



**OLDER DRIVERS
POLICY PAPER**

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Contents

Executive Summary	3
1. Introduction	6
1.1 About this paper	7
2. Data	9
3. Causes of Old Driver Accidents and Injuries.....	11
3.1 Type of Collision.....	11
3.2 Junctions	12
3.3 Visual Scanning.....	12
3.3.1 Motion extrapolation	13
3.4 Ill-Health	13
3.5 Alcohol and Drugs	13
3.6 Motoring Convictions	13
3.7 Low-mileage bias	14
3.8 Injury risk.....	14
3.9 Summary of Chapter 3	15
4. Preventing Accidents and Injuries	16
4.1 Assessing Fitness to Drive and Identifying Crash Risk	16
4.1.1 Cognitive tests	16
4.1.2 Vision tests	17
4.1.3 In-Vehicle Tests	17
4.1.4 Other indicators	17
4.1.5 The role of health professionals in assessing fitness to drive	18
4.2 Self regulation	21
4.3 Physical Activity.....	23
4.4 Driver Education.....	24
4.4.1 Driver Education Case Study: Guidance for the OLder Driver (GOLD), Norfolk County Council	25
4.5 Re-licensing.....	26
4.6 Licensing restrictions	27
4.6.1 Negative Consequences of Driving Cessation	28
4.7 Summary of Chapter 4	29
5. Discussion and Recommendations	30
6. References.....	33

Executive Summary

This paper identifies the main factors that can increase crash risk with age, as well of ways to help older drivers sustain a good level of safe mobility.

Older people are a large and increasing proportion of the population. Their mobility is vital to maintain a full and independent life.

However, as people get older, it is inevitable that general health and fitness will begin to deteriorate – and this is what causes concern that older drivers may be at an increased risk of being involved in an accident.

There is therefore the need to help people maintain safe mobility as they get older. Road safety activities play a fundamental role in that by decreasing the risk of being involved in an accident. Ultimately, age related conditions can eventually mean that there is a point when an individual must give up driving.

However, one fundamental philosophy which this paper adopts is that policies which prematurely remove an elderly person’s ability to drive can have negative consequences for their health and quality of life. These consequences can outweigh the reduction in crash risk to the driver and the rest of society. In short, any intervention must be proportionate to the risk, and a judgement must be made as to whether an individual intervention gets the balance right.

Engineering measures such as road or vehicle design can prevent accidents and injuries to older road users, although they are not covered within the scope of this paper which considers primarily education, training and publicity measures. However, they are fundamental to helping drivers maintain a good level of safe mobility. Vehicle adaption is one way of modifying a vehicle to assist safe driving.

In 2008, 190 drivers over the age of 60 years were killed in road accidents, 1,148 were seriously injured and 9,677 slightly injured. Although the casualty trend is decreasing, it is decreasing slower than for other ages.

Reported statistics indicate that the risk of being involved in an accident increases after the age of 70, and up to that age drivers are no more likely to cause a crash than to be the victim of another road user’s mistake. However, drivers over 70 and especially over 80 years, drivers are more likely to be at fault when they crash.

Underlying health conditions, and some types of medication taken to treat those problems, are a more common factor in accidents involving older drivers. Indeed, a proportion of older driver fatalities occur when a driver dies of natural causes while driving, and their vehicle immediately crashes.

Older drivers are commonly involved in collisions at junctions, often because they mis-judge the speed/distance of other vehicles or fail to see a hazard. Visual impairment may be a factor in this type of crash.

Due to their more fragile health and physical condition, older drivers are more likely to suffer injuries when they crash.

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An important aspect of older driver policy is being able to accurately identify which drivers are significantly more likely to be involved in crashes, and ultimately to help them give up driving and adapt to life without a car.

There are several cognitive and physical conditions which affect the ability to drive safely, and which, therefore, could act as indicators of increased risk. One important question is how best to test for these conditions, as it is crucial that interventions do not unfairly cause older drivers to lose their licence. As drivers age at different rates, age is almost certainly not a suitable indicator on its own.

There is comprehensive guidance for medical practitioners about how to assess fitness to drive, but there is a need for more education for health professionals about using the guidance and what measures they can take to help their patients who are, or are becoming, unfit to drive.

It is clear that many older drivers recognise that their driving ability has changed and consequently change when and where they drive (through self-regulation). However, not all older drivers do this, and there is little guidance for them or their relatives about it.

A major deterrent to self-regulation or stopping driving is the lack, or perceived lack, of viable alternatives to the car.

Exercise programmes can help to maintain health and driving ability as people get older. Driver education programmes specifically tailored for older drivers are another important method, although it can be hard to make sure that the programme reaches the right people.

A key question is how and when drivers should be relicensed. In the UK this occurs at 70 years (and every three years thereafter) and requires only the driver to self certify that they are fit to drive. Research does not suggest that a mandatory driving test would be effective.

The main conclusions from this paper are

- The evidence shows that the cessation of driving can have significant negative consequences on the health of older drivers. Driving cessation is recommended, if the case merits it, only after the safety of the driver cannot be secured through any other means.
- RoSPA does not believe that there should be a maximum driving age beyond which drivers automatically lose their driving licence. Research does not indicate that there is an age at which all drivers become unable to drive safely. Setting an arbitrary age limit would inevitably be unfair to some drivers.
- Information, education and publicity are needed to help to raise awareness of the effects of ageing, and of the possible effects of medicines on driving performance.
- Assessment and training courses should be made available to older drivers, tailored to the needs of the individual. Some courses have already been developed and a case study from Norfolk is described.

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- Positive advice on alternatives to driving should be incorporated into any materials and campaigns.
- Transport planners should be catering for older road users who may be considering giving up driving. It is unlikely that people will consider giving up the freedom and convenience of driving their own car unless there are suitable, safe, clean, attractive, convenient and affordable alternatives.
- Vehicle adaption is a method of optimising a vehicle for a driver, and tailoring it specifically to a driver’s requirement. Currently there are 14 mobility centres around the country that can offer advice on vehicle adaption <http://www.mobility-centres.org.uk>.
- General fitness underpins many strands of injury prevention. Some evidence shows that exercise programmes can add value to other road safety interventions.
- Driving cessation can be a controversial and emotional area, especially given the social importance of driving and the impact that giving it up can have upon health. Given this, it is important that the tools used to assess the impact of health conditions on driving standards are accurate.
- Drivers should be encouraged to undergo a formal medical check before renewing their licence when they reach 70 years of age, and again each time their licence is renewed.
- Research which helps develop better understanding of the link between self-regulation and crash risk, and how to help drivers to match the environments that they drive in to their condition would be a valuable contribution to this area.
- Drivers can be encouraged to discuss health conditions and fitness to drive during consultations with health professionals, who may not always raise fitness to drive issues first.
- Appropriate information and guidance for primary health care workers is important to assist them in assessing health conditions which may affect the way in which someone drives driving and to enable them to provide appropriate and sensitive advice.
- Families who are concerned about the driving standards of elderly relatives may also currently struggle to find appropriate advice, and this need must be addressed.

1. Introduction

Older people are a large and increasing proportion of the population. Mobility is vital for people to maintain a full and independent life, and therefore, transport policy, vehicle design and the transport environment should reflect, and provide for, their needs.

The National Statistics predict that the average age of the UK population will increase. In 1971, 13% of the population were aged 65 years or over. This increased to 16% by 2002 and is expected to rise to 23% by 2031ⁱ.

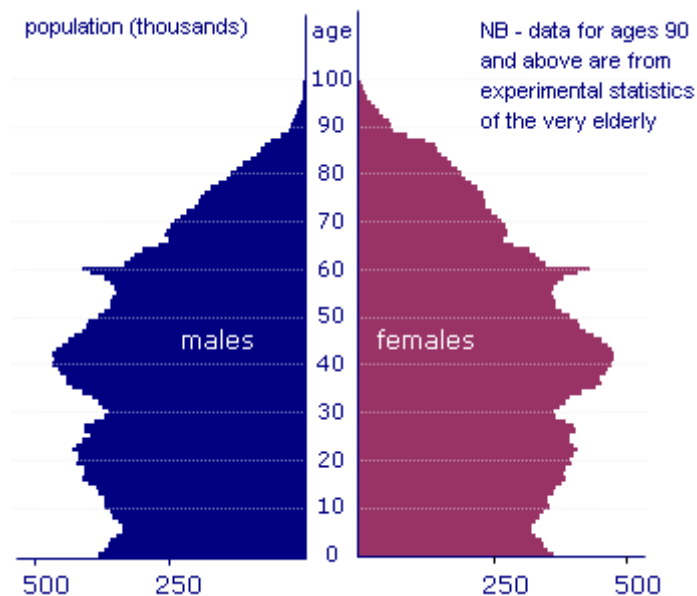


Table 1 Population: by gender and age, mid-2007ⁱⁱ

As people get older, it is inevitable that general health and fitness, eyesight, hearing, reaction time and physical mobility will begin to deteriorate, all of which can affect the ability to drive safely. However, these changes occur at different rates and ages for different people. Since the changes are often gradual, they may not be apparent to the individual concerned or to members of their immediate family or circle of acquaintance.

This decrease in health and fitness to drive is what causes concern that older drivers may be at an increased risk of being involved in road accidents.

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1.1 About this paper

This paper identifies the main factors that can increase crash risk with age, as well of ways to help older drivers sustain a good level of safe mobility.

Road safety activities can help drivers maintain a good level of safety by helping to drivers to improve their driving or adjust it to compensate for any reduced driving ability.

The paper primarily considers education, training and publicity measures which help drivers do that - rather than looking at road or vehicle design which are also essential methods in preventing accidents and injuries on the road. It is chiefly intended for those working in road safety and designing interventions to prevent accidents involving older drivers.

The re-design of vehicle and roads through engineering methods can also help to prevent older driver accidents and injuries, although these are not covered in this paper, and so studies covering these topics were discounted from the search.

For the purpose of this policy paper, older drivers are defined as drivers over the age of 60 years. However, this does not mean that accident risk increases from the age of 60 years; in fact, the data indicates that crash risk only increases in age groups over 70. Older drivers do not form a homogenous group as wide variations in their characteristics and driving abilities exist within this general category.

The evidence behind the policy paper was gathered by searching SafetyLitⁱⁱⁱ for the term ‘Older Driver’ and variations on this, to identify all papers which studied the accident risk involving older drivers as well as education, training or publicity interventions. Relevant references within those papers were also followed up. A large number of international papers were found, and the results of several of these have been included, especially when evidence from the UK is lacking. Often papers from different countries have found similar results. Where there may be problems transposing the findings to the UK, this has been noted.

A large number of papers found examined how different health conditions impact on driving. In the main these were not included here. “Fitness to Drive: A Guide for Health Professionals^{iv}” is the most comprehensive document which explores these issues in the UK. It is available freely on the Department for Transport website, or printed copies can be purchased from The Stationery Office (TSO).

This policy paper is intended as guidance for those with an interest in road safety or designing interventions, rather than for medical practitioners (although the role of medical practitioners is discussed in section 4.1.5).

The World Health Organisation defines health as a *“state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”*.

This is an important consideration when designing policies and safety interventions aimed at reducing older driver accidents, as it is important to ensure that they do not have adverse effects on other aspects of their health and well being. This is discussed in section 4.6.1.

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One fundamental philosophy which this paper adopts is that policies which prematurely remove an elderly person’s ability to drive can have negative consequences for their health and quality of life. These consequences can outweigh the reduction in crash risk to the driver and the rest of society.

In short, any safety measure must be proportionate to the risk, and a judgement must be made as to whether an individual measure finds the balance.



Inevitably, this will always be a difficult balance to get right, due to the difficulties in measuring the potential benefits and disbenefits and deciding what an appropriate trade off is between the two.

In practice, what this must mean then is that programme designers must be aware of the potential risks of getting it wrong. Whilst most road safety activities aimed at elderly drivers are to give feedback and help drivers to use the road safely, there is a chance that an activity may identify a driver with a condition which could mean they cannot. Programmes need to be sensitive enough to help the driver, their family and friends and relevant health professionals to have a large part in the decision to give up driving, with the results of any assessment used to help guide that discussion.

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2. Data

Older drivers and their passengers comprise a relatively small proportion of car occupant deaths and injuries. More drivers aged 20 - 29 years are killed in crashes than in any other age band. The number of deaths decreases in each age band until 70 year where there is a slight increase.

	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
Car Drivers								
Killed	118	236	135	105	76	64	71	55
KSI	978	2,235	1,323	1,180	821	607	438	293
All	10,574	28,135	20,566	18,565	10,842	5,965	3,212	1,648
Passengers								
Killed	100	90	37	18	27	19	30	26
KSI	998	968	342	284	240	230	230	155
All	9,219	11,291	5,097	4,225	3,095	2,335	1,668	904

Table 2 Reported car occupant casualties 2008, by age band and severity, GB

Of course, the number of deaths and injuries in any age group to some extent depends on the number of people in that group and the amount of driving they do. Table 3 shows a more marked increase in the number of car drivers killed per 100,000 population over the age of 69 years, whilst the rate of all injuries decreases. This may be an indicator that the injuries in older people are more likely to result in a more severe outcome.

	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
Car Drivers								
Killed	3.8	2.9	1.7	1.2	1.1	1.0	1.7	2.0
KSI	31	28	16	13	11	9.7	10	11
All	339	350	256	211	150	96	75	60
Passengers								
Killed	3.2	1.1	0.5	0.2	0.4	0.3	0.7	1.0
KSI	32	12	4.3	3.2	3.3	3.7	5.4	5.7
All	295	140	64	48	43	37	39	33

Table 3 Reported car occupant casualty rate in 2008, by age band and severity, GB

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“Older Drivers”

It is likely that increasing life expectancy will mean an increase in the number of older drivers, which in turn could lead to an increase in older driver fatalities. Table 4 shows that the number of drivers killed has been falling in all age groups (except the young driver group, aged 16 – 19 years). However, the age bands 70 – 79 years, and over 80 years have not been falling as fast as the other age groups. Although the casualty trend is decreasing, it is decreasing slower than other ages.

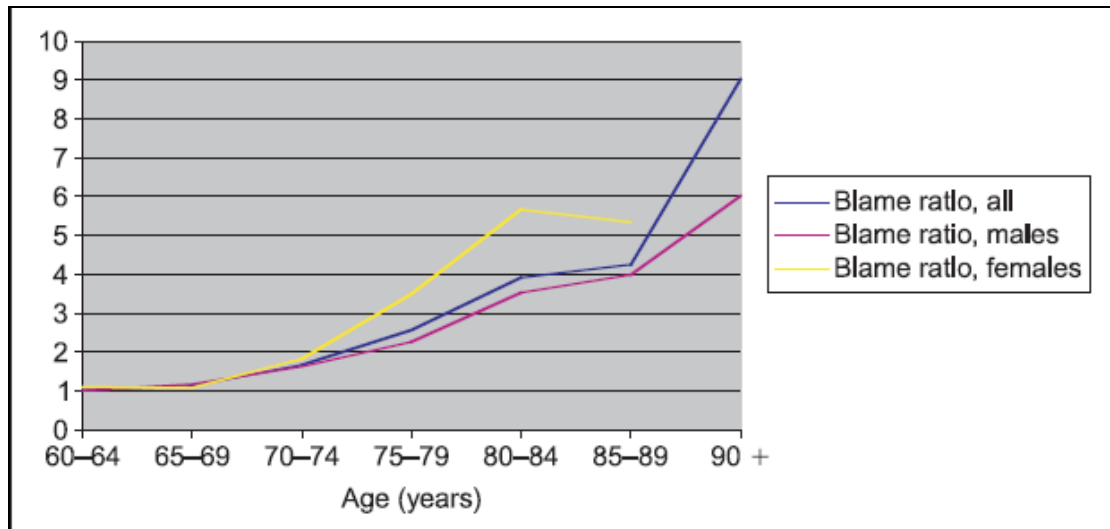
	2000	2001	2002	2003	2004	2005	2006	2007	2008
16-19	113	134	131	144	151	149	149	136	118
20-29	303	285	327	325	291	324	317	258	236
30-39	197	225	198	206	200	183	151	145	135
40-49	126	146	138	133	133	127	133	114	105
50-59	126	120	112	123	98	103	105	98	76
60-69	89	84	84	95	68	66	85	73	64
70-79	75	91	79	83	79	76	57	58	71
80+	55	67	69	56	82	76	61	57	55

Table 4 Number of driver fatalities between 2000 and 2008, by age band, GB

3. Causes of Old Driver Accidents and Injuries

There have been several studies which look at why older drivers have a higher accident risk.

Drivers between 60 to 69 years appear to be no more likely to cause an accident as they are to be the victim of one caused by another person. However, over this age, the blameworthiness ratio increases for both genders – meaning that they are more likely to be the party that causes the crash rather than the one innocently involved in it^{vi}. Older drivers between 80 and 89 years appear to be four times more likely to have caused a crash than to have been involved in one (the authors of the report stress caution when looking at the 90 years + figure due to the small sample).



Graph 1 Blameworthiness ratios of drivers over 60, by age band and gender, GB.

3.1 Type of Collision

A comparison^{vii} (using data on 19,782 drivers in the US Fatality Analysis Reporting System, FARS) between older (65 years+) and younger (35 – 54 years) drivers found specific risk factors for the older groups. The point of impact in a collision had an influence on the risk of fatality, with the 1 - 3 o'clock angle (front passenger side as the study was of US vehicles) and the 7 - 9 o'clock angle (passenger door behind the driver) being linked to an increased risk of fatality. Both of these are oblique side impacts and it is argued that improved crashworthiness and side impact protection may mitigate this risk.

The paper found that driving with one passenger was associated with an increased risk of injury for older drivers, although the presence of a passenger meant there was a decreased risk of fatal injury in both age groups. It may be that the situations in which a passenger is present, such as the time of the day (which it also found to be a risk factor for older drivers) or the gender of the passenger and driver, influences this finding.

3.2 Junctions

Older drivers have been identified as having greater involvement in accidents at junctions. In several US analyses^{viii,ix} of accidents involving older drivers, turning left across a lane of traffic (equivalent to turning right in the UK) was identified as the most dangerous manoeuvre at an intersection. In this type of accident, the older driver was more likely to be at fault.

The reasons behind this high crash risk were failure to follow the traffic law, such as failure to give way to traffic which had the priority or disregarding a traffic signal.

There is some evidence that the main reason for failing to follow the law at an intersection changes with age. One US study compared older drivers with a control group of drivers aged 35 – 54 years. It found that drivers aged 70 – 79 years made more mistakes where they identified the hazard but misjudged the time available to complete the manoeuvre, whereas drivers 80 years and older predominantly failed to see or detect the other vehicle in the first place.

Several studies have looked at whether aging affects the ability to avoid a collision. Avoiding a collision is based on several components - identifying the hazard, judging whether or not it will cause a collision, knowing the correct course of action to avoid a collision, and then undertaking that course of action.

3.3 Visual Scanning

One underpinning requirement to interpret and respond to the situation on the road is good visual observation and hazard perception. This is reliant on visual scanning, and a large number of papers have studied the observations made by older drivers. Typically, the studies use younger or middle aged drivers as a control group against which to compare the responses of older drivers.

Simulator studies have been conducted which compare the visual scanning of older drivers to younger drivers. One Australian study^x found that older drivers were slower to both identify and respond to potential hazards.

One on-road study in the US^{xi} compared the visual scanning of groups of younger (18 – 25 years), middle-aged (35 – 55 years), and older (65 – 80 years) drivers at intersections by measuring the proportion of time they spent looking towards the left, right and in the rear view mirror. It found that compared with the middle aged drivers, the older and younger driver groups made less use of their full scanning range before driving through an intersection. Similarly, the older and younger driver groups were also found to check their rear view mirror less often than the middle aged group.

The sample of older drivers in the study made significantly fewer observations left and right whilst negotiating junctions.

There is some evidence that age itself does not have an influence on a driver’s visual scanning process. One UK study compared groups of older and younger drivers who had no acuity and visual field problems, and found little evidence of an age-related decline in the search of the scene when detecting hazards.^{xii} The implications may be that visual impairment is chiefly responsible for the decline in visual scanning techniques.

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3.3.1 Motion extrapolation

The ability to judge and extrapolate objects in motion decreases with age and may have an influence on a driver's ability to judge whether a collision would occur. Simulators studies have been used to study this phenomenon.

One paper^{xiii} reported that although older drivers were more cautious at judging time to collision (i.e. *when* a collision would occur) than younger drivers, they were less accurate at judging *whether or not* a collision would happen. Another paper^{xiv} also found that older participants were less sensitive at detecting whether collisions would occur and identified that this effect was particularly evident at higher speeds.

3.4 Ill-Health

This study also found that older drivers with heart disease or stroke were more likely to be involved in at-fault automobile crashes and that arthritis was also associated with an increased risk among female older drivers, implying that poor health is an issue.

3.5 Alcohol and Drugs

A US study^{xv} found that speeding and non-use of restraint were the two most important common factors in determining injury severity for young and old age groups. It also found that alcohol and drug related factors were not a common factor in the collisions between older and younger drivers.

Another paper did, however, find that the use of some legal drugs used to treat conditions that become more common with age were associated with crash risk^{xvi}. Nonsteroidal anti-inflammatory drugs, angiotensin converting enzyme inhibitors, and anticoagulants were associated with an increased risk of at-fault involvement in crashes. Benzodiazepine use was also associated with an increased risk of a crash although not necessarily at-fault.

Calcium channel blockers and vasodilators were associated with a reduced risk of crash involvement.

3.6 Motoring Convictions

Interestingly, there is some evidence^{ix} that previous motor vehicle convictions are significantly associated with reduced risk of injury for older drivers. Although given the methodology used in the study it was not possible to explain this relationship, it may be that self-regulation or family involvement are likely to follow a conviction, which may then influence crash risk thereafter.

This was supported by other studies^{xvii, xviii} which identified that prior convictions were associated with a reduction in crash risk. Prior involvement in crashes was a good indicator of future involvement.

Increasing life expectancy and healthiness at older age may also have an influence on the average age of drivers involved in accidents, and the age at which interventions are targeted. A study^{xix} of several cohorts of older drivers involved in intersection accidents in Finland between 1987 and 1995 found that for males, this accident type decreased for drivers aged between 60 and 79 years in the later cohorts, which also saw a corresponding rise in this accident type for drivers over 80

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years. The authors concluded that whilst intersection accidents are an age-related phenomenon which will occur, the age that it will occur at will vary.

Finally, many older drivers accidents may involve natural deaths before a collision. One in-depth study of Swedish accident data found that of the 152 drivers over the age of 65 years who died in road crashes between 2002 and 2004, 30 (20%) had occurred due to the driver dying of natural causes immediately before the accident^{xx}. These accidents were primarily single vehicle crashes.

3.7 Low-mileage bias

An important consideration when looking at the accident risk of older drivers is the low-mileage bias, where drivers of any age who drive less and cover shorter distances are more at risk of being involved in accidents per mile driven. As older drivers may typically drive much less or for shorter distances than younger drivers or drivers using the road for work, some of their increased risk may be to do with the relatively low distances they drive rather than age.

This point that older drivers are at no greater risk than other age groups once different levels of driving activity are taken into account is argued in several papers.^{xxi, xxii}

A study of travel data from the Netherlands^{xxiii} found that drivers over 75 years were generally safer than other drivers when taking low-mileage bias into account. It divided drivers into groups who annually covered less than 3,000km, between 3,000km and 14,000km, and over 14,000km. It found that only drivers who travelled less than 3,000km per year (one in ten of the older drivers in the study) had elevated crash rates.

A limitation to this study is that it was based on self-reported mileage data, a technique that has been questioned^{xxiv}, as it may not always be the most accurate indicator of actual mileage.

One study^{xxv} based on odometer data concluded, *“the low-mileage bias remains evident, albeit at a reduced level”*.

Modern GPS and Black Box technology could be used to get a more accurate understanding of not just the mileage driven by older drivers, but the roads used and times of the day they are driving.

3.8 Injury risk

As people get older, physiological changes also occur, which increase frailty and the risk of injury in a crash.

This fact that older drivers are more at risk of severe injury in a crash is well noted in the literature. One study performed in the 1980s found that 70 year olds were 3 times more likely to die than 20 year olds in identical crash conditions^{xxvi}. Similarly, an Australian study^{xxvii} of police reported crashes between 1998 and 2003 found that drivers over the age of 70 years sustained serious injury rates more than twice as high as those of the 30 – 59 year old drivers.

One US study suggested that between frailty was a made a greater contribution^{xxviii} towards the higher death rates per vehicle mile travelled of older drivers than any increased likelihood of crashing.

3.9 Summary of Chapter 3

There are differences between the types of road accidents and their severity between drivers of different age groups.

Drivers do not have a higher accident risk, until the age of 70, and up to this age they are no more likely to cause a crash than to be the victim of another road user's mistake. However, drivers over 70 and especially over 80 years, drivers are more likely to be at fault when they crash.

Older drivers are commonly involved in collisions at junctions, often because they mis-judge the speed/distance of other vehicles or fail to see a hazard. Visual impairment may be a factor in this type of crash.

Underlying health conditions, and some types of medication taken to treat those problems, are a more common factor in accidents involving older drivers. Indeed, a proportion of older driver fatalities occur when a driver dies of natural causes while driving, and their vehicle immediately crashes.

Due to the more fragile health and physical condition, older drivers are more likely to suffer injuries when they crash.

4. Preventing Accidents and Injuries

There are several strategies that can be considered to reduce the accident risk to older drivers.

4.1 Assessing Fitness to Drive and Identifying Crash Risk

Predicting the drivers who would be at increased risk of being involved in a crash due to age related factors is an important area of study. Good predictors of future crash involvement can have applications for medical professionals and families to identify older drivers who are most at risk, and offer appropriate advice.

Good indicators would also not wrongly identify ‘safe’ drivers as risky, as this can have implications for restricted mobility.

There are a large number of tests which have been developed and could be used to screen older drivers for crash risk and fitness to drive.

Given the range of requirements for driving and that it remains a complex activity; it is likely that no single test will be appropriate for identifying dangerous conditions. However, an examination method which uses a combined approach may be the strongest way of identifying drivers who are at an increased risk and need more help to drive safely, and drivers whose’ condition means they are unable to safely use the road.

The timing of the intervention and its acceptability to older drivers are also essential.

The potential indicators that can be used to assess crash risk are mainly in-vehicle, cognitive and visual, although there are also other indicators. As drivers age at different rates, age is almost certainly not a suitable indicator on its own

4.1.1 Cognitive tests

There are several tests which can be used to understand the level of cognitive impairment. They are typically designed to detect specific cognitive conditions rather than for general use.

- Mini-Mental State Exam (MMSE)
Consists of a short series of questions
- Clock Drawing Test
Candidates are asked to draw the full face of a clock
- Trailmaking Part A and B
A join the dots style activity
- Test Your Memory

There is evidence that cognitive performance can be used to predict future crash involvement.^{xxix}

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4.1.2 Vision tests

There is a range of vision tests used for older drivers in different countries. The most commonly used is the Useful Field of Vision test.

Studies^{xxx} of the licensing criteria for visual fitness to drive for older drivers in several western countries have only found an inconclusive link between the tests and their ability to predict poor driving performance.

An assessment of mandatory vision tests for the relicensing of drivers over the age of 80 in Florida found that older drivers did not see the tests as a deterrent to seeking renewal.^{xxxi}

4.1.3 In-Vehicle Tests

A common approach to identify risky behaviour is in-vehicle testing, and in most developed countries, this is the basis on which drivers initially gain their licence. However, it is much less common for drivers to be required to retake a driving test in order to retain their driving licence at a certain age.

In the UK, drivers' licences expire at the age of 70 years. In order to renew the licence, and be able to continue to drive, drivers must complete a form and certify that they are fit to drive. They must then repeat this every three years.

One issue with in-vehicle tests is that often they may use vehicles with dual controls or a different vehicle to the one which older drivers commonly use. Research has found^{xxxii} that for older drivers with some cognitive deterioration, using and adapting to an unfamiliar vehicle can contribute to the cognitive load that they have to deal with, and this may have an impact on a their ability to drive to their usual standard.

4.1.4 Other indicators

As well as various methods of assessing fitness-to-drive through testing or examination, there may be other indicators that a driver is at a higher risk of being involved in a collision.

One paper^{xxxiii} reported that several psychological, medication-related, visual attention and function related factors had an impact on crash involvement. This study found that people who had difficulties performing some physical tasks, such as light housework or yard work, or opening a jar, were more likely to have an increased risk of being involved in road accidents when driving.

A history of falls was also associated with a higher reported difficulty of driving.^{xxxiv}

Another paper^{xxxv} also found that older drivers who had reported a prior history of falls were 50% more likely to be involved in crashes. It also found other indicators of increasing crash risk, such as reported difficulty in walking over 1/2 a mile, moving outdoors, and the number of other activity limitations.

These findings were supported by a further paper, which found that a self reported fall^{xxxvi} in the previous year was also a marginally significant predictor of crash risk, although other physical difficulties such as walking one quarter of a mile and moving outdoors were also significant predictors.

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“Older Drivers”

4.1.5 The role of health professionals in assessing fitness to drive

A large study^{xxxvii} between 1988 and 2000 of over 110,000 older drivers found a weak, but statistically significant, link between being involved in a road accident and having had contact with a physician in the month beforehand. Involving medical practitioners and ensuring they are equipped with the information required to judge fitness to drive is, therefore, an important issue.

Currently guidelines of Fitness to Drive aimed at health practitioners is available from the DVLA^{xxxviii} and was last updated in February 2009.

UK

A Department for Transport study, “Attitudes of Health Professionals to Giving Advice on Fitness to Drive^{xxxix}”, aimed to:

- to explore health professionals’ current state of knowledge regarding medical aspects of fitness to drive;
- to investigate the attitudes and other factors that may influence their decisions on whether to discuss fitness to drive during routine clinical contacts;
- to explore the organisational barriers to the dissemination of up-to-date knowledge in this field, and the obstacles to including advice on fitness to drive as a routine part of consultations; and
- to suggest ways of improving medical and other health care personnel’s knowledge and their willingness to give advice to their patients, and indicate how these aims may best be achieved within the organisational context of these professional groups.

The research explored how fitness to drive issues were taught in medical schools in the UK. Out of the thirty two medical schools, twenty two (69%) reported teaching medical aspects of fitness to drive within their curriculum, five of whom reported that they taught the topic in depth. However, only four of the twenty two could quantify the extent that fitness to drive was taught, which was either one lecture or one lecture or tutorial.

Fitness to Drive issues were taught in different sections of the curriculum – such as medical ethics, or on specific health conditions such as epilepsy or cardio-vascular medicine.

A questionnaire survey of 630 health professionals from many different professional groups, such as GP’s, nurses, optometrists and occupational therapists amongst others, found that almost all (87%) were aware of the DVLA Guidelines and 80% said that they had consulted them over the previous two years.

Respondents to the questionnaire reported that they were most likely to advise patients about fitness to drive issues if they had epilepsy, fits or black outs, or a stroke. The majority of hospital consultants and GP’s reported that they had advised patients to stop driving within the last three months.

The Royal Society for the Prevention of Accidents “Older Drivers”

The respondents felt that discussing fitness to drive issues with patients was very important; most believed that they had a ‘duty of care’ to do this with their patients and that it was part of their role. However, knowledge was variable about whose role it was to advise patients and who had the legal responsibility to do so. Most also identified a need for better training or clearer guidelines about giving advice. Two in five respondents agreed that they did not have sufficient knowledge about fitness to drive issues.

The study also tested the knowledge of health professionals and how they would react when confronted with situations which would require them to advise a patient about their fitness to drive.

The 413 health professionals who participated in this part of the study were shown either a paper or video vignette - a scenario in which a patient had a medical condition which affected or might affect their fitness to drive, and in which the health professional would need to decide whether the patient was fit to drive, unfit to drive, or borderline between the two.

Only 31 (7.5%) of the health professionals scored all of the paper vignettes correctly, although two thirds scored one or two correctly. GPs and medical specialists tended to achieve more correct answers. The most common mistake was a bias towards rating patients who should have been told they were unfit to drive as borderline or fit to drive.

Three video vignettes simulated typical settings in which clinicians would be likely to have to give a patient advice about their fitness to drive. In the videos, pseudo-patients described a health condition that would render them unfit to drive, as well as a lifestyle that involved driving. A set of car keys were placed beside the pseudo-patients.

The videos were shown to a cross section of 101 clinicians in primary and secondary care. Several clinicians were shown more than one and 200 vignettes were shown in total. Clinicians were asked what advice they would give the patients; they were not informed that the purpose of the study was to investigate clinicians’ advice on fitness to drive.

Concerns about fitness to drive were expressed unprompted in one quarter (51/200) of the vignettes. In the 149 situations where driving was not mentioned by the clinician as a main concern, 60% of the clinicians mentioned it after ten minutes. However, this is generally a longer time than a standard consultation, and therefore, in reality, the topic of driving would not be raised. Most driving advice given by the clinicians was non specific.

In interviews following the vignette, several GP’s mentioned that driving is not relevant to the majority of their consultations, which are focussed on medical issues, and so a barrier to giving advice on fitness to drive was remembering to do it as well as covering all of the medical issues in the short period of time.

Other reported barriers to advising patients in the interviews were: assuming that older patients did not drive, lack of knowledge, the complexity of the guidelines, uncertainty over whose responsibility it is to give the patient advice about fitness to drive, patient resistance or denial, the risk of negative consequences to the patient, such as loss of well-being or livelihood, and the risk of jeopardising the doctor-patient relationship.

The Royal Society for the Prevention of Accidents “Older Drivers”

International

Some papers have gathered self reported attitudes from physicians to examine their views and practices. One Canadian^{xi} study used a mailed questionnaire to carry out a cross sectional survey of physicians to find out their attitudes and practices when assessing fitness to drive.

Most of the physicians in the survey felt that the assessment of fitness to drive in their medical practice was important, but just under half (45.8%) did not feel confident in doing so. Almost half (46.7%) did not feel that physicians are the most qualified professionals to identify unsafe drivers

Physicians were asked about a publication called *Determining Medical Fitness to Drive: A Guide for Physicians*, which is published by the Canadian Medical Association and has several sections on different conditions that can affect driving. Nearly one quarter of those surveyed (23.5%) were not aware of it and one third (31.2%) of those who were aware of it, rarely used it.

The vast majority of physicians (88.6%) felt they required more education in the subject of assessing fitness-to-drive, and 72.4% agreed that physicians should be legally responsible for identifying unsafe driving practices.

One major barrier to reporting a patient as unfit to drive to the licensing authority, cited by 75% of physicians, was that it would threaten the established doctor-patient relationship, and with it the trust that had been built up. Damaging this relationship could lead to patients failing to report other health issues. However, other similar Canadian studies have found that the vast majority of physicians believe that the interests of the public should prevail over those of individual drivers.

Although the paper highlights that its findings match research done in some Scandinavian countries, a note of caution must be attached to transposing these results to the UK, where there may be several differences between physician training, views, attitudes, as well as the clinical decisions that physicians make. However, in lieu of similar surveys in the UK these results indicate an area of future investigation.

Some research has also examined the use of education workshops for physicians and medical professionals to help develop their ability to assess the standards of driving and to encourage driving retirement or self regulation.

One workshop^{xii} focussed on educating health professionals about assessing and identifying the fitness to drive of older drivers with dementia, and how to encourage driving retirement amongst those individuals. A clearly focussed curriculum for the workshop was developed as part of a project run by the American Medical Association. The evaluation of the workshop found that the focussed curriculum with clear and immediate applications increased the knowledge and confidence of health professionals on the topic; were more likely to use driving-related behaviours in assessments and were more likely to encourage patients with dementia to retire from driving.

4.2 Self regulation

An important aspect of older driver safety is self regulation. This takes many forms, from completely avoiding driving, to planning journeys to avoid specific routes, times of day, or conditions.

Self-regulation is widely regarded as common by road safety professionals, and research evidence supports the belief that drivers self-regulate in response to their health, and difficulties they perceive when they are driving.

It is important to identify the characteristics of drivers who would self-regulate their driving. One study^{xiii} found that the drivers who are most likely to self-regulate their driving:

- are female
- are 75 years and older
- are not the principal driver in the household
- had been involved in a crash in the last 2 years
- are experiencing vision problems
- reporting lower confidence ratings

There was also a strong association between drivers avoidance of a specific condition if they reported deterioration in functional physical ability for those conditions. The situations which drivers reported they avoided most, were driving at night (25%), on wet nights (26%) and in busy traffic (22%).

One Swedish questionnaire study^{xiii} of older drivers and found similar results: older drivers were less likely to drive in taxing conditions, such as at night or bad weather, and female drivers were more likely to limit their driving. It also asked drivers whether they had any problems with daily activities (tying shoe laces, getting dressed, climbing stairs, walking over an open field, crossing a street, riding with public transport, stepping in or out of a car, using the seat belt in a car, engaging in social activities, gardening or hobby) but found that problems with these types of activity were only marginally associated with self-regulation.

A US study^{xiv} also identified daytime-only driving as one of the most common self restrictions, along with limiting driving distance and time. Out of the sample of 108 drivers in the study, who were collected via referral for a clinical driving examination, 8 respondents identified each of the three categories listed.

This study also found that drivers who performed worse in driving evaluation tests, which included the clock drawing test (CDT), mini-mental status exam (MMSE), Trailmaking, geriatric depression scale (GDS), and simulated driving, were less likely to self-regulate their driving.

Interestingly, this result contrasts with another US study^{xiv} in which the role of reported impairments on self-regulation was examined. In this study, telephone interviews with older drivers were used to gather data on their driving compared with 5 years earlier. It found that drivers who reported increased difficulty from physical impairments were the most likely to self-regulate their driving, and the chance of them doing so increased by 32% with each physical impairment. Drivers with visual impairments or memory impairments were 19% more likely to self regulate and drivers with diagnosed medical conditions were 13% more likely.

The Royal Society for the Prevention of Accidents “Older Drivers”

A potential explanation for this contradictory evidence is that in the second study the drivers themselves were able to describe their medical condition, whereas in the first study, it was measured clinically. This clinical approach may be more sensitive to identifying potential impairments which would have an impact on safety before the older driver were able to identify the impairments themselves.

Vision problems were also found to be a predictor of how a driver self-regulates their driving^{xlvi}. One paper found that poor scores in acuity, contrast sensitivity, and central and lower peripheral visual fields each predicted that drivers were more likely to have reduced their mileage two years later.

Certain worsening visual functions were also associated with giving up driving in different conditions two years later. Contrast sensitivity and central and lower peripheral visual fields were individually associated with a greater likelihood of giving up night driving and participants with worse baseline acuity scores were more likely to have given up driving in unfamiliar areas.

One study^{xlvii} compared the self reported health of older drivers with whether they had given up driving within the following two years. Self reported health was collected from drivers and rated on a scale (poor, fair, good, very good, or excellent). It found that 17% of the drivers who self reported poor to fair health in the original survey had given up driving two years later. Only 8% of drivers with good to excellent self reported health had stopped driving within the same period. Overall, 36% of drivers reported poor to fair health at the start of the study, and 11% had stopped driving after two years.

Studies^{xlviii} have also examined the relationship between driving ability and self regulation, which compared a questionnaire on driving habits with an on-road driving test to determine a driver’s fitness to drive.

It found that a poorer performance on the driving test was not related to overall avoidance of difficult situations. Importantly, this study did identify that there was a relationship between driving ability and avoidance of *specific* difficult driving situations – driving in the rain, driving at night, and driving in the rain at night. Drivers with a high level of confidence in their driving abilities were less likely to self-regulate their behaviour and avoid these specific situations.

This study also identified several barriers to self regulation. Almost three-quarters (70%) of participants said that they would not be able to maintain their present lifestyle if they stopped driving. Almost half (42%) said that their family and friends would be unavailable to provide transport when required and 44% said that they would be unwilling to ask for such help. One quarter (25%) of participants perceived there was a lack of public transport.

A focus group^{xlix} study to explore older driver opinions to self regulation found that older drivers were aware that aging could influence their driving and that they used self regulation in response to this. Another major theme was that transportation alternatives were not viewed as an option, as they were felt to be non-existent or limited

The availability of alternative transportation is an important pre-requisite for encouraging older drivers to consider the option of stopping driving.

The Royal Society for the Prevention of Accidents “Older Drivers”

One paperⁱ examined how the provision of public-transport training (referred to as ‘transit training’ in the paper) and free bus passes changed transportation use in the following year. The groups of older drivers who were given public-transport training reported that they used the bus more frequently than those that did not receive the training. However, the free bus pass did not have any further effect. Between the groups, there were no differences in self reported miles or days driven per week after the intervention.

There does not appear to be any research that has explored the role of friends and relatives in helping older drivers to self-regulate, and what support could help them. It is a difficult area to evaluate with the role being less formalised than the relationship between a health practitioner and patient, but helping family members deal with the problem may also be an effective way of encouraging effective self regulation.

Research which helps develop better understanding of the link between self-regulation and crash risk, and how to help drivers to match the environments that they drive in to their condition would also be a valuable contribution

4.3 Physical Activity

Physical health can also influence crash risk and some programmes have tried to address this amongst older drivers by physical training programmes.

An evaluated programme in Portugalⁱⁱ involved 32 older drivers between the ages of 60 and 80 years participating in an exercise programme designed to address several physical attributes linked with driving performance. Before taking part in the programme, the older drivers had several tests which, for example, looked at reaction time when performing single and dual tasks, or their useful field of vision.

The exercise programme itself consisted of 60 minute supervised sessions taken 3 times a week over a 12 week period comprising of activities designed to be both physically and cognitively stimulating.

After 12 weeks, the tests were performed again and researchers found improvements in reaction times, visual attention, and lower limb mobility. There was no evidence that the programme effected speed perception however.

Other programmes addressed some of the physical issues which older drivers have by running an exercise programme over the course of a 3 month period and used in-vehicle assessment to evaluate the programme’s effectivenessⁱⁱⁱ.

The programme compared a control group of 90 drivers (who did not take the exercise programme) with an intervention group of 88 drivers (who did take the programme). Drivers were recruited from clinics and the general community rather but not because there was any suspicion of driving difficulties. They were screened to identify any drivers at increased risk due to physical, cognitive or visual impairment, and any such drivers were not included in the trial. The instructors did not know which of the older drivers were in which group.

The course was a graduated programme aimed at physical activities required for driving including movements of the shoulders, spine, hip knee and ankle as well as hand strength and upper extremity co-ordination. The course was delivered by two physical therapists who were trained in the course delivery to ensure consistency.

The Royal Society for the Prevention of Accidents “Older Drivers”

Both the control group and intervention group were given monthly in-home education which covered home safety, falls and vehicle maintenance.

Three months after the intervention, the study group were found to have committed fewer critical errors, compared with the control group, whose driving performance had deteriorated. Although there was a significant difference between the driving evaluator’s assessments of the two groups, it is not necessarily clear how this would translate into crash risk - although the authors predicted from previous research that it would lead to an 8% to 16% reduction in crash risk.

Larger studies which use crash risk as an outcome measure could help to establish whether physical activity programmes help to reduce the number of older driver accidents.

4.4 Driver Education

Researchⁱⁱⁱ has shown that older drivers approve of education programmes for older drivers, which means that there is the potential for high take up of such schemes.

One evaluated driver education scheme, the 55 Alive/Mature Driver Education Programme in Canada^{iv}, was designed to provide information on the rules of the road, hazard recognition and changes which affect driving. The programme also encourages drivers to reduce exposure to risky environments and to plan for the time when they will have to give up driving.

The evaluation had three phases^{iv} – firstly to look at the self-selection bias of drivers enrolling on the study, secondly to examine crash rates, and thirdly to run focus group sessions with men who had attended the programme.

It found that there was a self-selection bias on the programme with drivers who had been involved in an at-fault collision being more likely to attend the course. Perhaps surprisingly the study found that attendance on the programme was associated with higher crash risk for those over the age of 75 years, although there was no change in the crashes amongst younger mature drivers. It was unclear from crash records which of the strategies did influence crash involvement, or whether it was a further factor such as reduced exposure to crash risk.

The focus groups invited drivers to talk about their driving habits and attitudes. The main finding was that the men who had not been involved in a collision following the programme (whether or not they had been in one before the course) used many more of the strategies presented in the programme to self-regulate their driving.

The role of their wives was raised by many older male drivers, and individuals in many of the focus groups said that it was their wives who had initially found out about the course and encouraged them to attend. In the group of drivers who had an accident after attending the course it was suggested that their motivation for attending the course was to appease their spouse rather than to learn about strategies to cope with age. This was supported by the inability of this group to recall information presented in the course.

One study^{vi} expanded upon this approach and explored both classroom and vehicle based older driver education and training programmes. The on-road driver evaluation consisted of two sessions, both of which lasted for around 35 minutes and were conducted on a range of different classes of roads with different speed limits. Whilst

The Royal Society for the Prevention of Accidents “Older Drivers”

on the drive, drivers were expected to perform a number of left and right turns. The second on-road session was conducted 4 - 8 weeks after the completion of the initial intervention.

Driving was evaluated by an instructor in the vehicle, using the standard procedure in the Province of Manitoba, and constructive feedback on driving habits was given at the time. It found that classroom sessions could improve a driver's knowledge of safe driving practices, and that the in-vehicle assessment could improve some aspects of safe driving, but did not link these to other variables such as driver confidence or accident rate.

4.4.1 Driver Education Case Study: Guidance for the OLder Driver (GOLD), Norfolk County Council

Thirty two UK organisations are listed on the Road Safety Time Bank as currently running, or having previously run, an education scheme aimed at older drivers^{vii}.

Of particular interest is the Guidance for the OLder Driver (GOLD) Scheme, run by Norfolk County Council with funding from a Department for Transport Partnership Grant. An evaluation of GOLD was published in 2009^{viii}.

There were four main steps to the programme. Firstly, older drivers became aware of the programme (which did not define an age range for older drivers, it was left to the drivers themselves to decide whether they were an 'older driver'). Drivers who felt they could benefit from the scheme could contact GOLD and undertake a Pre-drive screening with the GOLD Road Safety Officer, to assess their suitability to participate and establish a supportive atmosphere. Participants believed that this step made the driving assessment more relaxed.

If needed, an ADI would then contact the driver to arrange a driving assessment, following which the GOLD Road Safety Officer would contact the driver to get feedback and find out if they were satisfied with the assessment. If an ADI expressed concern about the person's drive, an additional assessment would be arranged with the GOLD Road Safety Officer accompanying.

A participant would only be advised to give up driving if it was within their best interest and advice on alternative forms of transport would be given along with further assistance. However, the key principle of the scheme was to provide drivers support rather than to stop them from driving. This aspect was particularly appreciated by participants, who also frequently reported that they had picked up some good advice following the drives.

The project aimed to link in with medical practices and the local Primary Care Trust. Involvement with the PCT at a strategic level was difficult due to internal restructuring and staff movement during the period when the project was running. Similarly it was difficult to recruit local medical practices via letters and publicity material within the pilot area.

Two medical practices who responded were selected to be part of the initial pilot, and due to limited referrals, five additional practices were recruited. Of the 96 participants in GOLD, it was estimated that only 20% had come via medical referrals. Many of the issues that medical practitioners face when raising fitness to drive issues with patients is discussed in section 4.1.5.

The Royal Society for the Prevention of Accidents “Older Drivers”

The bulk of participants contacted Norfolk County Council after having seen advertisements or articles in local publications.

The Approved Driving Instructors (ADIs) who took the older drivers on the in-car assessments were initially invited to an unpaid information day, which included a presentation from the local mobility centre¹ as well as a seminar on medical conditions that can affect driving.

The ADIs who gave assessments were chosen because of their location and ability to work with older drivers. The latter was important due to the difference in approaches needed between training younger, learner drivers and providing a more supportive assessment for elderly drivers.

Example feedback forms were produced to help the ADIs pitch the advice right, following the assessment. As part of a more sensitive approach, the ADIs did not write their feedback report during the drive.

On a more practical note, the routes that the ADIs used were also adapted to encompass the types of road and conditions routinely encountered by the older drivers, rather than using typical learner routes which would try to encompass a much wider range of conditions and roads. Many participants also commented on the length of the assessment drive, and so ADIs observed if a driver became fatigued during it.

One important challenge which the GOLD project identified – and which is of relevance to any organisation running similar schemes – is how to promote the scheme so that it reaches and encourages people who would be less confident and comfortable with taking part in an assessment.

4.5 Re-licensing

Several countries and regions have a process of reapplying for a licence at a certain age. Successful reapplication is generally dependent upon the driver's fitness to drive, and this can either be through a mandatory or self reported process.

In the UK, drivers' licences expire at the age of 70 years, and in order to renew the licence, and continue to drive, drivers must complete a form and certify that they are fit to drive. They must then repeat this every three years.

Several studies have looked at the potential effectiveness of re-licensing. Australian research^{lix} compared the accident rate of two sets of drivers, one from Victoria, where there was no re-licensing assessment, and one from New South Wales where drivers over 80 years have to provide annual medical certificates, and pass an on-road driving exam from the age of 85 years. This study used fatal accident data from Victoria and New South Wales, along with population and licensing data for both states.

As well as comparing the older driver fatalities in the two states, the 40 - 49 years age range was examined to look at any underlying road safety differences between the two states.

¹ East Anglian DriveAbility - <http://www.mobility-centres.org.uk/>

The Royal Society for the Prevention of Accidents
“Older Drivers”

There were several differences between the two groups in the study. Victorian drivers were associated with a slightly lower fatality rate which was marginally statistically significant and a significantly lower fatality rate for occupants not in the same vehicle. Victorian drivers had a passenger fatality rate which was two to three times higher than New South Wales drivers, although the researchers stated that this could not logically be attributed to the differences in licensing procedure. The difference disappeared when accounting for passenger occupancy rates in Victoria.

Accounting for the higher passenger rate of Victorian vehicles, there were no statistically significant differences between the two groups, and the researchers suggested the results show that age-based mandatory assessment of older drivers about 80 years did not have any effect on the accident rates.

The authors stress that Victorian roads are around 7 % safer than roads in New South Wales and there may be other differences not examined in the study. A caution must be mentioned about extrapolating the findings of this study to the effectiveness of other re-licensing arrangements in different countries.

4.6 Licensing restrictions

A further approach is licensing restrictions which only allow the holder to drive in certain conditions. This would work in a similar way to graduated licensing schemes which are used in some countries to prevent young driver accidents.

One Canadian paper^x looked at older driver’s attitudes to a similar approach and used interviews to determine the attitudes of older drivers towards several different restrictions, which all had varying influences on accident risk. It used a variation on a research method called the gamble technique to examine how favourable drivers were to different restrictions.

It found, perhaps unsurprisingly, that the greater the restriction on driving habits, the less favourable it was viewed by older drivers. The results are shown in table 5 below

Restriction	Acceptance
Permitted to drive only with corrective lenses (if prescribed by optometrist or physician)	0.98
Permitted to drive only if undergoes regular assessments specified by the provincial Ministry of Transportation	0.94
Permitted to drive only vehicles outfitted at the driver’s own expense with special equipment to address specific needs	0.94
Permitted to drive only during daylight hours	0.93
Not permitted to drive on certain types of roads (i.e. Highways with four lanes or more, and a speed limit of 100km per hour)	0.89
Not permitted to drive during rush hour	0.87
Not permitted to take left turns	0.69
Permitted to drive only on roadways with a specific speed limit	0.50
Permitted to drive only within a 10-km radius of home	0.45
Permitted to drive only to specific destinations (e.g. grocery store, doctors office, work place)	0.45
Permitted to drive only if accompanied by a licensed driver	0.42

Table 5, older driver acceptance of different licensing restrictions

The Royal Society for the Prevention of Accidents “Older Drivers”

There was a high approval for Ministry of Transport assessments, which covered both on-road driving assessment and medical assessment.

No UK research was found on this topic.

4.6.1 Negative Consequences of Driving Cessation

Driving provides mobility, independence and better access to social activities. For this reason, driving can greatly improve the quality of life.

The Centres for Disease Control in the US set out a chain of events which typify age-related changes in driving^{lxi}, which highlight the health consequences of reduced mobility:

1. Physical and mental changes lead to reduction in skills needed for safe driving
2. Age related physical and mental changes lead to a reduction in driving while also increasing the risk of crashes
3. Reductions in driving lead to a reduction in senior mobility
4. Reductions in mobility lead to quality of life consequences, including reduced activity levels

There is a strong association between limiting the ability to drive and the level of out-of-home activity level, and one paper^{lxii} presents the evidence that limiting this affects many quality of life issues, mental and social well being. Conversely, the paper presents evidence that an active lifestyle is protective against risk of stroke, heart disease, and fractures, amongst others.

A literature review^{lxiii} of the issues associated with the transportation and mobility needs of older drivers found clear evidence that quality of life is reduced for older people when they stop driving. The paper modelled driving status as part of a web of interactions, where it could have an impact on physical and psychological health, community mobility and use of health services.

The review also looked at the potential results of driving reduction and cessation, and found a range of detrimental consequences which would affect the driver, such as a more negative outlook on the future quality of life. Some papers in the review found evidence that losing a licence was associated with increased depression, a loss of self confidence, status, and some of the papers reviewed also suggested a risk of early death.

The review also found that some groups of older drivers, such as women and the financially disadvantaged, were more likely to suffer greater consequences from driving cessation. This was reflected in studies from a wide range of different countries. One study included in the review^{lxiv} listed reasons why the cessation of driving would have a greater impact on older women than men:

- Many older women live alone
- Women who will be 85 years old in 2 decades will have had fewer children and therefore fewer people to provide assistance
- Women who have children will still experience difficulty getting assistance as their children are likely to be busy raising their own families
- Women will be less likely to have the resources to be able to buy assistance or services they need as they face mobility problems.

4.7 Summary of Chapter 4

An important aspect of older driver policy is being able to accurately identify which drivers are more likely to be involved in crashes and when this risk increases to the point when they are no longer fit to drive.

It is crucial that interventions do not unfairly cause older drivers to lose their licence prematurely, as this often has devastating consequences their quality of life and mental and physical well-being.

There are several cognitive and physical conditions which affect the ability to drive safely, and therefore could act as indicators of increased risk. One question is how best to test for these conditions; by a medical practitioner and/or in-vehicle driving assessment. There is comprehensive guidance for medical practitioners, but there is a need for more education for GPs and other health professionals about how to assess fitness to drive and what measures they can take.

It is clear that many older drivers recognise that their driving ability has changed and consequently change when and where they drive (through self-regulation). However, not all older drivers do this and there is little guidance for them about it. For example, there may be some simple indicators, (such as difficulty in tying shoelaces or walking a short distance) that may be a sign to consider one's driving ability.

A major deterrent to self-regulation or stopping driving is the lack of viable alternatives to the car. Public transport is not perceived as meeting the needs of people who do not drive.

Exercise programmes are one way of maintaining health and driving ability as people get older. Driver education programmes specifically tailored for older drivers are another important method, although it can be hard to make sure that the programme reaches the right people.

A key question is how and when drivers should be relicensed. In the UK this occurs at 70 years (and every three years thereafter) and requires only the driver to self certify that they are fit to drive. Research does not suggest that a mandatory driving test would be effective.

5. Discussion and Recommendations

As people get older, it is inevitable that general health and fitness, eyesight, hearing, reaction time and physical mobility will begin to deteriorate. Since these changes are often gradual, they may not be apparent to the individual concerned or to members of their immediate family or circle of acquaintance. Older drivers may unknowingly experience physical and psychological health problems, which vary widely from individual to individual.

This paper has set out the driving risks which become present with age, drawing from international research. It is expected that in future, longer life expectancies and a larger population will mean more older drivers using the road. Given the potential risks, and increasing exposure, the provision of safe mobility for all drivers needs to be addressed.

RoSPA does not believe that there should be a maximum driving age beyond which drivers automatically lose their driving licence. People age at different rates, thus someone aged 70 years may well be fitter, more alert and active than someone aged 60 years or younger. Setting an arbitrary age limit would inevitably be unfair to some drivers who would be able to drive safely at and beyond the age limit chosen.

The evidence shows that the cessation of driving can have significant negative consequences on the health of older drivers. Given this, it is important that the tools used to assess the impact of health conditions on driving standards are accurate, so that drivers are not advised to give up driving when there may be ways of providing safe mobility for longer.

Drivers should be encouraged to undergo a formal medical check before renewing and self-certifying their licence when they reach 70 years of age, and again each time their licence is renewed. Drivers are advised to seek regular medical checks (or at the least, eye checks) from an earlier age. It is noted that vocational drivers are required to undergo medical checks from 45 years of age.

Medical checks can help to identify drivers who are at an increased risk and need more help to drive safely, and drivers whose condition means they are unable to safely use the road. The results can help medical professionals and families to offer appropriate advice and help plan for when an individual retires from driving. The driver themselves should always be part of this when possible.

Mobility is vital for people to maintain a full and independent life. One approach to help older drivers stay on the road safely to preserve their mobility and independence is set out in a US report on Older Driver Safety^{ixv}. It highlights the use of three methods

- *optimizing the driver,*
- *optimizing the driving environment, and*
- *optimizing the vehicle.*

In this approach, driving cessation is recommended only after the safety of the driver cannot be secured through any other mean, and this is one which RoSPA supports.

The Royal Society for the Prevention of Accidents “Older Drivers”

Transport planners should be catering for older road users who may be considering giving up driving. It is unlikely that people will consider giving up the freedom and convenience of driving their own car unless there are suitable, safe, clean, attractive, convenient and affordable alternatives.

Planning and land use policies are also crucial, and should be designed to ensure that people (of all ages) have access to local facilities and services, so that the need to travel by car is reduced.

Intelligent Transport Systems may also have a role to play, and some studies have looked at Intersection Decision Support Systems which can provide drivers with information about the gap they are intending to pull in to. More research is needed to establish how systems such as this can help support older drivers.

The optimisation of the vehicle is an important area. Some established philosophies of modern vehicle design, such as improved crashworthiness, may be contributing the survivability of an accident.

Active safety systems which interact with the driver and warn of dangerous situations are another area of vehicle design which may reduce the accidental risk of older drivers. It is important the usability of these systems by drivers of all ages are examined when trialled or evaluated.

Vehicle adaption is a method of optimising a vehicle for a driver, and tailoring it specifically to a driver's requirements. Throughout this policy paper, the phrase 'older drivers' has been used almost exclusively to describe 'older drivers in unadapted vehicles'. Currently there are 14 mobility centres around the country that can offer advice on vehicle adaption <http://www.mobility-centres.org.uk>. Greater awareness and involvement of these centres in local schemes may increase the length of safe driving that a driver can achieve.

Information, education and publicity are needed to help to raise awareness of the effects of ageing, and of the possible effects of medicines, on driving performance, amongst older drivers and their relatives. Positive advice on alternatives to driving should be incorporated into any materials and campaigns.

Assessment and training courses should be made available to older drivers, and some courses have already been developed and a case study from Norfolk is described. All training and education courses need to be tailored to the needs of the individual, and appropriate for the older drivers who take the course.

Training should include some form of independent assessment as well as encouraging self-assessment by the drivers concerned. However, training needs to be affordable and accessible. The cost, if borne by the drivers themselves, will have a direct effect on the number of drivers willing to take training voluntarily. It can be hard to make sure that the training programme reaches the right people.

The driving environment and road engineering tends to be examined as a way of preventing crashes following accident statistics. Given that older driver accidents tend to occur at junctions, there may be ways of redesigning areas where the recorded accidents indicate there is a high older driver crash risk.

The Royal Society for the Prevention of Accidents “Older Drivers”

General fitness underpins many strands of injury prevention. Some evidence shows that exercise programmes can add value to other road safety interventions.

Many drivers self regulate as they get older by giving up driving in different circumstances. A driver’s decision to limit their exposure to risky scenarios would be expected to reduce their chance of being involved in an accident.

Some research suggests that people with a high level of confidence in their driving ability were less likely to self-regulate their road use, and so it may be some drivers do not limit exposure to more risky circumstances.

Research which helps develop better understanding of the link between self-regulation and crash risk, and how to help drivers to match the environments that they drive in to their condition would also be a valuable contribution

Appropriate information and guidance for primary health care workers is important to assist them in assessing health conditions which may affect the way in which someone drives driving and to enable them to provide appropriate and sensitive advice.

Given that many health professionals may not raise fitness to drive issues during medical consultations, drivers can be encouraged to raise the effects of health conditions on driving.

Families who are concerned about the driving standards of elderly relatives may also currently struggle to find appropriate advice, and this need must be addressed.

6. References

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- ⁱ **Focus On People and Migration**, Office for National Statistics: June 2004
http://www.statistics.gov.uk/downloads/theme_compendia/fom2004/migration.pdf
- ⁱⁱ **Population Estimates**, National Statistics, 2008
<http://www.statistics.gov.uk/cci/nugget.asp?ID=6>
- ⁱⁱⁱ **SafetyLit: Injury Prevention Literature**
<http://www.safetylit.org/>
- ^{iv} **Fitness to Drive: A Guide for Health Professionals**
<http://www.dft.gov.uk/adobepdf/164386/fitnesstodrive>
- ^v WHO. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June 1946, and entered into force on 7 April 1948.
- ^{vi} **Road Safety Research Report 109 Collisions Involving Older Drivers: An In-depth Study**. Clarke et al. Department for Transport: London. September 2009
- ^{vii} **Predictors of injury among younger and older adults in fatal motor vehicle crashes**. Awadzi KD, Classen S, Hall A, Duncan RP, Garvan CW. *Accid Anal Prev* 2008; 40(6): 1804-10.
- ^{viii} **Collisions involving senior drivers: high-risk conditions and locations**. Mayhew DR, Simpson HM, Ferguson SA. *Traffic Injury Prev* 2006; 7(2): 117-24.
- ^{ix} **Factors Affecting Common Vehicle-to-Vehicle Collision Types: Road Safety Priorities in an Aging Society**. Ulfarsson GF, Kim S, Lentz ET. *Transp Res Rec* 2006; 2006(1980): 70-78.
- ^x **Driving responses of older and younger drivers in a driving simulator**. Fildes BN, Charlton J, Muir C, Koppel S. *Annu Proc Assoc Adv Automot Med* 2007; 51: 559-72.
- ^{xi} **Age-related differences in visual scanning at median-divided highway intersections in rural areas**. Bao S, Boyle LN. *Accid Anal Prev* 2009; 41(1): 146-52.
- ^{xii} **Eye fixation scanpaths of younger and older drivers in a hazard perception task**. Underwood G, Phelps N, Wright C, Van Loon E, Galpin A. *Ophthalmic Physiol Opt* 2005; 25(4): 346-56.
- ^{xiii} **Judgments about collision in younger and older drivers**. DeLucia PR, Kathryn Bleckley M, Meyer LE, Bush JM. *Transp Res F Traffic Psychol Behav* 2003; 6(1): 63-80.
- ^{xiv} **Age-related differences in collision detection during deceleration**. Andersen GJ, Cisneros J, Saidpour A, Atchley P. *Psychol Aging* 2000; 15(2): 241-52
- ^{xv} **Comparison of severity affecting factors between young and older drivers involved in single vehicle crashes**. Dissanayake S. *IATSS Res* 2004; 28(2): 48-54.
- ^{xvi} **Relations among chronic medical conditions, medications, and automobile crashes in the elderly: a population-based case-control study**. McGwin G, Sims RV, Pulley L, Roseman JM. *Am J Epidemiol* 2000; 152(5): 424-31.

The Royal Society for the Prevention of Accidents
"Older Drivers"

- ^{xvii} **Previous convictions or accidents and the risk of subsequent accidents of older drivers.** Daigneault G, Joly P, Frigon JY. *Accid Anal Prev* 2002; 34(2): 257-61.
- ^{xviii} **Passengers and other factors affecting the safety of young and older drivers.** Padlo P, ultman-Hall L, Stamatiadis N. *Transp Res Rec* 2005; 2005(1937): 7-13.
- ^{xix} **Cohort effects in older drivers' accident type distribution: are older drivers as old as they used to be?** Hakamies-Blomqvist L, Henriksson P. *Transp Res F Traffic Psychol Behav* 1999; 2(3): 131-138.
- ^{xx} **A pattern analysis of traffic crashes fatal to older drivers.** Skyving M, Berg HY, Laflamme L. *Accid Anal Prev* 2009; 41(2): 253-8.
- ^{xxi} **A re-assessment of older drivers as a road safety risk.** Langford J, Koppel S, Charlton J, Fildes BN, Newstead S. *IATSS Res* 2006; 30(1): 27-37.
- ^{xxii} **Driver ageing does not cause higher accident rates per km.** Hakamies-Blomqvist L, Raitanen T, O'Neill D. *Transp Res F Traffic Psychol Behav* 2002; 5(4): 271-274.
- ^{xxiii} **Older drivers do not have a high crash risk-A replication of low mileage bias.** Langford J, Methorst R, Hakamies-Blomqvist L. *Accid Anal Prev* 2006; 38(3): 574-578.
- ^{xxiv} **'Low mileage bias' and related policy implications: A cautionary note.** Staplin L, Gish KW, Joyce J. *Accid Anal Prev* 2008; 40(3): 1249-52.
- ^{xxv} **In defence of the 'low-mileage bias'.** Langford J, Koppel S, McCarthy D, Srinivasan S. *Accid Anal Prev* 2008; 40(6): 1996-9.
- ^{xxvi} **Risk of fatality from physical trauma versus sex and age;** *J Trauma* 28: 368-378, 1988
- ^{xxvii} **Fragility and crash over-representation among older drivers in Western Australia.** Meuleners LB, Harding A, Lee AH, Legge M. *Accid Anal Prev* 2006; 38(5): 1006-1010.
- ^{xxviii} **Fragility versus excessive crash involvement as determinants of high death rates per vehicle-mile of travel among older drivers.** Li G, Braver ER, Chen LH. *Accid Anal Prev* 2003; 35(2): 227-35
- ^{xxix} **Can high-risk older drivers be identified through performance-based measures in a department of motor vehicles setting?** Ball KK, Roenker DL, Wadley VG, Edwards JD, Roth DL, McGwin G, Raleigh R, Joyce JJ, Cissell GM, Dube T. *J Am Geriatr Soc* 2006; 54(1): 77-84.
- ^{xxx} **Implications of vision testing for older driver licensing.** Bohensky M, Charlton J, Odell M, Keeffe J. *Traffic Injury Prev* 2008; 9(4): 304-13.
- ^{xxxi} **Survey of older drivers' experiences with Florida's mandatory vision re-screening law for licensure.** McGwin G, McCart AT, Braitman KA, Owsley C. *Ophthalmic Epidemiol* 2008; 15(2): 121-7.
- ^{xxxii} **Driving tests with older patients: effect of unfamiliar versus familiar vehicle.** Lundberg C, Hakamies-Blomqvist L. *Transp Res F Traffic Psychol Behav* 2003; 6(3): 163-173.
- ^{xxxiii} **Exploratory study of incident vehicle crashes among older drivers.** Sims RV, McGwin G, Allman RM, Ball K, Owsley C. *J Gerontol A Biol Sci Med Sci* 2000; 55(1): M22-7.
- ^{xxxiv} **Factors related to driving difficulty and habits in older drivers.** Lyman JM, McGwin G, Sims RV. *Accid Anal Prev* 2001; 33(3): 413-21.

The Royal Society for the Prevention of Accidents
“Older Drivers”

-
- ^{xxxv} **Mobility Impairments in Crash-Involved Older Drivers.** Sims RV, McGwin G, Pulley L, Roseman JM, Owsley C. *Annu Proc Assoc Adv Automot Med* 1999; 43: 203-212.
- ^{xxxvi} **Mobility impairments in crash-involved older drivers.** Sims RV, McGwin G, Pulley LV, Roseman JM. *J Aging Health* 2001; 13(3): 430-8.
- ^{xxxvii} **Association between road vehicle collisions and recent medical contact in older drivers: a case-crossover study.** Leproust S, Lagarde E, Suissa S, Salmi LR. *Inj Prev* 2007; 13(6): 382-7.
- ^{xxxviii} **At a glance guide to the current medical standards of fitness to drive**
<http://www.dvla.gov.uk/media/pdf/medical/aagv1.pdf>
- ^{xxxix} **The Attitudes of Health Professionals to Giving Advice on Fitness to Drive,** Road Safety Research Report No. 91, January 2010, DfT London.
- ^{xl} **Family physicians' attitudes and practices regarding assessments of medical fitness to drive in older persons.** Jang RW, Man-Son-Hing M, Molnar FJ, Hogan DB, Marshall SC, Auger J, Graham ID, Korner-Bitensky N, Tomlinson G, Kowgier ME, Naglie G. *J Gen Intern Med* 2007; 22(4): 531-43.
- ^{xli} **Driving and dementia in older adults: Implementation and evaluation of a continuing education project.** Meuser TM, Carr DB, Berg-Weger M, Niewoehner P, Morris JC. *Gerontologist* 2006; 46(5): 680-7.
- ^{xlii} **Characteristics of older drivers who adopt self-regulatory driving behaviours.** Charlton JL, Oxley J, Fildes BN, Oxley P, Newstead S, Koppel S, O'Hare M. *Transp Res F Traffic Psychol Behav* 2006; 9(5): 363-373.
- ^{xliii} **Older drivers' aberrant driving behaviour, impaired activity, and health as reasons for self-imposed driving limitations.** Rimmo PA, Hakamies-Blomqvist L. *Transp Res F Traffic Psychol Behav* 2002; 5(1): 47-62.
- ^{xliv} **Error specific restrictions for older drivers: Promoting continued independence and public safety.** Freund B, Colgrove LA. *Accid Anal Prev* 2008; 40(1): 97-103. *
- ^{xlv} **Characteristics of older drivers who self-limit their driving.** Braitman KA, McCart AT. *Ann Adv Automotive Med* 2008; 52: 245-54.
- ^{xlvi} **Measures of visual function and their association with driving modification in older adults.** Freeman EE, Muñoz B, Turano KA, West SK. *Invest Ophthalmol Vis Sci* 2006; 47(2): 514-20.
- ^{xlvii} **Self-reported health and driving cessation in community-dwelling older drivers.** Sims RV, Ahmed A, Sawyer P, Allman RM. *J Gerontol A Biol Sci Med Sci* 2007; 62(7): 789-93.
- ^{xlviii} **Self-regulation of driving and its relationship to driving ability among older adults.** Baldock MR, Mathias JL, McLean AJ, Berndt A. *Accid Anal Prev* 2006; 38(5): 1038-1045.
- ^{xlix} **A qualitative exploration of self-regulation behaviors among older drivers.** Donorfio LK, Mohyde M, Coughlin J, D'Ambrosio L. *J Aging Soc Policy* 2008; 20(3): 323-39.
- ^l **Impact of transit training and free bus pass on public transportation use by older drivers.** Stepaniuk JA, Tuokko H, McGee P, Garrett DD, Benner EL. *Prev Med* 2008; 47(3): 335-337.

The Royal Society for the Prevention of Accidents
“Older Drivers”

- li **The Effects of an Exercise Programme on Several Abilities Associated With Driving Performance In Older Adults.** Jose F Marmeleira, Mario B Godinho and Orlando M Fernandes. *Accid Anal Prev* 2009; 41(1): 90-97
- lii **A randomized trial of a physical conditioning programme to enhance the driving performance of older persons.** Marottoli RA, Allore H, Araujo KL, Iannone LP, Acampora D, Gottschalk M, Charpentier P, Kasl S, Peduzzi P. *J Gen Intern Med* 2007; 22(5): 590-7.
- liii **Older Individuals' Perceptions Regarding Driving: Focus Group Findings.** Kua A, Korner-Bitensky N, Desrosiers J. *Phys Occup Ther Geriatrics* 2007; 25(4): 21-40.
- liv <http://www.safety-council.org/training/55alive/55alive.htm>
- lv **Crash risk of older drivers after attending a mature driver education programme.** Nasvadi GE, Vavrik J. *Accid Anal Prev* 2007; 39(6): 1073-9.
- lvi **The combination of two training approaches to improve older adults' driving safety.** Bedard M, Porter MM, Marshall S, Isherwood I, Riendeau J, Weaver B, Tuokko H, Molnar F, Miller-Polgar J. *Traffic Injury Prev* 2008; 9(1): 70-6.
- lvii **Road Safety Time Bank** http://www.roadsafetyhub.co.uk/user_types_results.php?id=7
- lviii **An Evaluation of the GOLD Pilot Scheme**, RSN Associates, March 2009
- lix **Do age-based mandatory assessments reduce older drivers' risk to other road users?** Langford J, Bohensky M, Koppel S, Newstead S. *Accid Anal Prev* 2008; 40(6): 1913-8.
- lx **The acceptability to older drivers of different types of licensing restriction.** Marshall SC, Man-Son-Hing M, Molnar F, Wilson KG, Blair R. *Accid Anal Prev* 2007; 39(4): 776-793.
- lxi **Older Adults, Transportation and Longevity**, Centres for Disease Control and Prevention. (2000) Atlanta, GA.
- lxii **Consequences of driving cessation: Decreased out-of-home activity levels.** Marottoli RA, de Leon CFM, Glass TA, Williams CS, Cooney LM, Berkman LF. *J Gerontol B Psychol Sci Soc Sci* 2000; 55(6): S334-40.
- lxiii **It cannot be all about safety: the benefits of prolonged mobility.** Oxley J, Whelan M. *Traffic Injury Prev* 2008; 9(4): 367-78
- lxiv **Asking the Right Question. Understanding the Travel Needs of Women Who Do Not Drive.** Rosenbloom S and Winsten-Bartlett C. *Transportation Research Record*, 2002 Vol 1818 pp. 78-82
- lxv **Older Driver Safety: A Report from the Older Drivers Project.** Wang et al. 2003.