained throughout the current research study.

In earlier sections of this chapter, criteria for consideration when formulating countermeasures for older drivers was discussed. Researchers decided to analyse SafeDrive according to those recommendations for older driver initiatives and in the light of their understanding of participant reaction to countermeasures suggested in the literature. The following table is a summary of this analysis.

Criteria	SafeDrive
Rationale of program: to help older drivers improve performance rather than place restrictions on their driving.	Meets criteria Stated aims: - assist mature drivers to appreciate limitations that increasing age may place on driving capacity. - not intended to encourage older drivers to give up driving but provide information to amend driving practices. - if in reasonably good health and after consultation with health professional should remain driving, although some may have limitations.
Content: - information about changes to road rules; - information about how violations occur due to the effects of ageing on, for example, vision, attention, and reactions; - how disability affects driving; - a range of relevant topics covered.	Meets criteria - Volume 6 provides information on important road rules Meets criteria - Volume 3 relates to Health and the Senior Driver and Volume 5 contains information about Vision and Older Drivers Meets criteria - Volume 3 Meets criteria
Teaching Methods: - Combination of techniques used - Encouraging older drivers to participate. - Presented in an uncomplicated way. - Humour	SafeDrive uses: lecture format, overhead transparencies, and suggestion of "take home" pamphlets. No mention is made however, of promoting group discussions or provision of written notes on the program. Encourages participation by making information relevant to older drivers, explaining how physical changes impact on senior drivers, specifically targeting older drivers. Simple format for moderators and participants. Overheads written clearly, mostly in legible sized font. Yes - some overheads with cartoons incorporated into teaching materials.
Environment - Comfortable environment - Presented at a pace easily understood by all participants.	Essential for the program, but unable to assess since SafeDrive could be conducted over a range of locations.

The strengths of the SafeDrive program include the following:

- The information is directed towards “you” the older driver. This approach tries to activate involvement by the older driver with the information, for example, in volume 3:
“DO NOT accept disease as part of getting old!
 - *Ask the Dr about how safe it is to drive*
 - *Ask the Eye Specialist how safe it is for you to drive*
 - *Ask them WHEN it is safe for you to drive.”*
- SafeDrive encourages the older drivers to drive responsibly. The program does not say “don’t drive”, it does say be responsible and recognise your own capabilities.
- SafeDrive recognises that individual older drivers differ in their driving abilities and physical health and are not one homogeneous group.
- An explanation is given for the physical changes often associated with ageing and then these are related to driving ability. This approach appears to be effective because it increases the relevance to the target audience and provides easy to relate to examples, for instance, a decrease in hearing can result in a possible inability to hear sirens.
- Results from previous studies are incorporated into the program. This provides a “real life” flavour and gives credibility to the other information.
- The provision of clearly labelled, large lettered overheads improve comprehension of the material. These include both visual overheads and overheads where text and pictures are combined.

Elliott and Shanahan Research believe the following comments may help enhance the resource:

- It may be more appropriate to use pictures of older people in the overheads, rather than younger illustrations,

- It is sometimes unclear whether information relates to all drivers or older drivers specifically. This distinction needs to be made clear;
- No guidelines are given regarding the recommended number of participants to include in a SafeDrive program. This information may be helpful to program organisers;
- It would seem more appropriate to have the “Manual for SafeDrive Organisers” incorporated into volume 1, rather than it appearing as volume 9,
- Volume 8 covers information on defensive driving techniques. It may be beneficial for participants to be given contact details of courses available.

SafeDrive is currently produced in Victoria for use by people in Victoria. The following comments are made for consideration, should the Federal Office of Road Safety or any other State authority decide to develop the resource for a wider Australian audience

1. Currently, SafeDrive makes reference to Victorian institutions like the Royal Automobile Club of Victoria (RACV). If the resource were to be extended, references to other state institutions would be required.
2. Although licensing requirements differ around Australia, it would seem important to incorporate details of these requirements for older drivers.
3. Elliott and Shanahan Research discussed a countermeasure called 55 Alive/Mature Driving with participants in their study. The perception was that the program targeted older drivers at too young an age. SafeDrive is aimed at older drivers from age 50 onwards. Based on the results of our research, 50 year olds would have little incentive to attend a course targeting “older” drivers.
4. Other programs for older drivers have found positive benefits of using older people to present the information targeting older drivers. Indeed, our own research highlighted the beneficial impact. Participants believed they could relate better to the information if presented by a person their own age, experiencing similar changes as themselves. Perhaps SafeDrive could incorporate the use of older professionals to run specific segments of the course

5. VicRoads authorises community groups in Victoria to use the SafeDrive material for presentation to their members. This is a very positive approach since participation in the course may be encouraged because of group membership. A range of organisations could be targeted including Combined Pensioners and Superannuants Association, the Older Women's Network, Independent Retirees Association, Rotary International, Retirement Groups, etc.

Possible inclusions to SafeDrive include:

- The incorporation of "tests" into their resource to enable participants to experience "first hand" any changes which may be occurring, for example, testing for night vision, ability to see under glare, reaction times. The aim is not to frighten participants, but to increase awareness of changes which are occurring which could impact on their driving ability, so that steps can be taken to counteract them
- Incentives to increase program participation such as:
 - insurance discounts for graduates;
 - making attendance a prerequisite for licence renewal,
 - publicity about the existence of the program
- A handout for participants who attend the program. This information should not be too detailed, but would serve to aid recall of the information presented in the course. Additionally, it could be passed on to encourage others to attend a similar course.
- Provision of guidelines for group discussion topics to increase participant involvement and understanding of the course content.

6.234 Other Education Programs

Other examples of driver training and education programs in the American literature include a Defensive Driving Course offered by the National Safety Council and a Safe Driving for Mature Operators program offered by AAA offices. Completion of the Defensive Driving Course entitles drivers to a reduction in their car insurance. The second program includes general driving information as well as testing drivers for night vision, ability to see under glare conditions and reaction time (Brenton 1986).

6.3 Leaflets Targeting Older Drivers

6.31 Overall response

Older drivers have also been targeted with educational messages via brochures and leaflets. In this study, participants were asked to comment on a range of material in brochure format as an alternative or supplement to education programs.

Overall, the concept of brochures was received well. Pamphlets were found to be appealing because older drivers said they could read the information at their leisure and did not require a huge time commitment in order to enhance their driving skills (unlike the driver education programs which were perceived as requiring a large time commitment).

The negative aspects of brochures related to distribution and use. Participants in the study believed there were difficulties in ensuring the brochures reached the target audience and questioned whether the information would be read and understood by older drivers.

6.32 Reaction to Specific Brochures

Two brochures produced by the State Transport Departments in Victoria and Queensland were used as stimulus material during the group discussions and interviews. Both the Queensland pamphlet titled "Licensing for Older and Medical Drivers" and the Victorian pamphlet "Safety Hints for the Elderly Driver" were A4 in size with information and pictures printed on both sides of the paper. The brochures were praised by older drivers because of the simple layout and limited information content. They believed older drivers were more likely to read this type of information because it would not take a lot of time and did not look complicated.

6.321 *The Older Person's Guide to Safe Driving*

"The Older Person's Guide to Safe Driving" is produced in the USA by The Public Affairs Committee which publishes a range of pamphlets dealing with social and personal issues. The information presented in the older drivers pamphlet is based in part on information provided by the AAA Foundation for Traffic Safety in the American state of Virginia.

Although older drivers in the study recognised the importance of information provision, they were critical of the Public Affairs pamphlet. They felt the brochure contained too much information, a perception which made them disinclined to read the information. They also believed the font size was too small and questioned whether drivers would be willing to pay for the pamphlet. In the US the pamphlet is available for a minimal cost.

Stakeholders also believed the booklet contained too much information. A pamphlet layout with less information was preferred as it was considered more "user friendly".

6.322 *Response to the American Guide for Families and Friends*

Malfetti and Winter (1991) developed a resource for the AAA Foundation aimed at the families and friends of older drivers. The booklet offers a range of suggestions on how the relatives and friends of an older driver might cope with problems experienced by older drivers on the road. Topics covered in the booklet include:

- ways to assess an older driver's ability;
- options for you and your older driver; and
- information on how ageing affects driving ability.

Reaction to the Family and Friends Guide in the present study was influenced by a number of factors. Participants questioned the ability of their family and friends to judge the older drivers' ability to handle a car on the road. They also believed that the success of the guide was dependent on the nature of the relationship between the older driver and his/her family. If a good relationship exists, the older driver is more likely to accept the suggestions on how to improve their driving. In contrast, if the relationship is poor, advice from the family may only heighten family problems and do nothing to assist the older driver.

The Guide for Families and Friends elicited a mixed response. The strengths of the approach included:

- it provides an understanding of the importance of tactfully communicating with older drivers,
- the positive benefits of involving families because sometimes the older driver is unaware of physical changes which may result in driving deficits; and
- if children are well meaning then parents believed they would listen to their thoughts and suggestions about driving.

While participants did not read the information contained in the brochure in depth, there was a negative response by some to the concept of targeting family and friends. Some believed the guide suggested that older drivers were incapable of deciding whether or not to drive and that responsibility for this decision should be given to others. This was interpreted as familial interference and elicited strong resentment by some.

There was also some concern that family members may be over critical of the older drivers abilities, without having any training on which to base their assessment

Involving families and friends in decisions about driving was seen by stakeholders as a positive, tactful way of addressing an older driver's problem. Some stakeholders interviewed had first hand experience with relatives concerned about an older drivers' declining driving ability and felt the guide had the potential to be a useful resource. While the idea was perceived positively, the execution was criticised for containing too much information. Stakeholders believed the guide looked uninviting and complicated and would need to be simplified to encourage readership.

One suggested improvement was to incorporate advice for families and friends about where for example, to seek further information or details on refresher driving courses or education programs for the older driver.

Stakeholders believed there would be limited readership if only available through State Traffic Authorities. It is commonly believed that people visit Authorities like the RTA or VicRoads infrequently as licence renewal is normally done by post. One method of distribution suggested

in the study was to advertise the guide in newspapers and provide a 008 number for readers to call and obtain the booklet. This was seen as an effective cost saving measure for the government.

6.323 Information About Changes to Road Rules

Participants in the study believed it was important to keep informed about changes in the road rules. Some felt it is the driver's responsibility to ensure they learn about new rules, while others believed it is the responsibility of the State Transport Authority to alert drivers to changes in the system.

A common opinion expressed related to the belief held by older drivers that all drivers require information about road rules - not only older drivers. They felt information directed at all drivers would be most beneficial. In addition to having road rule booklets available at Transport Offices, suggestions were made to include updates in the mail with licence renewals.

6.33 Barriers To Involvement in Education

Older drivers, like most other drivers, have a propensity to believe that their own accident likelihood is less than that of other drivers (Cooper 1990; Holland 1993). Cooper et al (1993) found that all but a few (98.9%) of the older drivers he interviewed believed their driving ability was average or better-than-average. In fact 41.4% of those interviewed felt they were better-than-average drivers. The study also found that this belief changed little with age. It is therefore important to ensure that education and training programs are seen as relevant to the older driver in order to increase participation.

Holland (1993) discovered that people in their 70's believed that drivers in their 30's were more likely to have an accident. The study also indicated that *"all groups of subjects, including those in their 70's, thought themselves to be least likely to have an accident when comparing themselves with an average driver aged 70, as compared with average drivers aged 30 and 50. This suggests that the positive self-bias is still an important component for older drivers, despite their realistic judgements of themselves in relation to other age groups"* (Holland 1993, p439). Holland (1993) concluded that as older drivers' confidence in their own abilities decreases so does their positive self-bias, however it is still quite evident.

Mc Knight (1988) found that less than 2 percent of the older driver population are willing to enrol in formal programs of driving instruction. In order to encourage program participation, suggestions included:

- insurance discounts for graduates of the program;
- highlighting that participants may be able to retain their licence longer;
- emphasising that self improvement in driving skills is possible;
- making completion of the program a pre-requisite for licence renewal,
- publicise existence of the program.

6.4 Licence Testing Procedures

There are a wide variety of testing procedures currently used and proposed for evaluating older drivers' driving capabilities. Both the current and proposed testing procedures appear to fall into one of three categories ("*health profession assessments*", "*practical driving assessments*", and "*road law tests*") or a combination of these categories (Hull and Nguyen 1994, p8).

6.41 Assessment by Health Professionals

A number of different health aspects are currently considered important in the testing of older drivers. Most of the testing concentrates on the visual ability of the driver. Hull and Nguyen (1994, p9) mentioned that the term "*medical assessments*" is inappropriate because most "*general practices are ill-equipped to assess night vision, glare recovery and peripheral fields of view.*" They also mention the inability of GP's to assess changes to lifestyle as a result of the various considerations that affect "*quality of life or mental health*" (Hull and Nguyen 1994, p9).

It is evident from the earlier section on contributing factors that visual ability is not the only health aspect that is important in safe driving. A health examination may need to include assessment of such things as cognitive ability, range of motion, physical functioning and auditory sensitivity. Torpey and Francis (1992) also recommend testing older drivers'

attentional abilities. They concluded *"there is currently a lack of valid, sensitive and reliable tests to discriminate impaired individuals who are acceptably safe as drivers from those who are not."* (Torpey and Francis 1992, p22)

Currently in Victoria persons returning to driving after a stroke or massive head trauma are assessed by Occupational Therapists. However Hull and Nguyen (1994) commented that this method of assessment not would be cost effective if applied to older drivers, and the considerable cost would be borne by the tax payer as Medicare would be unlikely to foot the bill. The availability, efficiency and equity of these driving assessments by occupational therapists was also seen as unsatisfactory by Torpey and Francis (1992, p29) because, they are *"only available from a small number of specialist rehabilitation institutions staffed by occupational therapists with recognised post graduate training in driver assessments."*

Torpey and Francis (1992) recommended that in the future there should be a list of practitioners and agencies that can help with cases where GP's do not feel competent in assessing driving skills. This recommendation was based on the belief *"that medical practitioners in Victoria are not in possession of adequate advice and/or information with regard to making assessments of driving capacities in relation to medical conditions"* (Torpey and Francis 1992, p34).

6.411 Response to Health Professional Assessment

Study participants believed a medical examination was an appropriate method of assessing driver suitability. Doctors were seen as both capable and appropriate professionals to conduct such an examination.

The majority believed they would accept their Doctors' opinion if they were found to be medically unfit to drive. In fact, declining health was most often stated as the reason why older drivers would not renew their licences.

There were some older drivers however who said they would not accept their doctor's decision if found unfit to drive. These drivers were strongly opposed to the notion of giving up their licenses and believed they would seek alternative medical opinions until successful.

In NSW for example, older drivers would have difficulties in "shopping around" for a doctor to endorse their medical fitness. According to instructions on the medical report required by the

RTA, the examining doctor must forward the completed report to the Traffic Authority if the licence holder is considered unfit to drive. Administrative procedures therefore should restrict older drivers from finding loopholes in the system.

6.42 On-Road Driving Tests

The practical driving tests currently in use in Australia are designed to test novice drivers' car control skills, ability to negotiate the roads and apply the road laws when they are on the road. There is no current evidence to indicate that a driver's score on these tests correlates with road safety performance (Hull and Nguyen 1994)

The main problem faced by legislators is that any implementation of compulsory licence re-testing for drivers at or above a certain age is likely to face strong opposition due to its impact on equity, mobility and access (Hull 1991). However Stamatiadis et al (1990) reported that age 60 would be a reasonable starting point because at this age and beyond there is a higher than average accident involvement rate.

There is a wide variety of re-testing requirements throughout the world and indeed within Australian States. The following table from the FORS publication titled "Driver Licensing Practices in Australia (1993)" details the different requirements of each state in Australia, with regard to older drivers

Victoria is the only state that does not require any re-testing of older drivers. Hull (1991) points out that the fatal crash rate for Victorian older drivers is less than that of the other states over a similar period. From this data he concludes *"that medical testing, vision testing and road testing of older drivers are not an effective means of reducing the fatal crash rate of older drivers"* (Hull 1991, p20).

Waller (1988, p76) looked at a number of programs that have been implemented overseas and concluded *"the evidence suggests that road testing as it is currently practised is probably not useful in routine renewal testing, even for older drivers."*

More recently Torpey and Francis (1992) mentioned that the on-road testing procedures being developed by occupational therapists in Melbourne and Sydney rehabilitation centres appear to have the most potential

State/Territory	Vision Test From Age	Medical Test From Age	Road Test From Age
A.C.T.	50	70	Nil
N.S.W.	80	80	70 (public vehicles), 80 some other vehicles; 85 all drivers annually
N.T.	All drivers on renewal	Nil	Nil
QLD	70	If problem declared or 70 plus	If warranted by driving history or suggested by medical practitioner
S.A.	Yearly from 70	Yearly from 70	At 75 and yearly after 80 or if requested by doctor on annual medical
TASMANIA	Yearly from 75	Yearly from 75	Yearly from 85
VICTORIA	First licence only or if reported	If declared or reported	If reported
W.A.	75	If declared	At 85 onwards

Source: Driver Licensing Practices in Australia 1993, p32

6.421 Reluctance for On-Road Test

There was genuine concern expressed throughout the study regarding the compulsory on-road practical driving test. Older drivers seemed nervous at the prospect of having to pass a practical driving test and stories were told of drivers giving up their licence in preference to taking the examination.

Older drivers believed that the practical examination should not be given in the same form as the novice driver's test. They felt that the test for older drivers should acknowledge their driving experience and their very often good driving record.

In NSW, which is the only state in the study where mandatory road testing occurs (road testing not mandatory in Queensland or Victoria), participants agreed that older drivers should undergo re-examination even though they did not like the prospect. Re-testing was especially, seen as positive for those drivers who refuse to accept they may no longer be capable of driving safely.

6.43 Knowledge Test

There also appears to be little evidence that performance on knowledge tests correlates with a driver's road safety performance (Waller, Hall and Padgett 1977; Hull and Nguyen 1994). Knowledge tests are designed to ensure that those who have never legally driven before know exactly what is expected of them on the roads. These tests are therefore inadequate as a means of assessing an older driver's ability to maintain driving in a safe manner.

A study was conducted in North Carolina to test the impact of eliminating knowledge testing in the renewal procedure (Waller et al, 1977). Drivers who had no violations within the four years prior to renewal did not have to undertake a routine knowledge test. There was no evidence that there was any detrimental effect for renewal applicants aged 25 and over who were not required to take the test. Waller (1988, p75) concluded *"it appears that the elimination of routine knowledge testing for older licence renewal applicants who have no convictions during the 4 years before renewal has no adverse effects on subsequent driving performance, as measured by crashes and convictions on the official driving records."*

6.431 Knowledge Tests for Everyone

If knowledge tests were to be introduced, older drivers in this study believed they should be mandatory for all drivers. Older drivers felt they knew the basic road rules from their years of experience, but probably like all drivers were not aware of recent changes or new additions.

There was little support for mandatory knowledge testing. While older drivers stressed the importance of knowing basic road rules, they felt experience was more important than knowledge testing.

6.432 Age When Licensing Controls Should Occur

There is some debate in the literature about using chronological age as a basis for licensing controls. One argument in support of re-testing older drivers is that physiological changes which occur as a person ages result in a decline in the older driver's driving ability (Brenton 1986). Malfetti and Winter (1991) comment that using chronological age as a basis for licensing decisions is unsatisfactory because older drivers vary so widely in their abilities. Participants believed setting an age limit for compulsory re-examination at any age, based on age alone could be considered discriminatory. Older drivers also believed they police themselves by for example, driving less often and generally avoiding hazardous conditions which in some respects renders licensing controls unnecessary (Public Affairs Pamphlet No 641 1986)

Few participants in NSW were aware of the rules regarding mandatory medical and practical assessments. Even though there was some disagreement with compulsory testing on an emotional level, most agreed that testing was, in all probability, necessary for drivers as they grow older.

Participants believed that although they may restrict their driving, unless measures are mandatory, they are unlikely to effectively alter behaviour. There was support among NSW participants for reducing the age of compulsory on-road testing to 80 years of age and medical testing to 70-75 years.

An associated issue raised related to licence renewal. In NSW, all drivers are currently able to renew their licence for a 5 year period and in Victoria, a licence can be renewed for 10 years. Participants in the study believed that over a certain age, licences should no longer be renewable for 5 year periods, but for a period of 2-3 years. The rationale for this suggestion was that one's health could deteriorate within the 5 year time limit and some drivers may not recognise the potentially damaging effects on their driving skills

6.44 Restricted or Conditional Licences

According to Chipman (1991, p106) *"the job of regulating drivers is a difficult one, and striking a balance between reasonable access and reasonable risk presents some unexpected challenges where older drivers are concerned."* Complications arise not only in determining what measures to propose, but in working out at what age any initiatives should occur.

Suggestions in the literature involve the introduction of a "graded" or "restricted licence" for older drivers. This type of licence is described as being somewhere between having full driving privileges and no driving privileges. A graded licence is thought to enable older people to continue driving as long as they can drive with safety to themselves and others (Malfetti and Winter 1991).

Torpey and Francis (1992) and Saremi et al (1993) also recommend the need for graduated or conditional licences so that drivers with less serious impairments can maintain their mobility under certain conditions. A licence may be issued for example, which places restrictions on the distance the older driver can travel, or which permits driving during daylight hours only. Saremi, Wang and Liu (1993) argue that as young people and beginners gradually become part of the driving population, so too older drivers should not be abruptly removed. In the state of Washington for example, drivers who cannot pass the normal driving test after two attempts are placed in a special program that may ultimately lead to them obtaining a special licence. This licence may restrict their driving to certain areas or times of the day (Frisbie 1991).

Restricted licences appear to represent the good "middle ground". Older drivers may feel less threatened by the prospect of re-examination if they know that a poor result does not mean licence cancellation. Re-examination may lead to a finding that the older driver can drive safely under some, but not all conditions.

Another consideration to ensure safety of the older driver and the community is to grant "limited term" licences - not only for older drivers but for people with specific health conditions. A "limited term" licence may be granted for a period which is less than the normal renewal period in order for authorities to monitor the health or age related deficiencies of the older driver (Waller 1988).

Mourant (1979) argues against the notion of restricted licences on the basis that restricting older drivers to low stress situations (for example, daytime driving, non-peak hour travel) would not significantly reduce accident rates, since older drivers already avoid stressful situations themselves.

Others point out that placing restrictions on older drivers may result in more infrequent driving, resulting ultimately in more dangerous driving (due to lack of practise) than before any action was taken. Decreased mobility may also result in the older person experiencing poor health and suffering social isolation (OECD 1985).

6.441 Response to Restricted Licences

Study participants believed the most beneficial aspect of the restricted licence was that it allowed older drivers to still maintain a certain level of independence. While some participants found the idea appealing, others believed that if they were unable to maintain the full privileges of a licence they would prefer not to drive at all. This perception appears to be influenced by the older drivers confidence in their driving ability. If they knew they had failed the extended re-examination, then some believed they would feel incapable of driving shorter distances competently. For these drivers, they had effectively decided it was “all or nothing”

The older drivers in this study confirmed the point in the literature that conditional licences may be unnecessary because older drivers restrict their own driving habits. They believed that older drivers tended to drive less at night, during peak times and long distances on unfamiliar roads.

There was a sense that older drivers should not be given a licence if they are incapable of passing the driver re-examination test. Regardless of the restrictions on any licence granted, participants believed the risk of accidents occurring was still high

The majority believed that a system of conditional licences would be very difficult to monitor and that abuse of the privilege would occur.

6.45 Other Measures/Tests

Gebers and Peck (1992, p91) have suggested an *"age-mediated point system"* for older drivers. They found an interaction between age and prior driving record when traffic accident and traffic conviction records were closely examined. Gebers and Peck (1992, p21) suggested a points system *"in which driver control actions would be initiated at a lower threshold for drivers above... 60 or 70 years of age"*. The advantage of such a system is that it could also be used to detect drivers with mental and physical problems who could be referred for further investigation.

6.5 Changes to Road and Vehicle Design

Much of the literature dealing with problems experienced by older drivers suggests improvements could be made to the road system and automobile design. Many of the suggested changes are simple and could easily be implemented, while others are substantially more complicated and somewhat futuristic.

6.51 Changes to Vehicle Design

As discussed earlier in this report, there are a number of substantial physiological changes that occur as a person ages. It is these problems that have influenced most of the suggested changes in current vehicle safety design including changes to safety belts, mirrors, windshield wipers, steering, brakes, dashboards, seats and headlights (Kanouse 1988; Waller 1991; National Road Safety Council 1990).

Malfetti (1985) reported that older drivers often have difficulties reaching seat belts and consequently this provides an excuse for them not wearing them. For this reason older drivers would especially benefit from automatic safety belts that eliminate the problems of buckling and unbuckling (Kanouse 1988).

Other safety features mentioned by Kanouse (1988) include:

- improved design and, interior and exterior placement of mirrors to help older drivers with reduced flexibility of the neck and trunk;
- changes to the size and placement of supporting A pillars to reduce the difficulties of blind spots to older drivers;
- increased width of windshield wiper sweep to heighten lateral visibility which is often deteriorating in older drivers;
- provide power brakes and power steering to assist older drivers as their physical strength decreases with increasing age;

- provide antilock brake systems to minimise the effects of decreasing reaction times in emergency situations;
- decreasing in the complexity of controls and visual displays on dashboards to compensate for possible cognitive difficulties experienced by older drivers;
- improved lateral and lumbar support, and less padding for seats as older drivers often are uncomfortable sitting in most car seats even for moderate time periods. The risk of injury could also be reduced by seats that on collision prevent excessive forward and downward movement of the buttocks; and
- high-mounted brake lights that increase visibility and decrease the likelihood of rear-end collisions would benefit older drivers, as they have an increased risk of being struck from the rear due to their slower driving speeds.

A number of changes to vehicle design were also suggested by Mortimer and Fell (1988). They believe that older drivers would benefit from a reduction in the maximum allowable mounting height of headlights because this would reduce glare, especially from vehicles in the exterior and interior mirrors. Another of their suggestions involves a wiper system for headlights to maintain an acceptable level of cleanliness.

There are also a number of safety features that would compensate for older drivers susceptibility to serious injury in the event of an accident. These include the installation of airbags and relatively softer interior structures within cars (Godwin & Yee 1988, Mackay 1988).

6.52 Changes to The Road Environment

As the older driver population increases it is becoming apparent that the older driver should be a very important consideration when designing and regulating the traffic environment (Spolander 1991). A great deal of the literature dealing with older drivers suggests that their road safety could be enhanced by improvements to the driving environment, such as better signage, lighting and traffic signals (Waller 1991; Yanik 1991; Mortimer & Fell 1988, Godwin & Yee 1988, Saremi et al 1993).

To decrease the involvement of older drivers in crashes after dark, Mortimer and Fell (1988) suggest a number of changes to improve the night driving environment. The suggested road design changes include an increase in the reflectivity of roadway delineation and other objects that pose a danger during night driving. Others (National Road Safety Council 1990) have also highlighted the importance of the reflectivity of road markings and their maintenance to ensure they retain a sufficient level of brightness. There is a belief that as the population ages older drivers are more likely to want to maintain their high level of mobility and reduce their number of self imposed restrictions. Therefore enhanced delineation should be beneficial (Deacon 1988).

A number of people also believe there are gains to be made by improving road signage. Older drivers require extra time to respond to signs when compared to younger drivers, therefore bigger and brighter signs, multiple signs for advance warning, and improved sign placement and maintenance could be of benefit to them (Mace 1988). To reduce the disadvantages of older drivers, the National Road Safety Council (1990) suggests there needs to be:

- better materials used for signs to enhance their retro-reflectivity and replacement when their visual ability for older drivers is lost; and
- an avoidance of the colours blue and red, and an increase in the use of colours such as yellow, orange, and white on contrasting backgrounds.

6.521 Response to Changes in the Road Environment

Participants believed changes in the road environment would not only benefit older drivers, but the entire population including other drivers and pedestrians.

There was no consensus regarding whether icons or text were preferred on signs and reaction seemed to reflect individual preference. For people of NESB backgrounds, symbols were felt to be more appropriate, since they are internationally recognised and do not require English language skills for interpretation.

While participants recognised that changes in the road environment may improve safety, they also recognised that problems exist with the skills of the driving public. Changing the road environment was felt to have little impact on driver quality.

Although stakeholders believed changes to street signs may assist all drivers, they questioned the cost effectiveness of such measures. Some believed that changing the size of street signs may only result in older drivers staying on the road who may be a danger to themselves or others.

Another stakeholder commented that ensuring older drivers understand the signs should take higher priority than bigger signs. Overall, stakeholders believed that each individual driver has a responsibility to familiarise him/herself with changes to the road environment and that the traffic authority should also communicate changes to the public.

6.522 Road Transport Informatics

There are a number of proposed transport informatics technologies that would be of special benefit to older drivers. Grieco and Axhausen (1991, p192-3) believe the main ones include:

- *"Dynamic and static route guidance systems relieve the drivers from some of their planning and monitoring tasks, which can be especially stressful in areas unknown to the driver;*
- *Parking guidance and reservation systems can reduce the need for the older driver to search for extended periods of time in densely used urban areas under stressful conditions;*
- *Trip planning systems can advise the older driver about routes, necessary rest periods and rest facilities and modal alternatives on longer journeys;*
- *Distance keeping and platoon driving systems are intended to relieve the driver of the need to continuously monitor relative distance and speed to the vehicles in front. For the elderly this would be welcome as it would reduce the mental work involved in routine driving;*
- *Overtaking warning systems are envisaged in the first instance to advise the driver of the presence of cars in his/her overtaking path. The elderly would benefit from such technologies given their reduced ability to judge speeds and distances of following and oncoming vehicles;*

- *Performance monitoring systems are intended to provide non-intrusive monitoring of the driving abilities of the driver, in particular of their alertness."*

6.6 Additional Countermeasures

6.61 A Self Assessment Test

The American Automobile Association (AAA) Foundation for Traffic Safety has developed a self rating form for drivers over 55 years to test their driving proficiency. The booklet titled "Drivers 55 plus. Check your own performance" (1994) aims to help older drivers recognise their limitations on the road and create an awareness of remedial actions which can be taken.

The form asks the older driver to answer 15 questions and then calculate a questionnaire score. The lower the score, the safer the driver is considered to be. The booklet also suggests measures the older driver can use to cope with any deficiencies revealed.

6.611 Response to Self Assessment Test

The Roads and Traffic Authority (RTA) in NSW used the AAA Self Assessment Test to guide the development of its Older Driver Handbook. The RTA's booklet targets drivers aged 75 and over but essentially asks the same questions as the American self assessment.

One of the key objectives of the RTA's version of the Self Assessment Test developed by Malfetti and Winter on behalf of the AAA Foundation, was to link medical fitness to driving ability. Rather than suggesting a link between age and driving ability, the booklet emphasises a health orientation which is believed to be more acceptable to older drivers.

The RTA distributes the booklet by mail to drivers when they turn 75 years of age. This direct mail approach is seen as the best method of ensuring the target group receive the information (although it must be noted that nothing can ensure the booklet will be read). The age of 75 was chosen in order to increase awareness of the obligatory medical test at 80 years and driving test at 85 years. It was also selected because of the perceived increasing accident involvement which occurs from 75 years onwards.

Participant interest was high for the Self Assessment Test amongst groups in the study. The Self Assessment Test was seen as less threatening than a practical driving test, although the use of the word "test" still prompted some to be concerned they might "fail" the test

If the questions were answered honestly, study participants believed the self-assessment would prompt older drivers to think about their own situation and focus on any problem areas. Whether or not this would result in any behavioural change is unclear.

The major drawback of the Self Assessment Test was that it would more likely attract those drivers who are already aware of the potential for declining driving skills related to the ageing process. Participants believed this countermeasure would not target the older driver who is most in need of assessment - that is, the driver who is unwilling to admit any negative changes in driving behaviour. For these drivers, the self assessment test would be considered irrelevant because they don't perceive any driving problems.

Participants also questioned whether older drivers would answer the questions honestly. Since the assessment is for the "drivers eyes only", people in the study believed older drivers were more likely to gloss over deficiencies in their own performance rather than critically examine any skill deficits.

Awareness amongst the small sample in our study of the countermeasure in NSW was low, although, this may result from group participants being aged less than 75 years old

As with study group participants, stakeholders believed that the Self Assessment Test could be applicable to all drivers - not only older drivers. The overall impression was that although it represents a good idea, not all older drivers would be inclined to complete the test and read the suggestions. Stakeholders believed that older drivers who had already experienced health problems would be more inclined to read the Handbook. They believed the Self Assessment Test could be used as one resource among a number of initiatives targeting older drivers

The RTA conducted an evaluation of the "Older Drivers' Handbook" (Internal RTA Communication 1995) Five thousand (5,000) questionnaires with reply paid envelopes accompanied mail outs of the Handbook over a two month period, yielding a response rate of 30% (1,520 questionnaires returned). The main findings of the research were

- *"Awareness of the Handbook. About 8% of respondents were aware of the handbook before receiving it. Of these, 23% found out through the media, 21% from RTA publications and 27% by word of mouth. Other sources and 'not indicated' made up 16% and 13% of respondents respectively.*
- *Willingness to read the handbook. Only 6% of respondents indicated they would not read it.*
- *Appropriate age to receive the handbook. About 80% of respondents agreed that the present target audience of 75 year old licence holders is appropriate.*
- *Assessment score. About 90% respondents agreed with their score. About 35% of this number said they identified areas of their driving which need changing.*
- *Suggested changes to the handbook. 16% of respondents recommended the handbook should contain more information. The most common suggestions were roundabouts (23%), road rules (21%) and traffic signs (5%).*
- *General. Every question received a positive response from the majority of the respondents." (Internal RTA Communication 1995).*

The research findings suggest a favourable response to the concept of the Older Drivers' Handbook. While respondents may have found the initiative relevant and informative, it is difficult from the research results to gauge its potential impact on drivers behaviour.

In order to investigate if the handbook has altered driving habits, perhaps past recipients of the resource could be asked about its impact on driving behaviour.

Overall however the RTA results suggest the Older Drivers' Handbook is well targeted and accepted by older drivers aged 75 years and over.

6.62 The Silver Mark

In Japan, a study was conducted by Shimizu and Kimura (1989, p18) to measure attitudes to a "Silver Mark" (or "Elderly Driver Mark"). The silver mark sticker was placed on the cars of 81 older drivers (aged 60+) in Honshu. Later both the elderly drivers with the stickers and other drivers (non-elderly) were interviewed about their reactions to the "Silver Mark"

The study found that:

- 96% of the elderly drivers said they were not disturbed by other drivers,
- 59% of the elderly drivers said the sticker was effective for improving traffic safety for elderly and non-elderly drivers;
- older drivers were very conscious of their situation when they used the mark, and
- 92% of the non-elderly drivers interviewed said they were courteous to older drivers who drove with the sticker placed on their cars

6.621 Negative Reaction in Australia

Overall, the “*Silver Mark*” suggestion received a negative response by study participants. Older drivers believed the mark was discriminatory (young drivers do not require a sticker) and that older drivers would be unwilling to voluntarily place the sticker on their car

The area of greatest concern was that the sticker would result in older drivers being targeted both on the road and in the home. Older drivers felt that some other drivers would harass them on the road, for example, by tailgating if they were designated older drivers. A more sinister suggestion was that older drivers, by being recognised as a group, may become victims of violence in their cars or homes.

On another level, the sticker itself was seen as impractical and participants felt a removable or magnetic emblem was more appropriate should it be implemented.

The only positive aspect of the “*Silver Mark*” was the possibility that it may result in other drivers being more courteous and patient with older drivers. However, this was considered an unlikely outcome.

The overwhelming response by stakeholders was that the “*Silver Mark*” would result in further negative stereotyping of older people. Stakeholders believed the mark would highlight the older drivers' declining driving abilities and were doubtful of any positive outcomes. There was also concern as voiced by group participants, that older drivers would be victimised by other drivers because of easy identification.

One opposing yet minority view was that the “*Silver Mark*” may be seen as dignified and demanded further consideration.

6.63 Flexibility Training Program

Another countermeasure suggested in the literature is a flexibility training package for improving older driver performance. The package contains exercises designed to improve the drivers flexibility as it relates to driving. Good flexibility allows drivers to move their body and joints more freely in order to observe the road from all angles. This flexibility can alert drivers to potential hazards in the road environment

6.631 Reaction to Flexibility Training Package

Participants recognised the importance of good flexibility when driving, but did not believe it was realistic to expect older drivers to undertake exercises specifically for driving. The issue of flexibility was understood in relation to general health and well-being and not in terms of its relationship with driving.

6.64 Alternatives to Driving Their Motor Vehicle

As already indicated a drivers licence has a great deal of emotion attached to it for older drivers. Some older drivers may respond to alternatives which offer an economic incentive. A taxi voucher scheme may be adopted where older drivers are at ease with taxi use. Such a scheme would need to offer a definite savings over the normal taxi fare. The issue of funding needs to be canvassed

Additionally, older drivers are likely to be very cost conscious since many will have a restricted income flow. Accordingly, making older drivers aware of the costs of owning a motor car with or without minimal use, could cause some older drivers to sell their car and use alternative transport. The NRMA in NSW produces a booklet each year on what it costs to run a car depending on age of car, make and size of car and distance travelled (NRMA 1995). For medium size cars the cost is between \$110 and \$170 per week based on 15,000km per annum, ie. 40-57 cents per kilometre. For lower annual kilometre usage, which is likely to typify older drivers, the cents per kilometre could easily be double that quoted above

7.0 Communicating with Older People

- 7.1 Older People Are Not All The Same
- 7.2 Understanding The Environment - A Key Element
- 7.3 Involvement Fosters Acceptance
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- 7.9 Summary

In order to understand how best to communicate with older people, it is necessary to look beyond the road safety literature.

7.1 Older People Are Not All The Same

According to the literature, it is important to recognise that older people are not an homogeneous group. They are a group of individuals who have a range of experiences, abilities and needs. It is essential therefore to keep this in mind when planning a communication strategy aimed at older drivers. It may be necessary for example, to tailor a strategy to subsections of the older driver population, but how can this segmentation be achieved?

Opinions differ as to the best means of segmenting the older market. Bone (1991) outlines a range of segmentation methods including age, psychographics, socio economic conditions, lifestyle variables, adjustment to retirement and health, and levels of health care utilisation. While these criteria have been used to describe and distinguish between subgroups in the overall older market, the literature does not distinguish between subsections of the older driver population. Apart from distinguishing between drivers according to chronological age (which is the method most often used in research studies), no information is available on how to segment the older driver population for a communication campaign.

Whether to target the total older driver population with the same campaign or to tailor the message to subsections of the older driver audience must be a consideration in any campaign development. Additionally an indirect approach may be considered whereby the direct audience are friends and relatives of older drivers.

7.2 Understanding The Environment - A Key Element

A communication strategy may aim to inform, to change attitudes or, more optimistically to, alter behaviour. The communication task with older drivers aims ultimately to reduce the number of older drivers involved in accidents. In order to achieve this goal, any initiative must be relevant to the target audience, communicated in a form they understand, and be accessible to them.

An understanding of the older driver's environment should help tailor the initiative and allow recognition of any influences which may impact on how any messages or initiatives are received.

According to the report titled "Traffic Safety of Elderly Road Users" (OECD 1985), older people hold certain views about themselves which may influence their reaction to any communication about driving. The report (1985, p141) states that the attitudes of older people may reflect:

- *fatalism: the problems which they may experience in coping with everyday tasks, including traffic tasks, are accepted as the expected and inevitable results of ageing;*
- *pessimism: even when their situation might in principle be helped, they personally consider it to be a waste of time and effort; such attempts will most probably fail, as they have seen happen it so often in their life;*

- *suspicion: offers of help and suggestions that they should modify some behaviour are seen as attacks on their integrity, symptomatic of a society which wishes to limit their independence and decide what is best for them;*
- *self-assertion: they do not see themselves as the ones who should change their behaviour. People of their age deserve respect and it is up to other people to adapt their behaviour as necessitated by the situation.*

An Australian study by Elliott & Shanahan Research titled "A Qualitative Study of Ageing and Well-Being into the Next Century: Aspirations, Intentions and Concerns" (1993) also discovered that older people believe society in general has negative views towards them. Older participants in the study believed the general community saw them as:

- *frail and in need of help;*
- *a burden in society;*
- *of little value;*
- *unintelligent, stupid.* Elliott & Shanahan Research, 1993, p 46.)

Many examples were given by study participants about how negative community perception manifests itself in terms of older people's interaction with the community. Participants believed for example, that the community showed intolerance to older people when crossing the road or walking on the street. Any communication package for older drivers must therefore take these perceived negative attitudes and behaviours into consideration.

7.3 Involvement Fosters Acceptance

In order to improve the acceptability of an initiative aimed at a particular target group, it would seem important to seek their involvement in its development. Asking older drivers about possible countermeasures for example, may result in solutions which they find acceptable rather than solutions which they feel are imposed on them. Thus, an integral part of the present study was to investigate older driver attitudes and reactions to a range of countermeasures.

Tinker (1994) highlights the importance of researching the needs and wants of older people. The comment is made that too often their voice is unheard because it is assumed they are inarticulate. Any communication with older drivers may therefore be enhanced by seeking their views on proposed initiatives. According to Malfetti (in McKnight et al, 1982, p.132) it is essential to involve older drivers in what is being planned for them - *"enlisting the elderly to work on their own behalf"*.

7.4 Build On Existing Motivations

Kanouse (1988) believes that information campaigns work best if they build on the audiences existing motivations. In the case of older drivers for example, Kanouse (1988) comments that some may understand they have difficulties in certain situations and be concerned regarding these difficulties. These older drivers may therefore be quite responsive to initiatives which assist in managing a self difficult situation. Accordingly, there is a need to identify the more common difficulties faced by older drivers.

7.5 Encouraging Behavioural Change

The ultimate aim in targeting older drivers is to reduce the number of older driver fatalities, that is, to modify the behaviour of older drivers to improve their safety. Mackay (1994, p. 208) argues that thinking differently about a problem/situation may result in behavioural change which may ultimately lead to attitudinal change.

The Seventh Law of Human Communication according to Mackay (1994, p. 226) is that: *"people are more likely to change in response to a combination of new experience and communication than in response to communication alone"*. One method of changing driver behaviour is to change the driver environment so that people can act and react to the changes, ultimately resulting in a new experience. The challenge is how to provide this "new experience" for older drivers.

It is also important to communicate to older drivers the nature of the problem and the reason why a particular solution is being tried. The aim is to modify older driver behaviour in order to

gain acceptance and understanding of this message. By explaining the rationale for any intervention, it is hoped that older drivers will react more favourably to the countermeasure than if no explanation is given.

7.6 Who to Target?

There is some discussion in the literature about whether it is most effective to communicate with older people themselves or whether to target them through their carers, family or friends

Hibbard (1988) for example, highlights how social networks are related to the adoption of healthy behaviours:

"social ties are a potential resource which may be called on for assistance; information, support or aid. Social ties are also an important part of one's social environment, broadly influencing norms, attitudes, coping abilities and behaviours". (Hibbard, 1988, p131)

In relation to older drivers, it may be necessary to consider communicating with a wider group than older drivers themselves.

Teshuva et al (1994) also believe in the importance of social support in sustaining health behaviours in older people. They suggest that encouraging a sense of personal control and self efficacy are integral to the adoption of particular behaviours.

The report on "Traffic Safety of Elderly Road Users" (OECD, 1985) outlines two approaches to targeting older drivers. The individual approach involves targeting the people who advise older people on issues including road safety. These people may be family and friends, medical practitioners or other health professionals.

The second approach described in the report involves targeting groups of older people with road safety information. This approach is used in the United Kingdom for example, by the Police, Road Safety Officers and Health Education Officers. Sheppard and Valentine (1979, p143) found that the group approach of disseminating road safety information to older people was the most effective when recall was assessed.

7.7 What to Say?

To be effective, the message in a communication campaign should be relevant to the target audience and presented in a way they understand. The results from Elliott and Shanahan Research's qualitative study of older drivers will influence the type of message proposed for a communication strategy and the form the communication will take.

For older drivers, it appears especially critical to communicate compassionately the reasons why older drivers are being targeted for a road safety campaign. The aim is to get the older driver motivated and involved; not to alienate the older driver and thereby risk rejection of any intended message.

Hauer (1988, p.199) argues against the articulation of over representation in crashes to motivate changes in driver behaviour. The author suggests motivating be concerned with the following argument:

"There is little question that as one grows older, it becomes gradually more difficult to cope with the transport system. There is also no disagreement about the importance of mobility for older persons; the more mobile and self-reliant one can be as one gets older, the better for everyone. It follows that if there are opportunities to enhance the mobility and safety of older persons at reasonable cost, such opportunities should be taken. Nothing in this argument depends on the existence of overrepresentation."

Malfetti and Winter (1991, p.31) also provide some suggestions on how to approach older drivers about a perceived decline in driving ability. They believe:

"A direct accusation of unsafe driving will likely be met with anger and denial, hardly the components for positive results. Better to start by conveying your understanding of how important driving is to them. Better to tell them that you want to keep them on the road and therefore have a few ideas they might wish to consider toward that end. You should try to express

this sentiment in a way which shows positive and supportive feelings for them. They should be made to feel part of the decisions and actions you are encouraging them to make and take.”

The Seniors Media Network Council in NSW produced a booklet called “Language and Older People” (1994) which is a useful guide to recognising ageism in language including good and bad usage and outmoded stereotypes of older people. The following table from the guide provides some valuable guidelines for “dos and don’ts” about communicating with older people which is important for developing strategies targeting older drivers.

Kroj (1988) believes that future campaigns should concentrate on “strengthening the elderly driver’s critical self-consciousness”. This may involve talking to drivers about the warning signs associated with physical impairments, for example, reduced vision in twilight conditions or nighttime driving circumstances and how the older driver can cope in such situations

Holland (1993, p. 440) explains how in general, drivers perceive their chance of having a crash as significantly lower than that of their peers. This phenomenon is termed “self bias”.

In a study conducted by Holland (1993), eighty subjects aged 50-79 were asked to complete a self-rating questionnaire on the likelihood of accident involvement when driving themselves, when someone else was in control, comparing themselves to “average drivers” of different ages.

DON'Ts AND DOs

<p>DON'T talk about the problem, or the burden, to society, of an ageing population. This gives the impression that everyone over a certain age is both a problem and a burden, which is untrue, hurtful and demeaning.</p>	<p>DON'T use the term Aged Care unless-as a proper noun. It implies that all older people are dependent and in need of care.</p>
<p>DO say the issue/concerns/challenges of an ageing population. That way the insult is removed and the subject may be discussed without offense.</p>	<p>DO talk about health and community care.</p>
<p>DON'T say: "You can't teach an old dog new tricks". It implies that older people are not receptive to new ideas, which is not true. Studies show there is no reason why the ability to learn deteriorates with age. Social environment and personal history are far more significant than the ageing process.</p>	<p>DON'T describe older people as geriatric, it is a technical term commonly misused.</p>
<p>DO let older people know that you value their wisdom and experience.</p>	<p>DO use the preferred terms, older people, seniors, or - if applicable - mature workers.</p>
<p>DON'T assume that enthusiasm for new ideas and an interest in new technology is the exclusive preserve of the young. It isn't.</p>	<p>DON'T describe people as "the aged" or "the old". It assumes that they are a homogenous group.</p>
<p>DO try to treat older people as living human beings and not imagine that because they have lived longer than you have, their lust for life (or lusts in life) is in some ways dead. Studies conducted by Kinsey, Masters and Johnson and Pfeifer show that the capacity for sexual activity is retained well into old age.</p>	<p>DO say senior, or seniors</p>
<p>DON'T refer to an older person as a pensioner. It defines the person by their source of income.</p>	<p>DON'T quote chronological ages in the media, unless some assured relevance attaches to doing so.</p>
	<p>DON'T use cliches like the Blue Rinse Set. It's insulting, old fashioned, patronising and plain bad manners.</p>
	<p>DO say, the seniors group, or a group of older people.</p>
	<p>DON'T talk about an older person as "a case," a common fault among service providers.</p>
	<p>DO try to recall an older person's name, or at least give each person the respect due to him/her by talking about them as people, not things.</p>
	<p>DON'T use terms like grannies, wrinkles, geris or oldies. Use instead seniors or older people.</p>

Reference: Language and Older People, 1994 p. 15

The study found that self bias exists into older age, although it does reduce with increasing age Holland (1993, p. 440) suggests:

“The implication is that giving older people specific information of the risk factors along with suggestions as to what they do improve their safety, may not only make them safer, but also put them ‘back in control’, increasing the internality of their focus of control.”

Thus, if road safety information is directed at the older driver, they may be more likely to make sensible changes to their driving than their younger counterparts.”

Thus, the study concluded that, if road safety information is directed at the older driver, they may be more likely to make sensible changes to their driving than their younger counterparts.

Like “self bias”, the term “optimism bias” is also used in the literature to explain (using a road safety example) how individuals overestimate their driving ability compared to other drivers. The practical implication of optimism bias is that drivers have a sense of invulnerability which may lead to more risk taking behaviour and less adoption of precautionary measures (Lee and Job 1995).

Lee and Job (1995) conducted a study which investigated the effect of information on optimism bias. The study was conducted via a questionnaire with eighty one (81) first year psychology students who were randomly assigned to two groups. a control group was only given instructions on questionnaire completion, while the second group received in addition, statistical information on the risk of AIDS and road trauma.

When asked about events involving AIDS and road trauma, the information group experienced a reduction in optimism bias. The authors concluded that:

“...the provision of relevant risk information, a common strategy in health promotion, causes a general rather than a specific reduction in optimism bias. (Lee and Jobl 1995)”

It may therefore, be appropriate to provide older drivers with well-targetted messages with the potential of generally reducing their optimism bias.

Job (1990) also conducted an Australian study which examined the effect of age on driving confidence. It was hypothesised that: *“Driver confidence should increase with age since more and more confidence building experience may occur on the road, and through supposed fear messages and publicity regarding the road toll”*.

Seven (7) age groups were included in the study (17-19 years, 20-24, 25-29, 30-39, 40-49, 50-59, 60-69) and the data indicated that Australian drivers are over confident.

Respondents were asked to describe how they regarded themselves as a driver and given the following alternatives: much better than average, better than average, slightly better than average, an average driver, slightly worse than average, worse than average, much worse than average

53.6% of the sample rated themselves as above average (when the three better than average categories were combined), 44.3% ranked themselves as average, and only 2.1% rated themselves below average. Driving confidence was found to only increase up to the age of 40 after which little change occurred.

7.8 How Best to Reach The Audience?

Messages can be communicated to the public in a range of ways including, using the mass media (television, newspapers, magazines), posters, leaflets, manuals or through specifically designed programs or seminars.

Communication strategies may be aimed at the general public or at certain sections of the community. The choice of media depends on how best to reach the target audience. In terms of the present study, a method must be found of communicating with older drivers. A study conducted by Elliott & Shanahan Research (Survey of Attitudes to Ageing and Well-Being into the Next Century, 1994) provides some clues on how older people obtain information. The study involved an Australia wide telephone survey of over 2000 respondents aged 40 to 75 years. In relation to information sources, the study found that **the doctor or general practitioner was the main source of information on health matters**. Other findings included.

- major newspapers represented a key medium to reach people in the 55 to 75 year age group;
- "suburban newspapers" were nominated by a significant proportion of people as information sources; and
- the major "mainstream" women's magazines (eg' Women's Day, Women's Weekly etc) were an important medium for females aged 55 to 75 years, (Elliott & Shanahan Research, 1994, p33)

Other methods of communicating with older people include:

- via organisations who have frequent contact with older people, for example, Combined Pensioners and Superannuants Associations and Councils on the Ageing; etc; and
- Through affinity groups such as, retirement communities, social or recreational groups.

In a publication produced by the NSW Social Policy Directorate, an outline is given of various information delivery modes for particular customer sub-groups. For older people, the following information delivery options were considered very suitable:

Information Delivery Options for Older People
Personal
<p>presentations to community forums incidental to service provision personal visits community organisations friends and family secondary contact, for example, family doctor.</p>
Print
<p>Newsletters Newspapers/magazines direct mail</p>
Telephone etc
<p>Standard phone line freecall/local call cost lines 24 hour services information lines/call centres</p>
Electronic
<p>radio cassette tapes television</p>

Reference: Delivering the message (1995, p.43)

Road safety messages can also be presented in a range of ways including: mass media campaigns, manuals, lectures and seminars. According to an OECD report (1985) research on road safety publicity suggests that an effective mass media campaign must be intensive and/or produced near (in time or place) to the advocated actions. The report comments that:

"mass media campaigns related to road safety for the elderly rarely achieve either of these requirements". (OECD, 1985, p143)

Another method of reaching the older driver population used in the United Kingdom involved the production of leaflets and booklets. The information was produced in large clear print, to enable easy understanding by older people, but problems were experienced in distributing the information (OECD, 1985, p143)

McKnight et al (1982) listed some guidelines on how a manual for older drivers should be designed. These suggestions included the following:

- information should be presented in a straightforward, factual way rather than in an emotional style;
- information presented should emphasise traffic safety concepts, rather than traffic laws;
- the manual must convince older drivers that it contains new information which is relevant to their personal needs,
- information should be presented at a 6th grade reading level,
- technical terms should be avoided if possible - if they are used, a definition must be provided;
- the manual should be written in an informal style

Malfetti and Winter (1978) highlight the importance of presentation style when communicating with an older audience. They suggest that a talk by a younger person may not be as well received as a presentation by an older individual with more years of driving experience. In the 55 Alive/Mature driving course in America for example, older volunteers are trained to present the programme

7.81 Positive or Negative Images?

Kanouse (1988) believes that response by a target audience is likely to be greater when the information empowers them, rather than if it makes them feel powerless. He writes. *"information that emphasises a danger may produce avoidance rather than coping responses"*

(Kanouse, 1988, p 143). Hill (1953) also believes that fear campaigns will not be successful with older people as a target group. Perhaps this is because the older group have been exposed to death and find it so personally relevant that they try and repress the images.

It has also been suggested that media warnings of the dangers associated with the road toll may result in “immunisation” to the message (McGuire 1962 in Job 1990). While the initial presentation of the message may arouse fear, the end result may be a defensive reaction (“it won’t happen to me”) which is further reinforced when the message is repeated. Thus, there will be little effect on driver crash behaviour except perhaps to encourage over confidence.

Job (1990) explains when drivers see reports of car crashes involving injury and death they conclude, because they have not been killed or injured that they are in fact safer than average drivers. While drivers should be confident in their driving abilities, presentation of fear messages may lead to recklessness rather than precautionary driving behaviour.

7.82 Barriers to Communication

Communication with older people should avoid using stereotypes about ageing or the ageing process (Bartos 1989). Care should also be taken not to use language which is hurtful or patronising of older people.

Malfetti and Winter (199)) also highlight the importance of non-discrimatory language. In their study on graded licences, focus group participants responded poorly to using the word “restriction” to describe the limits of the graded licence. They suggested the word “conditions” which was perceived as a more neutral term.

7.9 Summary

In summary, communication initiative with older drivers should be:

- carefully planned;
- influenced by an understanding of the older drivers' environment (what they want, their knowledge, attitudes and beliefs);

- relevant;
- appropriate in content for older drivers;
- presented in an appropriate medium for the older driver audience; and
- able to be evaluated.

The guidelines for effective mass media campaigns (Elliott 1985) apply for any specific segment. However, in the case of older drivers the audience is especially tuned to reject messages unless they have been especially designed with them in mind.

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Discussion Guide - Older Drivers

General questions re: driving habits

- What do you see as the dangerous situations someone your age can get into?
- What is the role of the car in your life?
- What do you use your car for? (eg shopping trips, visiting etc)
- How often would you use your car? (eg daily/weekly etc)
- Are there any particular times of the day you tend to drive?
- Any times you avoid?
- Why is being able to drive important to you?
- Do you see driving as a right or a privilege?

Driving ability

- How would you describe your driving ability? (eg average, better than average)
- On what basis would you rate your ability?
- Have you noticed any differences in the way you drive today, compared to 10 years ago? If yes - what kinds of differences?
- Do you know of any other people your age who have had any difficulties driving?
- What kinds of problems have they had?
- Do you think the ageing process affects your driving skills? How?

Problems/Accidents

- What sort of problems do older drivers face? (eg. slower reaction times, problems with other drivers, ability to make quick decisions)
- When do you think these problems begin to occur? (Can you put an age to it?)
- Are older an “at risk” group in terms of road accidents? Why?
- How do older drivers cope with problems and risks?
- What factors contribute to road accidents? (in general)
eg speed/alcohol/disobeying signs/signals etc
- What factors contribute to accidents for older drivers?
- Do you think there is a reluctance to acknowledge a decrease in ability to drive?

- Are there any changes you would make to the road environment.
eg signs, speed limits, intersection design etc?

Attitudes to giving up driving

- For what reasons would you give up driving
(eg Dr's advice, deterioration in health etc)
- Who would make the decision to give up driving? (eg self, family, Dr)
- What criteria should be used to determine what you should give up your license?
- When should you cease to drive or consider ceasing to drive?
(Can you put an age on it?)
- Have you considered giving up?
- What are the alternative means of transport you would consider?
- What changes in health occur as a person gets older? (vision/hearing/joints etc)
- How do these changes impact on driving ability?

Countermeasures

- Is anything needed as drivers get older to help them become aware of possible limitations in their driving ability?
- Who should be in charge of such an initiative?
- At what age should this occur?

Imagine your task is to address the issue of older drivers and their risks on the road.
You have to come up with a strategy to be implemented Australia wide.

- what are you going to do?
- aims/objectives?
- who to target?
- at what age?
- how to involve older people?
- how to ensure involvement?

Countermeasures (rotate)

- 55 Alive
- Silver Mark
- Legislative controls
- Self completion tests
- Reaction to these - strengths/weaknesses/suggested changes?
- Education (TV ads/community programs)
- Do older drivers need to be made aware of physical changes and how these may impact on driving?
- What do older drivers need to know? messages?
- Expected sources for this advice?
- Should information/education be tailored to specific age groups (55+, 60+, 65+) or aimed at all drivers?
- Would you be willing to pay for this information/education?
- How much?
- Who should fund it?
- Format of information
 - television
 - newspaper
 - magazine
 - information with licence renewal
 - training program
- If I use the term “older driver” what does this mean to you?
- When I say “older drivers” what images/words come to mind?

Interview Guide - Road and Motor Organisations

- Do you consider older drivers to be an “at risk” category of road users? How big a problem is it?
- How would you define the “older driver”?
- What role does the car play in the older driver’s life?
- What kind of problems do older drivers experience?
- Do you think older drivers understand how age may impact on their driving ability? Do they perceive driving as a problem for them?
- How do older drivers compensate for any age related changes?
- What can be done to reduce the risk of older drivers’ involvement in car accidents? (eg. education, information, cars, road environment.)
- At what age should initiatives begin?
- What form should interventions take? (eg. education, mass media/programs.)
- How should older drivers be targeted?
- What information messages should be delivered?
- Is restriction (through legislation) the best method of coping with the problem?
- What are the re-licensing requirements for older drivers in this state?
 - Is there a specific age when people are required to have their licence reviewed?
 - Is a medical report needed?
 - Do they have a vision test?
 - Road test?
 - How often?
 - Is there an age when licences are cancelled?
- Reaction to countermeasures suggest in the literature strengths/weaknesses/suggestions.
- Do you believe your organisation has a role to play in reducing the road toll of older drivers?
What form could this take? (eg. funding, distributor of information/education etc)

Interview Guide - Doctors

- What role does driving play in the older person's life?
- Are older drivers "at risk" on the road? How big a problem is it?
- How would you define the "older driver"?
- Do you ever discuss driving with your older patients? Who raises the issue?
- What role (if any) do you have in relation to your older patients' ability to drive?
- What role should you have?
- What should a doctor check when an older patient is seeking to renew his/her licence? (eg. vision, hearing, movements etc.)
- Generally, would you see one of your roles as educating patients? (having a preventative role?)
- Do you advise your older patients about how medication may influence their ability to drive?
- Do you have any ideas about how to reduce the risk of older drivers in accidents?
- What messages need to be given to older drivers?
- How should these messages be delivered?
- By whom? Do you (the medical profession) have a role in older driver education? How?
- Reaction to counter measures suggested in the literature strengths/weaknesses/suggestions.

Education and Training Programmes

Content:

- information on new rules, regulations and changes to highway system
- ageing processes
- impact of ageing processes on driving ability
- functional disability

How?

- Individually based
- group approach
- mass media approach

“55 Alive / Mature Driving”

What is it?

- training course for older drivers - 6 sessions
- groups of 18-25 people
- conducted by trained older volunteers who are graduates of the programme
- sponsored by local organisation

Aim:

- to assist older adults achieve many years of safe, independent, accident-free driving

Content of programme:

- accident characteristics
- accident experiences of older drivers
- physical changes related to driving performances
- common hazards encountered
- emergency driving techniques
- adverse driving techniques
- characteristics of other road users
- local problems
- auto maintenance
- licence renewal
- checklist for purchasing car insurance

Older Driver Self-Rating Form

What is it?

- a self-rating form of questions, facts and suggestions for safe driving
- Questions to be answered

Aim:

- provide guidance for older drivers to assess their driving skills
- designed to put more control in the hands of older people
- points out driving deficiencies
- suggests ways of compensating for deficiencies

“The Silver Mark”

What is it?

- sticker (11 x 11) attached to the car driven by an older person

Background to idea:

- older drivers and pedestrians will be alerted to the symbol
- older drivers will be more conscious of their driving capability

Aim:

- improve traffic safety
- improve traffic congestion

Ideas for changes to road environment

- Would changes to road signs assist the older driver?

eg. bigger signs

brighter colours

multiple signs for advanced warning

improved sign placement

use of symbols / words preferable

- What about changes to traffic signals

Licence Renewal

- At what age should measures be put in place to re-test the driving ability of older drivers?
- What kind of tests should this involve? eg. assessment by health professionals - eye tests, cognitive tests, hearing, range of motion, physical functioning.
- Who should perform the tests? eg. Doctor's, organisations like RTA, Hospital Outpatients clinics.
- Should there be an “on road” driving test:
 - At what age?
 - Who should make the decision? (self or others)
- Reaction to a ‘restricted’ licence. eg. not being able to drive at night