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The Mobility and Accessibility Expectations of Seniors in an Aging Population

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ABSTRACT:

Populations of post-industrial nations are aging. With a growing number of people living well into their 80's and maintaining active lives, the transportation system will have to start focussing more closely on understanding their mobility and accessibilty needs, so as to ensure that specific requirements of this large segment are not being ignored through the promotion of traditional 'solutions' and historical assumptions. This paper takes a close look at the evidence on the mobility needs and travel patterns of individuals over 64, distinguishing between the "young" elderly (aged 65 to 75 years) and the "old" elderly (over 75 years). This distinction is particularly useful in recognising the threshold of health change that impacts in a non-marginal way on mobility needs. This distinction also focuses transport planning and policy on a commitment to understanding the different needs of these subgroups of the population, identifying services and facilities that better cater for these groups. We review the evidence, in particular, on the mobility characteristics of the over 75 years age group, including how they secure support through migration and settlement patterns. We use the empirical evidence from a number of western nations to identify the role of conventional and specialised public transport as an alternative to the automobile in meeting mobility and accessibility needs.

KEY WORDS: Aging populations, transport needs, support networks, mobility, accessibility.

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1. Introduction

The western world's population is aging. It is expected to double its present size by the year 2025 and one in three persons in these countries will be over 65 years of age (Rosenbloom, 2001)[1]. By 2051, the projected population of people aged 65 years and over is expected to be at least double its size in 1999. In Australia, for example, the population is projected to increase from 12 percent of the current population to 27 percent of the projected population (ABS, 2001). According to the U.S. Bureau of the Census, Australia's 65 and over population will increase by 149.5 percent in the period from 1998 to 2050 (Rosenbloom, 2001).

These dramatic changes in the composition of the population will provide new challenges for the provision of transportation services, especially because the travel patterns and needs of the elderly[2] are likely to become more complex and ever-increasingly better served by the car, accessible to a high proportion of licensed elderly drivers. For example, it is estimated that by the year 2020, eighty percent of US residents will be, or will have been, licensed drivers; and one hundred percent of males and sixty to ninety percent of females will enter retirement as drivers (Rosenbloom 2001; Evans 1999; Burkhardt *et al*., 1998). The expected increase in the number of older drivers will be significant. In addition to this, it has been recognised that travel behaviour follows a general rule: people stay as long as possible with the type of behaviour they are used to. Older drivers persist in driving when their skills are no longer adequate to operate a vehicle, and with the elderly so accustomed to driving, it is no surprise that they will select the car as the preferred mode of travel (Tacken, 1998).

As individuals become more accustomed to using the car over the pre-retirement stage in the life cycle, they tend in retirement to explore ways of fulfilling all activity needs in the most efficient manner, focused on the automobile. One travel behavioural response to satisfying this need, for example, is the formation of trip chains[3]. The increasingly active elderly population is more likely to engage in trip chaining behaviour than their counterparts of a few years ago, reinforcing the attractiveness of the car and the unattractiveness of public transport use (Hensher and Reyes, 2000). This is but one way in which senior's implement mobility strategies associated with achieving acceptable levels of accessibility to desired activities.

The focus of this paper is on mobility and accessibility expectations of seniors in an aging population. Given the ambiguity in definition of constructs such as mobility and accessibility, we will spend some time commenting on their meaning. Mobility per se is particularly ambiguous when defined, as is popular, by trip rates. For example, when individuals have certain goods and services delivered instead of travelling to the point of collection, they are excluded in the mobility indicator (Rosenbloom and Winsten-Bartlett, 2002). With many senior's increasingly using delivery service (which includes relatives shopping for them), their trip rates (defined as travel from an origin to a

[1] In the year 2000, the USA, Canada and Australia had very similar age structures (ABS, 2001).
[2] We will use the terms elderly and senior interchangeably; however in Australia a senior is someone in the age band 55-84 and an elderly person is someone over 84 year of age.
[3] Trip chaining is defined as a sequence of trips that involve multiple purposes and multiple destinations so as to minimise travel and increase the number of activities performed due to time constraints (Hensher and Reyes, 2000). For example a trip chain may be the following sequence of trips: home - shops - visit grandchildren - shops - home.

destination to undertake activities or a set of activities) are observed to decrease. This might then be judged to be a loss of mobility when in fact it is a benefit. What has occurred in this case is that freight trips have replaced passenger trips. Accessibility defined as the ease of reaching destinations (Levine and Garb, 2002) per se has actually increased, whereas mobility as the ease of movement has decreased.

2. Definitions of Mobility and Disability

A definition of transport mobility should include recognition of one or more of the following dimensions (Metz 2000, Burns 1999):

1. Access to places of desire such as visiting family and friends (derived demand)
2. The psychological benefits of travel where social contact and independence are important aspects of mobility
3. The benefits of physical movement
4. Maintaining social networks[4], and
5. Potential travel.

Seniors of today have higher driving licence rates as well as growing trip rates per unit of time compared to 10 years ago (see Table A2). Seniors also are known to under-report their trip making behaviour more than other cohorts[5]. Consequently, the growing amount of mobility of this sub-population will impose greater burdens on the transport system in the future than are often suggested by planners and policy makers.
The mobility of senior's is however tempered by the growing incidence of disability, defined as a condition(s) that hinders or hampers a person's ability to perform everyday tasks or duties (McIntosh and Phillips, 2001). However, this disability may be translated into growing network support, which in itself adds to the transport task for the elderly (but which is credited in surveys to the support person).

Given the above, it may be preferable to focus on causes and responses to mobility impairment and mobility disability.[6] With this in mind, the next section looks at findings of various studies consulted.

3. International Comparisons

The majority of studies investigating the mobility characteristics of an aging population are from the USA with a growing number from the United Kingdom, The Netherlands, and a few examples from Canada and Australia. A review of travel patterns of the elderly in a range of western nations (with similar age profiles and life styles) will provide useful insights for other societies.

[4] This is best achieved if the level of mobility remains and has been identified to reduce the onset of depression and even death in the elderly.
[5] Many elderly people do not wish to participate in surveys (they tend to believe that their trip patterns are irrelevant and insignificant). As a group with a large portion of the non-responding households, underestimation of trip rates is significantly high compared to responding households (Kurth *et al*., 2001; Zmud 2003).
[6] The inability to walk (or impaired mobility) rises to 35 percent, whereas for people between 65 and 80 years of age (the seniors), the prevalence is 7.7 percent (Shunway-Cook *et al*. ,2002).

3.1 Major findings

More senior and elderly people are driving cars than ever before. This can be attributable to a number of factors such as an increasing number of older people with driver's licenses, cars which are easier to drive, a more active and healthier older population, a greater amount of disposable income (combined with the notion of cash rich and time poor individuals eager to participate fuller in life), and the growing reluctance of individuals to change their modal behaviour once they enter retirement (Martolli *et al*., 2000; Rosenbloom and Morris 1998; Tacken 1998). Indeed the elimination of the public transport-based commuter trip is often replaced by the car-based non-commuter trip given the changing disperse nature of activity destinations.

Greater automobile dependency among the elderly is witnessed in Europe, the United States and Australia (Rosenbloom, 2001). The preferred mode of transport for the 65-75 age group and the over 75 age group is the automobile, as either driver or passenger; however driver is cited more often in the literature for the former age group (Parolin, 1988; Burkhardt *et al*., 1998; Burns, 1999; Georggi and Pendyala, 1999; Shuway-cook *et al*., 2002; Rosenbloom, 2001; Rosenbloom and Morris, 1998; Tacken, 1998). Public transport and walking are not frequently used modes of transport for the elderly as a whole in many western nations, especially in the USA. In Melbourne, Australia, for example, in 1993, it was found that those aged 65 and over, were not much less likely to use the car than younger people; 74 percent of trips made by the 65 and over age group were made using the car whereas the figure for the 18-59 age group was 56 percent (Rosenbloom, 2001). However, 80 percent of trips under 0.5 km involved walking (Rosenbloom, 2001). The longer the trip, the more likely a car is used.

Not only are the travel patterns for the 65-75 year age group not significantly different to the travel patterns of the 18-59 age group in terms of car use, the former age group is actually travelling longer distances than the comparable age group of a few years ago. Their trip rates are higher and trips made are longer and more varied, in terms of purpose (Rosenbloom, 2001; Rosenbloom and Morris, 1998; Burkhardt *et al*., 1998; Hu and Young, 1999; Tacken, 1998).

Trip making for non-work trips, observed in Melbourne, did not decrease significantly until 80 years of age (Rosenbloom, 2001; Rosenbloom and Morris, 1998). In the United States and other countries, more non-work trips were made by 65-75 year olds than younger people, and most of these trips were during the period between 6am to 6pm, adding to traffic congestion in the peak (Rosenbloom, 2001; Skinner and Stearns 1999; Tacken, 1998). In addition, this group of individuals who used to undertake trips to work by public transport, switched to the car for non-work trips when they entered retirement (Rosenbloom, 2001). This meant that even more trips made by the elderly used the car as the preferred mode of transport.

Many trips by seniors, predominantly the 65-75 year old age group, are short trips leading to an increasing number of cold starts. Catalytic converters require a certain time period before they are activated and short trips comprise a higher proportion of trip time under cold start condition (typically the first 3 kilometres of every trip from a cold start). The result is more atmospheric pollution (carbon dioxide emissions) and increased congestion on road networks (Hensher, 2000; Rosenbloom, 2001).

Adding to environmental and congestion problems, older drivers, especially aged over 75 years, have increasing navigational problems particularly when travelling through unfamiliar areas. Navigational "waste" is estimated at around four percent of all travel in the United Kingdom (Burns, 1999). It is likely to impact on the level of functionality of the private car as a means of transport, which in turn affects the mobility of seniors, becoming a burning issue as the population ages. This has implications for road transport networks and capacities. These issues will be further discussed in later sections of the paper.

3.2 Mobility characteristics of the over 75 years age group

Mobility reductions become more evident as people reach 80 years of age. In the USA, for example, the 75-years and over age group is characterised by lower income, lower car ownership rates and greater physical limitations than younger cohorts (Georggi and Pendyala, 1999; McKnight, 2001; Evans, 1999; Coughlin, 2001). Driving cessation is perceived negatively because so many of the elderly are dependent on the automobile, and losing driving privileges is equated with a reduction in their standard of living. Driving is typically associated with an 'optimal' level of mobility. High levels of mobility are associated with access, choice, opportunity and freedom (Burkhardt *et al*., 1998; Burns, 1999; Coughlin, 2001). There is evidence that suggests the elderly who are ex-drivers make fewer trips than their driving counterparts, usually because the planning of trips consumes precious time and energy and impinges on social and recreational time (Burkhardt *et al*., 1998). However, one counter argument is that they engage in trip chaining that links many shorter trips, in order to preserve participation in destination activities. This will ultimately save time but may be exhausting for the older person with walking and/ or other disabilities who prefers to spread activities out over a longer period of time.

Older people who have never driven are aware of their physical limitations and have adapted their lifestyle to accommodate this. However, older ex-drivers are not as aware of their physical limitations, adding to the feeling of lost independence (Skinner and Stearns, 1999; Rosenbloom and Winsten-Bartlett, 2002). Education programs informing elderly drivers of the alternatives to driving, as well as increasing the awareness of their potential mobility needs, are to be encouraged. "Retiring from driving" should be addressed throughout all relevant age groups in society (Burkhardt *et al*., 1998; Coughlin, 2001), just like 'Retiring from Work' is.

A high proportion of people have historically ceased driving once they reach 80 years of age; although this may change in the future. However, women tend to cease driving prematurely and constitute a high percentage of the over 80 years age group (Foley *et al.,* 2002; Skinner and Stearns, 1999; Burns, 1999). This is not surprising given the longer life expectancy of women, otherwise known as the "feminisation of aging" (Rosenbloom and Winsten-Bartlett, 2002).

Although women on average live longer than men, older women have a higher disability rate than comparable men (over 25 percent and 16 percent respectively in the USA) and are more likely to require greater assistance in relation to transport activities and mobility. In the London Area Travel Survey report (London Research Centre, 1991), it was found that over 32 percent of females aged over 65 had experienced difficulty travelling. These individuals are more likely not to drive, have less income and are

more likely to live alone due to being widowed, divorced, never married and having few, if any children to support them in their retirement years (ABS, 1998; Georggi and Pendyala, 1999; Rosenbloom and Winsten-Bartlett, 2002). This appears to be a growing phenomenon in many countries. These factors accentuate the negative impacts on older women, in terms of mobility and raises environmental justice[7] issues: older women will be negatively burdened by a lack of transportation alternatives.

The loss of driving ability for the older person will also affect their immediate family who may be relied upon for transportation services. This may be a burden for some family members due to the time involved and extra responsibilities associated with providing a service to older family members (Burkhardt *et al*., 1998).

3.3 Transport modes for the over 75 years age group

Despite the popularity of the car, there is a role for public transport, with use increasing as individual's pass 75 years of age (Georggi and Pendyala, 1999; Evans, 1999; Rosenbloom and Winsten-Bartlett, 2002; London Research Centre, 1991). This increasing use of public transport among the 75 years and over cohort tends to be for individuals with higher education and income living in higher residential density levels; it is however negatively associated with more drivers in the household and detached housing (Evans, 1999).

The dependence on public transport tends in part to be linked to the availability of family members to cater for their transport needs. Middle-aged children who look after their aging parents, as well as their young children, are called the "sandwich generation" (Rosenbloom and Winsten-Bartlett, 2002). In the future it is expected that the "sandwich generation" will become rarer as the growth in the aging population, due to increased life expectancies, far outweighs the growth in fertility rate. In addition, children are less likely to be able to provide transport support due to the lifestyles they lead (Coughlin, 2001; McKnight, 2001; Burkhardt *et al*., 1998). One major implication of these scenarios is that an increasing number of seniors will have to care for themselves (and/or rely on non-family support networks) in the future.

The evidence in the literature suggests that some people are able to meet their essential transportation needs because they have one or more of the following support networks:

1. Spouses or others who drive
2. Live with children or have children who live nearby
3. Possess sufficient financial resources to purchase transport services
4. Are strongly involved in a religious institution
5. Reside in communities well serviced by transportation options for non-drivers
6. Are physically able to use public transportation, and

[7] Environmental justice is commonly referred to as the equitable distribution of both negative and positive impacts across racial, ethnic and income groups, with the environment defined to incorporate ecological, economic, and social effects (Transportation Research Board 2002). Environmental justice appears to comprise fundamental elements of Rawls Theory of Justice, which is based on two principles. The first states that all social primary goods such as liberty, opportunity, income, and wealth are to be distributed equally; the second states that if these goods are not distributed equally, they are to be distributed to favour the disadvantaged (Transportation Research Board 2002, Khisty 1996).

7. Have reduced their activities and expectations to better adapt to their present situation (Burkhardt *et al*., 1999).

Despite the growing availability of support networks, an increasing number of individuals will find it increasingly difficult to meet their transportation needs, and given the likely further increases in life expectancies, a higher number of older people will be facing personal mobility problems alone.

3.4 Migration and settlement patterns of the elderly

Understanding migration patterns of the elderly is important because mobility and trip making will be greatly influenced by the timing of retirement, residential location and income (Skinner and Stearns, 1999). People tend to retire "in place"- stay in the same neighbourhood they have lived in for the majority of their adult lives (Skinner and Stearns, 1999; Lin, 1999; Rosenbloom and Morris, 1998)[8]. These residential areas are typically characterised by low housing density which encourage car use regardless of age (Rosenbloom and Morris, 1998).

When seniors do migrate, especially those 65 years and over, according to Duncombe *et al*. (2001), migration involves three moves. The first move is to areas which house many amenities. This move is usually made just after retirement. As these individuals get older and physical and mental impairment becomes more prominent, they choose to move to areas closer to friends and family (the support-network). The third move, if needed, is institutional. The evidence suggests that "three move" migration depends on the elderly population's level of income, where other family members reside, and the marital status of the older individual(s).

A greater understanding of the residential choices of the elderly is essential if we are to develop land use, social and transportation settings compatible with meeting the broadening dimensions of servicing accessibility for seniors in an aging population.

4. Policy Challenges

A strategic focus on mobility and accessibility intervention that will benefit seniors in an aging population should include transportation alternatives that provide a sense of independence and security, and which enable an individual to feel a sense of dignity (Burkhardt *et al*., 1999; Parolin 1988). Even with these positive characteristics for alternative transport services, giving up the automobile will be difficult (Tacken, 1998).

Adequate transportation alternatives (to the car) for the elderly do not exist in many western societies, due in part to a lack of understanding of the needs of this sub-group of the population. The elderly are often considered to be a homogenous group (in respect to servicing mobility and accessibility needs). This however is not the case and greater differences within this group come to light when we take into account different cultures, religions and social networks. As seniors in an aging population grow in

[8] If there is a decrease in the number of young people in an area, then the result is structural aging: the proportion of elderly has increased (ABS, 2003).

absolute numbers, we can expect greater diversity of needs as well as interventions to service the needs.

The provision of traditional timetabled public transport is not an appropriate intervention for many seniors seeking more flexibility in their transport services. Many existing non-drivers, in particular, are increasingly dissatisfied with the conventional fixed-route public transport currently available and find this alternative far less attractive compared to driving or being driven (Coughlin, 2001; Evans, 1999). It has become the mode of last resort.

Table 1 synthesises some of the perceptions of those aged over 75 years in the United States (Coughlin, 2001). The literature suggests that the dissatisfaction with conventional (fixed route) public and community transport is similar in many western countries. If public policy (or innovative private activity) is to attract seniors away from flexible automobility, it is likely that alternative transport must also have high levels of flexibility. With such large numbers of seniors in future years, the market opportunity to justify such services will be much improved. Specialised door-to-door public transport service has many advantages approximating car use and in particular equivalences support services provided by support networks such as family and friends.

Table 1: Range of Perceptions of Selected Alternatives to Driving

Alternative	**Positive Attributes**	**Negative Attributes**
Ride with friends/family	"Socialise and mobility together" "Almost like doing it yourself"	"imposing on people" "Cannot always have it (ride) when you want it"
Bus	"Don't have to bother anyone" "Gets you around traffic"	"Bad element on bus" "Waiting"
Light Rail	"Quick, on time" "Comfortable in all weather"	"Don't necessarily go where you need to go" "Too far to walk"
Walking	"Good for you" "Fresh air"	"Bad weather" "You can get there, but you can't get back"
Taxi	"Good for an emergency" "Reliable"	"Too expensive" "Can't always get one"
Demand Response (senior vans, paratransit)	"Door to door" "Cheap"	"Late picking you up" "Don't know of any"

Source: Coughlin 2001.

Canadian experience suggests that the specialised transport system is more cost effective when compared to aging public transport networks that require updating, to accommodate the aging populations' travel needs (Bell, 1988; Rosenbloom, 2001). Community buses exist in many countries such as the U.S., Canada, Norway and Australia, but typically require huge subsidies to survive (Rosenbloom, 2001). They are often viewed by established route operators as fringe providers, with limited credibility (from an industry perspective).

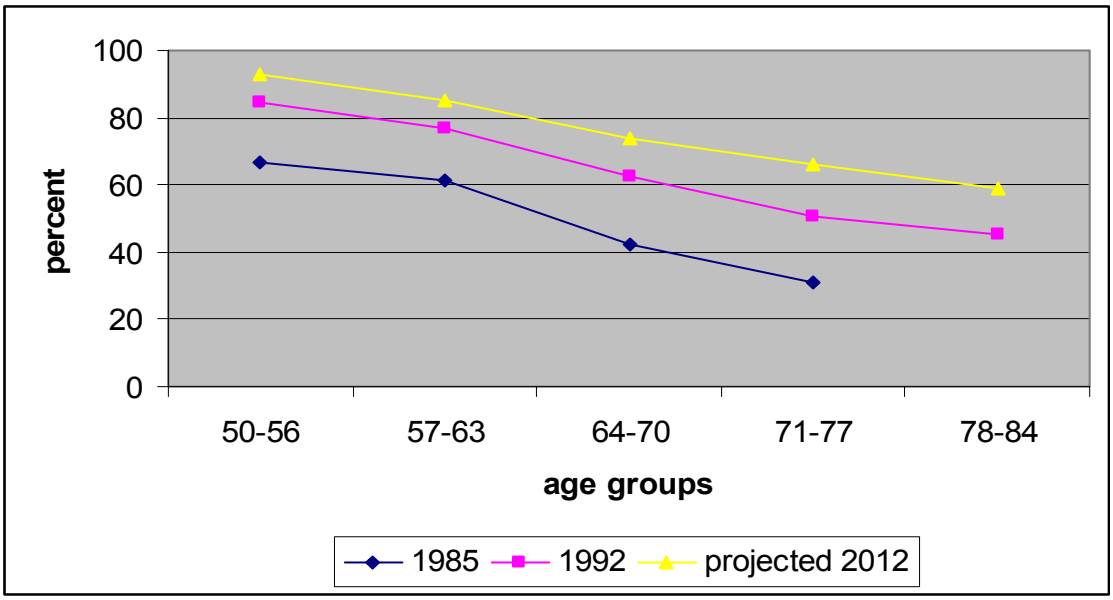
In 1999, there were 130 community transport projects in New South Wales (NSW), Australia, 120 of which were partially or fully funded by a joint initiative of the NSW Aging and Disability Department and the Department of Transport (Aging and Disability Department 1999). Continuing subsidy support for community transport is becoming increasingly difficult as the tax base from which these funds are extracted shrinks (Skinner and Stearns, 1999). One initiative to provide alternative funding as part of a self sustaining strategy is to raise advertising revenues (on vehicles with high exposure) as well as offering a level of service and comfort more tailored to the preferences of seniors. (Rosenbloom, 2001; McKnight, 2001; Parolin, 1988). Importantly, however, the growing number of seniors who might need an alternative to the car suggest new opportunities for 'mainstream' public transport providers.

From an environmental justice perspective, an important issue is to keep the elderly mobile rather than reactivate their desire for mobility (Tacken, 1998). This will help to minimise the level of depression associated with the loss of ability to drive and enable individuals to maintain a standard of living comparable to their standard of living before physical and mental impairments and disabilities take hold.

We all agree that older drivers will become more numerous as the number of people with drivers licenses increases along with an increase in the sheer numbers of the elderly. Most of these older drivers will be between the ages of 65 and 75 years. For example, for a sample of households drawn from the Adelaide population in 1999, the number of trips undertaken by the 65 to 75 year old age group was found to be significantly different to the number of trips undertaken by the over 75 age group[9]. The travel patterns of this age group are not significantly different to the travel patterns of the18-59 age group (Rosenbloom, 2001). This means that not only are there more aged drivers, but these drivers are very mobile and highly automobile dependent. Figure 1 shows the automobility (number of licensed drivers and access to an automobile) in Norway. In 1992, as the 50-56 age group entered retirement, the automobility rate was much higher than for the corresponding group in 1985. These rates will increase not just in relative numbers but also in absolute numbers as the population of the elderly increases. Two forces appear to be operating and this pattern will persist into the future. The likely results of this are increases in road congestion, increases in atmospheric pollution and increases in the number of road accidents involving the elderly. Planners and policy makers must develop combative measures to minimise the negative consequences of these developments by providing improved transportation alternatives, such as community transport. However, this may become a problem in itself if volunteers have to take out (expensive) liability insurance, suggesting an opportunity for specialised transport provided by mainstream operators.

[9] Unweighted data

Figure 1: Automobility in Terms of the Number of Licensed Drivers and Car Accessibility, Norway.



Source: Rosenbloom 2001.

Another mitigative measure is to provide better education to the middle aged population about all aspects of retirement including a focus on options to maintain (and even enhance) mobility and accessibility. This will make more people aware of their potential transportation needs in their retirement years and to factor them into their retirement plans (Skinner and Stearns, 1999).

With an increase in the number of road accidents involving the elderly, safety will become even more of a concern. There is a need to identify the links between mental and physical declines and reductions in performance, especially as a car driver (Skinner and Stearns, 1999). This may be achieved through the use of past task simulators that have the potential to assess performance. However, critical features of these simulators have yet to be identified due to inadequate and non-objective critical safety performance measures (Skinner and Stearns, 1999). For example, short tests may either accentuate or mask the participant's level of disability (Skinner and Stearns, 1999). Training and refresher courses offered to the elderly may enable these drivers to become more aware of their limitations in the road environment. These courses should be offered before the individual enters the period where he/she may begin to suffer from age related functional disabilities. Everyday driving rules may be modified for the elderly population to account for delayed reaction times and increased risk of severe injury (Coughlin, 2001; Skinner and Stearns, 1999). Some jurisdictions in Australia, such as the State of New South Wales for example, require a compulsory driving test every year when an individual reaches 85 years. However, once the individuals reach 80 years of age, they are required to undergo a medical examination every year (RTA, 2001).

Infrastructure for vehicles can be made more user friendly for the elderly by eliminating traffic conflicts at intersections (where most accidents involving all drivers occur), ramps, roundabouts and other trouble spot areas. These improvements would benefit all users (Coughlin, 2001: Skinner and Stearns, 1999).

4. Conclusion

We may not be able to get older people out of cars and into buses at a noticeable rate, however this should not be the objective. The important issue is to acknowledge that older drivers will become more numerous in future years and have a higher incidence of driver licences, be healthier and have more resources to support a preferred lifestyle than previous generations. Their mobility and accessibility requirements must be better understood to ensure that governments in particular direct resources to support the needs of seniors in an aging population in a way that is the best use of the increasingly scare dollar spent on transportation services.

Historical assumptions about the role of conventional fixed-route public transport need questioning, and opportunities for more flexible forms of transport should be investigated both in terms of the technology and the service provider. Mainstream public transport operators may well find that the market for flexible public transport catering for seniors is large enough to move the emphasis away from the much-maligned community transport provider to become a core business component of mainstream operators.

The elderly are not a homogenous group and this must be recognised. Differences exist between the "young" elderly travel patterns and needs and the "old" elderly travel patterns and needs. This reinforces re-categorisation of the over 65 age year old group into two subgroups: the 65 to 75 year olds and the over 75 year olds.

The issues presented in this paper are of growing importance given that dependency ratios will increase in the future and more funds will have to be devoted to transport alternatives for the growing elderly population.

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Appendix A. The Australian Perspective

Tables A1 and A2 illustrate the growing importance of understanding the mobility needs of the elderly in Australia. Table A1 shows car, bus and train trip rates for each person in Sydney, respectively. Car trip rates increased (as expected) in the period from 1991 to 2000, whereas bus trips for the three age groups decreased. Train trip rates, for the 65-75 age group showed a slight increase in the period between 1991 to 2000, however, the corresponding trip rates for the other age groups decreased.

Table A1: Sydney Person Trip Rates By Selected Mode By Age Group (Weighted)

2000	**18-64**	**65-75**	**75+**
car trip rates	*3.241*	*1.94*	*1.237*
1991	**18-64**	**65-75**	**75+**
car trip rates	*3.172*	*1.780*	*0.999*
2000	**18-64**	**65-75**	**75+**
bus trip rates	*0.160*	*0.228*	*0.244*
1991	**18-64**	**65-75**	**75+**
bus trip rates	*0.191*	*0.255*	*0.262*
2000	**18-64**	**65-75**	**75+**
train trip rates	*0.205*	*0.136*	*0.073*
1991	**18-64**	**65-75**	**75+**
train trip rates	*0.215*	*0.105*	*0.123*

Source: Sydney Household Travel Survey, Transport Data Centre, February 2003.

Table A2 shows that almost half of the individuals aged 85 years and over, in Adelaide, did not have access to a vehicle and lived alone. In contrast, one third to almost half of the people aged between 60 to 84 years had access to a vehicle and lived with someone else.

Table A2: Selected Car Ownership and Household Size Statistics for Seniors in Adelaide, 1999 (Percent)

Age group	No vehicles, household size =1	1 vehicle, household size=1	1 vehicle, household size= 2	2 vehicles, household size=2
55-59	1	11.3	20.1	34.5
60-64	2.9	11.6	33.6	28.5
65-69	4.9	14.8	40.9	22.9
70-74	8.5	20.6	43.1	15.5
75-79	8.6	23.5	45.6	8.3
80-84	22.5	21.4	37.6	6.4
85 +	43.4	18.9	16.9	3.8

Source: 1999 Adelaide Household Travel Survey, Transport South Australia.

The evidence above for Sydney and Adelaide suggests that more people are driving or being driven whilst less people are utilising public transport (bus and train). This highlights the urgency for research specifically targeted to understanding the elderly population's travel behaviour and likely ways in which they will seek out coping

strategies as they age. Conventional (fixed-route) public transport is unlikely to be a notable contributor to the mobility agenda of senior's in an aging population.

Data profiles available from the Australian Bureau of Statistic's Census only focuses on the journey to work. In the future, the Census should also ask about other trips to capture travel movements of sizeable segments of the population such as seniors and the elderly. Given that the proportion of the elderly (i.e. over 65 years of age) is expected to increase to 18 percent by 2020 (ABS, 2003), their exclusion is unacceptable. This information should be complemented by other data. For example, the Australian Bureau of Statistics (2003) found that Adelaide contained the largest proportion of people aged over 65 years, followed by Hobart. The analysis also showed which statistical local area housed the highest proportion of aged individuals.

In New South Wales, it was found in the year 2000, that elderly drivers only constituted a low percentage of the licensed drivers in the state and this meant that more were dependent on forms of transportation other than the automobile (Roads and Traffic Authority New South Wales, 2000). However, for the 60-69 and 70-79 year olds (as categorised by the Roads and Traffic Authority of New South Wales), the rate of licensed drivers will certainly double by the year 2020.