SENIOR VICTORIANS AND WALKING: OBSTACLES AND OPPORTUNITIES

Final Report

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Senior Victorians and walking:

Obstacles and opportunities

Final Report

This report was prepared by Dr Jan Garrard, Active Transport Consultant, for Victoria Walks and Council on the Ageing (COTA) Victoria, November 2013.

Victoria Walks Inc is a walking health promotion charity working to get more Victorians walking every day. Our vision is for vibrant, supportive and strong neighbourhoods and communities where people can and do choose to walk wherever possible. Victoria Walks is supported by VicHealth.

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1 Key findings at a glance

Walking is particularly important for seniors, who are less likely than younger adults to participate in more vigorous forms of physical activity, more likely to experience social isolation, and less likely to drive a car. Walking is highly valued by seniors for a range of reasons including improved health, wellbeing, independence, personal mobility and social connectedness.

Although overall physical activity declines with age, and 58% of senior Victorians do not achieve recommended levels of physical activity, walking is an increasingly important source of physical activity as the population ages. For people aged 75 years and over, walking comprises 77% of the total time spent on physical activity (Australian Bureau of Statistics 2013b) (see Figure 9).

The health benefits of walking for transport are similar to those associated with walking for recreation; however, walking for transport has a number of co-benefits associated with reduced motor vehicle use including improved air quality, reduced greenhouse gas emissions, less traffic congestion and increased community liveability. Walking for transport is also a more socially inclusive form of physical activity than leisure-time activity. While socioeconomically disadvantaged population groups are substantially less likely than advantaged groups to participate in recreational exercise, walking for transport is fairly evenly distributed across the socioeconomic spectrum (Australian Bureau of Statistics 2013b) (see Figure 10).

The literature review suggests elements that make an environment more walkable, both for seniors and the general population (although perhaps to varying degrees), include:

- residential density, with good pedestrian access to shops, services, and public transport,
- street connectivity,
- an aesthetically pleasant environment,
- quality walking infrastructure,
- proximity to the CBD (which is likely to be an indicator of other elements of a walkable environment),
- perceptions of safety,
- well-positioned and well-designed road crossings that allow sufficient time for older pedestrians to cross safely and comfortably,
- traffic calming in residential and service areas and limitations on car parking.

The most important perceived barriers to walking, in the survey of 1128 senior Victorians were, by order of concern:

1. Dogs that are off leash or not under control
2. Poorly maintained footpaths
3. Poorly lit footpaths
4. Drivers failing to give way
5. Bicycle riders on shared walking and cycling paths
6. Not enough public toilets.

When asked what measures might improve feelings of safety when walking, the top rating suggestions were:

1. Better cyclist behaviour on shared paths
2. Reduce cycling speed on shared paths
3. More emphasis on pedestrian safety in driver education
4. More policing of drivers' yielding rules
5. 40km/h speed zones in local shopping centres
6. Traffic calming in residential areas.

Traffic concerns were more important for seniors who walk for transport or live in central Melbourne. One in six residents of central Melbourne stated that they would walk more if local streets were designed so that traffic travels under 30 km/h.

Pedestrians are at greater risk of traffic-related injury than motor vehicle occupants, and older adults experience higher severity pedestrian injuries than younger adults. In the period 2003-2012, 148 Victorian pedestrians aged 70+ were killed, compared to 67 pedestrians aged 0-20.

Safety for older pedestrians can be improved through a safe system approach involving safer road environments, reduced traffic speed, improved vehicle design (as required in Europe), and more pedestrian-focused driver education, including increasing motorists' duty of care to vulnerable road users such as older pedestrians.

An additional injury risk for older adults is the risk of falling (due to slips, trips and stumbles) while using the road network, with fall injuries likely to outnumber traffic-related injuries. Fear of falling and consequent attention to the road surface may result in seniors being distracted from traffic hazards when crossing roads, or walking along roads without footpaths. Narrow, uneven, sloping, or slippery footpaths, obstacles such as tables, chairs and advertising signs on footpaths present a greater hazard to older pedestrians. In general, older adults require higher standards of both design and maintenance of pedestrian infrastructure.

Sudden, unexpected incidents such as cyclists passing at high speed without warning or uncontrolled dogs can sometimes cause as much, or possibly more concern than the more predictable hazards associated with motor vehicles.

Analysis of data from the Victorian Integrated Survey of Travel and Activity (VISTA) indicates that utilitarian trip purposes (eg shopping and personal business) become increasingly important for older seniors; increasing from 53% of trips for 60-69 year olds to 81% of trips for those aged 80+ (Figure 18). This confirms the important contribution that walking makes to older adults' mobility.

Shops were clearly the most common destination for transport walking amongst survey respondents (62%), followed by public transport (40%) and services such as library, health care, leisure facilities (31%) (see Figure 34). The survey results suggest health and wellbeing factors are also important motivators for walking more generally, especially amongst younger seniors (see Figure 30).

Seniors can and will walk a reasonable distance to access shops and services and conduct personal business – about 1km on average. The VISTA analysis and survey results suggest there is little variation in walking trip distance across all adult age groups, including older adults.

Both the VISTA analysis and survey results confirm that, consistent with the general population, seniors walk much more in inner Melbourne suburbs than outer Melbourne or regional Victoria. About twice as many survey respondents in inner Melbourne (62%) walked more than an hour per week for transport, compared to outer Melbourne residents (33%). Correspondingly fewer seniors in inner Melbourne (47%) drove a car on most days compared to middle (62%) and outer suburbs (61%).

In Victoria, about 14% of household trips by older adults are walking trips, while in Germany, for example, 39% of all trips undertaken by people aged 65-74 years are walking trips; rising to nearly half (48%) for those aged 75 years or older.

The substantial differences in walking rates for older adults between countries and between different parts of Victoria challenge the widely-held perception that low rates of walking for transport among older adults are largely due to increasing ill-health and functional limitations. The walkability of the environment appears to be a more important determinant of walking by seniors.

2 Introduction

Walking is a fundamental human activity for people of all ages; but walking is frequently taken for granted and therefore overlooked in the public policy arena. However, there is now increasing recognition that walking is a valuable form of health-enhancing physical activity; an important means of social participation and community engagement; and a convenient, cheap and sustainable form of transport.

Increasing recognition of the value of walking has led to a growing body of research into what supports and constrains everyday walking, together with the development of numerous multi-sectoral strategies aimed at increasing walking, particularly as a form of transport for short, local trips (Department of Infrastructure and Transport 2012). However, much of this research and policy interest in 'walkable' neighbourhoods has focused on young and middle-aged population groups, and relatively little is known about what supports and constrains walking for older adults.

Older adults are the fastest growing segment of the Victorian population, with the current proportion of Victorians aged 65 years and over (14.0%) (Australian Bureau of Statistics 2013a) predicted to increase to nearly a quarter of the population (23.1%) in 2056 (Australian Bureau of Statistics 2010) (see Figure 1). Physical inactivity is a risk factor for a range of chronic diseases such as cardiovascular disease, type 2 diabetes and some forms of cancer that increase markedly with age (see Figure 2), but most senior Victorians (58%) do not achieve the levels of physical activity recommended to reduce the risk of these and other health conditions[1] (see Figure 3).

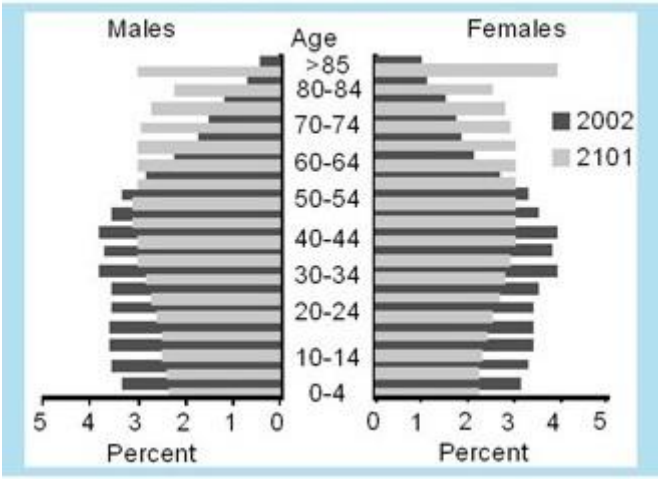


Figure 1: Historical and projected age profile of the Australian population
(Source: CSIRO, 2010, *Global Megatrends*, Australian Business Foundation Event, 21 July, 2010; based on ABS data)

[1] At least 30 minutes of moderate intensity physical activity on most days of the week, in bouts of at least 10 minutes duration (Department of Health and Aged Care [1999] *National physical activity guidelines for Australians*. Canberra, Department of Health and Aged Care).

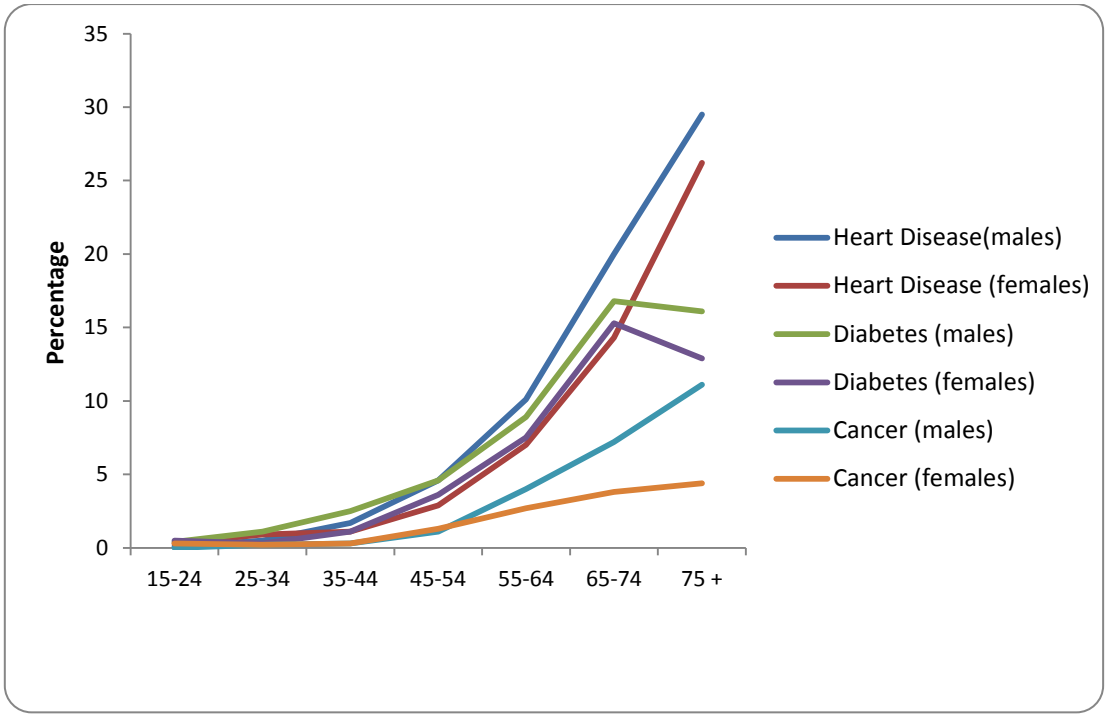


Figure 2: Proportions of persons with heart disease, diabetes and cancer
(Source: Australian Bureau of Statistics 2012a)

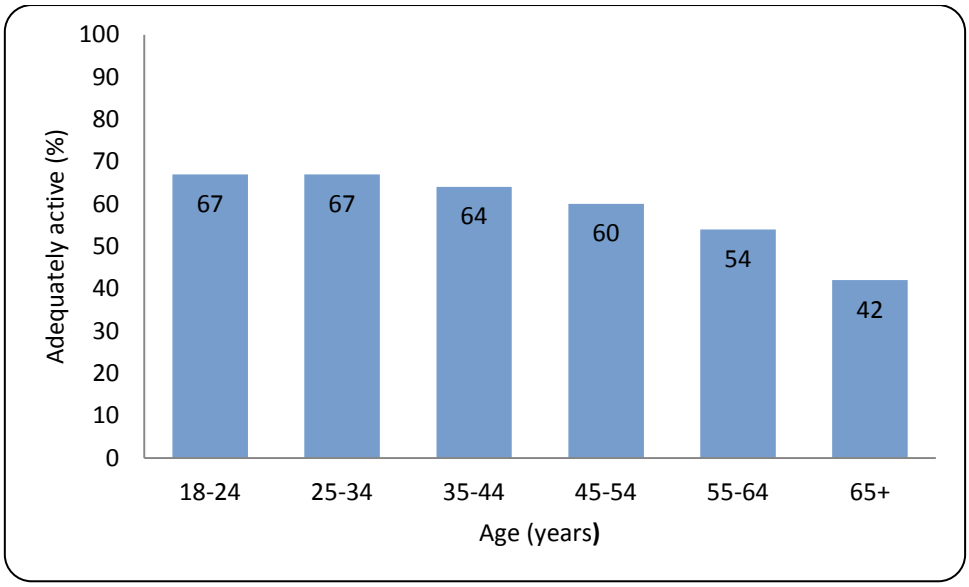


Figure 3: Physical activity levels (adequately active) by age, Victoria, 2010
(Source: Victorian Population Health Survey)

In addition to chronic disease prevention, older adults who are physically active are also more likely to experience improved mental health and cognitive functioning; increased social connection and community engagement; reduced functional decline, increased independent living and reduced risk of falls (World Health Organisation 2002; Bauman 2004).

Independent mobility is consistently perceived to be an important component of quality of life for older people (Gabriel and Bowling 2004), and walking for transport is an increasingly important form of mobility for older adults, particularly those who do not drive a car (GOAL Consortium 2012).

In a classic case of a benevolent cycle, physical activity for older adults improves health and wellbeing, which in turn assists older adults to participate in community life, thereby further enhancing health, wellbeing, quality of life and social connectedness.

Much research into physical activity for older adults focuses on rehabilitation from specific illnesses in clinical settings, and relatively little is known about what supports and constrains physical activity, including walking, for the general population of older adults. This is especially the case for walking for transport.

The current study addresses this gap in the research literature through a comprehensive investigation of seniors' walking as outlined in the following section.

3 The seniors walking study

In March 2013, Victoria Walks contracted Dr Jan Garrard (Active Transport Consultant) to conduct a comprehensive study of the barriers and enablers for seniors' walking for transport and recreation. The study was conducted in partnership with COTA (Council on the Ageing) Victoria.

The overall aim of the project is to review research evidence related to the actual and perceived supports and barriers to seniors' walking, and identify and measure barriers and enablers for walking among senior Victorians (60+ years).

The study has four components as summarised in Table 1.

Table 1: Study components

Component	Aim	Methods
1. Desktop literature review	Review research evidence related to the actual and perceived supports and barriers to seniors' walking.	Desktop literature review of international, Australian and Victorian research, including peer-reviewed research and relevant non-peer-reviewed research and data.
2. Analysis of walking data for Victorian seniors.	Describe patterns of walking for senior Victorians.	Secondary analysis of Victorian Integrated Survey of Travel and Activity (VISTA) data for the financial year 2009-10. The analysis includes variables such as trip frequency, distance, duration, location, purpose and socio-demographic characteristics.
3. Focus	Explore barriers and	Eight focus groups (total of 32 participants)

group discussions among senior Victorians	enablers for walking among senior Victorians.	recruited through COTA. Including: males and females; aged 60 years and over; inner, middle, outer suburban Melbourne and Victorian rural/regional locations.
4. Survey of senior Victorians	Assess walking behaviour and barriers and enablers for walking among senior Victorians.	Online and paper-based survey of senior Victorians. Sample (N = 1128) includes a range of senior Victorians, recruited through several organisations and methods (COTA, Facebook advertisements, Municipal Association of Victoria, Seniors Online, Victoria Walks). The sample is not a probability sample (as in a CATI survey, for example). Survey questions are based on findings from previous components, particularly focus group discussion findings.

4 Overview of seniors' walking

This section presents an overview of the current status of walking for older adults in Victoria and Australia. This background overview, and the study as a whole, includes walking for fitness, exercise, recreation or sport (generally referred to as 'recreational' walking) and walking for transport[2] (ie to get to places such as shops, services and public transport). The health benefits of walking have been established for both recreational walking and walking for transport (see Sections 5.2 and 5.3).

4.1 Walking for recreation

Walking is the most popular form of leisure-related physical activity in the Victorian population, in terms of both participation rates (see Figure 4) and frequency (see Figure 5). Walking participation increases markedly with age up to 65 years. The increasing popularity of walking with age suggests that the decline in walking that occurs in the 65+ years age group (see Figure 4) is likely to be due to increased barriers to walking in this age group, rather than an inherent dislike of walking. Consequently, reducing the barriers to walking is likely to assist older Victorians to maintain or increase walking levels.

Some, though not all of the constraints on walking that develop with age are potentially modifiable, as demonstrated by the high levels of walking (for transport) among older people in many European and Asian countries; for example, nearly half (48%) of all trips undertaken by people aged 75 years or older in Germany are walking trips (Pucher and

[2] Walking for transport is also referred to 'utilitarian' walking.

Dijkstra 2003). Potentially modifiable barriers to walking for older adults are the focus of this study.

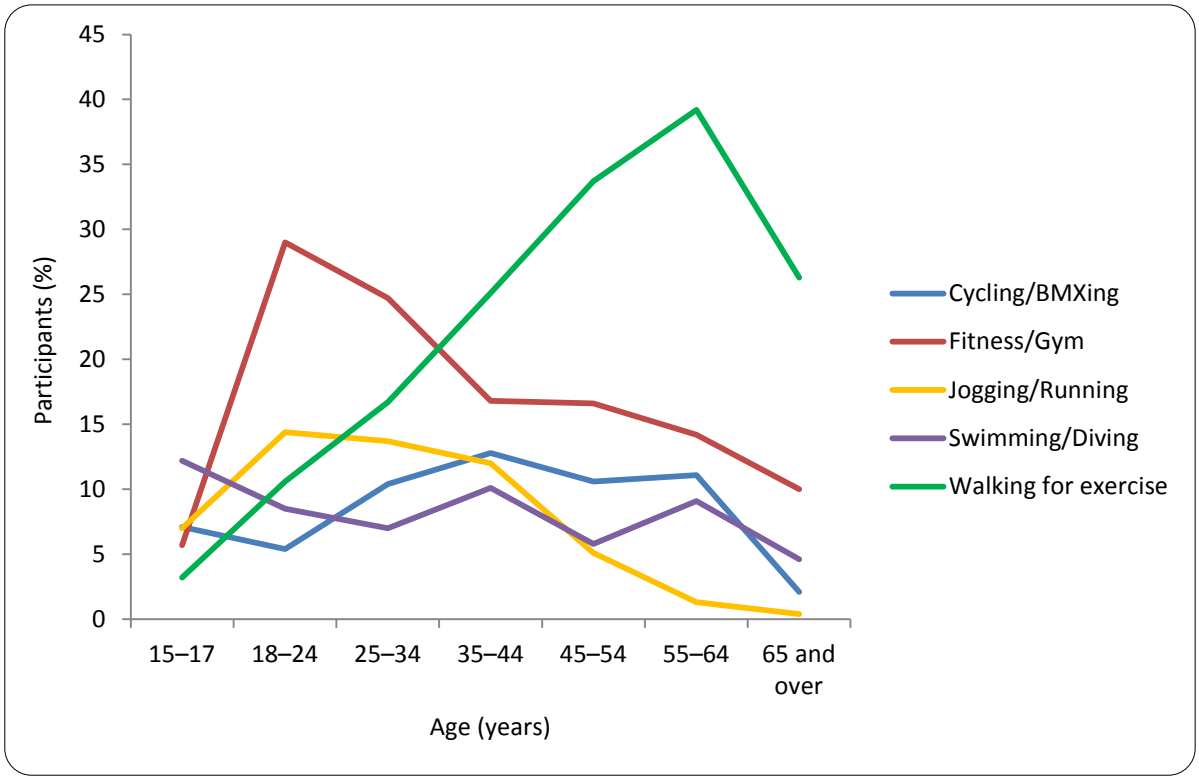


Figure 4: Participation in the top five forms of sport and physical recreation, Victoria
(Source: Australian Bureau of Statistics 2012b)

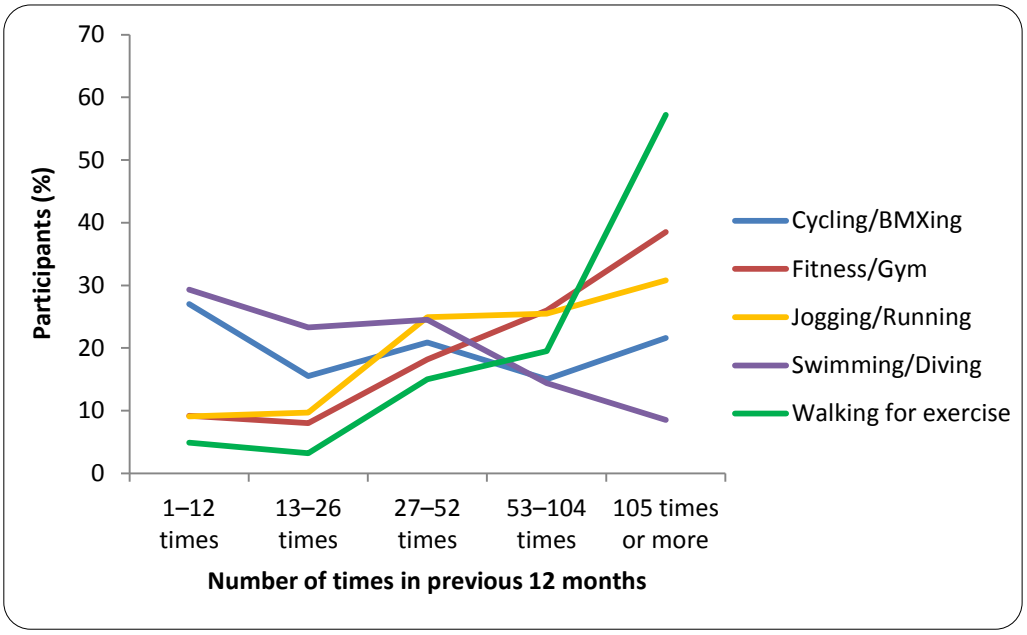


Figure 5: Frequency of participation in top five forms of sport and physical recreation, Victoria
(Source: Australian Bureau of Statistics 2012b)

4.2 Walking for transport

As described above, recreational walking is the most popular form of sport and physical recreation for Victorians aged 35 years and over. However, rates of walking for transport in Victoria and Australia are relatively low compared with many other developed countries (see Figure 6).

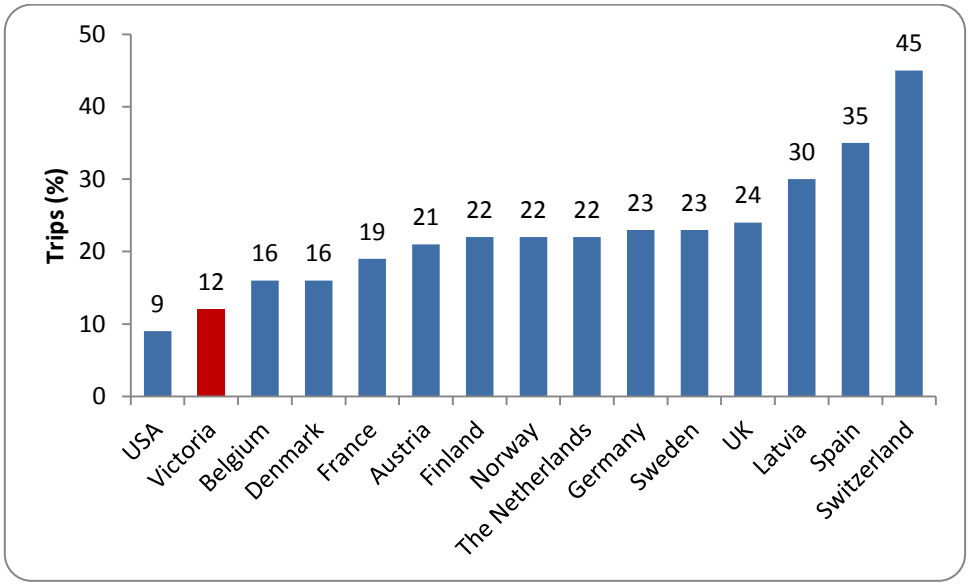


Figure 6: Walking share of trips by country (and state of Victoria)
(Source: Bassett et al 2008)

In Victoria, walking accounts for about 12% of all household trips (Victorian Integrated Survey of Travel and Activity [VISTA] data online). Although the overall level of utility walking in Victoria is relatively low, walking as a proportion of all trips tends to increase with age; nearly doubling between 45-49 years (8%) and 85+ years (14%[3]) (see Figure 7). This increase in walking trips is associated with a marked decline in car driving trips.

[3] This figure needs to be interpreted cautiously due to the large relative standard error for this age group.

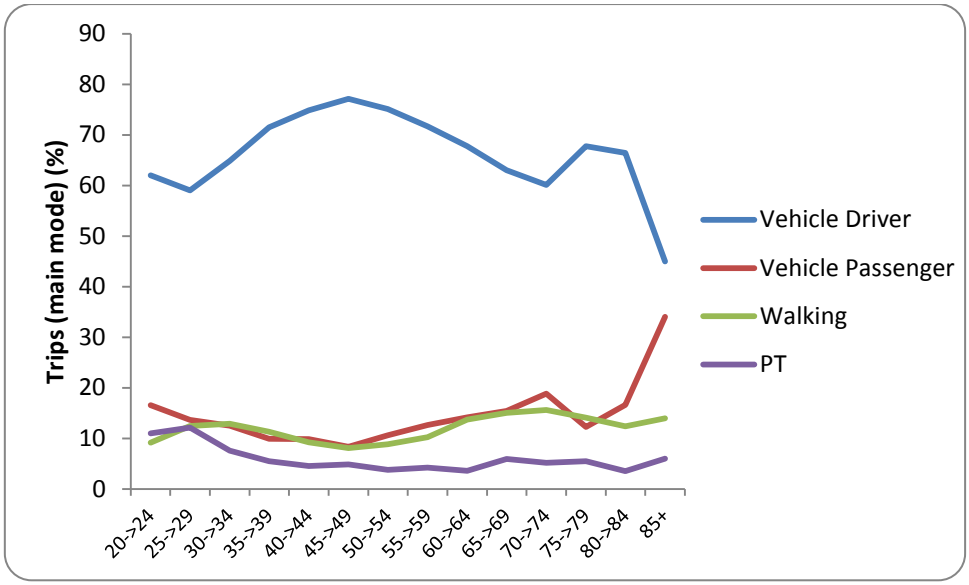


Figure 7: Main method of travel (trips) by age, Victoria 2009-2010
(Source: VISTA online)

The trend of increased utility walking with age is also evident in countries with high overall rates of walking. For example, 39% of all trips undertaken by people aged 65-74 years in Germany are walking trips; rising to nearly half (48%) for those aged 75 years or older. In the Netherlands, where cycling is more prevalent than walking, walking trips are still high (relative to Australia): 19% for the 65-74 years age group, and 24% for those aged 75 years or older (Pucher and Dijkstra 2003). These international comparative data suggest that, in supportive environments, older adults will continue to walk in large numbers, and, consequently, reap the health benefits of regular 'incidental' physical activity as a part of daily life.

4.3 Walking for fitness and transport in Australia

The 2011-12 Australian Bureau of Statistics *Australian Health Survey* included data on physical activity, including walking for fitness and walking for transport (Australian Bureau of Statistics 2013b). Total physical activity[4] declined with age, particularly in the 75+ age group (see Table 2), and most markedly for vigorous activity. Walking for fitness increased with age up to 65-74, and then declined in the 75+ age group. Walking for transport showed less variation with age, but also declined in the 75+ age group.

While time spent walking for fitness and transport declined for those aged 75+, walking for fitness and walking for transport were relatively more important sources of physical activity for older adults than for young and middle-aged adults (see Figure 8). Crucially, for people aged 75 years and over, walking for fitness and transport comprised 77% of the total time spent on physical activity (see Figure 9).

[4] Across the four areas of vigorous and moderate physical activity, and walking for fitness and transport.

The data outlined above suggest that walking is an increasingly important source of recreational physical activity and personal mobility as the population ages.

Table 2: Average minutes per week spent on physical activity in Australia
(Source: Australian Bureau of Statistics 2013b)

Column1	18-24	25-34	35-44	45-54	55-64	65-74	75 and over
Vigorous	114	75	59	60	32	21	7
Moderate	29	22	19	23	37	41	25
Walking for fitness	40	47	58	75	75	80	56
Walking for transport	94	93	84	82	83	73	53
Total	277	237	220	240	227	215	141

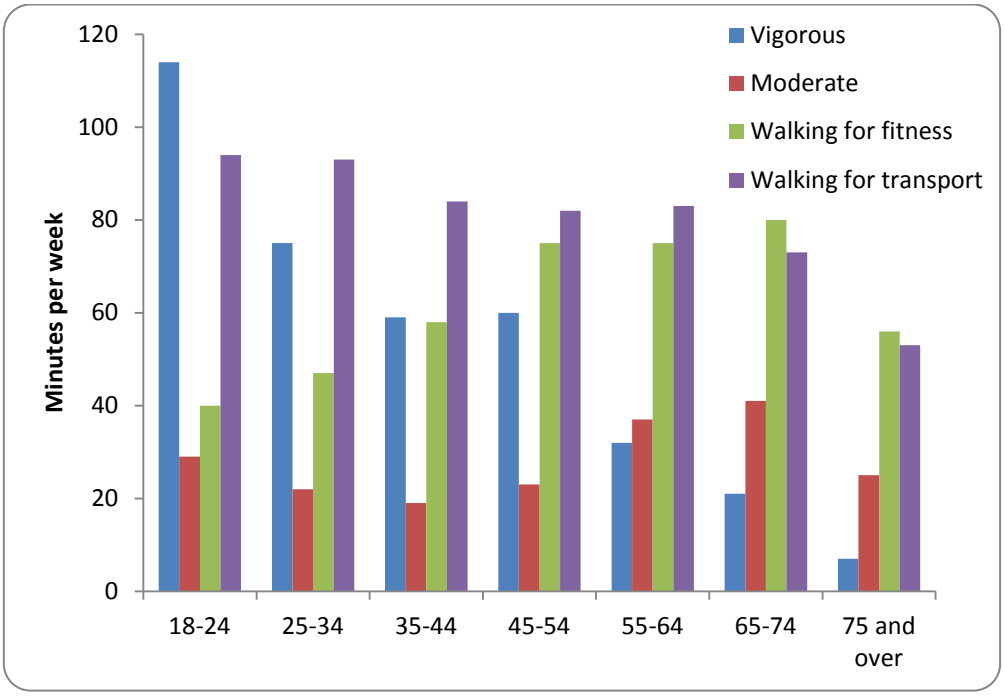


Figure 8: Average minutes per week spent on physical activity, Australia
(Source: Australian Bureau of Statistics 2013b)

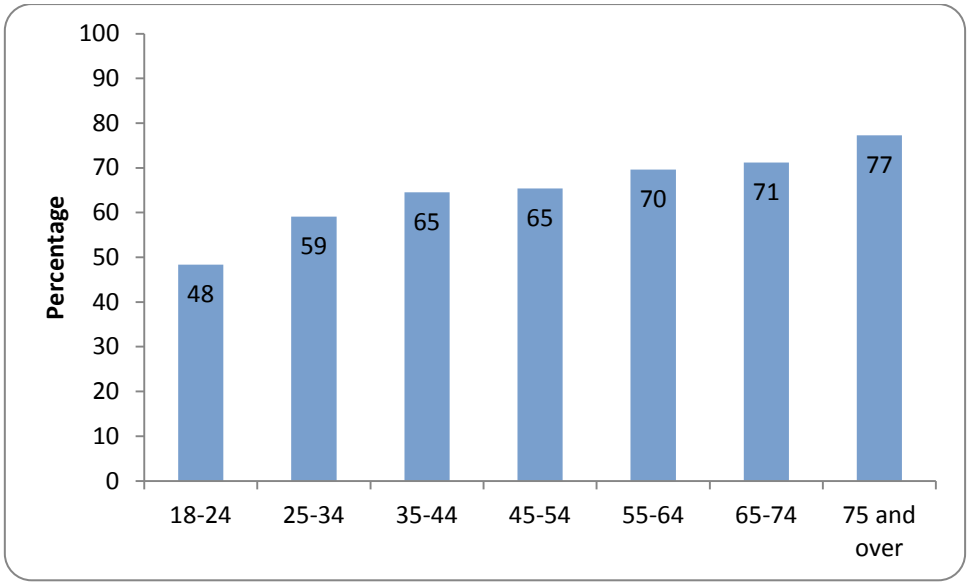


Figure 9: Proportion of total[5] physical activity undertaken by walking for fitness and transport

(Source: Australian Bureau of Statistics 2013b)

The *Australian Health Survey* report also provides data on the socio-economic correlates of physical activity in Australia. As shown in Figure 10, leisure-time physical activity (vigorous and moderate physical activity and walking for walking for fitness, recreation or sport) is more likely to be undertaken by socioeconomically advantaged population groups. Walking for transport, on the other hand, is more socially inclusive; with no significant differences based on socioeconomic indicators. This finding is consistent with the socioeconomic profile of Victorians who walk to work, based on "journey to work" data from the Australian population census (Bartley Consulting Pty Ltd 2008).

These differing socioeconomic patterns for different types of physical activity are important because they suggest that walking for transport may contribute to reducing health inequalities in Australia. It is well-established in Australia that socioeconomically disadvantaged groups experience more ill health; are more likely to engage in behaviours that increase their risk of ill health (such as physical inactivity); and are less likely to use preventive health care services (Turrell et al 2006). Consequently, creating supportive environments for (more) transport walking may be more effective in increasing physical activity and improving the health of socioeconomically disadvantaged population groups than traditional forms of physical activity promotion such as encouraging participation in sports, exercise and fitness programs.

[5] Across the four areas of vigorous and moderate physical activity, and walking for fitness and transport.

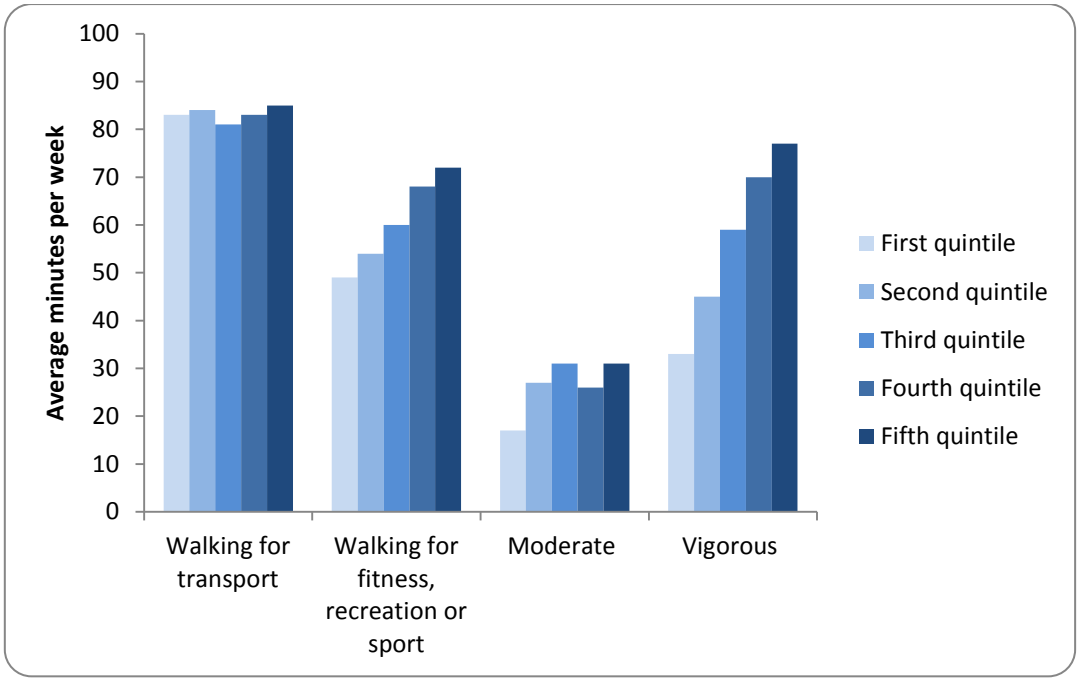


Figure 10: Average minutes per week spent on physical activity, by SEIFA Index

(The first quintile refers to the most disadvantaged 20% of areas in Australia, and the fifth quintile refers to the most advantaged 20% of areas in Australia based on the ABS SEIFA Index)

(Source: Australian Bureau of Statistics 2013b)

Data also indicate that walking for transport can make a substantial contribution to increasing the proportion of Victorians who are adequately active. Analysis of Victoria's household travel survey data (Victorian Integrated Survey of Travel and Activity [VISTA]) found that 15.1% of Melbourne's population (aged ≥ 5 years) gains adequate physical activity through active travel alone (principally walking) (Beavis 2012). Private vehicle users average 10.0 minutes of active travel per day; public transport users average 35.2 minutes; and walkers/cyclists exclusively (ie no other mode of travel used that day) average 38.3 minutes daily. Adequate physical activity (through active travel alone) was achieved by 12.6% of private vehicle users; 60.3% of public transport users; 58.3% of walkers; and 80.2% of cyclists (Beavis 2012). These findings are similar to those reported for a similar study conducted in Sydney (Merom et al 2010).

These data demonstrate that people who use walking as a means of getting around, frequently achieve adequate levels of physical activity 'incidentally' as part of daily life, at low cost, without having to find the time and money to participate in organised sports, exercise or fitness programs. As described above, as people age, walking for transport becomes an increasingly important source of physical activity as other forms of vigorous and moderate intensity physical activity decline (see Figure 9). Australians aged 65-74, on average, achieve nearly half (49%) of the recommended 150 minutes per week of moderate to vigorous physical activity through walking for transport (see Table 2).

International comparative data indicate that there is potential to increase levels of walking for transport in Victoria, including among older adults. Increasing walking among older adults, for both recreation and transport, will be assisted by understanding the supports and constraints on seniors walking. This is the focus of the literature review in the following section.

5 Literature review

5.1 Introduction

The focus of this literature review is on older adults'[6]:

(i) reasons and motivations for walking;
(ii) supports for walking; and
(iii) barriers to walking.

Reasons and motivations for walking include the meaning of walking for older adults in terms of health (across the three domains of physical, mental and social health and wellbeing) and mobility. Supports and barriers to walking cover the four domains of the social-ecological model in Figure 11.

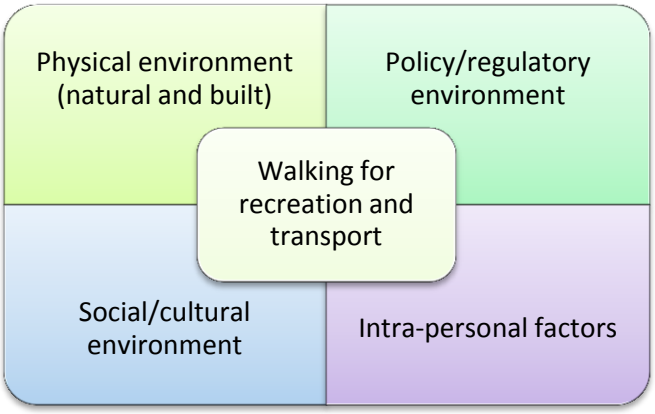


Figure 11: Social-ecological model of the determinants of walking

The review commences with a summary of the health benefits and risks of walking for older adults, including pedestrian injury rates for senior Victorians (traffic-related injuries and fall injuries).

5.2 Health benefits of physical activity for older adults: overview

Moderate intensity physical activity such as walking (Ainsworth et al 2000) is associated with a wide range of health benefits in older adults (Sattelmair et al 2009). The improved health and well-being outcomes that have been shown to occur for older adults who undertake regular physical activity include:

- reducing the risk of heart disease, stroke, high blood pressure, type 2 diabetes, and some cancers;
- building and maintaining healthy bones, muscles and joints, thereby reducing the risk of injuries from falls;

[6] Defined as 60 years or older in this study.

- maintaining or improving physical function and independent living; and
- improving social interactions, quality of life, and reducing depression.

(Department of Health and Ageing nd)

These benefits occur at all ages, and are more strongly correlated with recent activity than past activity (Sherman et al 1999). Consequently, it is recommended that people who are already active should maintain a physically active lifestyle into older age; and previously inactive older adults will achieve a health benefit if they commence physical activity (Department of Health and Ageing nd). Evidence reviews consistently conclude that the benefits of physical activity outweigh the risks (eg of falls), including for older adults (British Heart Foundation 2012a).

The three broad categories of physical activities for older adults are:

(i) ***aerobic fitness/endurance***: emphasis is on increasing the demand on the heart and lungs, and examples include brisk walking, bicycle riding, swimming and jogging;

(ii) ***resistance/strength training***: emphasis is on building muscle strength, and examples include resistance exercise, lifting weights, and stair climbing; and

(iii) ***mobility/flexibility/balance***: emphasis is on balance, walking, turning, going up and down steps, muscle flexibility and other mobility related functions.

(Department of Health and Ageing nd)

All three categories of activity – aerobic, resistance and mobility/balance – have demonstrated health benefits (Foster 2005) and can be promoted among older people (National Ageing Research Institute 2006).

In terms of the contribution of walking to meeting physical activity guidelines, Australian physical activity guidelines recommend that adults spend 150 minutes on moderate to vigorous physical activity (MVPA) per week, equivalent to energy expenditure of approximately 3,350 kilojoules (kj) per week (Egger et al 1999). Based on energy expenditures for walking, the gross energy cost of walking at 5 km/h over a smooth, level surface is about 18 kJ/min (depending on an individual's body mass) (Shephard 2008). Thus, walking 1.6 kilometres for 19 minutes in each direction, five days a week would be sufficient, on its own, to meet physical activity guidelines for Australian adults.

While some older adults may need to focus on a specific type of activity (ie aerobic, resistance or mobility/balance), the range of health benefits achieved is likely to be greatest with a mixture of physical activities. There are also synergistic benefits across the activity categories; for example, when balance and strength training support faster and/or longer walking (and hence aerobic fitness) whilst also reducing the risk of falling while walking. Australian physical activity guidelines for older adults recommend a mix of physical activity from the above three categories in order to improve general health (Department of Health and Ageing nd).

5.3 Health benefits of walking for older adults: specific health conditions

The following section summarises the health benefits of moderate to vigorous physical activity. The focus is on the findings of reviews of research evidence; and where available, findings for older adults and for walking (for recreation and/or transport) are included.

5.3.1 Cardiovascular disease

A meta-analysis of 18 studies on walking reported risk reductions of 31% for cardiovascular disease, and 32% for all-cause mortality for individuals in the highest walking category compared with the lowest (Hamer and Chida 2008a). For commuting walking and cycling, a meta-analysis of eight studies of the relationship between active commuting (walking and cycling) and cardiovascular risk reported an 11% overall reduction in cardiovascular risk, based on end-points including mortality, incident coronary heart disease, stroke, hypertension and diabetes (Hamer and Chida 2008b).

5.3.2 Healthy weight

A number of studies have reported a negative association between active travel (walking and cycling) and overweight/obesity (Bassett et al 2008; Wen and Rissel 2008; Pucher et al 2010). An Australian study found that driving to work was associated with a 13% increased risk of being overweight or obese (Wen et al 2006) after controlling for leisure time physical activity and other confounders. Similar associations between time spent driving and obesity have been found in other parts of the world, including Atlanta, USA, (Frank et al 2004) and China (Bell et al 2002).

A study conducted in Adelaide, South Australia, found that regular active transport appeared to moderate the strong positive relationship between TV viewing time and BMI, while leisure-time physical activity did not. The authors reported that BMI was significantly higher for the high TV viewing category compared with the low TV viewing category for participants who were inactive and occasionally active in transport, but not among those who used active transport regularly. The authors concluded that the risk of obesity associated with prolonged TV viewing appeared to be mitigated by regular active transport, but not by leisure-time physical activity (Sugiyama et al 2010).

An ecological study (including 14 countries, all 50 US states, and 47 of the 50 largest US cities) reported a negative association between population rates of active travel and obesity at all three geographic levels (Pucher et al 2010). In one of the few intervention studies conducted, a study aimed at reducing waist circumference for abdominally obese women in Sweden by increasing active commuting reported waist reductions for both moderate (-2.1 cm) and low intensity programs (-2.6 cm) (Hemmingsson et al 2009).

5.3.3 Type 2 diabetes

A study that examined the impact of different types of physical activity (occupational, commuting and leisure-time physical activity) on the risk of type 2 diabetes reported a 36% reduction in the risk of type 2 diabetes for more than 30 minutes per day of walking or cycling to and from work. The effect of 30 minutes of walking or cycling for commuting was similar to that of high levels of leisure-time physical activity (39% reduction in the risk of type 2 diabetes) (Hu et al 2003).

Partially consistent with these findings from cohort studies, an ecological study (including 14 countries, all 50 US states, and 47 of the 50 largest US cities) reported that high population rates of active travel (principally walking) were associated with lower rates of type 2 diabetes at the US state and city levels, but not at the country level (Pucher et al 2010).

For adults with diabetes, walking more than two hours a week is associated with 39% lower all-cause mortality and 34% lower CVD mortality (Gregg et al 2003). These health improvements also provide cost savings. In an economic analysis of moderate-intensity physical activity for adults with diabetes, a 3-mile daily walk resulted in cost savings (including medical and social costs) of approximately US$1,000 per person per year (Di Loreto et al 2005).

The health and social costs associated with the rapid increase in the incidence of diabetes in Australia in recent years are considerable. Expenditure on hospital admitted patient services for diabetes patients more than doubled in the eight years between 2000-01 ($300 million) and 2008-09 ($647 million). Total health care sector expenditure on diabetes is currently $1,507 million (Australian Institute of Health and Welfare 2013). These costs will continue to escalate, with type 2 diabetes projected to become the leading cause of disease burden in Australia by 2023 (Australian Institute of Health and Welfare 2010).

5.3.4 Falls and fractures

Risk factors for falls among older adults include muscle weakness, impaired balance, gait deficit, and limited mobility (British Heart Foundation 2012a). Exercise interventions have been found to be effective for the prevention of fall injuries among community-dwelling older people. Physical activity can help improve muscle strength and balance, which in turn improves mobility and functional capacity, and reduces the risk of falls and injuries (British Heart Foundation 2012a).

An inverse association between physical activity and risk of fractures is also well-established, with a meta-analysis of 13 prospective cohort studies reporting that moderate-to-vigorous physical activity is associated with a hip fracture risk reduction of 45% (95% CI 31–56%) for men and 38% (95% CI 31–44%) for women (Moayyeri 2008). A study that examined how this association varies according to the type of physical activity undertaken found that walking for leisure or transport was associated with lower risk of fracture in both

men and women. In a combined analysis including both men and women, walking for any duration was associated with a reduced risk of 36% for any fracture, and 43% for hip fracture (Moayyeri et al 2010).

5.4.5 Mental health

An Australian study found that physical activity in older adults (55-89 years, mean age 65.2 years) was related to positive mental health. People who were either moderately (150–420 minutes per week) or highly active (>420 minutes per week) had significantly higher mental health status (assessed using the SF-12 health survey questionnaire) than those who were inactive (< 150 minutes per week) after controlling for physical health status (Mummery et al 2004).

A systematic review of the relationship between physical activity and depression concluded that exercise reduces the symptoms of depression (Mead et al 2009). Based on this evidence, the recent UK National Institute of Clinical Excellence (NICE) guideline for depression recommends the inclusion of regular exercise in the treatment of mild depression (National Institute for Health and Clinical Excellence 2009). Others state that aerobic exercise may be considered a potential stand-alone treatment for mild depression, or used in conjunction with antidepressant medication (Mago and Mahajan 2009).

Walking may also be associated with improved mental health through 'green exercise' and contact with nature; with recent research indicating that there are health benefits associated with contact with the outdoor environment. A recent review of research into 'green exercise' found that exercising in the presence of nature (including both urban and rural settings) improves self-esteem and mood, with a synergistic effect for exercise and exposure to nature (Barton and Pretty 2010). Walking, whether for recreation or transport, is a form of physical activity that usually occurs outdoors.

5.3.6 Cognitive functioning

The large US Nurses' Health Study found that long-term regular physical activity, including walking, was associated with significantly better cognitive function and less cognitive decline in older women. The study found a 20% lower risk of cognitive impairment for women in the highest quintile of activity compared with women in the lowest physical activity quintile (Weuve et al 2004).

In a US study of community-dwelling older men and women, higher levels of physical activity were associated with a 33% reduced risk for Alzheimer's disease for 'much' physical activity compared with 'no' physical activity (Scarmeas et al 2009). A systematic review of cognitive functioning in older people concluded that physical activities that improve cardio-respiratory fitness are also beneficial for cognitive function in healthy older adults. Effects include improvement in motor function, cognitive speed, delayed memory functions and auditory and visual attention (Angevaren et al 2008).

In Victoria, the estimated number of people with dementia in 2013 was about 74,600; with the prevalence predicted to increase by 32% to 98,100 in 2020 (Deloitte Access Economics 2013). Population increases and ageing account for a sizeable proportion of this increase, but modifiable risk factors such as physical inactivity are also considered to play a role. Better cardiovascular health, and maintaining a physically, socially and cognitively active lifestyle throughout middle age are considered likely to reduce the risk of dementia (Australian Institute of Health and Welfare 2012).

5.3.7 Maintaining mobility and independent living

Strength, endurance, balance, bone density and flexibility all decline with age, with the consequent loss of functional capacity impacting on older adults' health, wellbeing and ability to maintain independent living (British Heart Foundation 2012a). Cardiorespiratory exercise such as walking can offset declines in endurance and reduce breathlessness and fatigue in older adults, and resistance training can improve physical function and mobility, including walking speed and time to stand up from a chair (British Heart Foundation 2012a).

Fielding et al (2011) report that regular physical activity reduces functional limitations and assists older adults to maintain functional independence. Loss of mobility is associated with higher rates of morbidity, mortality, and hospitalizations; poorer quality of life; and reduced likelihood of remaining in the community (Fielding et al 2011).

5.3.8 All-cause mortality

A systematic review and meta-analysis of non-vigorous physical activity and all-cause mortality reported an 11% reduced risk of mortality for 2.5 hours of brisk walking a week (~11 MET-hours/week) compared with no walking (Woodcock et al 2010).

Walking and cycling for transport have been shown to reduce all-cause mortality, though not in all studies for both men and women (Andersen et al 2000; Matthews et al 2007). In a study in Finland, Barengo et al (2004) reported that reduced all-cause mortality was associated with active commuting for women only.

A study of Chinese women found that walking to work and other destinations was associated with reduced all-cause mortality, but the association was not significant (p for trend = 0.071). The risk ratios were adjusted for a number of demographic and health covariates, including other forms of physical activity (eg exercise and housework) (Matthews et al 2007).

These findings from studies of all-cause mortality are particularly important because they demonstrate that, overall, the benefits of walking outweigh the risks; the main ones being traffic-related injuries, fall injuries and the harmful effects of air pollutants (see Section 5.7).

5.4 Additional benefits of walking

Walking has several additional benefits compared with other forms of moderate intensity physical activity. Walking is a socially inclusive form of physical activity that is readily accessible to most people regardless of age, gender, ethnicity, and socio-economic position (see Section 4.3). When walking is used as a mode of travel it also has the benefit of combining physical activity with mobility, and exercise time with travel time. For older adults who do not drive a motor vehicle, walking provides an important form of independent mobility, both for short local trips to places such as shops, services and social and cultural events and activities, and for accessing public transport services for longer trips.

There are also several benefits associated with walking as an alternative to car travel. The physical activity benefits have been outlined above. Additional health, well-being and community benefits associated with reduced car use include:

- improved air quality
- reduced noise pollution
- reduced traffic congestion
- reduced road trauma
- reduced greenhouse gas emissions
- increased social connectedness
- improved community liveability
- personal cost savings
- improved independent mobility for people who don't drive cars.

(Litman 2013)

5.5 Physical activity for older adults: conclusions and recommendations

The British Heart Foundation (2012a) review and summary of the evidence on the health benefits of physical activity for older adults (aged 65 years and older) concluded that the health benefits of regular physical activity for older adults are similar to the benefits for middle-aged adults for all-cause mortality, cardiovascular disease and type 2 diabetes.

The review also concluded that the benefits of physical activity far outweigh the risks for older adults, including frail older adults (British Heart Foundation 2012a).

As discussed in Section 5.6 below, falls are a major health risk for older adults, but while some falls occur while walking outdoors, most occur in and around the home; including falls on flat surfaces as well as from beds, chairs, steps and stairs (Cassell and Clapperton 2008). As outlined above, physical activity, including walking, can help prevent these falls. The risk of falling can be further reduced by exercise programs specifically designed to improve balance, muscle strength, flexibility and agility for older adults who may be at increased risk of falling due to functional decline (British Heart Foundation 2012a). The risk of falling

outside the home can also be reduced by improving the outdoor walking environment (see Section 5.6).

Based on evidence of the benefits (and risks) of physical activity for older adults, Australian physical activity guidelines for older adults are as follows:

1. Older people should do some form of physical activity, no matter what their age, weight, health problems or abilities.
2. Older people should be active every day in as many ways as possible, doing a range of physical activities that incorporate fitness, strength, balance and flexibility.
3. Older people should accumulate at least 30 minutes of moderate intensity physical activity on most, preferably all, days.
4. Older people who have stopped physical activity, or who are starting a new physical activity, should start at a level that is easily manageable and gradually build up the recommended amount, type and frequency of activity.
5. Older people who continue to enjoy a lifetime of vigorous physical activity should carry on doing so in a manner suited to their capability into later life, provided recommended safety procedures and guidelines are adhered to.

(Department of Health and Ageing nd)

The British Heart Foundation also lists five "top line messages" for providing public advice on physical activity for frailer, older people. Under the umbrella message of "*Moving more often every day"* the five key messages are:

1. Something is better than nothing.
2. Build up your physical activity gradually.
3. Be sure to add activities that will help you be strong and steady.
4. Limit and break up the amount of time you spend sitting still.
5. The health benefits of physical activity outweigh the risk.

(British Heart Foundation 2012b)

As mentioned briefly above, walking is associated with some risks; the principal ones being traffic-related injury and injuries due to falls. These risks are described in the following section.

5.6 Walking risks for older adults

The health benefits of walking are substantial, but senior pedestrians using the transport network are exposed to injury risks associated with collisions with other road users, as well as non-collision falls. While the health benefits of walking outweigh the injury risks, further improvements to the benefit-risk profile are possible given that many injuries are preventable.

There are several sources of pedestrian collision injury data in Victoria, all providing different measures of pedestrian injury. These include: (a) police reports of traffic injuries (VicRoads CrashStats and TAC Online Crash Database), (b) hospital data (including, separately, admissions and emergency department presentations), and (c) TAC claims records. Pedestrian injuries in CrashStats and from the TAC are generally only those that involve an injury collision between a pedestrian and a vehicle (including bicycles) on the public road network (which includes footpaths and shared bicycle/pedestrian paths).

Hospital data distinguish between traffic-related pedestrian injuries (referring to traffic crash injuries which involve a vehicle and occur on public roads, streets or highways); and fall injuries that do not involve a vehicle (some of which occur on roads, streets and highways; but the majority of which occur in and around the home). Hospital data are collected and analysed by the Victorian Injury Surveillance Unit (VISU) and recorded separately for emergency department presentations (Victorian Emergency Minimum Dataset [VEMD]) and admissions (Victorian Admitted Episodes Dataset [VAED]). Fatal injuries are recorded in the ABS Death Unit Record File, held by VISU, and also in VicRoads CrashStats and the TAC Online Crash Database.

It is also well-recognised in the pedestrian injury literature that many pedestrian injuries do not appear in any of these databases. These are the (generally) less severe injuries that are treated by GPs, physiotherapists and other private health care providers, or by the pedestrian his or herself.

5.6.1 Traffic-related pedestrian fatalities

In 2012, 35 pedestrians were killed on Victorian roads, 15 (43%) of whom were aged 60 years or over (TAC Online Crash Database 2012). In contrast to motor vehicle occupant fatalities, pedestrian deaths occur predominantly in the Melbourne metropolitan area (80% in 2009), and on roads with 50 km/h or 60 km/h speed limits (66% in 2009). The most common types of crashes resulting in pedestrian deaths in 2009 involved a pedestrian crossing the road (50%).

Data for the 10-year period from 2003-2012 indicate that pedestrians aged ≥70 years have the highest number of fatalities (see Figure 12). The 70+ age group represents 10% of the Victorian population, but they comprise 31% of pedestrian fatalities (Australian Bureau of Statistics 2012c; TAC Online Crash Database 2012). Age-specific rates, based on data for the period January 2006 to December 2008, indicate that older Victorian pedestrians experience a fatality rate five times that of the overall population (4.04 per 100,000 for 75+ years compared to the all-age pedestrian fatality rate of 0.8 per 100,000) (Cassell et al 2011).

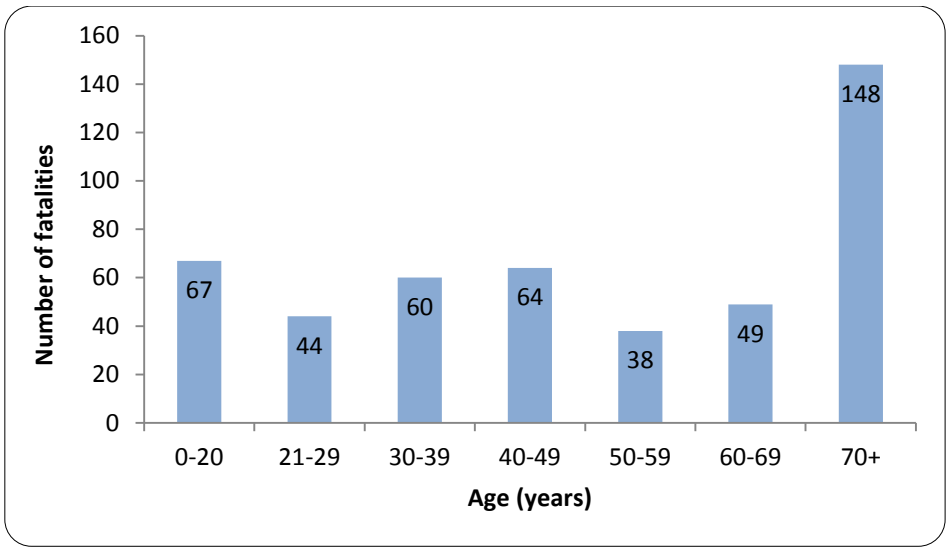


Figure 12: Pedestrian fatalities by age, Victoria, 2003-2012
(Source: TAC Online Crash Database 2012)

Victoria has an impressive track record of steadily reducing road fatalities over several decades; however, in recent times, these improvements have not been equitably distributed across all road user groups. Over the last 10 years (2002 to 2011), pedestrian fatalities in Victoria have shown only a small decline relative to motor vehicle occupants, and also relative to the reduction in pedestrian fatalities in Australia as a whole (see Figure 13) (Bureau of Infrastructure Transport and Regional Economics 2012).

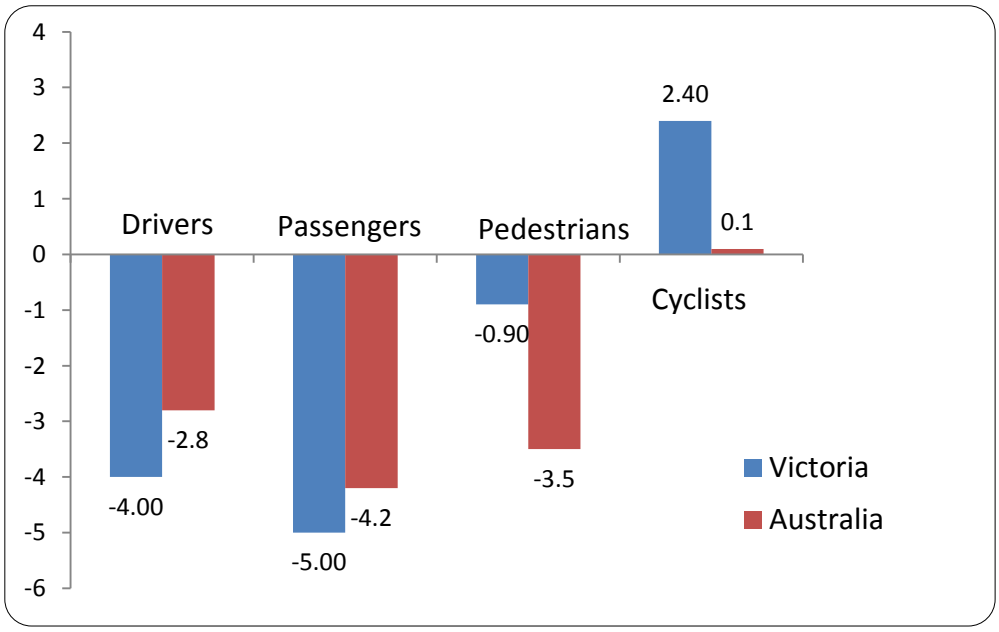


Figure 13: Average annual percentage change in fatalities, 2002-2011
(Source: BITRE 2012)

Data in Figure 14 show that, in the Netherlands and Sweden (countries with low overall traffic crash fatality rates), pedestrian deaths are declining at a faster rate than in Victoria,

indicating that further improvements are achievable, even from the already low rates in these countries. It is also important to note that the populations of Sweden and the Netherlands are about double and treble (respectively) that of Victoria, and their citizens walk about twice as much per person as do Victorians.

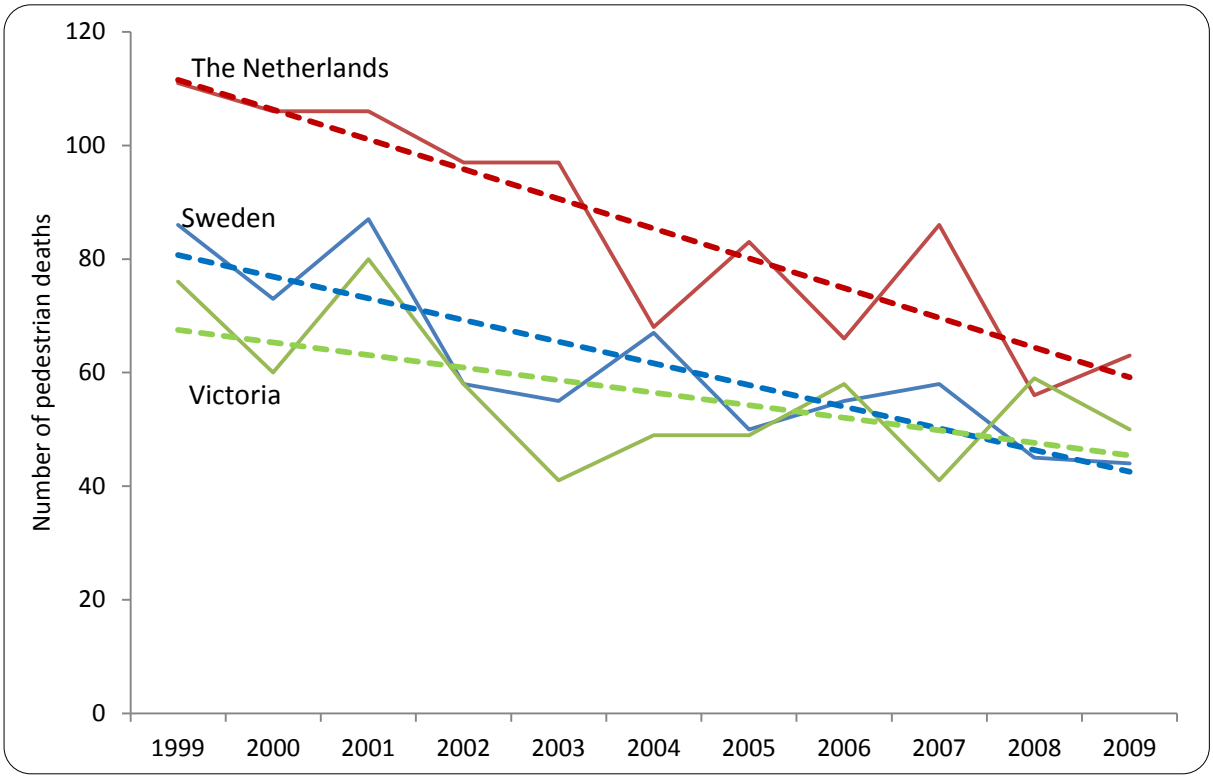


Figure 14: Pedestrian deaths, 1999-2009, The Netherlands, Sweden and Victoria
(Sources: BITRE 2012;
http://ec.europa.eu/transport/road_safety/pdf/statistics/historical_country_transport_mode.pdf)

5.6.2 Traffic-related pedestrian injury

Police data

The following data provide an overview of the characteristics of pedestrian injuries for the overall Victorian population. Age-specific data are included where available.

There were 3702 pedestrian fatal and serious injury casualties reported to the police in Victoria between 2004 and 2008 (256 deaths and 3446 serious injuries), most of which (95%) occurred in urban areas (including regional centres) (Boufous et al 2010). The majority of these crashes occurred on arterial roads (56%) and local roads (43%) with speed limits between 40-50 km/h (37%) and 60 km/h (42%). Crashes that occurred on 60 km/h roads were more likely to result in pedestrian serious injury or death compared to crashes that occurred on roads with speed limits of 40-50 km/h (OR:1.21, 95% CI: 1.10-1.34).

Just over half of pedestrian fatal and serious injury casualty crashes did not occur at an intersection (54.4%), and these crashes were more likely to result in pedestrian severe injury (OR: 1.19, 95 CI: 1.09-1.31) than those that occurred at intersections (Boufous et al 2010).

This study, consistent with several other Australian and international studies, found that older people are over-represented in pedestrian crashes. The report also noted that fatalities among older pedestrians are predicted to increase due to the projected doubling in the proportion of older people in the Australian population (to approximately 24%) by 2041, with as many as one in three pedestrian fatalities likely to be aged 85 or older, compared to one in five currently (Boufous 2010).

Hospital data

A recent analysis by the Victorian Injury Surveillance Unit (VISU) found an average of 1,161 cases per year of hospital-treated pedestrian traffic-related injuries in Victoria, based on VISU data for the 3-year period 2006-08 (Cassell et al 2010). Nearly all pedestrians (93%) were injured in collisions with cars, trucks, vans and buses; with the remaining cases injured in collisions with motorcycles, bicycles, trains, trams and pedestrian conveyances such as mobility scooters, wheelchairs and skateboards.

These 1,161 cases comprised 717 hospital admissions, and 444 emergency department (ED) presentations (Cassell et al 2010). ED presentation rates were highest for young people (18 per 100,000 population[7] for pedestrians aged 15-19 years); however admission rates were highest among pedestrians aged 80 years and over (31 per 100,000, compared with the all-age rate of 13.7 per 100,000). These findings are consistent with several similar studies in comparable countries which all found that older people (age 65 years and over) are over-represented in fatal and severe pedestrian crashes (Cassell et al 2010).

TAC claims data

For the 10-year period between 2002 and 2011, the Victorian Transport Accident Commission (TAC) reported 6167 claims for pedestrian injuries requiring hospitalisation. Nearly a third of these (29%) were for pedestrians aged ≥60 years. Of the 6167 claims, 1818 (29%) were for hospitalisation for more than 14 days, and pedestrians aged ≥60 years had the highest proportion of severe injury claims, with nearly half of their injuries (48%) requiring more than 14 days hospitalisation (see Figure 15). The average annual number of pedestrian injuries requiring more than 14 days hospitalisation was greater for adults aged 70+ (207) than for young people aged 0-25 years (189).

[7] Victorians in this age group.

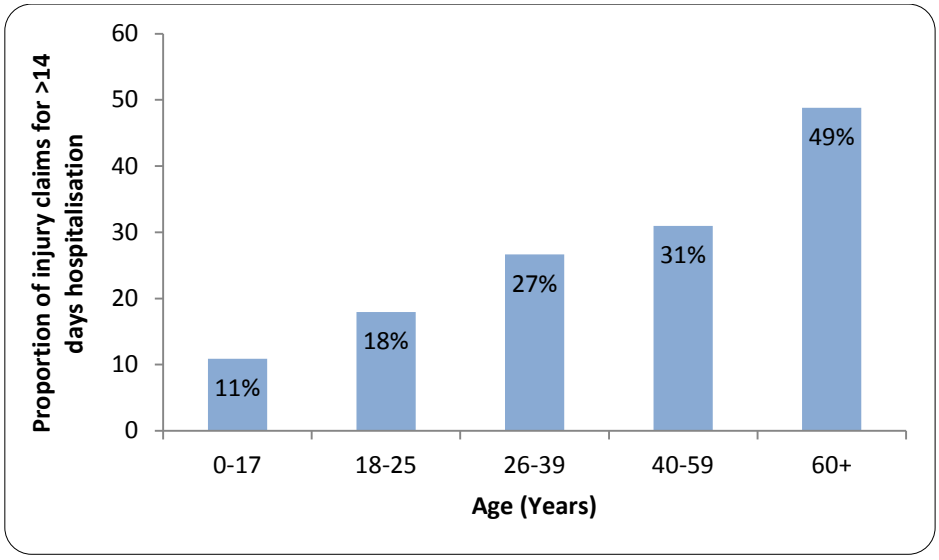


Figure 15: Injury severity by age - proportion of TAC injury claims involving >14 days hospitalisation
(Source: TAC Online Crash Database 2012)

Taking action to prevent serious pedestrian injuries among older adults

The three sources of data on traffic-related pedestrian injuries outlined above present a consistent picture of relatively high rates of pedestrian fatalities and serious injuries in Victoria that have improved little in recent times. Pedestrian fatality rates (per population) in Victoria compare unfavourably with several European countries, particularly in the light of relatively low rates of walking for transport in Victoria (see Table 3).

Table 3: Road traffic fatalities and walking share of transport trips, 2007
(Sources: World Health Organisation 2009; BITRE 2012; Henley and Harrison 2012)

	Pedestrian fatalities (per 100,000 population)	Road traffic fatalities (per 100,000)	Walking share of transport trips (%)
Norway	0.50	5	22
The Netherlands	0.58	4.8	22
Sweden	0.62	5.2	23
Germany	0.84	6	23
Victoria	0.79	6.4	12
Australia	0.97	7.6	NA

The other consistent feature of the data outlined above is the over-representation of older adults in pedestrian fatal and serious injury crashes, and their over-representation in the more severe injury categories.

The over-representation of older pedestrians in fatal and severe crashes is generally attributed to the interplay of factors associated with functional decline (reduced sensory, visual, perceptual and cognitive abilities), complex demands (eg crossing multi-lane roads), and increased frailty in the event of a collision (Cassell et al 2010). The relative contribution of these factors is debated in the research literature (Boufous et al 2010), and is complicated by the fact that older pedestrians themselves attempt to compensate for functional limitations by modifying their behaviour (ie by 'self-regulating' when, where and how they walk). What is widely acknowledged, however, is that older pedestrians are not 'risk-taking' road users in the sense that the term is applied to young male drivers, for example, who are also over-represented in traffic fatalities and serious injuries. On the contrary, older pedestrians are considered to be 'at risk' road users (ITF/OECD 2012).

Consequently, the *Safe System* approach that underpins Victoria's Road Safety Strategy (http://www.roadsafety.vic.gov.au/) has important implications for improving the safety of older pedestrians. The *Safe System* approach incorporates the principle that the road system must be 'forgiving of errors by road users'; that is, the inevitable occasional mistakes made by road users (including older pedestrians) should not result in death or injury because safety should be built into the *Safe System* of safe roads, safe vehicles, safe speeds and safe road users. Safe speeds, in particular, have been shown to be crucial to the safety of older pedestrians (World Health Organisation 2013).

The injury data described above are for traffic-related pedestrian injury. Many older people experience falls (trips, slips and stumbles) when walking outside the home, but these are not classified as 'traffic-related pedestrian injury'. Data for non-traffic falls are described in the following section.

5.6.3 Non-traffic falls

Unintentional fall injuries (ie 'accidental' fall injuries from all causes in all locations) for older adults are substantially higher than the traffic-related injuries described above. The Victorian Injury Surveillance Unit reported that for the three financial years from 2003 to 2005, the major cause of unintentional injury deaths for people aged 65 years and over was falls (70%), followed by transport (mainly car occupants and pedestrians) (13%), asphyxia (5%) and poisoning (2%). Similarly, hospital admissions for unintentional injury were predominantly caused by falls (76%), transport (5%) and asphyxia (3%) (Cassell and Clapperton 2008).

The annual average number of unintentional injuries for Victorians aged 65 years and over was 566 deaths, 26,867 hospital admissions and 17,078 emergency department presentations (Cassell and Clapperton 2008). Unintentional injuries increase markedly with age, with an 18-fold increase in the rate of deaths, and a 7-fold increase in the rate of hospital admissions for seniors aged 85 years and older relative to those aged 65-69 years.

The average annual fall-related death rate was 21 per 100,000 for people aged 65-69 years, rising to 364 per 100,000 for those aged 85 years and older. Hospitalisation rates were 1,613 per 100,000 for people aged 65-69 years, rising to 10,867 per 100,000 (about 1 in 10) for those aged 85 years and older (Cassell and Clapperton 2008).

It is difficult to quantify the proportions of injuries to older Victorian pedestrians using the road environment that are traffic-related (ie injuries involving another vehicle and occurring on public roads and paths) and non-traffic related (eg injuries due to falls on public roads and paths). What is known is that the majority of fall injuries among seniors are non-transport injuries (70% of deaths and 76% of hospital admissions) that occur predominantly in the home or residential institution, due to falls on the same level (eg slip, trip, stumble), or from bed, chairs, or stairs/steps. A relatively small proportion of total fall injuries among older adults occur on a road, street or highway (Cassell and Clapperton 2008). Nevertheless, due to the high total number of fall injuries among older adults, falls that occur while using the road system can comprise a sizable proportion of total pedestrian injuries among older adults (ie traffic-related and fall injuries). While not specific to older adults, a study of OECD countries reported that the share of pedestrian injuries that involve pedestrians falling in public spaces "*account for up to 75% of all pedestrian injuries. These injuries are partly due to an inadequate environment or poor maintenance of facilities. This problem will increase with ageing of the population*" (ITF/OECD 2012).

The World Health Organisation (2013) describes a Swedish study (The Swedish Transport Administration 2012) which reported that in 2011, the number of seriously injured pedestrians in the country was estimated to be 4500, but if pedestrians who were seriously injured due to falling in the road environment had also been considered, the number of seriously injured would have been more than 8400. The study concluded that "*One in every two people seriously injured in the road transport system in 2011 in Sweden was a pedestrian who fell. In this light, it is evident that several aspects of safe walking are omitted from official road traffic crash data*" (WHO 2013).

5.7 Summary and benefit-risk analysis of walking for seniors

5.7.1 Summary

In terms of the overall pattern of risks and benefits of walking for older adults, the data outlined in Sections 5.2-5.7 above indicate that:

1. The health benefits of walking (primarily chronic disease prevention) outweigh the risks (primarily injuries due to traffic-related collisions and non-traffic falls).
2. Rates of fall injuries among senior Victorians are relatively high, but walking outside the home is not the main cause of fall injuries, as most occur in the home or residential institution and most involve a fall on a flat surface or from a bed, chair, stairs or steps.

3. Walking can assist in lowering the risk of falls and fractures, though falls risk reduction is maximised by doing regular physical activities that include aerobic (eg walking), resistance and mobility/balance activities.
4. A relatively small proportion but nevertheless sizeable *number* of unintentional injuries occur outside the home, including traffic-related injuries and non-traffic fall injuries.
5. In contrast to traffic-related pedestrian injuries, less is known about the causes of non-collision falls among seniors on Victoria's public road and pathway network. These falls are generally attributed to functional decline among older adults (ie individual factors), but little is known about the relative contributions of environmental factors; that is, road and pathway design and maintenance ('safer roads'), the behaviour of other road and pathway users ('safer road users'), and vehicle speed (which may have an impact on non-collision falls as well as collision injuries).
6. Fear of falling (particularly outdoors and away from home) is a constraint on seniors' walking, and consequently a constraint on seniors achieving the health benefits of walking. Improving walking environments is therefore likely to have multiple benefits in terms of contributing to reducing traffic injuries, fall injuries and the fear of falling while walking outside the home.
7. Older Victorians are over-represented in pedestrian traffic-related deaths and injuries; and traffic-related pedestrian injuries are more severe for older seniors.
8. International comparative data indicate that further reductions in deaths and serious injuries among senior pedestrians are possible through the implementation of appropriate urban design, transport planning and road safety strategies.

5.7.2 Benefit-risk analysis for walking

A number of studies have been conducted into the health economics of walking, though none has focused specifically on older adults. A 2011 Queensland study found that, for a typical off-road path located in an inner urban area, 1000 pedestrians per day will generate discounted benefits of about $7 million over a 30 year period, with a net benefit of $2.12 per kilometre walked (Department of Infrastructure and Transport 2012). Health benefits were the main contribution to the net benefit ($1.68 per km walked), with injury costs estimated at -$0.24 per km walked, reflecting the consistent finding (see Section 5.5) that the injury risks of walking are substantially outweighed by the health benefits gained.

A recent review of 16 economic valuations of transport infrastructure or policies (most of which included health and other benefits) reported a median benefit-cost ratio (BCR) of 5 for walking and cycling projects (ie five dollars in benefits for every dollar spent) (Cavill et al 2008).

The World Health Organisation has developed an online resource "*Health economic assessment tools (HEAT) for walking and for cycling"* which can be used to estimate the

economic savings resulting from reductions in mortality as a consequence of regular cycling and/or walking (Kahlmeier et al 2011). HEAT calculates the answer to the question "If x people cycle or walk y distance on most days, what is the economic value of mortality rate improvements?" HEAT can be used in the economic assessment of planned walking and cycling interventions (such as infrastructure), or to value the mortality benefits from current levels of cycling or walking, such as benefits from cycling or walking to specific destinations. While HEAT is a useful, general tool, it only includes the mortality benefits of walking and therefore underestimates the overall benefits. The authors also caution that it cannot be applied directly to specific population groups such as children or the elderly because the mortality benefits for these groups have not been adequately assessed.

The health economic assessments described above are for general adult populations and are not age-specific, but the evidence cited in Section 4.5, that the health benefits of physical activity for older adults outweigh the risks, suggests that there would also be net benefits for seniors. While traffic injuries and falls increase for older adults, so do the risks of chronic disease (and falls) that can be reduced through recent/current physical activity.

The health benefits and risks of walking for older adults have been described in the sections above, providing a sound foundation for recommending walking as an ideal form of moderate intensity physical activity for senior Victorians. The following sections briefly review research findings related to what walking means to older adults (ie attitudes to walking, and reasons and motivations for walking), and supports and constraints on seniors' walking.

5.8 The meaning of walking for older adults

Independent mobility, including walking, is consistently perceived to be an important component of quality of life (QoL) for older people; though most of the research involves older adults with specific health conditions in clinical settings, rather than general population groups in community settings.

In a UK study of people aged 65 + living in private households, key QoL themes to emerge from in-depth interviews with 80 participants (drawn from a sample of 999 seniors) included:

- having good relationships, help and support;
- living in a home and neighbourhood that is perceived to give pleasure (including being able to go for "nice walks"), feels safe, is neighbourly and has access to local facilities and services including transport;
- maintaining social activities and having a role in society; and
- having good health and mobility (including being able to walk).

(Gabriel and Bowling 2004)

Metz (2000) examined the concept of mobility in more detail, and argued that mobility for older adults should be viewed as a broader concept than simply "travel to achieve access to desired people and places". He proposed that mobility incorporates the elements listed below, and that these wide-ranging benefits should be included in economic assessments of transport planning:

1. Travel to achieve access to desired people and places.
2. Psychological benefits of movement – of "getting out and about".
3. Exercise benefits of everyday mobility.
4. Involvement in the local community – yielding benefits from informal local support networks.
5. Potential travel – knowing that a trip could be made even if not actually undertaken.

(Metz 2000), p.150)

In relation to mobility and "involvement in the local community", a study by Glass et al (1999) highlights the complex interactions between mobility, social engagement and health for older adults. Glass et al (1999) found that, for a cohort of 2761 men and women aged 65 and older, all three forms of activity (social, productive, and physical activity) were independently associated with reduced mortality rates for a 13-year follow-up period after adjusting for potential confounding factors (Glass et al 1999). *Social activities* included visits to cinema, restaurants, sporting events, and participation in social groups. *Productive activities* included gardening, preparing meals, shopping and paid and unpaid community work; and *physical activity* included active sports, swimming, walking and physical exercise. Mobility underpins all three forms of activity, highlighting the importance of mobility for older adults and the wide-ranging nature of mobility and quality of life as proposed by Metz (2000).

The important role that walking plays in the lives of older adults is also reflected in their actual walking behaviour. As outlined in Section 4, walking is the most popular and most frequent form of active sport and recreation for older Victorians (see Figures 4 and 5). In terms of utility walking, while the total number of daily trips (by all modes) undertaken by Victorians declines with age, the proportion of trips undertaken by walking increases from age 45-54 years, as car driver trips decline (see Figure 7). These data are for walking-only trips. It is also important to recognise that total walking is substantially higher than walking-only trips, as most trips by private car and public transport also involve some walking (Beavis 2012). As noted in the ITF/OECD (2012) report *Pedestrian safety, urban space and health*, "*we are all pedestrians, and most trips begin and end with walking*".

The increasing importance of walking as a mode of transport as people age has also been documented in several other countries, including:

- Germany: 34% of trips for people aged 65+ are walking trips compared with 20% for 45-59 years;

- Denmark: 21% of trips for people aged 70-85 years are walking trips compared with 13% for 40-59 years; and
- the Netherlands: 28% of trips for people aged 65+ are walking trips compared with 21% for 45-64 years.

(Buehler and Pucher 2012)

The data outlined above point to the important role that mobility plays in the quality of life of older adults, and the increasingly important contribution that walking makes to mobility (ie for recreation, leisure and transport) as people age. The benefits of the independent mobility and physical activity achieved by establishing or maintaining walking among older adults are wide-ranging (see Sections 5.2-5.5). These potential benefits will only increase over time as Victoria's population continues to age. It is therefore crucial that public policy measures across a range of sectors and levels of government support rather than constrain walking for senior Victorians.

Supports and constraints on walking among older adults are described in the following sections.

5.9 Supports for walking for older adults

The determinants of physical activity, including walking, for older community-dwelling adults have not been well-researched, with most 'determinants of physical activity' research focusing on young and middle-aged adults (Saelens and Handy 2008). Research into physical activity and older adults focuses mainly on limitations associated with impaired health or functional decline; or on the role of physical activity in recovery from illness (eg cardiac rehabilitation). Consequently, research has focused mainly on intra-individual factors related to health deficits, and relatively little is known about the environmental, social and policy determinants of physical activity and walking for older adults (refer to Figure 11). In particular, the recent and rapidly expanding body of research into 'walkable' environments has principally involved young and middle-aged adult populations (Sallis et al 2006).

It is likely that there are some important differences between middle-aged and older adults in the ways that neighbourhood environments influence walking behaviour. This section focuses on the (relatively limited) research into the environmental determinants of walking for older adults.

A recent USA study examined the relationships between neighbourhood walkability, physical activity (including utility walking and cycling), obesity and lower-extremity mobility impairment among community dwelling older adults (King et al 2011). The authors reported that "*Across regions, time and neighbourhood income, older adults living in more walkable neighbourhoods had more transport activity and moderate-to-vigorous physical activity and lower body mass relative to those living in less walkable neighbourhoods*."

A survey of 323 residents in 32 retirement villages in Western Australia found that walking was the most popular form of physical activity, though objectively-measured activity was low (Nathan 2012). Built and social environmental factors significantly associated with walking included: closer objectively-measured distance to public transport; higher perceived proximity to destinations; higher perceived aesthetics score; and more physical activity support from family.

One of the few studies to comprehensively examine the use of active transport modes by older adults investigated socio-demographic and environmental factors that influenced travel by car, public transport and walking among older adults in Montréal, Canada (Moniruzzaman et al 2013). The study found that walking trips and trip distance decreased with age (for 'seniors' aged 65-74 and 'elder seniors' aged 75+, compared with 'younger seniors' aged 55-64). Having a driver's licence substantially reduced walking trips and walking trip distance. Higher income was associated with fewer, but longer walking trips. Seniors who lived alone were more likely to walk and to walk further than those living with a partner or other household members. Seniors who worked part-time (rather than full-time), were retired, or stayed at home were also more likely to walk. The authors suggested that "*relaxed time constraints are associated with both a higher preference for walking and longer walking trips*." (p.94).

In the same study, the environmental factors of higher density urban structure, street density and land-use mix were all associated with more walking trips, but not walking trip distance. On the other hand, living in the 'downtown core' (compared to the suburbs) predicted both walking trips and walking trip distance, after controlling for socio-demographic factors (including car ownership) as well as density and built environment variables. This finding suggests that there are factors associated with living in suburban environments that inhibit walking in addition to the well-recognised socio-demographic and built environment factors. For example, it may have something to do with 'habitual' transport modes, whereby suburban residents who are in the habit of driving, continue to drive, even in suburban areas that have relatively high walkability. 'Habit' was found to be an important predictor of utility walking and cycling for adults in the Netherlands (de Bruijn et al 2009).

It is also possible that the suburban/CBD differences (independent of density and built environment factors) may be partly due to walking being more appealing than driving a car in inner city areas where traffic congestion is higher, and car parking more difficult and/or expensive. It is important to bear in mind that, while from a public health perspective the choice of exercising or not is a relatively straightforward 'yes'/'no' decision, from a transport perspective, walking to get to places is a travel mode choice that is influenced by competition from alternative travel modes. In Australia, this is predominantly car travel. Thus, a more walkable environment is also one where car travel is less appealing, over and above the more commonly studied 'walkability' factors. In many of the high-walking OECD

countries, the prioritisation of walking and cycling over car travel in built-up areas involves an integrated package of measures that makes walking and cycling for local short-to-medium distance trips faster, safer, cheaper, more convenient and more pleasant than car travel (Pucher and Buehler 2010; ITF/OECD 2012).

In the Montréal study described above, both the probability of walking and the geographical variation in walking tended to decrease with increasing age. Nevertheless, even the oldest cohort was more likely to meet physical activity guidelines through walking if they lived in the 'downtown core' rather than in the suburbs; and younger seniors living in the suburbs were unlikely to meet physical activity guidelines by walking (Moniruzzaman et al 2013). Overall, the study indicates that a range of urban form and socio-demographic factors influence seniors' walking trips and walking trip distances.

A recent review of research into the physical environment and physical activity among older adults reported on characteristics of the physical environment including walkability, residential density, land use mix diversity, street connectivity, access to services, access to public transport, access to recreational facilities, walking/cycling facilities, traffic-related safety, crime-related safety, aesthetics, and urbanisation (Cauwenberg et al 2011).

The review reported inconsistent findings for many of these factors, which the authors attributed to the limited research available; the methodological limitations of studies; heterogeneity of 'older adult' populations (eg 'Younger senior' [55-64); 'Senior' [65-74]; 'Elder senior' [75+])(Moniruzzaman et al 2013); several studies were conducted in fairly homogeneous settings, mainly in the USA; and most studies measured total physical activity rather than specific forms of physical activity such as walking (Cauwenberg et al 2011).

The authors commented on the rather surprising finding that crime- and traffic-related safety was not a consistent predictor of older adults' physical activity behaviour, suggesting that this might be due to the use of "diverse and often imprecise measurements of safety", including measures of perceptions of safety and crime, sources of danger (ie crime, traffic safety, falls), and emotional reactions attached to these perceptions. The relative importance of both actual and perceived safety is also likely to influence these findings, as well as people's sense of control over perceived and actual risks, which is an important factor in risk perception (Fischhoff et al 2002) .The review authors concluded that knowledge about the relationships between the physical environment and physical activity in older adults is limited, and suggested that studies conducted in countries other than the US would provide valuable insights into environmental influences on older adults' physical activity and walking. They also recommended further research into specific physical activity domains rather than total physical activity (Cauwenberg et al 2011).

Sallis et al (2009) also state (based on a study of neighbourhood environments and physical activity in 11 countries) that, while seven perceived neighbourhood attributes had varying impacts on physical activity among adults (the study did not include seniors), more

attributes is generally better (up to 100% higher likelihood of sufficient physical activity for highly supportive environments). They therefore suggest that multiple environmental changes are likely to be needed to have a substantial impact on physical activity levels (Sallis 2009). Pucher et al (2010) came to a similar conclusion in an international review of the effectiveness of interventions aimed at increasing cycling; namely, that, while individual measures have varying impacts when examined alone, a 'package of measures' appears to be effective in achieving substantial and sustainable increases in cycling levels in large geographical areas such as cities (both large and small) (Pucher et al 2010).

The ITF/OECD (2012) report '*Pedestrian safety, urban space and health*' summed up the current findings on supports for older adults' utilitarian walking as follows:

> *"... to promote walking for transportation a neighborhood should provide good access to shops and services, well-maintained walking facilities, aesthetically appealing places, streets with little traffic and places for social interaction. In addition, the neighborhood environment should evoke feelings of familiarity and safety from crime. Future quantitative studies should investigate if (changes in) these environmental factors relate to (changes in) older adults' walking for transportation."* (p.69)

5.10 Constraints on walking for older adults

Constraints on walking for older adults are related to the supports/correlates of walking described in the previous section, in that the absence of conditions that support walking effectively acts as a constraint on walking. The main difference between 'supports/correlates' and 'barriers' research into seniors' walking is the focus of the research studies. The previous section principally looked at objectively-measured and self-reported environmental correlates of walking aimed at answering the question "what neighbourhood environmental factors are associated with walking?" This research usually includes 'macro-level' factors such as urban form and population density. The current section, on the other hand, focuses on studies (usually surveys) that ask older adults specifically about 'barriers to walking'.

'Barriers' research tends to elicit more individual factors such as health status and motivations for walking or reasons for not walking. Environmental influences are also usually included, but these tend to focus on more 'micro-level' factors such as the availability, quality and maintenance of footpaths.

This section on barriers to seniors' walking also includes research into factors associated with pedestrian injuries, including injuries involving collisions with bicycles, as actual and perceived risks of injury are potential barriers to walking.

Research into constraints on physical activity and walking for older adults focuses mainly on restrictions due to health problems and reduced functional capabilities. As people age,

health factors become an increasingly important barrier to physical activity, including walking (Jerome et al 2006). Older adults may have reduced motor, sensory and cognitive abilities which, together with increased frailty, can increase the risk of pedestrian injury, and also discourage older adults from walking (GOAL Consortium 2012). In addition to changing physical capabilities, changes in employment status, household composition, car ownership and use, and income also impact on walking among older adults (ITF/OECD 2012).

While changing health and lifestyle factors can constrain walking among older adults, there are also a number of potentially modifiable factors that can assist older adults to maintain or adopt more physically active lifestyles. It is also important to bear in mind that physical activity at all ages can help prevent many of the health conditions that subsequently constrain physical activity among older adults (see Sections 5.2-5.5).

Because the main focus of this study is on supportive environments for older adults' walking, this section focuses on research into potentially modifiable individual and environmental constraints on seniors' walking rather than on constraints due to specific health conditions.

Potentially modifiable individual factors include risk perceptions, which can differ from actual risks. For example, a study of 143 independent–living women aged 70 and older in Canada titled ""*My heart couldn't take it": older women's beliefs about exercise benefits and risks*" found relatively high levels of general awareness of the health benefits of physical activity, but many women were constrained by feelings of physical vulnerability and uncertainty about their actual risks and benefits (O'Brien 2000).

Interventions aimed at increasing awareness of current guidelines for physical activity for older adults (including that the benefits of physical activity outweigh the risks, and that the maintenance or adoption of physical activity is recommended for seniors of all ages) may help to address these concerns (see Section 5.5).

A baseline survey of middle-aged and older people in the UK who attended two national walking programs[8] (N = 680, mean age 64.4 years) reported a range of perceived barriers to walking in the neighbourhood, classified according to the social-ecological model in Figure 11. Key barriers included:

- *intra-personal factors*: "health problems" (20%);
- *social/cultural factors*: "no one to walk with" (25%), "worry about personal safety" (29%);

[8] The study sample was recruited from two walking schemes: the majority via ''Walking the Way to Health'' initiative (WHI) (n=601), with additional participants (n=149) recruited from the ''Paths to Health'' (PTH) project, based in Scotland. These schemes aim to encourage sedentary adults to become more active by attending local-led ''Health Walks'' (approx. 60) which generally have trained walk leaders, assisted by volunteers.

- *built environment*: “worry about tripping over broken paving stones” (18%), “too much traffic” (17%), “worry about being knocked down by a cyclist riding on the pavement” (11%).

(Dawson et al 2007a)

The baseline survey found that both health problems and environmental barriers to walking were associated with lower levels of walking.

At 12-month follow-up, there was little change in walking levels, though total physical activity (including at work and home, for transport, and recreational physical activity) was significantly reduced (Dawson et al 2007), suggesting that walking was maintained while other forms of physical activity were not.

Despite there being little change in walking levels, participants reported more non-health barriers to walking at follow-up compared to baseline, though one barrier (“worry about personal safety”) decreased, possibly due to the social nature of the walking groups.

A significant positive association was reported between health barriers and external barriers, suggesting that people with poorer health may require higher quality walking infrastructure than those with better health. However, change in health status over the 12-month period did not appear to impact on walking or total physical activity, suggesting that poorer health does not necessarily lead to reduced walking and other forms of physical activity.

These findings are complex, and in some instances, inconsistent. However, other studies have also reported that adults who walk more tend to report more environmental barriers to walking compared with those who walk less (Humpel et al 2004). It may be that participation in walking leads to increased awareness of potential barriers, although the number and nature of the perceived barriers may be insufficient, on their own, to restrict walking. For example, in the study by Dawson et al (2007b), the decrease in “worry about personal safety” may have partially negated the impacts of barriers that were perceived to have increased. Similarly, the perceived benefits and enjoyable experiences of walking may have helped some people to overcome increased health barriers.

These findings are a cautionary reminder that *some* self-reported ‘barriers to walking’ might not necessarily reduce walking behaviour, though they might, for example, make it less enjoyable. In the focus group discussions conducted as part of the current study, participants talked about planning walking routes, times and destinations to avoid walking infrastructure and conditions they considered unsafe (see Section 7). Thus, it may be that older adults who are motivated to walk and may have fewer time constraints than younger adults are able to find ways around some perceived barriers.

These types of interactions are in fact predicted by social-ecological models of walking, whereby intra-personal factors interact reciprocally with environment factors to influence

walking behaviour. These are complex, multi-directional interactions, and, consistent with the research findings described in Section 5.10, there may be no (or few) 'silver bullets' when it comes to identifying and understanding environmental influences on walking for senior adults.

However, this is not a reason for inaction. Large variations in walking behaviour internationally (Sallis et al 2009) and locally (Moniruzzaman et al 2013), after controlling for a range of socio-demographic and other factors, indicate that something is making a difference. It has been noted that studies of the correlates of walking for general adult populations typically identify factors that explain only about 30% of the variance in walking behaviour (Krizek et al 2009). Possible explanations for the lack of explanatory power for known factors include that research has failed to identify one or more important factors, or that multiple, small-impact factors (that can be hard to measure statistically) explain the missing variance. The latter explanation supports the need for a 'package of measures' to increase seniors' walking (see Section 5.10).

Many of the environmental barriers to seniors walking focus on walking infrastructure and injury and personal safety issues associated with using the road network. In contrast to the limited research into general supports and barriers for seniors walking, there is a large body of research into barriers in the form of risk of traffic-related injury for older pedestrians. The following section summarises the key findings from this research.

5.11 Constraints on walking: traffic-related injury risk for older pedestrians

Factors that impact on pedestrian safety can be categorised according to the four components of the *Safe System* framework:

- safer roads and road environments;
- safer vehicles;
- safer speeds; and
- safer people (ie road user behaviour).

Measures that impact on pedestrian safety, particularly for older adults, are discussed in these four categories.

5.11.1 Safer roads and road environments

Missing or poorly maintained pedestrian infrastructure increases the likelihood that pedestrians will be killed or injured when walking alongside or crossing streets and roads. However, the mobility and safety needs of pedestrians, especially older pedestrians, are frequently neglected in urban design and transport planning, which predominantly cater for the needs of motorised traffic (World Health Organisation 2013). As stated by the WHO (2013):

"...the design of roadways and the entire built environment can either prevent pedestrian traffic injuries or magnify pedestrian risk. Pedestrian safety requires that road design and land-use planning include safe, accessible and comprehensive facilities prioritizing the needs of pedestrians."

In relation to "the entire built environment" and "land-use planning", a number of OECD countries have prioritised walking and cycling over car travel in many residential and service areas, thus creating the over-arching conditions for safe and regular walking and cycling. Measures include urban design and area-wide traffic calming that discourage through traffic in residential, shopping and service areas. At individual street level, 'living streets', 'home zones', and the Dutch 'woonerf' (literally 'living yard') incorporate elements of safe roads, safe speeds and safe driving behaviour that improve the safety and prevalence of walking. A systematic review of area-wide traffic calming schemes such as these found some evidence of effectiveness in reducing traffic crashes, injuries and deaths, though not consistently for the three outcome measures (Bunn et al 2003).

Most severe and fatal pedestrian injuries are caused by being struck by a motor vehicle (see Section 4.7). Avoiding collisions between pedestrians and motor vehicles, or reducing the severity of collisions, is therefore crucial for pedestrian safety. Separation from high-speed, high-volume traffic is important. The risk of pedestrian injury is high when pedestrians share the road with vehicles travelling at fast speeds, with vehicle–pedestrian collisions 1.5 to 2 times more likely to occur on roads without footpaths (World Health Organisation 2013).

A high proportion of pedestrian injuries occur while crossing roads (see Section 5.6). Wider lanes and roads take longer for pedestrians to cross, and also tend to increase traffic speed, making these roads more dangerous for pedestrians to cross. Risk of injury increases with each additional lane a pedestrian must cross. Vehicles travel more slowly on single lane roads or when streets are narrow, and drivers may drive more cautiously on narrow streets (World Health Organisation 2013).

'Road diets' are increasingly being implemented internationally as a means of reducing the number of traffic lanes on selected roads, and using the additional space to widen footpaths, introduce or widen roadside landscaping, or construct bicycle lanes. An evaluation of road diets in 45 treatment sites in California, Iowa and Washington reported a 19% to 49% reduction in total crashes relative to reference sites (Turner-Fairbank Highway Research Center 2010). The study did not provide pedestrian-specific data.

Median strips or islands can also reduce the risk of crossing multi-lane roads by enabling pedestrians to cross in two or more stages. It is not only mid-block (ie between intersections) crossings (with or without marked pedestrian crossings) that can be risky for pedestrians. Crossing at intersections is also hazardous. Intersections frequently include several pedestrian-vehicle conflict points, and while driver and pedestrian behaviour at these conflict points is specified in road rules (eg left- or right-turning vehicles must yield to

pedestrians), collisions can occur when the pedestrian is obscured from the driver's view or is difficult to see (eg in poor light), or when right-of-way rules are ignored by drivers (WHO 2013). Signalised intersections are safer for pedestrians than uncontrolled intersections, but they can still present risks for pedestrians (Moudon et al 2011).

Mid-block pedestrian crossings appear to assist pedestrians, but actual safety depends on their design and use. Inappropriately positioned or designed pedestrian crossings can be ineffectual, or even counter-productive, partly due to a false sense of security on the part of pedestrians (WHO 2013). In some situations, the only way pedestrians can signal their intent to cross is to stand in the pedestrian crossing (WHO 2013). However, situations where drivers must yield to pedestrians *in*, rather than *at* an intersection, tend to be more risky for pedestrians. An Australian study also found high levels of misunderstanding of right-of-way rules among both pedestrians and motorists at a range of pedestrian crossing types, with potential to contribute to pedestrian injury (Hatfield et al 2007).

A Swedish study of driver behaviour at a zebra crossing found that rates of drivers yielding to pedestrians can indeed be low, placing pedestrians in the difficult situation of waiting for a gap in the traffic, or adopting the potentially risky behaviour of entering the crossing in the hope that drivers will yield (Varhelyi 1998). The study reported that the frequency of giving way was 5%, and that most drivers did not (as the law requires) "*adapt the speed in such a way that they do not endanger pedestrians who are already on, or are about to step onto the zebra crossing*". In encounters with pedestrians at the crossing, only 25% of drivers slowed down, and 75% of drivers maintained the same speed or accelerated, which the author interpreted as "*a signal from the drivers that they do not intend to give way to the pedestrian at the zebra crossing*." The author concluded that driver behaviour must be influenced before reaching the 'decision zone' at 40-50 metres before the crossing to prevent this "*signalling by speed*" behaviour (Varhelyi 1998).

A related Swedish study found that giving way to pedestrians on crossings depends on vehicle speed at the crossing, and that speed reduction measures need to be implemented well before the crossing. The study investigated speed cushions[9] as a means of reducing vehicle speed. Sites with no speed cushions had much higher speeds at the crossing than those with speed cushions, and higher cushions were more effective at slowing vehicles at the crossing than lower cushions (Johansson and Leden 2007). An additional study found that speed cushions further away from the crossing (10 m) slow vehicles at the crossing more than closer cushions (5 m) (Johansson et al 2011). The authors noted that these findings are likely to apply to other physical measures designed to reduce vehicle speed and increase yielding at pedestrian crossings.

Key factors for the safe use of signal-operated pedestrian crossings for older pedestrians are crossing mechanisms and crossing times. Studies in several countries report that many older

[9] Traffic calming devices similar to speed humps.

pedestrians are unable to cross roads in the allocated time. A large study in England, of 3,145 men and women aged ≥65 years found that many older adults cannot walk fast enough to use a pedestrian crossing in the UK. The assumed normal walking speed of 1.2m/sec was found to be inappropriate for many older adults who had mean walking speeds of 0.9 m/sec for men and 0.8 m/sec for women (for a timed walk of 8 feet at normal pace) (Asher et al 2012).

A study of 355 community-dwelling adults aged ≥60 years in Dublin found a strong inverse correlation between age and walking speed (1.3 m/sec at 60; 1.1 m/sec at 70; 0.9 at 80; and 0.7 at 89), and reported that maximum pedestrian crossing times at pelican crossings (pedestrian-activated signalised pedestrian crossings) may be a hazard for very old people (Romero-Ortuno et al 2010). Similar concerns have been identified in Cape Town, South Africa, where 30% of people (N = 47, aged 65-93) resident in four homes for older people were found to walk slower than the recommended speed of 1.2 m/sec. The study also surveyed study participants, and reported that 51% felt that traffic lights did not allow sufficient time to cross roads, resulting in feelings of apprehension (45%), anxiety (17%) and fear (11%) when crossing (Amosun et al 2007). The finding that levels of concern (up to 45%) were higher than actual levels of inability to cross in time is noteworthy, given that people's *feelings* of concern about using the road environment may be as important a barrier to walking as actual injury risks.

In the focus group discussion component of the current study (see Section 7), participants talked about becoming anxious when the 'flashing red' signal appears while crossing the road, even though there may still be sufficient time to safely complete the crossing. Pedestrian countdown timers (PCTs) may provide safer and less stressful (especially for older adults) pedestrian crossing information. PCTs typically replace the 'flashing red' signal with a numeric countdown display in seconds that informs a pedestrian of the time remaining to complete the road crossing. PCTs are currently being trialled in Sydney, Adelaide and Melbourne (McTiernan et al 2012).

A study of pedestrian traffic flow at a busy urban intersection in Los Angeles, California, also investigated actual and perceived risks for older adults crossing the intersection (Hoxie and Rubenstein 1994). The mean walking speed of older pedestrians was 0.86 m/sec. Over a quarter (27%) of the 592 older pedestrians observed were unable to reach the opposite curb before the light changed to allow cross traffic to enter the intersection, and a quarter of this group were "*stranded by at least a full traffic lane away from safety*". Interviews with older pedestrians who were unable to cross in time (mean age of 77 years) found that 74% considered the intersection to be "dangerous", though 63% reported crossing the street at least once a day (Hoxie and Rubenstein 1994). These two studies suggest that, for sizable numbers of older pedestrians, the fact that a road crossing is both dangerous and perceived to be dangerous does not necessarily prevent them from using the crossing. It is therefore

important to improve the design safety of pedestrian crossings, as improvements are likely to reduce injuries whilst also increasing feelings of safety and confidence while walking.

In Australia, the standard walk time used for calculating crossing signals is 1.2 m/sec (or 4 feet/sec), which is the 15th percentile walk speed. However, there are variations in the relative lengths of green, red flashing and "all red" (when the walk sign is steady red but the cross traffic does not yet have a green light) phases (King, 2013, personal communication). These timings, while designed to allow 85% of pedestrians sufficient time to cross, may nevertheless *appear* risky to the pedestrian, especially for the 15% of pedestrians who walk more slowly than 1.2 m/sec – a group that includes a high proportion of older adults. Older pedestrians are not only slower than younger pedestrians, they are also more cautious and law-abiding (see below). Consequently, the red warning lights are likely to cause more anxiety to older pedestrians, especially if they are unable to increase their walk speed to complete the crossing safely.

Technological advances in signalling are beginning to be used to address both of these barriers to walking for older adults; that is, signals that allow (a) increased crossing time for slower pedestrians; and (b) less stressful communication of the time left for completing the crossing. In addition to the pedestrian countdown timers described above, Singapore has recently initiated a "Green Man +" scheme that allows extra walk time for older pedestrians and people with disabilities. When the pedestrian taps a registered card on a reader, the system allows 3 to 12 seconds (average 5 seconds) of additional walk time. A pilot study was conducted to assess whether current crossings in Singapore provided sufficient time for pedestrians under various loading conditions (handling a stroller, shopping cart, and grocery bags), and to determine what additional walk times (if any) are required. The length of additional time required depended on age and load, with not all sites meeting the time crossing needs of older pedestrians, particularly when loaded. The authors noted in conclusion, that "*With the advancement of technology, it may soon be possible to store personalized gait data on a sensor that can activate the pedestrian crossing system to cater to individual needs*" (Kong et al 2013). These types of technological advances are rarely used to improve the safety and mobility of pedestrians in Australia.

Other forms of pedestrian infrastructure that reduce pedestrian injuries include raised pedestrian crossings, which force vehicles to slow, and increase the likelihood of drivers yielding to pedestrians using the crossing. Raised crossings: (i) should be clearly marked with advance warning provided: (ii) are not usually suitable for very high-speed environments; and (iii) are more effective if there are other traffic-calming devices in advance of the crossing (World Health Organisation 2013).

Adequate lighting and design of the road and road environment can improve the visibility of pedestrians, especially during dusk, dawn, and at night (World Health Organisation 2013). These measures include: providing lighting; increasing the intensity of roadway lighting; removing or repositioning objects that affect visibility, such as trees, signs and billboards

that make it difficult for drivers to see pedestrians; and providing kerb extensions. Kerb extensions can be used to place pedestrians in a more visible location prior to crossing and to provide better sight lines to observe traffic. Kerb extensions also have the additional advantage of reducing the crossing distance for pedestrians by narrowing the roadway, which may also slow vehicle traffic (World Health Organisation 2013).

A great deal of research, as described above, has been conducted into what makes footpaths and crossing roads safe or hazardous for pedestrians. However, most of this research focuses on motor vehicle collisions with pedestrians, rather than falls (slips, trips or stumbles) while using the road/path network (see Section 5.6). Falls are associated with factors such as surface quality and footpath maintenance as well as pedestrian and road infrastructure design.

Research into falls by older adults while walking focuses mainly on how older people's functional limitations impact on their ability to successfully negotiate hazards such as obstacles on footpaths and roadways, dual-tasking (eg talking while walking), and level changes (Beauchet et al 2009; Galna et al 2009; Barrett et al 2010). In most cases, these conditions are more hazardous for older compared with younger pedestrians, and are associated with increased risk of falls. A systematic review of obstacle crossing deficits in older adults found that, while older adults used a slower, more cautious obstacle crossing strategy, they were more likely to contact obstacles when less time was available to adjust their foot placement (Galna et al 2009). These findings indicate that unexpected or sudden changes on footpaths and roads increase the likelihood of a fall, as do time-constrained (eg crossing roads) or distracting conditions.

As discussed below (Section 5.11.4: safer road users) older pedestrians are relatively cautious, law-abiding road users who are generally aware of, and attempt to compensate for personal deficiencies that increase their risk of injury. However, they are at risk for unexpected events in complex traffic conditions in unforgiving road environments. Establishing supportive walking environments (ie "Safer roads and roadside environments") as described above, plays a crucial role in improving the safety and mobility of older adults. "Safer vehicles" also play a role, as described in the following section.

5.11.2 Safer vehicles

One of the key principles of the Safe System framework is that the transport system should be 'forgiving' of user errors. In Australia, the concept of creating a system that protects road users in the event of mistakes or errors has been widely applied to motor vehicle occupants (in the form of seatbelts, airbags, crumple zones, safer car interiors, etc) rather than unprotected road users such as pedestrians and cyclists. *The Windsor Star*, Ontario, Canada, recently described the imbalance between the protection of motor vehicle occupants and pedestrians in these terms:

"Occupants of a car are protected by seat belts, airbags and dashboards devoid of sharp objects. A pedestrian's only defence generally is to get out of the way." (The Windsor Star, 9 July, 2013)

Motor vehicle design has a sizeable impact on pedestrian injury following collision with a pedestrian, with older pedestrians at substantially greater risk of severe injury due to their increased frailty.

Despite these risks, vehicle safety in Australia is dominated by the protection of people in cars, rather than the protection of people that cars collide with. ANCAP (Australasian New Car Assessment Program) ratings principally rate the level of *occupant* protection provided by vehicles in serious front and side crashes, and all vehicle purchasers are encouraged by road safety authorities to buy '5-star' vehicles (the maximum rating) (http://www.ancap.com.au/about). ANCAP has only recently (in 2012) introduced pedestrian protection criteria, but the criteria still fall short of the equivalent European agency's (Euro NCAP) criteria. ANCAP requires a "marginal" pedestrian protection rating to earn five stars, while Euro NCAP requires a stricter "acceptable" pedestrian protection rating (Joshua Dowling, "Safety ratings on a crash course", Sydney Morning Herald, January 21, 2012, http://www.smh.com.au/executive-style/motors/safety-ratings-on-a-crash-course-20120124-1qeux.html).

Vehicle design features that impact on the safety of pedestrians include vehicle front design, bull bars, window tinting, and side underrun protection for heavy vehicles. More recently developed features to improve pedestrian safety include energy-absorbing bonnets, windscreens and pillars; blind-spot mitigation; and windscreen airbags. The UK Transport Research Laboratory estimated that 8% of all pedestrian fatalities and 21% of all pedestrian serious injuries could be prevented through improved vehicle design, with BCRs of 7 to 1 (Paine 1999). More recently, it has been claimed that technologies such as autonomous emergency braking (AEB) have the potential to lead to substantial reductions in pedestrian deaths and injuries (see http://users.tpg.com.au/users/mpaine/ppvd.html).

5.11.3 Safer speeds

Speed is the single most important contributor to road fatalities and serious injuries. It is estimated that one-third of crashes resulting in a fatality involve an element of excess speed, but speed is also an aggravating factor in all collisions. Speed contributes to the severity of crash outcomes regardless of other causal factors (World Health Organisation 2008).

The Safe System approach is based on the premise that the protection of human life and health takes priority in the trade-off between the benefits of mobility and the human and economic costs of death and injury. Road traffic injuries are preventable through reduced

traffic speed, and the transport system should adopt speeds that offer mobility without compromising safety (World Health Organisation 2008).

As speed increases, both the distance travelled during the driver's reaction time in response to an emergency, and the distance needed to stop increase. As illustrated in Figure 16, the driver of a car travelling at 50 km/hr takes about a second to react to an emergency incident such as a pedestrian stepping onto the road. In that second, the car will travel about 13 metres (43 feet – about the width of a suburban house block). The car will travel an additional 13 metres before stopping – a total length of about two suburban house blocks. At a speed of 30 km/hr, the total stopping distance is approximately halved. At 30 km/hr, not only is the total stopping distance halved, but the vehicle is travelling at a more 'survivable' speed while the driver is reacting to the emergency and then braking (ITF/OECD 2012).

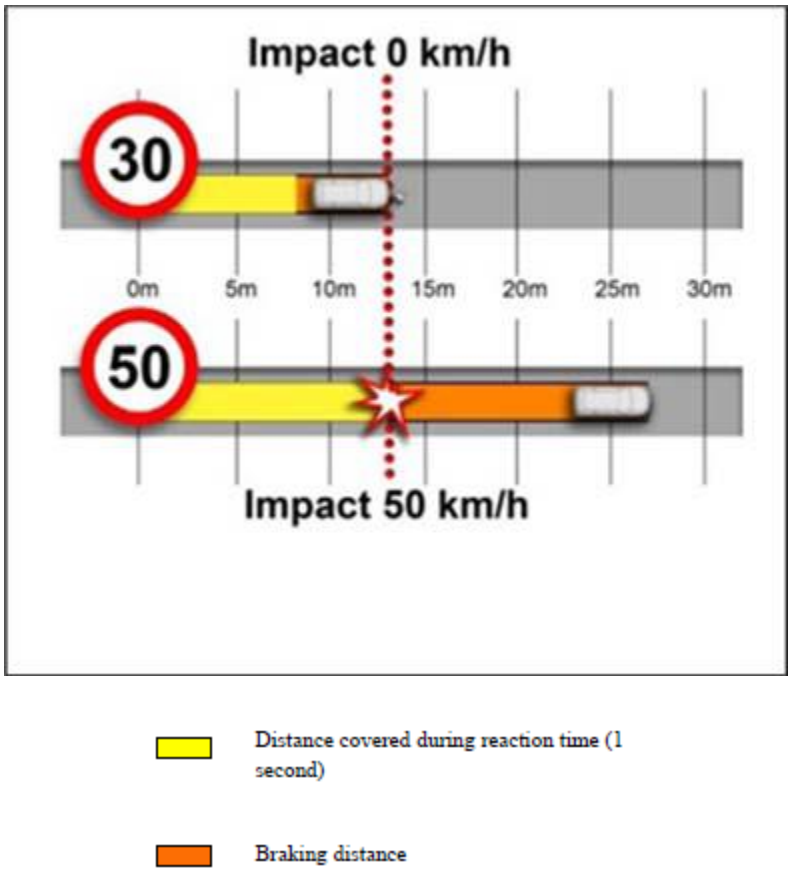


Figure 16: Stopping distances at 30 km/h and 50 km/h
(Source: CERTU, cited in ITF/OECD [2012])

The relationship between speed and probability of a fatal injury illustrated in Figure 17 is the basis for recommendations on urban speed limits from a number of international road safety organisations. The recently released report "*Pedestrian Safety, Urban Space and*

Health" from the International Transport Forum[10] at the OECD (of which Australia is a member) acknowledges the importance of walking as an integral part of the transport system and provides guidelines for developing a safe environment conducive to walking. Recommendations include:

> *Implement traffic-calming policies and generalise 30 km/h zones in city centres, residential areas and other high pedestrian activity areas. This should be based on a functional classification of urban spaces, streets and road networks, supported by appropriate infrastructure design criteria to create low-risk and amenable urban environments for non-motorised road users. To be fully effective, best-practice education, communication and enforcement programmes are needed. The development of intelligent speed adaptation systems is also recommended. (ITF/OECD 2012)*

Other international organisations which recommend 30 km/h speed limits in urban areas include: the (UK) National Institute for Health and Clinical Excellence, EU Committee on Transportation and Tourism, and the World Health Organisation.

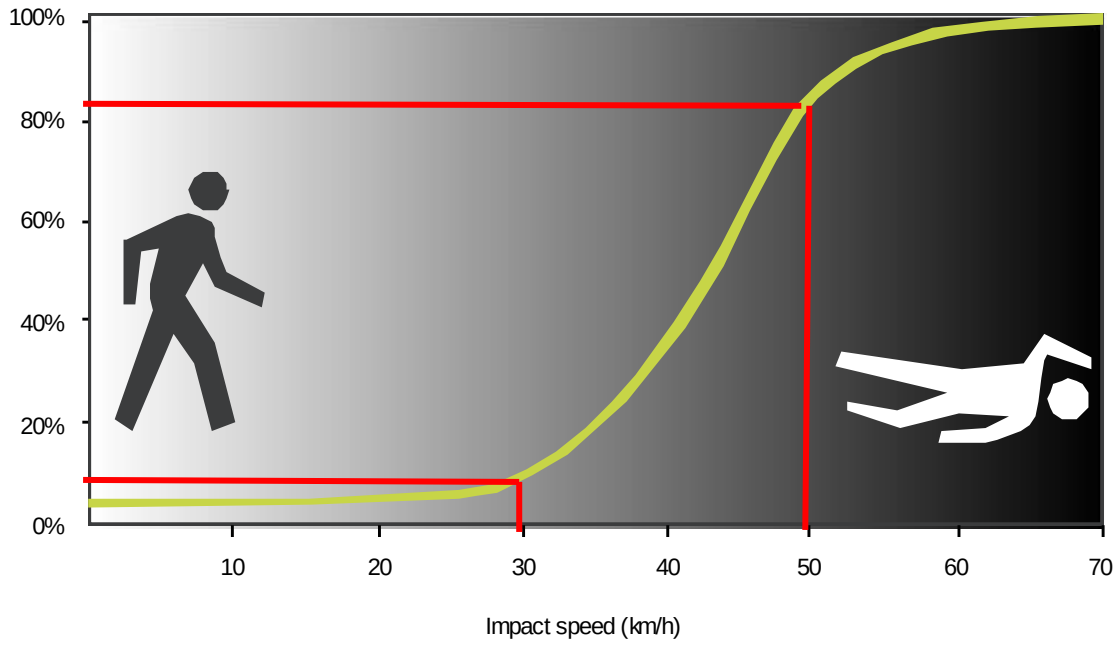


Figure 17: Probability of fatal injury: 50 km/h compared with 30km/h
(Source: WHO 2008[11])

[10] The International Transport Forum is an intergovernmental organisation with 52 member countries including Australia. It acts as a strategic think tank with the objective of helping shape the transport policy agenda on a global level and ensuring that it contributes to economic growth, environmental protection, social inclusion and the preservation of human life and well-being.

[11] More recent research has estimated lower probabilities of pedestrian fatalities than indicated in this graph, though the general pattern of substantially increased risk above 30 km/h remains (WHO 2013).

Victoria's Safe System road safety strategy has as its foundation that the road system "needs to be designed, built and *speed limited* so that in the event of a crash, the people involved do not receive fatal or serious injuries" (VicRoads 2010). This principle is particularly important for pedestrians, and especially so for older pedestrians. Victoria's road safety strategy also acknowledges that the road transport system must allow for human error. Vehicle speed is one of a limited number of protections available for pedestrians and cyclists who share the road space with motor vehicles, and occasionally, like drivers, make errors.

Victoria's speed limits are high by international standards (ITF/OECD, 2012; Fildes et al 2005) (see Table 4).

Table 4: International and Australasian speed limits

(*Source*: Fildes et al 2005)

Road type	Europe (mainly)	Australasia (mainly)
School areas	30 km/h	40 km/h
Residential areas	30 km/h	50-60 km/h
Built-up areas	60 km/h	70-80 km/h
Urban roads	60-70 km/h	80 km/h or higher
Rural roads	80-90 km/h	100 km/h
'Motor' roads	100 km/h	100 km/h
Motorways	120 km/h	110 km/h

There is widespread community acceptance, in general terms, that increased vehicle speeds lead to more accidents and injuries (Australian Transport Safety Bureau 2006). However, the public hold mixed beliefs about what constitutes 'speeding' and also mixed attitudes to a range of circumstances under which speeding is considered acceptable (Daly 2011). The widely held belief (79% of Victorians) that "*Speeding is driving too fast to be safe given your ability as a driver, the weather conditions, the state of the road and the condition of your car*" (Daly 2011) is of particular concern for the safety of pedestrians and cyclists. Drivers' perceptions of a safe speed are often car-centric, and fail to take into account the risks to unprotected road users.

Vehicle speeds and walking behaviour

The evidence that lower vehicle speeds reduce pedestrian injuries, including for older pedestrians, is strong (World Health Organisation 2013). However, evidence for the impact of lower speeds on walking behaviour is less consistent, and generally lacking. Road safety measures such as reducing speed limits are frequently evaluated in terms of impacts on

injury rates, but rarely in terms of walking behaviour, so the evidence base for the impact of vehicle speed on walking behaviour is sparse.

Conducting research into the relationship between vehicle speed and walking is also methodologically challenging. Speed limit reductions are often accompanied by other measures (such as street design) that potentially impact on walking behaviour; and walking behaviour itself is influenced by a wide range of factors that can make it hard to measure the impact of one factor alone (ie lower speed). Travel mode 'habits' are an under-researched but important influence on travel mode choices (de Bruijn et al 2009), and habitual behaviours are not easy to change in the short-term, or through limited, one-off interventions. In addition, speed reduction in single streets or shopping strips may have a limited impact because people require a variety of routes to walk varying distances to multiple destinations. Countries, cities and towns that have high rates of safe walking and cycling generally have area-wide traffic calming (Buehler and Pucher 2012).

For these reasons, much of the current evidence for the impact of traffic speed on walking is indirect, as summarised in the report "*Safe speed: promoting safe walking and cycling by reducing traffic speed"* (Garrard 2008). The report proposed that vehicle speeds impact on active travel behaviour via both perceived and actual traffic environments, and reviewed the available evidence for both pathways.

A recent review of 14 home zone pilot projects across the UK reported that traffic calming measures reduced speeds in the home zones to below 20 miles per hour (32 km/h), with a majority falling below 15 miles per hour (24 km/h) (Biddulph 2010). There was a post-project reduction in traffic crashes (an average of 3.4 fewer accidents per year for 12 projects). Resident surveys found that the majority of respondents reported feeling safer or neutral in 12 cases, though for a small number of projects, some residents (up to 40%) felt that the environment was more dangerous. Residents reported high levels of support for the projects, though there was no consistent evidence of more social interactions among adult residents. The author stated that "*in these generally quiet residential streets it appears a redesign will not necessarily have dramatic results on existing adult relationships. ...it might take more than street redesign to get people socialising, even if the space has been created for it to happen.*" (Biddulph 2010).

These findings differ somewhat from a related study in Switzerland which examined neighbourhood interactions, use of public space and the personal feelings of belonging among residents in three types of streets in the city of Basel, Switzerland: a 50 km/h street; a 30 km/h street; and three home zones (20 km/h and pedestrian priority) (Sauter and Huettenmoser 2008). Lower speed limits were associated with more positive perceptions of traffic safety in the neighbourhood; with the proportion of residents stating that their street is quite or very dangerous for children and elderly persons decreasing with street speed (85% of residents in the 50 km/h street, 51% in the 30 km/h street, and 24% in the home zones). Residents also reported more contact between neighbours in streets with slow

moving traffic, limited space for parking and good environmental qualities. The study also reported that elderly people were more likely than younger adults to say that their streets play an important role in their social life. Public benches were used by older residents for socialising, placing shopping bags, and for resting on their way to and from shops (Sauter and Huettenmoser 2008).

A recent evaluation of a 'self-explaining roads' (SER) project in New Zealand (incorporating several elements of 'home zone' type street treatments) reported improvements in vehicle speed, crashes and pedestrian behaviour. In 'self-explaining roads' treatments, the road environment effectively provides a signal for road user behaviour for the particular type of road, and there is less need for separate traffic control devices such as additional traffic signs to regulate traffic behaviour such as vehicle speed (see *Self-explaining roads*, European Commission Road Safety, available at: http://ec.europa.eu/transport/road_safety/specialist/knowledge/road/designing_for_road_function/self_explaining_roads.htm).

The New Zealand project (in a suburb of the City of Auckland) reported lower vehicle speeds (mean speed of 30 km/h), a 30% reduction in crashes, and a higher proportion of pedestrians on the local roads that were part of the project (though more so for children than adults) (Mackie et al 2013). However, an earlier evaluation of the same project reported no statistically significant change in respondents' ratings of the safety of walking and cycling shortly after the SER treatment (Charlton et al 2010). This might reflect differences in people's perceptions (of safety) and actual behaviour (ie walking), though it could also indicate that attitude and/or behaviour change in response to these types of street treatments takes time, and may not be apparent immediately post-intervention. Post-treatment measurement of walking occurred four months after completion of the project (Mackie et al 2013).

5.11.4 Safer People

The fourth component of the Safe System framework is Safer People. 'Safer People' focuses on road user behaviour, and includes the behaviour of pedestrians, motorists and other road users. Safer people are those who "*comply with the road rules, are safety conscious and alert, and avoid dangerous and unsafe behaviour in relation to themselves and other road users*" (World Health Organisation 2013). Measures that impact on road user behaviour include awareness-raising (eg mass media campaigns); education and skills; and road rules and their enforcement.

Pedestrian behaviour

As in the earlier section on 'Safer Roads', the research literature on the behaviour of older pedestrians focuses on the impact of functional impairment on injury risk. As discussed earlier, some older people are unable to cross roads within the time allowed by pedestrian

crossing signals, and can also experience difficulties dealing with obstacles on footpaths and roads. This section describes additional difficulties associated with road crossing behaviour, which is the major source of collision injury for older pedestrians.

An observational study of the extent to which pedestrians checked for oncoming traffic before crossing signal-controlled intersections on busy city streets compared the road-crossing behaviour of younger and older adults. The study found that older pedestrians make more perceptual and judgemental errors than younger adults, but are more cautious and law-abiding than younger adults. The study concluded that "*Contrary to the portrayal of older pedestrians as being less aware of the traffic environment, pedestrians over the age of fifty were the most cautious, especially under dangerous traffic conditions*" (Harrell 1996).

Functional differences between older and younger adults have also been reported for judging street crossing time. A study which compared estimated with actual road crossing time reported that older pedestrians were more likely than younger pedestrians to underestimate the time it will take them to cross the street (Zivotofsky et al 2012).

Other studies have reported that older adults can have difficulties crossing roads because they are less able than younger adults to accurately assess vehicle speeds (Dommes and Cavallo 2011). Older adults are more likely to make incorrect crossing decisions, including risky decisions when a vehicle is approaching at high speed. They are also more likely to miss safe crossing opportunities at low speed. The authors suggested that older adults' road-crossing decisions appeared to be based on a simple 'vehicle distance' estimate that failed to adequately take into account the speed of approaching vehicles. Factors that came into play in the decision-making process were information processing speed, visual attention, time-to-arrival estimates, and walking speed. The authors concluded that a combination of perceptual, cognitive and physical performance declines with increasing age lead to gap selection difficulties among older adults, with implications for speed limits, road design and education/training (Dommes and Cavallo 2011).

A further study which assessed the effectiveness of training older adults to cross roads safely found that while the training led to older adults making more conservative decisions about road crossing, the training had little impact on their ability to take into account the speed of oncoming cars. In contrast to younger adults, older adults' unsafe decisions increased with vehicle speed. The authors concluded that "*This finding may reflect age-related perceptual and cognitive difficulties that cannot be remedied by a behavioural or educational training method*", and recommended speed reduction measures to reduce injuries among elderly pedestrians (Dommes et al 2012).

Another factor that can increase older adults' risk of collision injury while crossing roads is the fear of falling. A study that combined observational data with a short survey found that fear of falling had a significant effect on older pedestrians' head pitches while crossing roads; that is, the proportion of time pedestrians point their heads down to check the

pavement and their footsteps, rather than up and around to check on cross traffic (Avineri et al 2012). Reduced ability to deal with obstacles on footpaths and roads, particularly under time stress, and concerns about crossing roads within the signal time (see Section 5.12.1), are all likely to contribute to the fear of falling when crossing roads, and therefore poor checking of cross traffic. Consequently, several behavioural and environmental factors appear to operate synergistically to increase the risk of injury among older adults while crossing roads.

In summary, the research findings described above suggest that older adults' over-representation in pedestrian serious injuries and fatalities cannot be attributed to older adults' 'risk-taking behaviour' in the sense of knowingly behaving in ways that increase their risk of injury. On the contrary, older pedestrians appear to have generally good awareness of their abilities, and attempt to compensate for reduced functional capacities by adjusting their behaviour accordingly. They are more cautious and law-abiding than younger pedestrians, and attempt to deal with challenging situations (eg avoiding both falling and being struck by a vehicle while crossing roads) by distributing their attention accordingly. Injury risks for older pedestrians therefore arise primarily when the requirements of the task (eg crossing a road) exceed their functional capabilities (eg walking speed, balance, foot-lifting, visual acuity and cognitive processing).

These findings may help to explain why education/training programs to change the behavior of elderly pedestrians have not been shown to be effective in reducing injuries among older pedestrians (Rivara et al 1997; Duperrex et al 2002), while environmental changes such as improved pedestrian infrastructure and lower vehicle speeds are effective.

Consistent with earlier research findings (eg Harrell [1996] described above), a recent study of pedestrian attitudes and behaviours in 19 European countries found that older pedestrians have more positive attitudes and behaviours[12] to a range of measures related to pedestrian safety than younger pedestrians (Papadimitriou et al 2013). Thus, it is the 'better-behaved' older pedestrians who experience higher levels of injury than less well-behaved younger adults. The study also found no correlation, at a country level, between pedestrian attitudes and behaviours and pedestrian fatality rates in the countries studied (including pedestrians of all ages). The authors stated that the lack of a relationship suggests that pedestrians' attitudes and behaviours may not have a major impact on pedestrian safety, and that pedestrian safety is "more affected by the attitudes and behaviours of motorists".

The consistent evidence that older pedestrians are generally cautious and law-abiding road users is at odds with public discourses associated with serious injuries and fatalities among

[12] Pedestrian behaviours included crossing the road against a red light, crossing streets at places other than the pedestrian crossing, avoiding certain streets or intersections because they are too dangerous, wearing reflective clothing, having to walk on the street due to parked cars or other barriers, and distracted walking (using handheld phones and listening to music devices).

elderly pedestrians which almost invariably focus on elderly pedestrians needing to 'take more care' on the roads. These discourses originate from road safety authorities as well the media and the general public (refer to Garrard [2008] and http://www.victoriawalks.org.au/News.aspx?NewsID=1406). On the contrary, the research evidence points to the road system needing to 'take more care' of older pedestrians.

Older pedestrians also have a responsibility for their own behaviour and safety, but currently, there are indications that road safety discourses and measures in Victoria have not achieved an optimal (in terms of effectiveness) and equitable balance of personal and 'system' responsibility for reducing injuries among older pedestrians. In contrast, countries with high levels of safe walking, including for older adults, place more responsibility for the safety of vulnerable road users on the road system; including driver behaviour, as described in the following section.

Driver behaviour

Driver behaviour is the most important source of safety concerns while walking. Based on findings from the large USA *National Survey of Bicyclist and Pedestrian Attitudes and Behaviour*, the most important reasons pedestrians felt threatened for their personal safety while walking were motorists (62%[13]), dogs or other animals (36%), the potential for crime (36%), and uneven walkways or roadways (28%). Among those who reported that they felt threatened by a motorist, the two actions that were seen as most threatening were driving too fast (41%) and driving too close to the pedestrian (35%) (U.S. Department of Transportation 2008).

Males and females were equally likely to have felt threatened for their personal safety on the most recent day they walked, and older pedestrians (aged 65+) were the least likely age group to report feeling threatened. These findings may be influenced by age and gender differences in walking behaviour. For example, males (25%) were more likely than females (20%) to have walked in the dark, and the proportion walking in the dark decreased with age from about 1 in 3 pedestrians under 30 to about 1 in 10 of those 65 and older. Thus, females and older adults may avoid walking under conditions that are perceived to threaten their safety, or they may have less reason to walk in these conditions. Females were more likely to have felt threatened by the potential for crime (42%) than were males (30%) (U.S. Department of Transportation 2008).

Driver education, and traffic regulations and their enforcement are important influences on driver behaviour. These educative and legal systems, in turn, are shaped by socio-cultural values and norms, which, in Australia and in several other English-speaking countries, place less emphasis on driver responsibility for the safety of vulnerable road users than in countries such as the Netherlands, Sweden, Germany and Denmark, where high 'duty-of-

[13] Of the 6 percent of pedestrians who felt threatened for their personal safety on the most recent day they walked.

care' among drivers for the safety of pedestrians and cyclists is the norm (Jacobsen et al 2009; Garrard et al 2010; Buehler and Pucher 2012).

The World Health Organisation (2013) describes several measures used to raise awareness and modify driver and pedestrian behaviour, adding that these measures are most effective when implemented alongside other measures such as speed management and reducing pedestrian exposure to vehicular traffic. The WHO report also cautions that "*changing the attitudes and behaviour of drivers and pedestrians is a complex, long-term undertaking that requires a variety of interventions to be implemented."*

Bicycle-pedestrian interactions

While the main source of injury risk to pedestrians, in terms of both incidence and injury severity, involves being struck by a motor vehicle, pedestrians also frequently express concerns about the risk of injury from bicycles on footpaths and shared bicycle-pedestrian paths. This section reviews the available evidence on this risk of injury. Age-specific data are not available in published form, so most of the data described below are for the general population.

It should be noted that, as for most of the Safe System measures described above, research into bicycle-pedestrian interactions focuses on measuring and observing interactions such as near collisions, collisions and collision injuries. Generally, this research does not address, and cannot answer, the question of whether the risk of bicycle-related 'frights' and injuries (eg on shared paths) is a barrier to walking, including for older adults.

In a recent study of pedestrian injuries in Victoria, Boufous et al (2010) reported that there were 3702 pedestrian fatal and serious injury casualties reported to the police in Victoria between 2004 and 2008 (256 deaths and 3446 serious injuries). The majority of other road users involved in crashes leading to pedestrian deaths or serious injuries were drivers (91.6%), with a small proportion of crashes (1.6%) involving motorcyclists and 0.9% involving bicyclists. Out of 274[14] pedestrian fatalities in Victoria between 2004 and 2008, one (0.4%) involved a collision with a bicycle (on-road, at a signalised pedestrian crossing where the cyclist failed to stop).

Hospital-based data show a similar pattern, though these data differ in that they are not restricted to the road traffic environment. There were 3,584 pedestrian hospitalisations in Victoria between 2004 and 2008, and the majority (90.6%) of hospitalisations were for pedestrians injured in traffic crashes involving collisions with cars, pick-up trucks or vans. Another 3.1 % were hospitalised as a result of collisions with heavy transport vehicles, and 2.1% in collisions with pedal cyclists. A third of pedestrians hospitalised as a result of collision with a pedal cyclist were aged 60 years and over. Average length of stay in hospital

[14] Includes 20 fatalities in non-traffic environments.

was highest for motor vehicle collisions (4.4 - 7.0 days) and lowest for collisions with bicycles (2.9 days) and other non-motor vehicles (2.8 days) (Boufous et al 2010).

Both the police-reported and hospital-reported data include pedestrian-cyclist crashes that occur on shared paths, but no breakdown by type of pedestrian facility (ie shared path, footpath, or road) is available. While the numbers are relatively low (consistent with the low proportion of trips that are undertaken by bicycle), the data suggest that older pedestrians may be at greater risk of injury from collisions with cyclists than younger pedestrians. As cycling increases in inner metropolitan Melbourne, and competition for road and path space between cars, cyclists and pedestrians also increases, the risk of injury to older pedestrians from cyclists using shared paths may also increase.

A recent study in Queensland investigated pedestrian-cyclist interactions on shared paths. The study analysed observational data for 1,992 cyclists in the Brisbane city centre where cycling on the footpath is permitted (Haworth and Schramm 2011). The authors reported that just over a fifth of the observed cyclists (21.8%) rode on the footpath. There were one or more pedestrians within 1m of 18.1% of observed cyclists, and there were one or more pedestrians within 5m of 39.1% of observed cyclists. Cyclists riding on the footpath were more likely to have one or more pedestrians with a 1m (46.5%) or a 5m radius (60.9%) than were cyclists riding on the road (10.4% within 1 m, 33.0% within 5m).

Overall, 1.1% of cyclists were observed to have had a conflict with a pedestrian; defined as an occasion where if no one took evasive action a collision would occur. However, no collisions were observed. Three-quarters of the conflicts with pedestrians occurred on the footpath (76.2%) and the remaining quarter occurred on the road (23.8%). Almost all (90.5%) of the pedestrian conflicts were avoided by the cyclist swerving, and one on-road conflict was avoided by hard braking.

The authors concluded that, while cyclists and pedestrians are often in close proximity in the city centre, “it appears that the current situation poses relatively few problems in pedestrian-cyclist interactions in the city centre” (Haworth and Schramm 2011). However, the authors also noted that “shared paths may be a greater challenge for cyclist-pedestrian interactions than footpaths” and that these interactions need to be examined.

One such study was conducted recently in NSW. This study involved a total of 672 observation hours at 10 shared paths in Sydney, Newcastle and Wollongong. Based on observations of 51,031 pedestrians and 12,319 bicyclists, five near miss incidents and no actual contact between bicyclists and pedestrians were observed. The authors concluded that the perception of danger is much greater than the actual risks of bicyclists and pedestrians on shared paths (Taverner Research 2009).

Another NSW study assessed the speed of cyclists on different types of infrastructure in the Sydney region using volunteer cyclists fitted with GPS devices (Grzebieta et al 2011). Mean

section speeds for different infrastructure were: footpath (21 km/h); bicycle lane (23 km/h); cycleway in a park (19 km/h); roads 50 to 70 km/h (26 km/h); and roads less than or equal to 50 km/h (21 km/h). There is little data available on the impact of cycling speed on pedestrian injury in the event of a collision (Short et al 2007).

A comprehensive study by Austroads "*Pedestrian-cyclist conflict minimisation on shared paths and footpaths*" investigated actual and potential conflicts between cyclists and pedestrians, and recommended strategies to minimise conflict and to improve both perceived and actual safety on shared paths and footpaths (Mellifont et al 2006).

The study reported a wide range of "*conflict-generating mechanisms covering user behaviour, the physical environment (poor design and maintenance; inherent nature of routes such as pinch points) or the interaction between the two (when 'people versus people' may not be the problem but people versus people and sub-optimal facilities leads to actual and perceived conflict).*" The study reported that the principal people-generated causes of conflict are: (i) unpredictable and unexpected interactions; (ii) lack of an agreed protocol for dealing with actual conflict; (iii) perceived clashes of values between users; and (iv) frustration in task/goal achievement.

The report also summarised the specific cyclist and pedestrian behaviours that can contribute to conflict on shared paths.

Cyclists were considered to contribute to conflict on shared paths through:

- individual riders passing too close at relatively high speed – a function of a basic desire to maintain speed either in training, recreation or commuting
- similar action by groups (at the extreme, a peloton)
- failure to warn pedestrians of their approach or intention to pass
- excessive speed in inappropriate situations (eg sharp curve, narrow path).

Pedestrians were considered to contribute to conflict on shared paths through:

- individuals failing to keep to the left and to maintain a predictable path
- groups occupying the width of the path
- children not being adequately supervised
- use of other vehicles and toy vehicles (powered scooters, roller blades, roller skis)
- dogs not being kept under control.

The authors also noted that the quiet nature of cycling and the use by pedestrians of radio/CD headsets are contributing factors to conflict on shared paths.

The report also listed a number of engineering design and traffic management aspects of shared paths that can contribute to conflict. These include path location and abutting land use (eg restaurants, car parking activity); width; sight distance; design of road crossings; and regulatory and warning signs.

Finally, a number of conflict minimisation strategies were proposed, including path design and maintenance, education and awareness-raising, regulation, and enforcement (Mellifont et al 2006).

An earlier OECD report '*Safety of Vulnerable Users'* also reported that pedestrian-cyclist conflicts were generated mainly by narrow footpaths, narrow cycle-tracks, relatively high speeds of cyclists, poor visibility, or considerable age difference between cyclists and pedestrians. The report also noted that while few conflicts were dangerous, the danger increased when several of the above factors were combined (OECD Scientific Expert Group on the Safety of Vulnerable Road Users (RS7) 1998).

5.12 Summary and concluding comments

Senior Victorians (aged 60+ years) are the fastest growing age group in the Victorian population. They currently experience relatively high rates of chronic diseases and fall injuries that impact on the health, wellbeing and quality of life of seniors and their families, and present a growing challenge for the provision of accessible and affordable health care services.

Rates of several of these age-related health conditions can be reduced if more senior Victorians are physically active. Physical activity levels among Victorian adults decline with age, and only 42% of Victorians aged 65+ meet recommended levels of physical activity (at least 30 minutes of moderate intensity physical activity on most days). Ill-health and functional decline contribute to, but are not the only causes of the decline in physical activity with age. In fact, ill-health and functional decline can be reduced by maintaining or adopting a physically active lifestyle.

Walking is the most popular form of sport and physical recreation among Victorian adults aged 35 years and older, with participation rates increasing up to the age of 64 years. Walking rates decline for Victorians aged 65+; however, walking remains the most popular form of activity, with participation rates several times higher than all other forms of sport and physical recreation (Figure 4). Based on data from the *Australian Health Survey*, on average, older adults spend about the same amount of time per week walking for transport as they do walking for fitness (Table 2); and walking for transport (and for fitness) does not show the rapid decline with age that occurs for vigorous physical activity.

These data indicate that Australian adults are favourably disposed to walking for both recreation and transport, and that reductions in walking with age are likely to be due to barriers to walking rather than an inherent dislike of walking. Most older adults do not need to be persuaded to walk; rather, they need spaces, places and conditions that assist them to do what they are already predisposed to do.

In addition to the health benefits of physical activity, walking for transport has additional health, well-being and community benefits associated with reduced car use. These benefits

include improved air quality; reduced traffic congestion; improved social connectedness and community liveability; and improved mobility for people who do not drive cars (Litman 2013).

Another important benefit of walking for transport is that it is a more socially inclusive form of physical activity than leisure-time physical activity. Socioeconomically advantaged population groups in Australia are substantially more likely than disadvantaged population groups to participate in recreational walking and other forms of moderate and vigorous physical activity. However, there is no comparable social gradient for walking for transport, which is fairly evenly distributed across socioeconomic groups (Figure 10). This unique feature of utility walking is important because disadvantaged population groups experience poorer health than more advantaged groups. Consequently, creating supportive environments for (more) transport walking may contribute to reducing health inequalities in Victoria by reducing disparities in physical activity participation.

In addition to the health benefits of walking as a form of physical activity, walking becomes an increasingly important form of personal mobility as Victorians age, and their car use declines. Although the overall level of utility walking in Victoria is relatively low, walking as a proportion of all trips tends to increase with age; nearly doubling between 45-49 years (8%) and 85+ years (14%[15]). In several other industrialised countries, up to 48% of daily trips undertaken by older adults are walking trips, indicating that high levels of walking among older adults can be achieved by establishing environments that support rather than constrain walking.

Independent mobility, including walking, is consistently perceived to be an important component of quality of life (QoL) for older people. In view of the health, mobility and quality of life benefits of walking for older adults, together with data indicating large variations in older adults' walking behaviour internationally, it is important to gain an understanding of what supports and constrains older adults' walking.

Factors that have been investigated include residential density, land use diversity, street connectivity, access to services, access to public transport, access to recreational facilities, walking facilities, traffic-related safety, crime-related safety, aesthetics, and urbanisation (Cauwenberg et al 2011). For many of these factors, findings are less consistent than related findings for younger adults. This could be due to fewer studies involving older adults; but it might also result from older adults having greater capacity to avoid adverse walking conditions because they may have fewer time constraints than younger adults. Some studies have found that (more) perceived barriers to walking are associated with *more* walking; suggesting that the experience of walking may lead to greater awareness of potential walking hazards. The concept of 'barriers to walking' for older adults is therefore complex, with 'barriers' having a number of possible impacts including (a) less walking; (b)

[15] This figure needs to be interpreted cautiously due to the large relative standard error for this age group.

less *enjoyable* walking; (c) more hazardous walking; (d) more careful walking; or (e) avoidance of adverse walking conditions by selecting when and where to walk.

One area of constraints on older adults' walking that has been investigated more comprehensively is that of traffic-related injury risks. Most of this research focuses on injury prevention rather than walking behaviour (ie the impact of improved pedestrian safety on walking rates); though the two are inter-related, with both actual and perceived risks impacting on walking behaviour. Actual and perceived risk of assault is also likely to impact on walking behaviour, though research in this area is inconclusive. Another injury risk that arises for older adults (that is largely absent for younger adults) is the risk and fear of falling while using the road network. In contrast to traffic-related injuries, little is known about the incidence, causes and prevention of fall injuries among older pedestrians using the public road network, though it appears that fall injuries may outnumber traffic-related injuries.

Pedestrians are at greater risk of traffic-related injury than motor vehicle occupants (World Health Organisation 2013), and older pedestrians experience more, and higher severity injuries than younger adults. Over the last decade, pedestrian fatalities in Victoria have declined more slowly than motor vehicle occupant fatalities, and also more slowly than in Australia as a whole. Victoria's rate of pedestrian fatalities is also higher than in several other industrialised countries, indicating potential for substantial improvement. Countries with the lowest rates of pedestrian fatalities also have relatively high rates of walking, including among older adults, indicating that it is possible (as well as desirable) to improve both the prevalence and the safety of walking among older adults.

Features within each of the four components of the *Safe System* framework[16] can make the road system more or less usable and safe for older adults.

Safer roads and road environments for pedestrians include the provision of well-designed and well-maintained footpaths and road crossings. Pedestrian safety, and possibly walking behaviour, are compromised when footpaths are missing or poorly maintained, and when pedestrian crossings are absent, poorly designed or misused by drivers.

Vehicle design features that enhance or reduce the risk of injury to pedestrians include vehicle front design; bull-bars; window-tinting; energy-absorbing bonnets, windscreens and pillars; blind spot mitigation; various forms of ISA (Intelligent Speed Assistance); and technologies such as autonomous emergency braking. Australian road safety authorities promote the purchase of '5-star' rated vehicles that provide maximum protection for vehicle occupants, but, in contrast to the European system, have not included best practice pedestrian protection measures in vehicle safety ratings.

[16] Comprising safer roads and road environments; safer vehicles; safer speeds; and safer people [ie road user behaviour].

Safer speeds are those that enable drivers to avoid colliding with a pedestrian, or, if a collision is unavoidable, to make contact at a more survivable speed. Speed limits in Australia are high by international standards, and frequently, pedestrian safety is traded off for small improvements in vehicle travel time. There is consistent evidence that slower speeds reduce pedestrian injuries, and some (more limited) evidence that slower speeds increase walking rates. Area-wide traffic calming appears to be more effective for increasing walking than site-specific road treatments (eg short 40 km/h zones in shopping strips), though the latter reduce pedestrian injuries.

Safer road users include drivers, cyclists and pedestrians themselves. However, the greatest threat to pedestrian safety is driver behaviour. In Australia, where the road system is largely seen as 'belonging' to motor vehicles, the educative, regulatory and legal systems that govern and shape road use place considerable emphasis and responsibility on vulnerable road users (such as older pedestrians) to avoid collisions with motor vehicles. In contrast, in several European countries, drivers have a high 'duty-of-care' to avoid collisions with pedestrians. In Australia, older pedestrians are largely held responsible for traffic-related collisions and injuries, and exhorted to "take more care on the roads". In fact, observational studies of pedestrian behaviour indicate that older adults are more careful, cautious and law-abiding pedestrians than younger adults. Consistent with these research findings is a lack of evidence that educational/training programs for older pedestrians are effective in reducing injuries. Rather than being 'risk-taking' road users, older pedestrians are 'at-risk' due to what (Wegman 2012) refers to as 'system failure' across the four components of the 'Safe System' as described above.

Consistent with older adults' generally cautious use of the road system, 'unexpected' events, such as bicycles passing at high speed and uncontrolled dogs on shared pedestrian-bicycle paths, can be a source of concern for older adults. Injury data and observational studies suggest that these incidents currently cause relatively little injury harm to pedestrians, though there are indications that the risks may be greater for older pedestrians. These concerns are also an important reminder that both actual and perceived risks also need to be addressed to make walking safer, less stressful and more pleasurable.

Overall, the benefits of walking for seniors outweigh the risks, but there is room for further improvement in terms of reducing the actual and perceived risks of walking using the public road and path network.

In conclusion, walking for recreation and transport is important for the health and mobility of older adults, with multiple benefits for seniors of all ages. Factors that support and constrain walking among older adults are numerous and wide-ranging, and, currently, not well understood. The evidence does suggest, however, that creating living spaces that support rather than constrain walking requires an integrated package of measures based on the principle that walking is an important form of mobility that, in many neighbourhood settings, should be prioritised rather than simply tolerated. The precise content of such a

package of measures is likely to vary somewhat by location, but broad guidance is available in the form of a growing number of countries, cities and towns that have successfully created the conditions that assist older adults to remain healthy, mobile, socially connected, and engaged in community life through walking as a regular part of daily life (GOAL Consortium 2012; ITF/OECD 2012).

6 Analysis of VISTA data for senior Victorians

6.1 Introduction

Data from the Victorian Integrated Survey of Travel and Activity (VISTA) were used to describe senior Victorians'[17] walking behaviour. The analysis included the socio-demographic characteristics of walkers aged 60 years and over; together with walking trip frequency, distance, duration, location and purpose.

6.2 Methods

The Victorian Integrated Survey of Travel and Activity (VISTA) is an ongoing survey of householders' travel and activity. The survey is conducted with approximately 11,000 households across greater Melbourne, and about 6000 additional households in Geelong, Ballarat, Bendigo, Shepparton and Latrobe. A 24-hour travel diary is completed for each person over five years old in the household on the specified day. The survey is administered on behalf of the Victorian Department of Transport, Planning and Local Infrastructure, and access to the data (for the construction of customised data tables) is provided online (www.transport.vic.gov.au/research/statistics/victorian-integrated-survey-of-travel-and-activity).

Data used in the analysis are for the 2009-10 financial year, with sampling spread across the full financial year. Data are for an average day (ie averaged across weekdays and weekends). Recreational walking trips are included, with respondents asked to nominate a recreational walking 'destination'. The outbound and return segments of the walk then comprise a total of two 'trips'. Trip rates (per population) were estimated based on age profiles of the residential population available from the Victorian Transport Statistics Portal (www1.transport.vic.gov.au/VTSP/homepage.html), based on data from the 2011 ABS Census of Population and Housing.

Data included in the analysis are for walking-only trips, and therefore exclude walking associated with travel to and from public transport or motor vehicles. They therefore underestimate total daily walking. An analysis of 2007-08 VISTA data indicated that individuals who use public transport spend slightly less time walking than those who walk only, while walking time associated with motor vehicle use is substantially lower (Beavis 2012). This pattern may vary for senior Victorians.

[17] Based on the regions covered by the VISTA survey (ie the greater Melbourne metropolitan area and selected Victorian regional centres).

6.3 Travel modes

Senior Victorians[18] aged 60 years and over travel mainly by car as a driver (64% of trips) or passenger (16% of trips), followed by walking (14%), public transport (5%) and other forms of travel such as bicycle, motorbike or taxi (1%).

As shown in Figure 7 (in Section 4), driving tends to decline with age for seniors, while car passenger trips increase (particularly for seniors aged 85+). Walking tends to increase with age across the senior years. These trends suggest that walking becomes an increasingly important form of mobility as people age, particularly for seniors aged 85 years and over.

6.4 Walking trips

Seniors walk an average of 0.5 trips a day; that is, about three and a half walking trips a week. The mean walking trip distance is 0.9km, the same as the mean walking trip distance for all people aged 20 years or over. These data indicate little variation in walking trip distance with age when seniors as a whole are compared with the overall adult population. There is a trend for walk trip distance to decline marginally with age within the seniors age range (1.0km for 60-69 years; 0.9km for 70-79 years; and 0.7 for 80 years or over); however, the differences are not statistically significant.

Seniors' mean walking trip time is 13.7 minutes, compared with 12.5 minutes for all adults aged 20 years and over; however, the difference is not statistically significant. Based on an average of 0.5 trips a day and 13.7 minutes per trip, seniors walk an average of 48 minutes a week. When walking associated with public transport and car use is included (ie based on 'stops' rather than 'trips'[19]), weekly walking travel time increases to an average of 71 minutes a week. This is substantially less than the weekly walking time reported in the Australian Health Survey (Australian Bureau of Statistics 2013b) (see Figure 8). This difference is likely due to the VISTA data not capturing all walking (eg recreational walking that does not constitute a 'trip' [eg at home, in gyms or shopping mall walks]). Also, the ABS data in Figure 8 are for Australia as a whole, though Victorian data are unlikely to differ markedly.

6.5 Walking trip purpose

Seniors' walking trips are mainly used for shopping (40%), for social/recreational purposes (29%) and to attend to personal business (19%) (see Figure 18). For older seniors (80+) walking to buy something and for personal business increase with age, while walking for social/recreational reasons decreases. These data indicate that, for older seniors, walking has an increasingly utilitarian function rather than a recreational function. This is the case

[18] Based on the VISTA sample of Greater Melbourne and selected regional centres.
[19] In VISTA 'trips' data, walking to a train station and then travelling by train to a destination is classified as a train trip; in 'stops' data, the walking stage is included as a 'stop'.

for *number* of trips. It may be that recreational trip distances are greater than utilitarian trip distances for older seniors, but standard errors associated with relatively small numbers preclude this analysis. Data from the ABS Australian Health Survey indicate than senior Australians spend a similar amount of time walking for 'fitness' and walking for 'transport' (about 70 minutes/week for each type of walking) (see Figure 8).

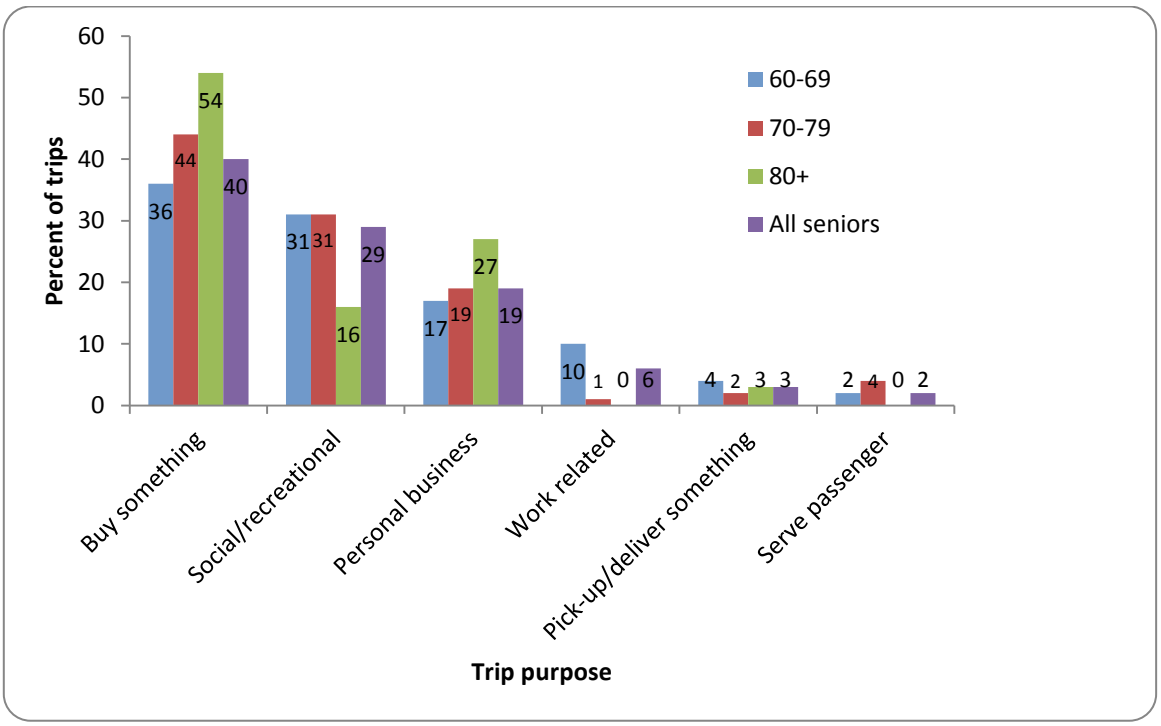


Figure 18: Trip purpose by age

6.6 Socio-demographic characteristics of seniors' walking

Age and gender

As described above, the proportion of trips made by walking shows an increasing trend from age 50 years and over, as driving trips decline (Figure 7). It is not possible to compare individual age groups as standard errors associated with data points are fairly large.

Walking rates tend to be higher for women than for men, though the differences are not statistically significant (see Figure 19).

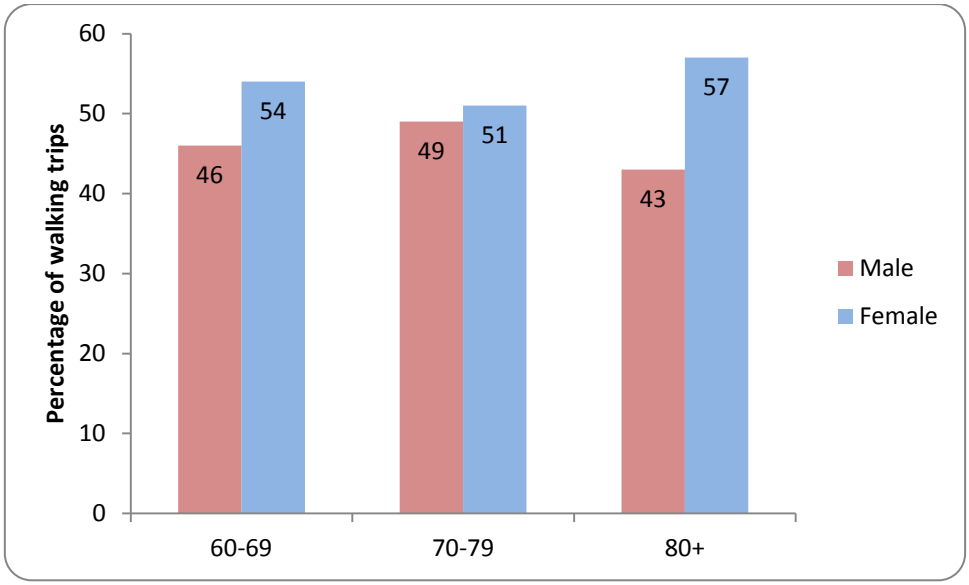


Figure 19: Walking trips by gender and age

Location

Seniors' walking rates vary considerably by location in the Melbourne metropolitan area, with the proportion of trips undertaken by walking highest in the central/inner Melbourne LGAs, and lowest in the outer Melbourne LGAs. This trend is similar to that for adults of all ages (20 years and over), and the scatter plot in Figure 20 shows a positive relationship between seniors' walking rates and all-adults' walking rates across metropolitan Melbourne LGAs.

Many of the data points in Figure 20 have high standard errors due to small numbers; nevertheless, the trend line suggests that seniors in some inner suburban LGAs have several times the walking mode share of trips compared with seniors in some outer suburban LGAs.

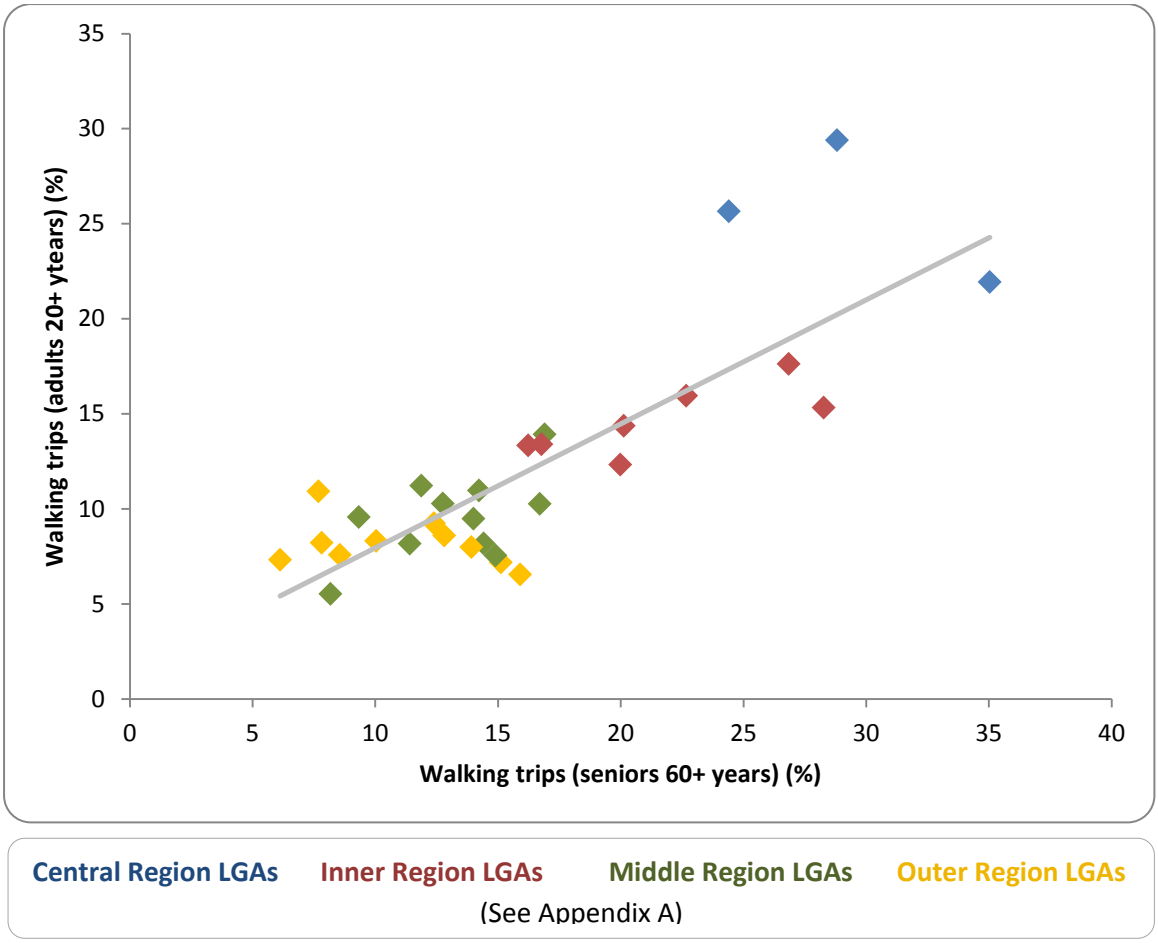


Figure 20: Proportion of trips by walking for seniors and the overall adult population by metropolitan Melbourne LGA

While the trend is for seniors in central and inner Melbourne LGAs to undertake a higher proportion of trips by walking than seniors in outer Melbourne LGAs, this does not necessarily mean that seniors living in central and inner LGAs spend more time walking than those living in outer LGAs, as walking trip distance may vary by location. This possibility was explored by examining walking trip distance for seniors by LGA.

LGAs in Figure 21 are listed from left to right by region (ie central, inner, middle, outer[20]), and alphabetically within regions. As is the case for the data in Figure 20, several data points have relatively high standard errors, and individual LGAs should not be directly compared. There are, however, indications of some overall trends. Mean walking trip distance shows an increasing trend from central/inner LGAs to outer LGAs, possibly reflecting the more dispersed urban form of outer suburbs and consequently longer distances between trip origins and destinations. The number of walking trips per senior per day declined between central/inner and outer LGAs, as did the mean distance walked per senior per day.

[20] See Appendix D for a list of the LGAs in each metropolitan region.

These trends suggest that higher walking trip rates in inner suburbs are in fact associated with more overall walking; that is, longer, but fewer walking trips in outer suburbs result in less walking overall than shorter but more frequent walking trips in inner suburbs. Inner-outer suburban differences in seniors' walking distance may be even more pronounced if multi-modal walking is taken into account. As noted above, the data presented here are for walk-only trips, and exclude walking associated with multi-modal travel such as walking to and from bus, train or tram stops. Public transport use is higher in inner Melbourne suburbs, and is therefore likely to contribute to increased overall walking distance in these areas (Beavis 2012).

Mean distance walked per senior per day was about two and a half times greater for seniors living in central/inner LGAs than for seniors living in outer suburban LGAs, though, as noted above, there are relatively high standard errors associated with these estimates.

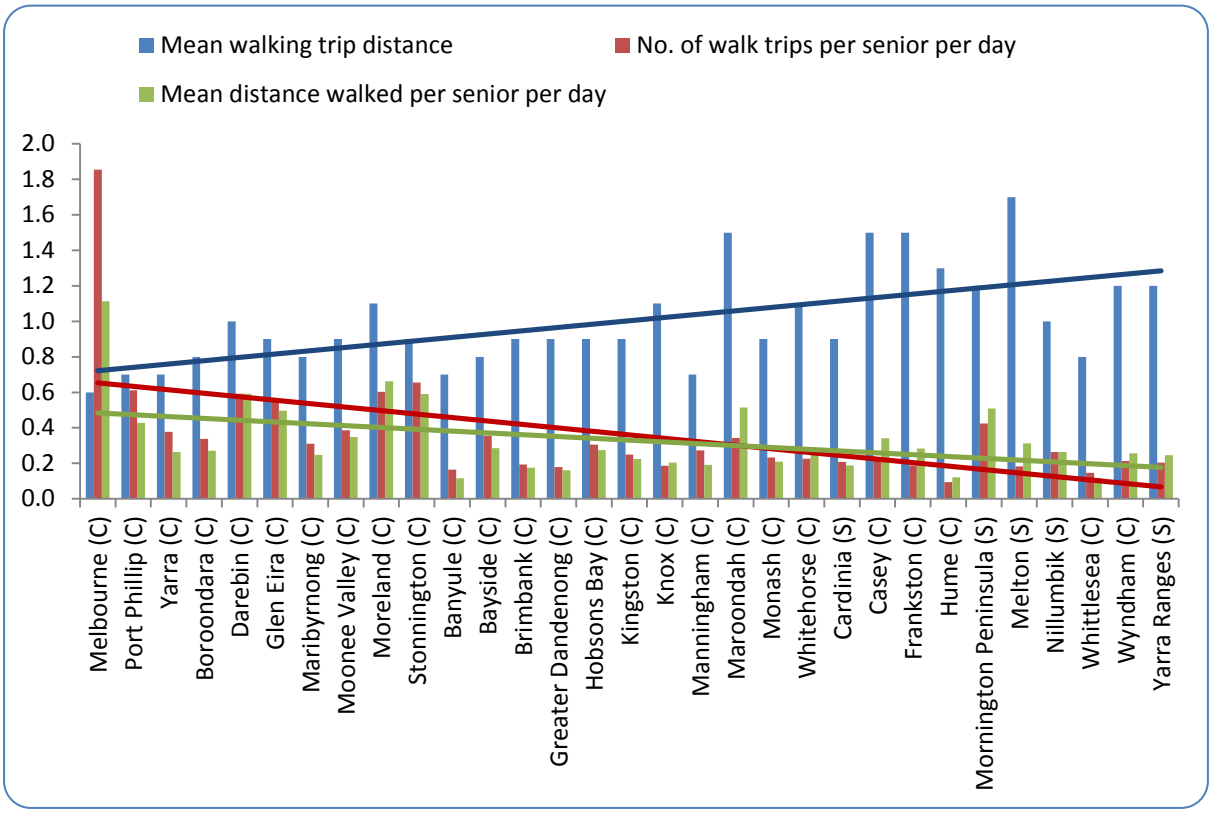


Figure 21: Mean walk trips (number of trips) and walk distances (km) by Melbourne LGA, seniors aged 60+ years

6.7 Concluding comments

Consistent with Victorian and Australian data cited in Section 4, and with data from several European countries, walking becomes an increasingly important form of mobility as people age, and driving a motor vehicle declines (Pucher and Dijkstra 2003). Utilitarian trip purposes (eg shopping and personal business) become increasingly important for older

seniors, confirming the contribution that walking makes to older adults' mobility. As mobility is an important component of older adults' quality of life (Gabriel and Bowling 2004), creating supportive environments for seniors' walking contributes to older adults' health, mobility, independence and quality of life.

An interesting finding from this analysis is that walking trip distance shows little variation across all adult age groups. This suggests that utilitarian walking has some unique[21] characteristics as a form of moderate intensity physical activity, as most other forms of vigorous and moderate intensity physical activity decline with age (see Figures 8 and 9). When walking to get to places is an intrinsic part of daily life (ie to facilitate shopping, personal business and socialising), health-enhancing physical activity is achieved incidentally rather than purposefully (eg with the specific purpose of improving health). The variety of purposes associated with personal mobility appear to provide more opportunities for more seniors to be active than occurs for health-motivated seniors seeking more deliberative forms of physical activity. These characteristics of utilitarian walking help to explain why walking for transport is one of the most socially inclusive forms of physical activity. Health-motivated physical activity varies by socio-demographic characteristics (eg gender, age, socio-economic position, etc), but mobility-motivated physical activity is more widespread across population groups. This study found few differences in utilitarian walking by age or gender, and the Australian Health Survey reported few differences based on socio-economic position (see Figure 10).

The other key finding from this analysis is the geographical variations in seniors' walking trip frequency and distance. The mode share of walking for seniors in inner suburban LGAs is several times greater than in some outer suburban LGAs, and is positively correlated with walking mode share for all adults (aged 20+ years). This finding is consistent with a similar analysis conducted in Montréal, which found that distance from central Montréal was the main determinant of seniors' utilitarian walking (Moniruzzaman et al 2013). These findings indicate than when the conditions are established that support walking in general, more seniors will also walk.

This analysis also found that, in addition to walking mode share, the number of walking trips per senior per day, and the walking distance per senior per day increased with proximity to central Melbourne. Distance walked per trip tended to increase with distance *from* central Melbourne, but, overall, inner Melbourne seniors walked more because they undertook more walking trips.

These findings therefore challenge the notion that poorer health and functional decline largely explain declining physical activity levels older adults. This may be the case for the more discretionary forms of leisure-time physical activity, but appears to be less important for utilitarian walking which is undertaken for a wider range of purposes than leisure-time

[21] Possibly shared with utilitarian cycling in countries with high rates of cycling for transport.

physical activity. Consequently, environmental conditions play an important role in seniors' walking, as they appear to support continued utilitarian walking when the ability and desire to participate in leisure-time physical activity declines.

7 Focus group discussions

7.1 Introduction

The aim of this component of the study was to explore barriers and enablers for walking among senior Victorians in some depth and detail using the qualitative data collection method of focus group discussions. Qualitative data assist in explaining and understanding quantitative data associated with barriers and enablers for walking, thereby providing insights into older adults' walking behaviours that cannot be obtained from numerical data alone. Findings from the focus group discussions were also used in the development of the questionnaire that was used in the survey component of the study.

7.2 Methods

Invitations for senior Victorians to participate in focus group discussions about neighbourhood walking were distributed through COTA newsletters emailed to approximately 2000 people, and announcements on Golden Days Community Radio. Printed invitations were also available at the reception area of the COTA premises in Collins Street, Melbourne. A total of 32 senior Victorians (23 females and 9 males) participated in eight focus group discussions; seven of which were conducted in a meeting room at the COTA premises, and one at Knox Leisureworks in Boronia.

A semi-structured interview format comprising 14 questions was used to guide the discussions (See Appendix A for a copy of the demographic questionnaire and the focus group discussion format). Participants were asked for permission to audio tape-record the discussion, and all gave their consent. The recordings were used to make comprehensive notes on the content of the discussions, and key themes were developed as a basis for the content analysis of the data. The direct voices of the focus group discussion participants in the form of (anonymous) verbatim quotes are used extensively in the presentation of the findings.

7.3 Results

7.3.1 Participant characteristics

A total of 32 senior Victorians (23 females and 9 males) participated in eight focus group discussions. Participants were:

- aged 55-60 (n = 1); 60-69 (n = 17); 70-79 (n = 12); and 80-89 (n = 2);
- lived in several inner, middle and outer Melbourne suburbs, and in two rural cities/towns; and
- not in paid employment.

The majority of participants walked for fitness or leisure on three or more days of the week, but five did not walk for fitness or leisure at all (see Figure 22).

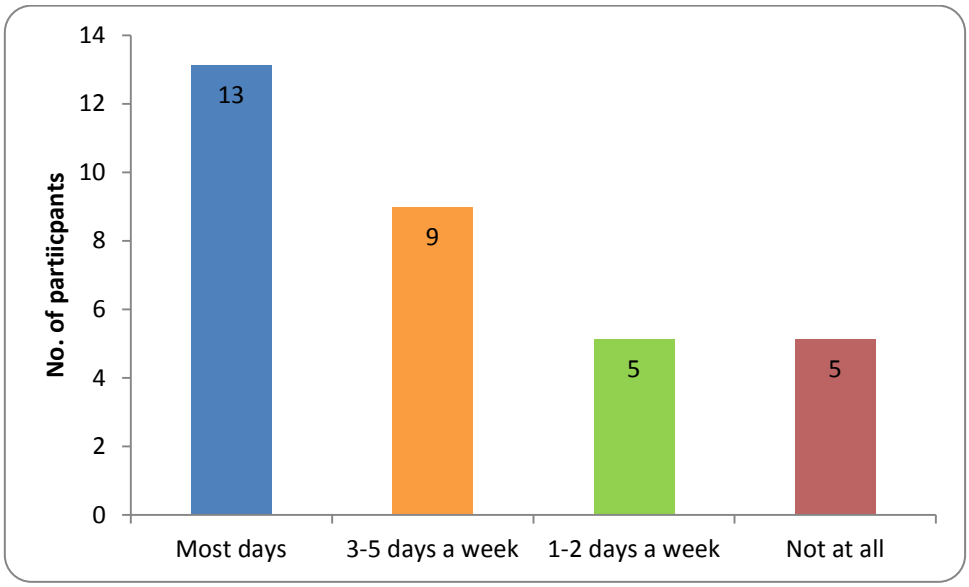


Figure 22: Walking for fitness or leisure

The majority of participants walked to get to places on three or more days of the week (n = 17), though nine did not walk for transport at all (see Figure 23). Most of the participants who did not walk for transport were from outer Melbourne metropolitan areas, or from country Victoria.

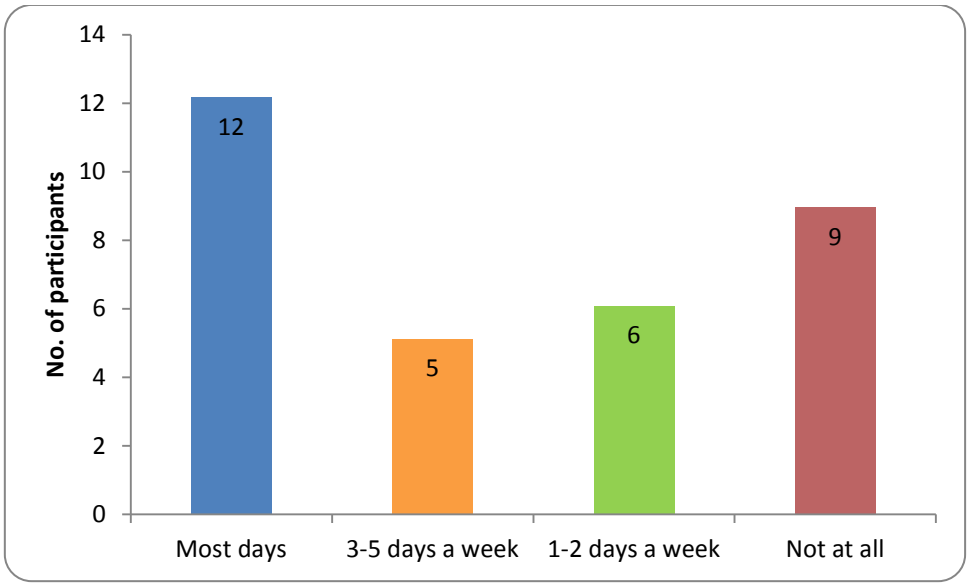


Figure 23: Walking to get to places

Participants were asked to nominate up to three modes of transport they usually use to get to places (starting with 1.). Most participants usually travel by car to get to places (Figure 24); with walking the second most commonly used mode (Figure 25), and train the third

(Figure 26). Overall (combining the top three modes), the three most commonly used travel modes were car driver, train and walking (Figure 27).

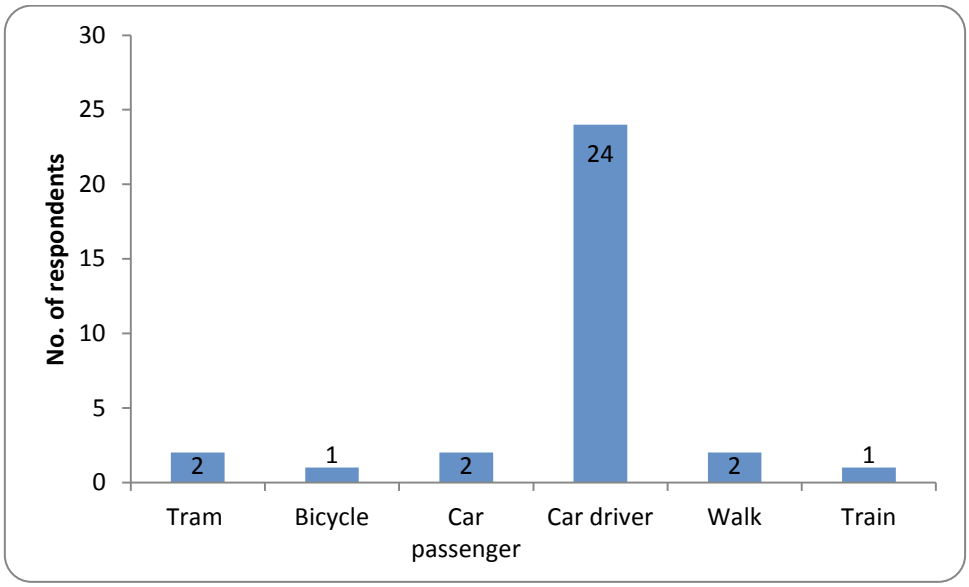


Figure 24: Most frequently used travel mode

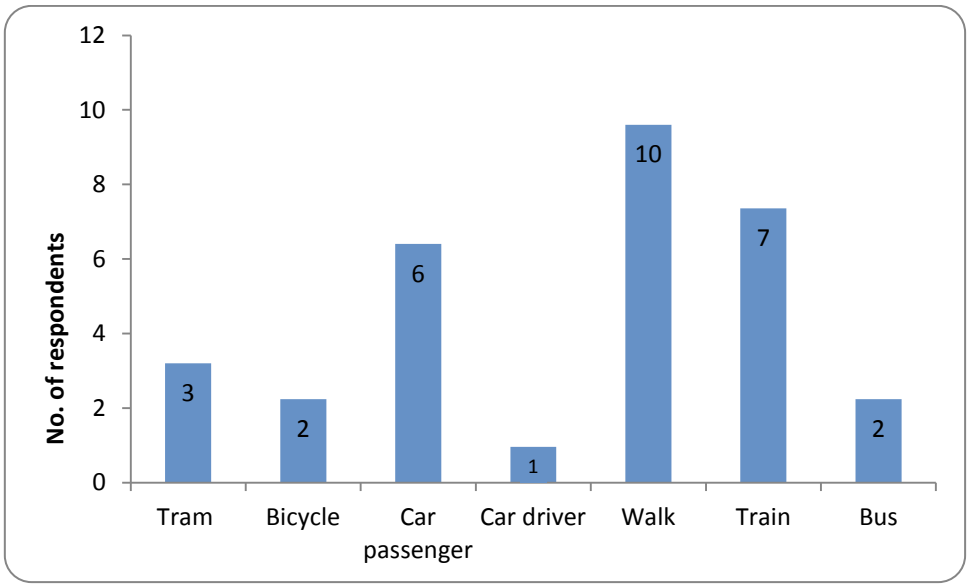


Figure 25: Second most frequently used travel mode

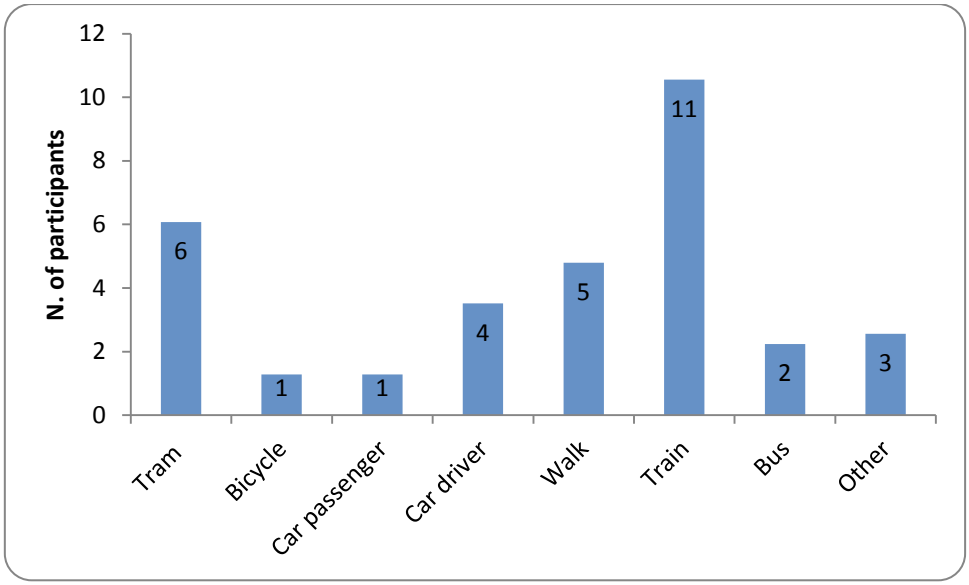


Figure 26: Third most frequently used travel mode

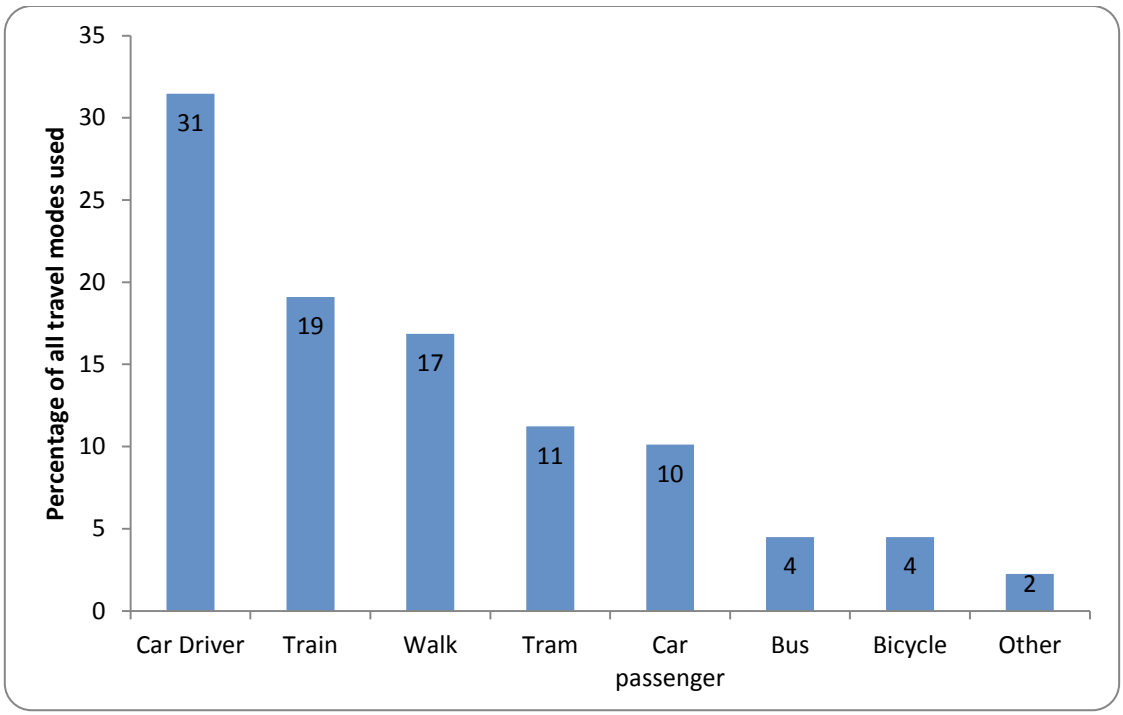


Figure 27: Most commonly used travel modes (three most commonly used modes combined)

Most respondents described their ability to get around by foot as 'good' to 'excellent' (Figure 28).

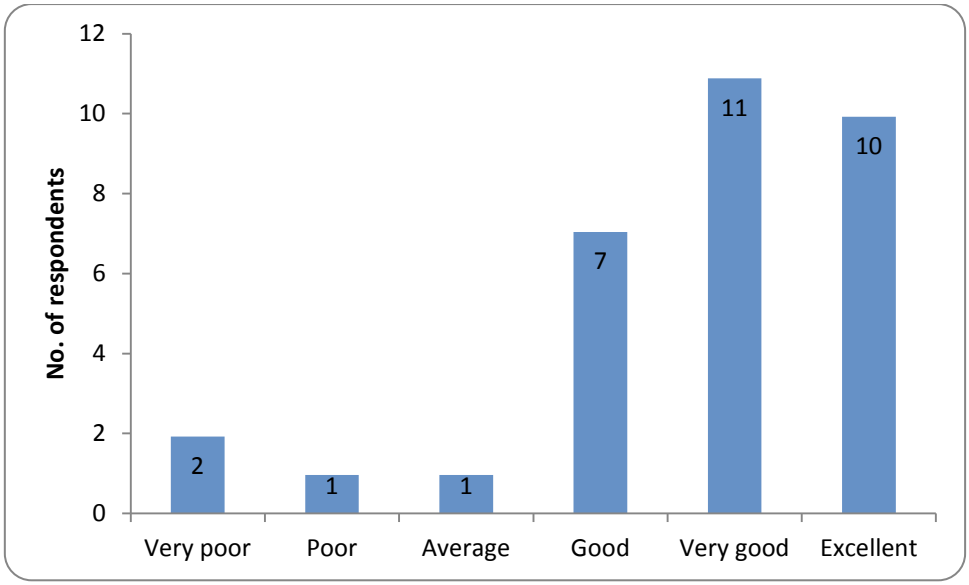


Figure 28: Walking ability

7.3.2 Focus group discussion findings

Seven key themes emerged from participants' responses to the focus group discussion questions. They were:

- The meaning of walking for seniors (in terms of both function and affective factors such as enjoyment)
- Supports for walking
- Barriers to walking
- Safety
- Traffic speed
- Sharing travel space
- Walking-friendly neighbourhoods

These themes are described in the following sections, predominantly through the direct voices of the focus group participants in the form of verbatim quotations.

7.3.2.1 The meaning of walking for seniors (function and affect)

Participants talked about a range of factors related to the functional and affective aspects of walking.

The functional aspects of walking ranged from the intrinsic to the practical, though with some overlap between the two. Walking was considered to be:

"basic to people – it's not one of those superficial things."

"Walking is a natural thing to be doing."

"I can't imagine not doing it – it's part and parcel of my life."

"It would be terrible – stuck all day at home!"

"I value my walking very much...I don't know what I would do. 11 out of 10 – that's how important it is!"

Consistent with the high intrinsic value of walking, several participants talked about seniors they knew who went to extraordinary lengths to walk again after a period of incapacity:

"*It was so important to him – just to be able to walk a few steps to get on a bus."* (following a broken leg).

"I walked to the corner shop and had to sit on fences along the way, but just being able to do that..." (following surgery).

"As you get older, it's something you can still do."

"His will to walk is so strong."

The more practical aspects of walking were the valued activities and conditions that are made possible by walking, including access to public transport and shops; getting exercise and staying fit; 'therapy' for a mental health disorder; a convenient, free form of transport; avoiding social isolation; taking the dog for a walk; and making friends after moving to a new area. Comments included:

"It's an important part of me and my dog getting our exercise. I've only been there four years and that's how I got to know the majority of people."

"Public transport is important."

"Living near shops."

"I'm known by my neighbours. It's the village – it's a sense of security."

"It's a good pace to actually see things, experiencing things."

"I enjoy it because, compared with just sitting in a car, you can take in so much more."

"It's being outside, slower pace, and you meet people you don't meet when you're in the car. Have a bit of a chat."

"I always walk down to the shops, just because it's beautiful, there's a lot of birds, it's peaceful, and not too much traffic."

"You get to meet interesting people, fresh air, and an easy form of transport, and it's free!"

"It's their social information exchange time as well as their morning exercise time! (Referring to a walking group for older adults associated with a housing estate.)

One participant recommended that when seniors 'down-size' and move houses, they should consider how they will get around when they no longer drive a car. Easy access to shops and public transport by walking was considered important.

Several 'affective' aspects of walking were mentioned. These included references to "feeling invigorated", "being outdoors", "in the fresh air", and being in "beautiful", "peaceful" environments. There were also references to fears about no longer being able to walk, and feeling "flat" and "terrible" if unable to walk.

7.3.2.2 Supports for walking

This study is based on the social-ecological model of walking illustrated in Figure 11. This model proposes that walking behaviour is influenced through the interplay of intra-individual characteristics, and factors associated with the physical, socio-cultural and policy-regulatory environments. Environmental factors include both the natural and built environments.

Participants' discussion of supports for walking touched on a small number of individual factors including "finding time for walking" and education/awareness-raising (eg medical advice on how to commence walking or increase walking levels; and raising awareness of neighbourhood walking facilities and walking groups).

Participants also mentioned several environmental factors, including directions for pedestrians when negotiating complex areas such as freeway interchanges and building (including roadway) construction sites that are "*supposed to be temporary, but have been going on for five years now*". There were several positive comments about traffic islands "*because at least you can get half-way, and the cars have to slow down a bit.*" Making traffic islands attractive (eg "*having flowers or something that make it a pleasant place to stop*") appears to encourage their use. For seniors living in outer suburban and country areas, more footpaths were required, as "*you don't have to be very far out of country towns before you run out of footpaths.*"

The importance of establishing attractive walking routes with interesting destinations that encourage walking in country towns was mentioned by one participant:

> *"In a small country town there's not a lot of places to walk. Once you get out of town, you're on flat country roads that can be somewhat dangerous – not exactly attractive country to walk in."*

Having good public transport was a motivation for walking for a number of participants, with one commenting that he walks to a train station that is not the nearest station to his home to get additional exercise.

Pedestrian underpasses and overpasses for crossing major roads were valued, but there were concerns about them not being cleaned often enough and becoming slippery.

Pedestrian crossings that reduce pedestrian waiting time were viewed favourably (and also considered safer):

> *"City of Monash have recently done the pedestrian mall, and at the end of the pedestrian mall there's two streets that cars are going up, and the pedestrian crossing there is designed to be walker-friendly. As soon as you press that button, it stops to let pedestrians cross. People used to notoriously just walk across the road, but now they stop because they know they won't have to wait long (30 seconds at the most). It's a pleasure."*

Suburban historical/art trails were viewed positively, because they add interest to walking (including utilitarian walking to shops, etc). This is an example of the interactive effect between utilitarian walking and the aesthetic appeal of the walking route. Social support for walking was also mentioned *("having company might encourage me to walk more").*

It was also suggested that hiking tracks to features such as waterfalls should include estimated time as well as distance, to account for variations in terrain. 'Easy to read' track information (eg from information centres) was also recommended, as some information is provided in small print or pale colours that are difficult to read.

Female participants also mentioned having places to walk that are "*well-lit and there are people around – and that's important, as it doesn't take much to knock over an older woman.*"

Other participants mentioned shopping mall walking groups as being good for getting people started with walking if they have initial concerns about health and safety.

A few participants referred to walking being preferable to driving a car, or an alternative form of mobility if driving is not an option:

> "*because it's easier to walk in the city – you wouldn't drive unless you absolutely had to.*"

> *"I can't drive, so I do a lot of walking*."

7.3.2.3 Barriers to walking

As for the supports for walking described above, participants mentioned a range of factors. Personal barriers centred on health problems, and, less commonly, lack of time and/or motivation. One participant referred to "*getting out of the habit of walking*" during winter, and being keen to re-establish the habit.

Environmental factors included hilly terrain and the weather:

> *"Weather – raining – but it has to be raining really hard."*

"Very hot weather."

However, consistent with many seniors' 'getting around the barriers' approach to walking, one participant described several walking routes he uses, depending on the weather:

"Our wet weather course is four laps of The Glen [shopping centre]!"

Most environmental factors, however, referred to characteristics of the built environment, such as access to public transport:

"I'd like to walk to public transport, but it's too far."

Several aspects of traffic infrastructure (for pedestrians and motor vehicles, and their interactions) were mentioned as barriers to walking. Poor pedestrian infrastructure included lack of footpaths; the barrier effect of major roads; crossing roads; and poorly surfaced or maintained footpaths.

Lack of footpaths:

"You either walk on the nature strip or you walk in the gutter – and there's often over-hanging trees on the nature strip, and walking in the gutters feels unsafe because some drivers come pretty close to you."

"Some of the newer estates only have a footpath on one side – difficult for people with prams, walkers, shopping trolleys or gophers."

"In country towns, trucks come flying through, there are deep gutters by the side of the road, and accumulated gravel where you have to walk."

The 'barrier' effect of major roads:

"Having to cross major roads."

"Incredibly heavy traffic impedes you – it's not pleasant to walk, so you stay at home."

"Have you ever tried to go past CityLink down by Docklands? I decided to walk there from the city and it's absolute...it's rather like hell! There's a huge round-about with huge lanes of traffic whizzing in every direction. You do have lights, but you've got to scurry, and I finally got there, and they said "did you find a parking spot? and I said "no I walked, and they said "Walk?!! How are you going to get out of here?" It's not designed for anybody to go anywhere near there. It's designed for the car. The car has completely taken over and made it almost impossible for pedestrians.

Crossing roads:

Knowledge, awareness and compliance with road rules was raised in a number of circumstances, and across road user groups, though especially drivers. Concerns included failure to stop at pedestrian crossings, slip-lanes, and for trams:

> *"They're encouraged to think* [stopping at pedestrian crossings] *is optional." I'm in a rush. My time's more important than yours. I'm bigger than you."*
>
> *"Cars on slip-lanes feel that they've got the right of way because it's a slip-way for cars – it allows them to join the traffic. How many pedestrians are prepared to take the chance [that cars will stop for them]?"*
>
> *"They (cars) never stop at slip-lanes. The problem with being a pedestrian on a slip lane is that the drivers are generally only looking in one direction – the opposite direction."*
>
> *"Crossing roads – one section of road in Ringwood, you have to do it in three stages. You get to one section and wait, then another section and wait."*
>
> *"Pedestrian crossing light cycles are not long enough. Wide road (Plenty Rd Bundoora), 80 km/h, you have to run for it!"*
>
> *"It took me 7 minutes to cross St Kilda Rd one morning – I timed it. I had to wait to get to the centre, then I had to wait for the tram, then get to the other side, 2 sets of car cycles because on the first walk cycle you can only get to the centre of the road. You've got no hope of getting across in one cycle. The car cycle could be shortened to allow pedestrians to get across, because, when you've got a 3 min wait and then another 3 minute wait on the other half, that's what makes people make a dash for it."*
>
> *"There's really no pedestrian access at roundabouts, and you don't know which way cars are going. I try and shift away from the roundabout, and cross 50 m down, but then you've got no protection – no rights. When you have to walk down the street and then walk back it adds to the distance."*

Other types of infrastructure that constrained seniors' walking were lack of resting places, seats and public toilets; isolated paths ("*some beautiful paths, but you don't feel safe*"); streets with heavy traffic; and uneven walking surfaces:

> *"Uneven footpaths. I know lots of people who have tripped. It only needs to be a bit uneven. In fact it's worse when it's smaller because you don't notice."*
>
> *"Huge, deep gutters* [in country towns] *and they're dangerous."*
>
> *"..... keeps falling over all the time because as he's getting older and weaker he's just not quite getting his feet high enough, he thinks he's on the flat but he's not."*

"In Sydney on the walks around the harbour they paint reflective paint on the cracks so they're quite visible."

"Slopes, angles, etc, can be difficult for people with gait problems, in wheelchairs, walking frames, pushing prams."

"Gravel paths are uneven and develop lots of potholes and I can trip easily."

"When I'm walking, I'm always looking at the ground. Now and again I'll stop and look around me because otherwise you miss the view because you're too busy concentrating on your feet."

"Concentrating on your feet" due to fear of falling, has been shown to contribute to older pedestrians spending less time than younger adults looking out for motor vehicles while crossing roads (Avineri et al 2012).

Some participants referred to barriers due to the regulatory environment, such as not allowing dogs on buses:

"Some seniors don't go out because if something happens, they can't get home with the dog."

Some of the barriers referred to, and seniors' responses to them, illustrate the trade-offs that are sometimes made between safety from assault, safety from traffic, and safety from falls. For example, in some circumstances, safety from traffic (eg on riverside paths) may increase concerns about safety from personal assault. For some seniors who enjoy walking, or who depend on walking to get around, 'barriers' such as poor weather need to be substantial to stop them walking. In fact, 'getting around barriers' in general was a recurrent theme in the discussions, with participants choosing walking times and places to avoid walking hazards; or taking extra care when using unavoidable hazardous areas:

"I'm very aware of what's going on around me when I'm walking on my own."

"... unevenness of some of the footpaths, mainly in the residential streets. If I'm walking at night, I expect the footpath to be uneven and accommodate that."

"I avoid walking at school start and finish times – it's a bit chaotic, and that's an understatement. The parents dropping off – parking where they feel like it, doesn't matter if it's in the middle of the road."

"I give way to everyone. I just wait, wait, until it's safe. You can't trust any of them. It's just common sense. It's hard to argue the point when you're lying on the road under the car."

"You've just got to watch for them. Wait for a gap, then zip across- wish me luck!"

"If you're slow at walking you have to avoid roundabouts."

"It [cyclists on sections of Yarra Trail] puts me off walking there, but it doesn't stop me walking."

"As you get older you do get more anxious, and that can make you angry. I'm annoyed at it so much, but they're not going to take away my pleasure at doing it."

"I walk with my eyes open – very alert!"

"I won't walk at night any more, only because of the uneven surfaces. You can't see where you're walking so you've got to be very, very careful. When the sun goes down, I don't walk, and that's a bit of a pity.

"Lighting is an issue in suburban areas when you want to go to things and walk home at night, if the streets aren't lit well it can be quite off-putting. Residential streets are dark at night. I have a friend who wears a headband with a light at night, and he looks a bit funny, but he's not going to fall over."

These insights into the nature and impacts of some 'barriers to walking' may help to explain some of the apparently inconsistent research findings on supports and barriers to seniors walking (see Section 5). It can be difficult to identify whether certain barriers restrict walking, make it less pleasant, lead to adaptive behaviours such as personal lighting, or lead to alternative route selections (but not necessarily less walking). It is, however, important to bear in mind that many of the seniors who participated in the focus group discussions appeared to be 'committed' walkers who may be more likely than other seniors to find a way around potential barriers to walking.

7.3.2.4 Safety

As discussed in Section 5, older pedestrians are over-represented in pedestrian fatalities and serious injuries in Victoria. This has led road safety authorities in Victoria to urge older pedestrians to "take more care on the roads" (see Section 5). This issue was discussed by participants in response to the question "Do older pedestrians take risks on the roads?"

The question elicited a range of responses, with most participants rejecting the notion of older pedestrians being risk-takers:

"No different to the general population. If it's directed at older people it's an ageist remark because across all age groups you get people who take risks. It's pretty patronising."

"I don't think the general [older] population would take kindly to being lectured."

"*Seniors actually know that they are mortal, I don't think we take risks, I think you're more cautious as you get older, in a lot of ways we are more careful."*

"The roads were built for cars and we're a nuisance, the walker is always at fault and it's the walker that needs to be re-educated not the driver."

"There's an element of ageism here – it there's an accident with an older person it's the older person's fault – it's always our fault."

"There are some who need to give up their licences, but I think older people get blamed for causing accidents and I think that's wrong."

"Some do [takes risks], but not purposefully."

Some participants felt that road conditions can contribute to risky behaviour:

"Some do. There's a range of people just like everything else. But some of them do it because they'd never get across otherwise. There's ones that do it because they've got to get somewhere."

"In our shopping centre they put barriers up to make pedestrians cross at the crossing, but they climb over it, or sidle along it, and it's not just the young ones – the elderly are just as much to blame."

Another participant commented that 'over-cautiousness' when crossing roads can lead to risk, because *"after waiting, waiting, waiting...they end up doing something unpredictable*". This is an example of older pedestrians making more 'missed opportunities' errors than younger pedestrians when crossing roads (see Section 5.6). In terms of dealing with this risk-taking anomaly, the participant went on to comment:

"*I was in Europe last year, and in those really narrow streets and there's just so much respect of everyone. And cars are secondary. Narrower streets are often safer, but there's huge opposition to any road narrowing. There's some really fundamental community education that needs to be done around this – it's based on good research – not just my opinion."*

Others mentioned that risky pedestrian behaviour can occur at all ages (for different reasons):

"You've got the problem of people with IPods and MP3 players – they're in another world, and it's not mainly older people. They're walking along, and you can see them, but they can't see you."

Another aspect of pedestrian safety, which is relatively neglected in the pedestrian safety research literature (see Section 5.6), is the risk of falls while walking. Several participants shared stories of themselves, family members or friends who had experienced falls while walking, due to footpath hazards. A number of participants described recent falls, for example:

"Some surfaces are very difficult. The other week I went for a beautiful swan dive because I tripped over the edge of a manhole cover that was up just that little bit. Fortunately, I didn't do any lasting damage, but I certainly got a fright."

"I have fallen over twice, because of the rough surfaces".

The above comment is another example of a recurring theme among focus group discussion participants of 'not letting adverse conditions stop them walking'. The following comment illustrates the same theme in the context of personal safety:

"I prefer to live my life the way I want to, rather than accommodate for any possibility. I walk locally at night, and keep an eye on shadows."

7.3.2.5 Traffic speed

The question *"Do you think reducing speed limits in some areas would make it safer and more pleasant for you to get around in your neighbourhood*? elicited mixed responses that ranged from support, to conditional support, to opposition.

Comments supportive of reduced speed limits included:

"All the evidence says that if you are going to be hit by a car, 40 is better than 60. If you're going to be hit by a car, choose a 40."

"That's something that should be done for all people, not just older people. When older people have difficulty walking, slower speed would be better because it gives them more time to cross the road."

"Motorists are more likely to see you so they can slow down."

One participant from a semi-rural area commented that reduced traffic speed is an effective "whole of community" way of simultaneously dealing with safe provision for cyclists, pedestrians and people using motorised scooters, including children walking and cycling to school, and older pedestrians on foot or using motorised scooters.

Conditional support focused on places where reduced speed was considered appropriate:

"Slowing traffic down is good in some places." "If infrastructure is good, speed doesn't matter so much."

"Areas where there aren't footpaths, areas where it's busy road traffic and pedestrians, dropping speed limit to 40."

"I'm from country Victoria, where there's a tourism precinct and lots of events, cars parked on both sides of road, people coming off the highway and don't know there is an event on - buses, kids , parents with prams crossing roads. It would be good to have solar signs set at 40."

There was some support for variable speed limits depending on the time of day; for example, 40 km/h in shopping strips that revert to 60 km/h overnight, using illuminated speed signs so the speed limit is obvious.

Participants who were opposed to lower speed limits commented that it was difficult to implement, or to expect drivers to comply with lower speeds:

> *"Council won't do it. VicRoads have to be involved....VicRoads don't want to know about it either. Council says they can't do it because it's not a school zone."*

> *"Slowing traffic down is good in some places but you get a lot more fumes, and it takes longer for cars to pass you on the road. For me it's got more negatives than positives. They've made a lot of avenues 40 and it seems so ridiculous, and more cars seem to flaunt the law."*

High existing levels of drivers breaking speed limits was frequently cited as a reason for not lowering them further:

> *"It won't make any difference – it will just frustrate them even more."*

> *"It's like the people who speed through car parks, at 50 Ks an hour, and it's obvious in a car park you've got people walking, and they come FLYING around a corner, and ...why? Lack of good manners. It's all about me, and not respect for others."*

> *"if you can get respect for one another you solve heaps of problems."*

Comments such as these indicate that for some people, opposition to lowering speed limits is not based on their perceived intrinsic value as a road safety measure, but, rather, on concerns that drivers will not comply with speed limits. Some comments regarding speed are consistent with seniors adopting a strong 'personal responsibility for safety' perspective (see above). It reflects, to some extent, an acceptance of current conditions, and adapting to them by modifying their walking behaviour.

Comments such as "*...avenues 40 and it seems so ridiculous, and more cars seem to flaunt the law"* support road safety recommendations that lowering speed limits should be accompanied by road designs that make lower speeds more intuitive; for example, by establishing 'self-explaining roads' (World health organisation 2013) (see Section 5.6).

Alternative traffic calming measures (to lower speed limits) were also mentioned by a participant who uses speed humps as 'informal' pedestrian crossings:

> *"Speed humps help because if there's a speed hump it's easier to cross because you know people are going to have to slow down."*

7.3.2.6 Sharing travel space

Participants were asked whether the behaviour of other road users puts them off walking or makes walking unpleasant. In response, a number of road users were mentioned, including bicycle riders, car drivers, people using electric mobility scooters, and motorcycle riders.

> *"When you walk anywhere you've got to be very careful of dogs and cyclists and skateboarders, and gophers[22] – they travel on footpaths very fast. You get startled as they come screaming up behind you."*
>
> *"There's a lot of gophers in the city, and some of them go really fast."*
>
> *"Some [cyclists, etc] put me off. Also scooter drivers – I don't think there's enough education. Some people have no idea about where they should be riding, and road rules, and you can't hear them. Bigger scooters go faster, and some men get the bigger scooters because they've had the bigger cars. They are a hazard. They're great, but it's something to think about when you're walking, especially if your balance is a bit wonky."*
>
> *"Dogs need to be on leads. Dogs can trip you up if they're not under control."*
>
> *"The motorcycles on the footpath aren't too good for negotiating around. Parking and moving – some of them take a great distance to find their parking spot! In the city – the 'little' streets are a bit hairy. You have to look carefully for cyclists, motorcyclists and skateboarders."*
>
> *"Drivers.....driving flat-out out of driveways and car parks and shops, as well as parking across footpaths."*
>
> *"Another thing drivers don't seem to know, if they are turning into a road you're crossing, they're supposed to give way to you."*

Some participants commented that drivers are more courteous to pedestrians (especially older pedestrians crossing roads) in areas that don't have a lot of through traffic. The waterfront area of Williamstown was mentioned as an example:

> *"It's got that feel, that it's not a place to rush through."*

In some rural/urban fringe areas, 'sharing' often means pedestrians, cyclists and motor vehicles sharing local roads that have no footpaths, and little prospect of them being built due to the costs involved. In these situations, safety and access is dependent on awareness (among drivers) of the possibility of coming across pedestrians, and preparedness to share the roads with non-motorised traffic. Participants reported that cooperative driving

[22] Motorised scooters.

behaviour is not universal, as some of these roads are popular with young 'hoon drivers', that are difficult to police because "*police can be 30 minutes drive away*."

In inner Melbourne areas, drivers failing to stop for people getting on and off trams was an issue, as was drivers failing to stop at pedestrian crossings:

> *"You walk across Station Street at the [signalised] pedestrian crossing, and I've nearly been killed three times, and I've talked to VicRoads and told them, and I've had no response whatsoever. It's an issue for school kids too."*

There were also reflections on additional reasons for conflict on shared spaces:

> *"Everyone's time poor and rushing around."*
>
> *"There's an increased level of aggression on the roads anyway these days."*

The speed, unexpected appearance (eg when overtaking from behind) and unpredictable behaviour of bicycle riders on shared paths was a key concern, for example:

> *"Cyclists on shared paths that go like a bat out of hell."*
>
> *"Cyclists are really bad...and I ride a bike myself, but they scare me [on the Koonung trail at the weekend]. They do not ring their bell, and I don't like the lycra people coming past. It's by law they should have a bell. Bicycle Victoria says "Obey the road rules", but they don't. So the Police need to start fining people."*
>
> *"I get concerned about the 20-year-olds doing the Tour de France. It's hoonish behaviour whether it's on a bike or in a car."*
>
> *"Some [cyclists] are wonderful, but others disregard it."*
>
> *"I live inner city and walking inner city is quite dangerous because of the bikes – not necessarily local residents, but commuters. They go through red lights. I've seen lots of people nearly skittled. On the shared paths, they travel too fast, and on crowded paths it's quite dangerous."*
>
> *"Instead of feeling safe on a footpath people are not, because if you deviate from a straight line, you might be collected by a bike, or subjected to their anger or abuse. Giving way to bikes can be difficult if you've got kids or are unstable on your feet. Some older people can't hear 'one ting' of a bike bell."*

One participant described two instances of injuries to pedestrians caused by cyclists on shared paths and commented:

> *"They go 'whoosh' as they go past, and often the paths aren't very wide, so this notion that you have to share has to come with more thought. If there's not enough room it's*

not a good match. If it's got to be shared it's got to be wider. Or separation between them."

Other participants commented that cyclists calling out "bike coming" was a good way of cyclists warning pedestrians that they are passing without a loud 'ding' or no warning. It was also suggested that signs be placed on paths as a reminder of how to share the paths safely.

As in earlier discussions about supports and barriers to walking, there was a strong sense of 'dealing with adverse conditions', because of the importance of walking in the lives of these older adults:

"Dogs off lead and all those sort of things. I'm annoyed at it so much, but feel they're not going to take away my pleasure of doing it. It makes you anxious. As you get older you lose some of those faculties, and you do get more anxious, and that can make you angry."

However, this participant noted that these circumstances do put her husband off walking:

"He doesn't want to do it anymore."

One participant recommended separate paths for pedestrians and cyclists, and others made suggestions for the safe use of shared paths:

"Separate walking and cycling tracks as in Fairfield park."

"Speed limits for cyclists might help, but only if they were enforced. Using the right sort of bell – warning, but not look out here I come! It alerts you to the fact that someone's coming up behind you."

"We're really talking about manners – I don't think regulation is going to.... Advisory speed limits might help, but having unenforceable speed limits is pretty pointless."

"Licensing of cyclists – number plates, and education from cycling groups."

"Increased education for drivers, cyclists,..."

"Use a hooter, but can scare people - and seem arrogant."

"Not sure which way to walk – facing cyclists coming the other way? It's never quite clear to me which is the safer."

The last comment is interesting because it may explain why some pedestrians choose to walk on the right–hand side of shared paths (possibly causing concern for bicycle riders).

Respect for others was seen as important, but often lacking:

"Shared paths are fine, but there's not a respect for each other."

Education was also seen as important, with one participant commenting that the City of Yarra did a good job in educating residents about using shared paths safely and courteously, but that the main problem was with "*the lycra set...who are passing through the suburb and want to do it at...50 km/hr*!"

> *"I and a few of my friends simply don't walk along a couple of the routes that cyclists use. There's a section along the Yarra [river] that you just don't go near at certain times. And you shouldn't have to do that*."

After some discussion in one group about how some pedestrian behaviours on shared paths also cause problems, advocacy between walking and cycling organisations was recommended as a means of changing the behaviours of cyclists and pedestrians on shared paths:

> *"A big government campaign like the train safety campaign they are running would be great. Having it public so people know about it."*

Others recommended line markings down the middle of paths to indicate 'keep left' [as occurs in some locations], accompanied by education and awareness-raising:

> *"I'd like to see a return to the etiquette of walking on the left of the path."*

> *"It worked very well during the Commonwealth Games when we moved how many hundreds of thousands of people, and everyone kept to the left and pedestrian traffic moved well. The Games finished and now we're all over each other and you can't walk anywhere comfortably because you've got people coming face-on at you all the time."*

> *"It was a return to how we were all brought up to walk on the left – basic good manners and a bit of courtesy."*

In response to a question about how to achieve this, "*starting in schools and in homes*" was discussed. An analogy was drawn with the contribution that school education has made to young people understanding and embracing the importance of the Anzac tradition:

> *"Anzac Day is something to behold these days because they've gone to the kids in schools and told them about Anzac day and taught them about what it's for. Why can't we teach the kids in school about walking and cycling? We used to have the National Safety Council of Victoria come out to schools."*

Other participants commented that parents need to support and back up what children are learning in schools, and model appropriate behaviour themselves:

> *"Remind Mum and Dad when it's the wrong thing to do..."*

Another participant commented that many of the road user behaviours that can make walking unsafe and unpleasant in Victoria do not occur in many other countries, indicating that education of road users can be effective:

> *"It's not like this in other countries, so education must work."*

The success of other community education programs such as anti-littering campaigns was also referred to as an example of what can be achieved through effective community education strategies.

7.3.1.7 Walking-friendly neighbourhoods

As described in the literature review section this study (see Section 5), the correlates of walking for older adults are multi-faceted. In reflecting on what makes their communities walking-friendly (or not), participants' comments reflected the diversity reported in the research literature. Themes included: access to public transport; good walking facilities, including pedestrian crossings, seats, toilets, shelters and directions to destinations; attractive and interesting routes and destinations; safety from traffic; and routes that do not require crossing busy roads.

One participant described how much he enjoyed the 'village' feel of his neighbourhood:

> *"In inner city, pretty well every house is different, or the gardens are different, and that's something enjoyable as you are walking, or the strip of shops where there's the Italian deli, and the bakery and the greengrocer's, and it's a bit of a village. It adds a bit of interest. The local strip shop is encouraging me to get out and walk, and when I buy it each day it's fresh rather than one big shop a week when it's not as fresh."*

Good walking infrastructure was viewed very positively:

> *"The inner city trail along the Maribyrnong, once it gets past where the freeway is there are actually underpasses under some of the dangerous roads, so you can just keep walking or riding your bike and you don't have to worry."*

> *"Those trails, whether for walking, biking or taking the dog out really encourage people. Near where I live is a local neighbourhood house that backs onto one of those trails and I think its location actually encourages people to walk there rather than drive cars."*

Descriptions of 'interesting routes' are a reminder that, for older adults, footpaths can be more than simply functional surfaces for walking on:

> *"Plaques [describing the history of the place] on shops in Swan Street, make the walk just that more interesting. Art trails. Historical plaques at intersections, with a brief history and photo of a local resident, makes it more interesting."*

When describing conditions that make a neighbourhood less walking-friendly, traffic conditions and poor walking infrastructure were common themes:

> *"The main roads are not friendly, and to get to places you have to cross them. That is a disincentive. There are times when it stops you."*

> *"The traffic has got much worse in the last 10-15 years."*

> *"Some streets don't have made footpaths, some people walk on the road. In some areas people's gardens have taken over the nature strip and gone right to the edge of the road."*

Some participants commented that a lack of consistently good walking infrastructure made the neighbourhood less walking-friendly from an overall perspective:

> *"Not really walking friendly. Walking trail along the beach, but the rest is not that good."*

> *"Lots of avenues and some have footpaths and some don't – I don't think they've kept up with the population."*

Participants commented that in the rapidly growing outer suburbs, local transport planning focuses more on the needs of the majority of [younger and middle-aged] residents who "all travel everywhere by car". In contrast:

> *"When there's an older population, they take more notice of us, and are more aware of their older population."*

However, one participant who lived in an inner Melbourne area with generally good footpaths described other forms of pedestrian hazards:

> *"No [not walking-friendly]. Because there's a lot of building going on [Southbank]. Footpaths are closed, builders' cars and trucks block footpaths, with high-rise, people are moving in and out on a daily basis and you've got removalist trucks parked on the footpaths and all the traffic going onto the freeways."*

7.4 Concluding comments

A key finding from the focus group discussions is the importance of walking in the lives of these senior Victorians. Walking is valued highly for a range of reasons including improved health, wellbeing, independence, mobility, social connectedness and community engagement. While it can be argued that seniors who self-selected to participate in the focus group discussions have a particular interest in walking that might have influenced their responses, their positive responses are consistent with a number of population-based studies that have also identified the importance of walking for older adults (see Section 5). Relatively high rates of walking for both exercise and transport among older adults in

Victoria and Australia also point to the importance of walking for a large proportion of senior Australians (see Section 4).

In addition to confirming the importance of walking for older adults, this qualitative study assists in understanding both the depth of feelings that older adults hold about walking, and some of the implications of these highly positive beliefs and attitudes. Accordingly, while adverse walking conditions can cause considerable concern to older adults, these concerns do not necessarily lead to reduced walking, as they appear to be countered by a strong desire to continue to walk. Adverse walking conditions do, however, cause fear, anxiety and annoyance, thereby detracting from their enjoyment of walking. And while some seniors attempt to remedy specific walking hazards by notifying the relevant authorities and advocating for improved conditions, the most common response to walking hazards is to modify their own walking behaviour.

As described above, older walkers' adaptive behaviours include (i) being selective about when, where, how and with whom they walk; (ii) taking extra care in potentially hazardous environments and situations (eg walking at night or in isolated areas, crossing roads, using roads without footpaths, using poorly maintained footpaths, and using shared paths); and (iii) generally walking defensively in circumstances where drivers and other road users are required to, but cannot be relied upon, to interact safely with pedestrians (eg at intersections and pedestrian crossings and on shared bicycle paths). Consistent with these adaptive behaviours was the commonly expressed view that seniors themselves are responsible for avoiding injury while walking. This strongly held perspective helps to explain why it is 'sudden, unexpected' incidents such as cyclists passing at high speed without warning or uncontrolled dogs that can sometimes cause as much concern as the more predictable (and substantially greater) hazards associated with interactions with motor vehicles.

Safety concerns raised by study participants included safety related to personal assault, traffic and falls, but the main focus of the discussions was fall injuries. In all likelihood, this was because several participants (or their family members or friends) had experienced falls while walking, while there were no reports of assaults, or collisions with motor vehicles. Little is known about fall injuries among older adults using the public road network, as only collision injuries are recorded by traffic authorities, and subsequently analysed by traffic safety researchers. The small numbers of studies that have investigated fall injuries among older adults using the public road network indicate that fall injuries outnumber collision injuries by up to three to one (Section 5.6).

The fall hazards described by the study participants were predominantly those associated with absent or poorly designed and/or maintained walking facilities. Participants pointed out that narrow, uneven, sloping, or slippery footpaths, or obstacles such as tables, chairs and advertising signs on footpaths present a greater hazard to older pedestrians than to young or middle-aged pedestrians. This is also documented in the pedestrian safety

literature (World Health Organisation 2013; ITF/OECD 2012). So while fall injuries can result from the combination of seemingly minor hazards (for the majority of *younger* pedestrians), and reduced sensory, visual, perceptual, motor and cognitive abilities among some older adults, the solution is largely an environmental one. Study participants were well aware of their increased vulnerability to injury, and attempted to compensate by, as far as possible, selecting safer routes, and walking carefully and cautiously.

Stopping walking altogether was participants' least desired measure for avoiding injury, and they were reluctant to do this. In fact, as discussed in Section 5, walking improves the health of older adults, thereby contributing to reducing some aspects of the functional decline that contribute to injury risk. Participating in resistance/strength training and flexibility/balance training in addition to walking, is also effective in reducing some elements of functional decline (British Heart Foundation 2012b), and the evidence suggests that it is likely to be a more effective method of reducing injuries among older pedestrians than traffic education/training (Rivara et al 1997; Duperrex et al 2002; Dommes and Cavallo 2011; Dommes et al 2012).

The weight of evidence from several sources therefore points to the importance of creating safe, supportive environments that encourage the rapidly increasing population of older Victorians to adopt or maintain an active lifestyle using their primary method of choice; namely, walking (see Section 4). It is also important to recognise that, in general, older adults require higher standards of walking infrastructure than younger population groups. This applies to both the design and maintenance of pedestrian infrastructure, though maintenance appears to be particularly important.

The other key theme that emerged in the focus group discussions was road/path user behaviour. Just as older adults can be more vulnerable to environmental hazards while walking, they also express high levels of concern about the behaviours of other road/path users. These concerns may be heightened for older adults because of their reduced ability to avoid a collision in the event of the sudden, unexpected movement of another road/path user, and increased likelihood that a collision (or the avoidance manoeuvre) will result in a fall and/or injury. Participants in this study were well aware of these vulnerabilities, and attempted to compensate for them by walking carefully and remaining alert. Because of their heightened awareness of potential risks and high sense of personal responsibility for their own safety, unexpected movements such as a cyclist passing at high speed or a dog suddenly crossing their path, over which they have no control, cause considerable concern.

Participants discussed potential methods for improving path/road user behaviour, including the traditional 'three Es' of engineering (ie good infrastructure design and maintenance), enforcement (of road rules) and education. However, their primary focus was on awareness-raising and education. There were concerns about road users' (including, in some instances, pedestrians themselves) lack of knowledge of the road rules that apply to interactions with pedestrians, as well as their failure to consistently obey the road rues (that

they *are* aware of). There were also some concerns that the rules themselves lacked clarity – a reflection that is supported in the road safety research literature (Hatfield et al 2007).

While education was seen as crucial to sharing travel space, the concept of 'education' was used in the very general sense of establishing a community norm of safe, courteous road/path users, rather than just 'education' to increase awareness of the correct road rules. Cooperation, respect and general 'good manners' were also seen to *partially* compensate for potentially hazardous infrastructure (eg narrow paths or poor sight distances), and to reduce the need for costly infrastructure (eg separate, wide paths for pedestrians and cyclists). Other conditions that were mentioned that were considered to require 'good manners' to work effectively included footpath narrowing due to tables and chairs on footpaths, whereby cooperative rather than 'selfish' behaviour would allow pedestrians, people with prams and shopping jeeps, motorised scooters, etc, to use the limited space safely and amicably.

In summary, walking is an important and highly valued activity for older Victorians, many of whom are highly motivated to maintain their walking behaviour for as long as possible. While acknowledging that changes in functional capacity with age can be a constraint on maintaining walking, there is good evidence that environmental factors are also important. Environmental factors include the physical environment (natural and built), the social-cultural environment, and the policy-regulatory environment (refer to Figure 11).

A number of factors associated with the built environment in particular can support or constrain seniors' walking. Addressing barriers within the built environment is likely to contribute to a number of desirable outcomes including: more walking; maintaining walking into older age; making walking more appealing and enjoyable; and reducing traffic-related and fall injuries. Senior Victorians can assist in achieving these outcomes as they are experienced and well-informed users of walking spaces (and potential walking spaces) in their neighbourhoods.

8 Seniors walking survey

8.1 Survey aims

The overall aim of the survey was to investigate senior[23] Victorians' perceptions and behaviours related to walking; and supports and barriers to walking for seniors. The survey also aimed to explore differences in perceptions, behaviours, supports and barriers based on seniors' age, residential location, and type of walking (ie walking for recreation/exercise or walking for transport).

8.2 Data collection methods

Data were collected using a 23-item questionnaire that was administered online (using SurveyGizmo Online Survey Software) and in paper format.

8.2.1 Survey instrument

The questionnaire was developed based on the study objectives, and on findings from a review of relevant research literature (see Section 5), together with findings from eight focus group discussions conducted with senior Victorians prior to the development of the questionnaire (see Section 7). Questionnaire items included: reasons for walking, time spent walking for recreation/exercise and transport (separately), walking destinations, walking ability, distance prepared or able to walk, frequency of use of a motor vehicle and public transport, preferred walking surfaces, and several questions about supports and barriers to walking. Demographic factors were gender, age and residential postcode.

Most questions were closed-ended, but four closed-ended questions included a follow-up open-ended "Any comments?" option, together with the opportunity for additional comments at the end of the questionnaire.

The questionnaire was pilot-tested with eight senior Victorians, and minor modifications were made to the structure of the questionnaire, instructions, and some response options.

A copy of the final questionnaire is in Appendix B.

8.2.2 Study sample

Multiple sources were used to distribute the online and paper versions of the questionnaire. For the online version, invitations to participate in a "Seniors Walking Research" study appeared (i) as advertisements on Facebook, targeting senior Victorians aged 60 years or over (see Appendix C) (529 responses); (ii) on the COTA website, and included in COTA electronic newsletters (137 responses); (iii) notices emailed to members of the local government Positive Ageing Network through the Municipal Association of Victoria (MAV) (113); and (iv) the Victoria Walks and Seniors Online (Victorian Government) websites (72

[23] Aged ≥60 years.

responses). The online survey was open from 1st July 2013 to 1st August 2013, and most of the paper surveys were also collected during this time period.

Paper questionnaires were distributed through COTA and the MAV (via emails to staff involved in the local government Positive Ageing Network). Local government and community health staff who received the email were invited to contact Dr Jan Garrard to request paper copies of the questionnaire together with a stamped, addressed envelope for returning completed questionnaires directly to Dr Jan Garrard. Four hundred questionnaires and envelopes were distributed and 129 were returned (comprising a 32% response rate for this method of distribution). In addition, some staff involved in the Positive Ageing Network photocopied additional copies of the questionnaire, of which 148 were completed and returned, giving a total of 277 completed paper questionnaires.

It is not possible to calculate an overall response rate for the survey as a whole because the number of people who received an invitation to participate (via the multiple sources described above) is unknown.

A total of 1128 questionnaires were completed, comprising 851 online questionnaires, and 277 paper questionnaires.

The survey results need to be interpreted cautiously in view of the fact that the study sample did not comprise a representative sample of the population of Victorian seniors. However, respondents were geographically diverse, including 39% of the total sample from all five rural regions of the Victorian Department of Health (Barwon-South Western Region, Gippsland Region, Grampians Region, Hume Region and Loddon Mallee Region). The remaining 61% of the sample was roughly evenly distributed across the inner, middle and outer regions of metropolitan Melbourne (see Table 5 and Appendix D). In addition, 19% of respondents walked for less than an hour a week for both recreation and transport (see Table 6), indicating that a sizable proportion of the sample did not participate in high levels of walking.

8.2.3 Data analysis

Data were exported from the online survey into a Microsoft Office Excel spreadsheet, and combined with data entered manually from the paper questionnaires. Data were analysed using Excel Statistical Functions. Significance testing for cross-tabulated data was conducted using the Chi-square statistic.

8.3 Survey results

Survey findings are presented in the following sections. Some discussion of the results is included in the presentation of the survey findings, rather than in a separate Discussion section.

8.3.1 Characteristics of the study sample

The study sample (N = 1128) was 74% female; and the majority of respondents were aged 60 - 69 years (60%) (see Table 5). However, the sample also included older seniors in their 70s (30%), 80s (9%) and 90s (1%, n = 12). Sixty-one percent of the sample lived in metropolitan Melbourne and 39% in rural/regional Victoria. Similar proportions of respondents lived in central/inner[24] (20%), middle (22%), and outer (18%) metropolitan areas. Rural/regional respondents came from all five rural regions of the Victorian Department of Health (Barwon-South Western Region, Gippsland Region, Grampians Region, Hume Region and Loddon Mallee Region).

Most participants (86%) 'never' use a mobility aid for walking; and 78% rated their ability to get around by foot as good to excellent. These data may reflect the relatively high proportion of younger seniors (60-69) in the sample.

Walking is the only or main form of physical activity for just over half of the study sample (51%), indicating that walking is an important form of physical activity for these older adults. This is consistent with population data indicating that walking is the most common form of physical activity for middle-aged and older adults in Victoria (Australian Bureau of Statistics 2012b).

Respondents were categorised as 'recreational' walkers if they walked for recreation or exercise for > 1 hr/week, and 'transport' walkers if they walked for > 1 hr/week to get to places such as shops, appointments, social activities, or train, tram or bus stops. Based on this classification, 74% walked for recreation or exercise (> 1hr/week), and 40% walked for transport (> 1hr/week). Most seniors who walked for transport also walked for recreation and exercise, and relatively few walked only for transport (6%). Nearly one-fifth (19%) walked < 1hr/week for both recreation and transport (see Table 6).

More detailed information about time spent walking for recreation and transport is included in Section 8.3.3.

[24] Central and Inner regions were combined into an 'Inner Melbourne' region.

Table 5: Characteristics of the study sample

Characteristic		Persons	Percentage
Age			
	60-69	669	60%
	70-79	336	30%
	80-90	97	9%
	90+	12	1%
Sex			
	Female	821	74%
	Male	290	26%
Region[25]			
	Central Melbourne	59	5%
	Inner Melbourne	167	15%
	Middle Melbourne	239	22%
	Outer Melbourne	195	18%
	Rural/Regional Victoria	424	39%
Use of a mobility aid for walking			
	Never	940	86%
	Occasionally	76	7%
	Often	26	2%
	Most or all of the time	52	5%
Ability to get around by foot			
	Excellent	366	33%
	Very good	303	28%
	Good	186	17%
	Average	146	13%
	Poor	77	7%
	Very poor	20	2%
Walking is only or main form of exercise			
	Yes	564	51%
	No	547	49%
Walk for recreation or exercise			
	<1 hr/week	281	26%
	>1 hr/week	817	74%
Walk for transport			
	<1 hr/week	659	60%
	>1 hr/week	446	40%

[25] See Appendix D for the location of these regions.

8.3.2 Reasons for walking for recreation, exercise or to get to places

All respondents

Health, fitness and getting around independently were important reasons for walking; as were factors associated with psychological well-being ('getting out in the fresh air' and 'feeling good') (see Figure 29). Aesthetic and social factors were somewhat-to-moderately important; while walking associated with public transport use or not driving a car were least important for the sample as a whole. However, there were some important differences in reasons for walking between older and younger seniors as described below.

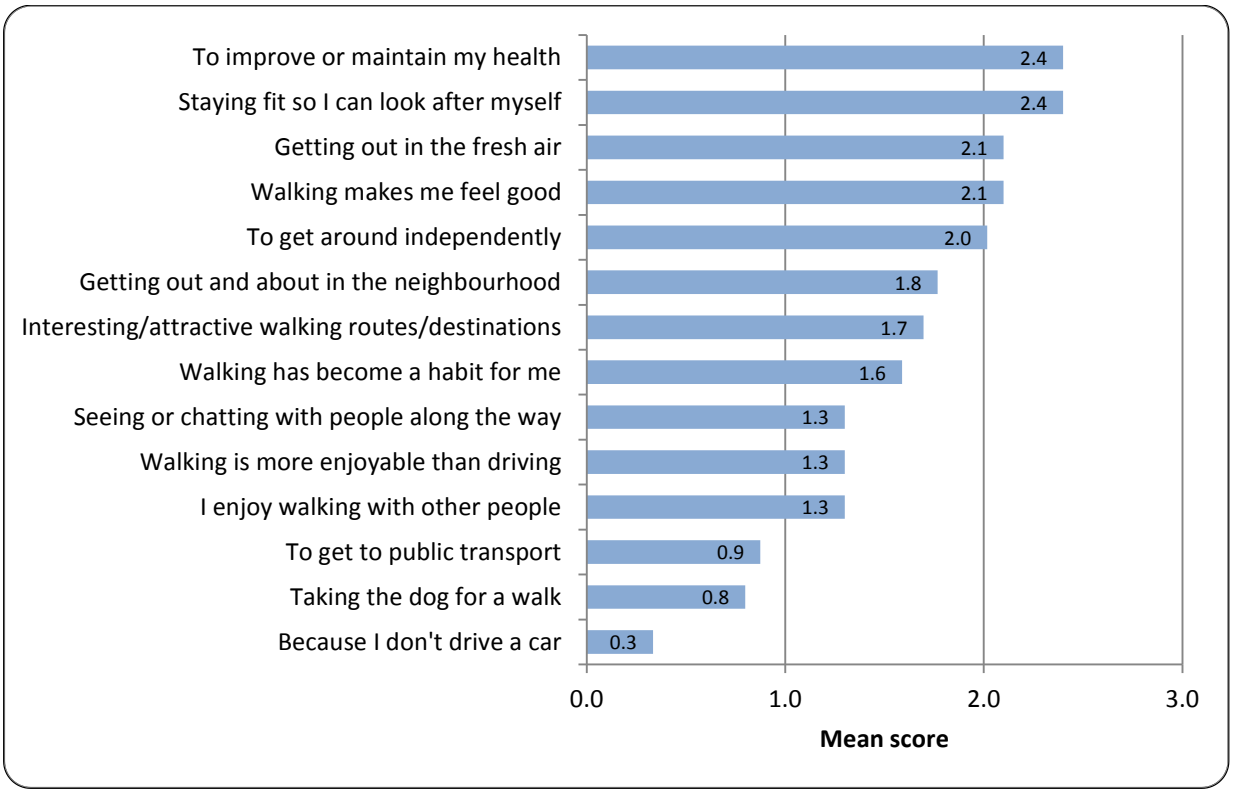


Figure 29: Reasons for walking for recreation, exercise or to get to places

(0 = No, not important; 1 = Yes, somewhat important; 2 = Yes, moderately important; 3 = Yes, very important)

Reasons for walking by age

Older seniors were more likely than younger seniors to report utilitarian reasons for walking (ie "To get around independently" [p = 0.04[26]], "To get to public transport" [p = 0.01], and "Don't drive a car" [p < 0.0001]) (see Figure 30). These differences are consistent with older seniors (80+) walking more for transport than younger seniors (see Section 8.3.3), and driving less (see Section 8.3.7).

[26] P-values are for respondents aged 80+ compared with respondents aged 60-79; and "a very important reason for walking" compared with all other responses combined.

Age differences in reasons for walking that are considered *less* important by older compared to younger seniors show a pattern consistent with more utilitarian reasons for walking for older seniors. Health and fitness were important for all age groups, but somewhat less so for those aged 80+ ($p = 0.06$, marginally insignificant). In comparison to younger seniors, there was a tendency for older seniors to report "staying fit so I can look after myself" and "getting around independently" as more important than "improving or maintaining health", though the differences between these three reasons were not statistically significant. Also consistent with the more utilitarian focus of older seniors' walking, "interesting or attractive routes" tended to be less important than for younger seniors, as were affective factors such as "walking makes me feel good" and "getting out in the fresh air", though the differences between older and younger seniors were not statistically significant.

There was also a tendency for the social connectedness and community engagement aspects of walking to be more important for older seniors, ie, "Getting out and about in the neighbourhood" and "Seeing and chatting with people along the way", though, once again, these differences were not statistically significant.

The more utilitarian-focused reasons for walking among older seniors are consistent with findings from the analysis of VISTA data (see Section 6) which indicated that walking to buy something and for personal business increased with age (80+ seniors), while walking for social/recreational reasons decreased.

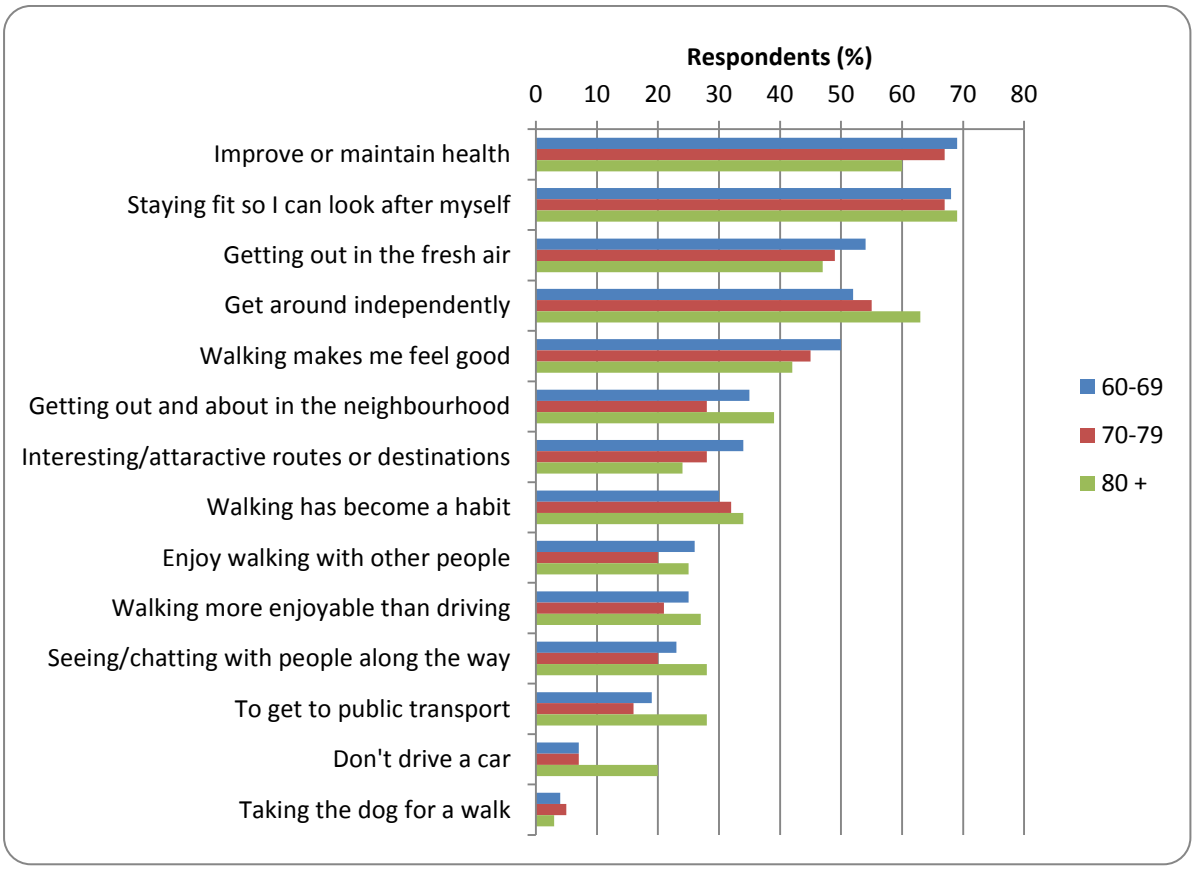


Figure 30: Reasons for walking by age (% "Very important")

8.3.3 Time spent walking for recreation/exercise or transport in an average week

All respondents

Consistent with the importance of walking for seniors for a range of reasons as described above, survey respondents reported spending a considerable amount of time walking. The amount of time spent walking is substantially higher for recreational walking than for utilitarian walking, with 42% of respondents walking for recreation for more than two and a half hours a week, and nearly one in five respondents walking for more than 5 hours a week (see Figure 31). Consequently, 42% of survey participants are adequately active[27] through walking for recreation/exercise alone (≥2.5 hours a week); and 9% achieve adequate physical activity time through walking for transport alone (≥ 2.5 hours a week).

While the nine percent 'adequate physical activity time' achieved through utilitarian walking might seem low, it can translate into a substantial number of people at the population level being adequately active when they might otherwise be inactive (eg people who, for a variety of reasons, choose not to participate in leisure-time physical activity).

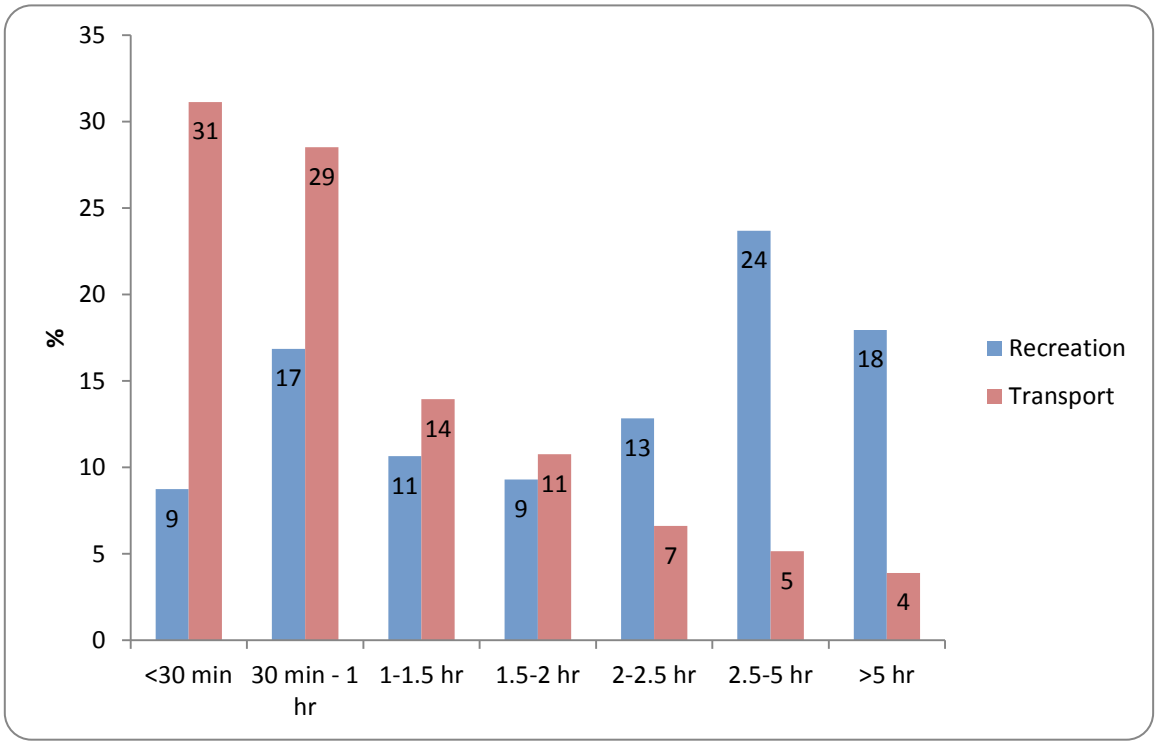


Figure 31: Time spent walking in average week (a) for recreation or exercise, or (b) for transport

When study participants were classified as 'walking for transport' if they spent >1 hr/week walking for transport; and 'walking for recreation' if they spent >1 hr/week walking for

[27] Based on the 'adequate time' recommendation of at least 150 minutes (2.5 hrs) a week of moderate to vigorous physical activity (*National physical activity guidelines for adults*. Canberra, Department of Health and Aged Care).

recreation, participants comprised the recreational/transport walking categories shown in Table 6. As outlined above, participants walked predominantly for recreation, with about half of recreational walkers also walking for transport. Few participants walked for transport only (6%), and about one-fifth of the sample (19%) walked for less than one hour a week for both recreation and transport (though their combined recreational and transport walking may total up to two hours a week). These findings are consistent with relatively low levels of transport walking in countries such as Australia, where most trips, including short-to-medium-distance trips are undertaken by car (see Section 4). In contrast, many other OECD countries have relatively high levels of utilitarian walking, including for older adults (Pucher and Dijkstra 2003).

Table 6: Walking for recreation (>1 hr/week) and/or transport (> 1 hr/week)

	Frequency (%)
Recreation-only	444 (39%)
Recreation and transport	403 (36%)
Neither recreation nor transport	215 (19%)
Transport-only	66 (6%)
Total	1128 (100%)

Walking by gender

Men (46%) were more likely to walk for transport (> 1hr/week) than women (38%) ($p = 0.03$); but there was no significant difference between men (77%) and women (74%) for recreational walking ($p = 0.23$).

Walking by age

Seniors in their 60s and 70s have similar patterns of walking for both transport and recreation, with both age groups nearly twice as likely to walk (> 1hr/week) for recreation than for transport (see Figure 32). However, seniors aged 80+ are less likely than other age groups to walk for recreation, and more likely than other age groups to walk for transport, although recreational walking is still more common than transport walking for seniors aged 80+. The differences between seniors 80+ and younger seniors are significant for both recreational walking ($p = 0.02$) and transport walking ($p = 0.03$).

Relatively higher rates of transport walking among seniors aged 80+ are consistent with them being less likely than younger seniors to drive a motor vehicle on most days of the week (see Figure 40). These findings are also consistent with VISTA data which indicate a decrease in car driving trips for people aged 85+ (45% of trips) compared with those aged 65-69 (63%); and a trend towards increased walking with age (see Section 6).

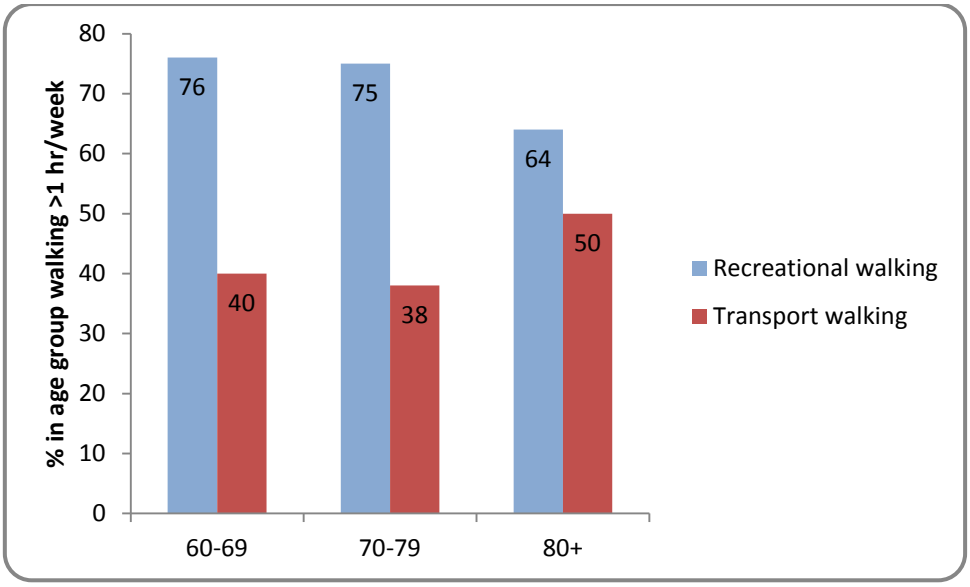


Figure 32: Recreational and transport walking by age

Walking by region

Seniors who live in inner metropolitan Melbourne were nearly twice as likely as those who live in middle and outer metropolitan Melbourne or in rural/regional Victoria to walk for transport for more than one hour a week (see Table 7). There were no significant differences in transport walking between middle, outer and rural/regional areas. These findings for senior Victorians are consistent with studies conducted with general adult populations in Australia and internationally, indicating that the relationship between urban form[28] and walking applies to older adults as well as younger age groups (Moniruzzaman et al 2013).

Table 7: Transport walking by region

Transport walking	Inner Melbourne	Middle Melbourne	Outer Melbourne	Rural/Regional	Total
<1 hr	85 (38%)	163 (69%)	129 (67%)	257 (62%)	634
>1hr	138 (62%)	74 (31%)	63 (33%)	158 (38%)	433
Total	223	237	192	415	1067

Inner Melbourne respondents were also more likely to walk for recreation than respondents who live in middle ($p = 0.06$, marginally insignificant) and outer metropolitan Melbourne ($p = <0.001$) or in rural/regional Victoria ($p = 0.003$), but the differences were substantially less than for transport walking (see Table 8).

[28] Urban form characterised by compact, connected, mixed development is generally associated with more utilitarian walking than 'urban sprawl', which is characterised by low-density, single-use development and high levels of car-dependency (Litman 2013).

The difference in recreational walking for middle Melbourne compared with outer Melbourne respondents was marginally insignificant (p = 0.06).

Table 8: Recreational walking by region

Recreational walking	Inner Melbourne	Middle Melbourne	Outer Melbourne	Rural/Regional	Total
<1 hr	38 (17%)	57 (24%)	61 (31%)	112 (26%)	268
>1 hr	188 (83%)	181 (76%)	128 (69%)	297 (74%)	794
Total	226	238	189	409	1062

In summary, seniors who live in inner Melbourne LGAs were most likely to walk for both recreation and transport, though the association is stronger for transport walking.

Region by age

The regional differences in walking for transport and recreation described above are unlikely to be due to age differences between regions (see Figure 33). Inner Melbourne has a higher proportion of respondents in their 60s and relatively fewer respondents in their 70s and 80+ than does rural/regional Victoria. However, there is no significant difference between inner Melbourne and middle Melbourne (p = 0.07) or between inner Melbourne and outer Melbourne (p = 0.7). The only other significant difference is that rural/regional Victoria has more respondents aged 80+ than the three Melbourne metropolitan regions (p < 0.001).

In summary, the findings described above suggest that, while health conditions and functional constraints may restrict some seniors' walking, these factors do not explain regional differences in walking. On the contrary, environmental factors appear to be important, as reflected in (i) higher rates of both recreational and transport walking in inner Melbourne; (ii) older seniors walk relatively more for transport than recreation compared with younger seniors; and (iii) seniors who do not drive a car on a daily basis have higher rates of walking for transport. Adding support for the influence of environmental factors on seniors' walking, particularly for transport, is the finding (in Section 8.3.5 below) that seniors of all ages are able and prepared to walk reasonable distances to get to shops and services.

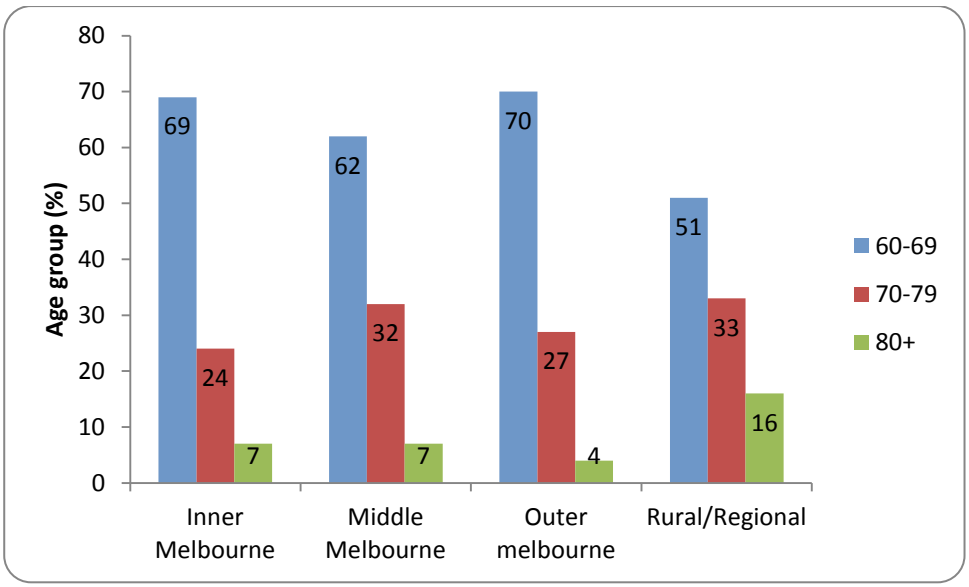


Figure 33: Age distribution within regions

8.3.4 Destinations for transport walking

The main destinations for transport-related walking trips are shops, public transport and access to services (Figure 34). There are few age differences in transport walking destinations, though seniors who are 80+ are significantly more likely than younger seniors to walk to social events, outings or activities ($p = 0.03$).

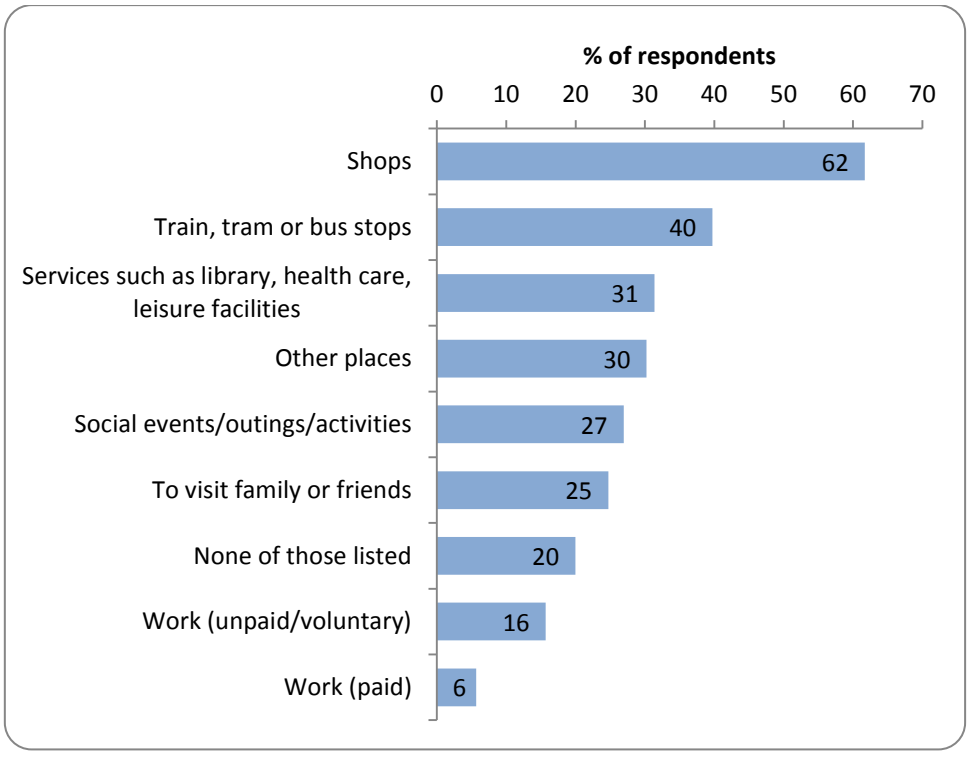


Figure 34: Transport walking destinations

8.3.5 Transport walking distance

All respondents

Respondents were asked how far they are able to, or prepared to walk to typical destinations as listed above (excluding walks that are mainly for recreation or leisure) (see Figure 35).

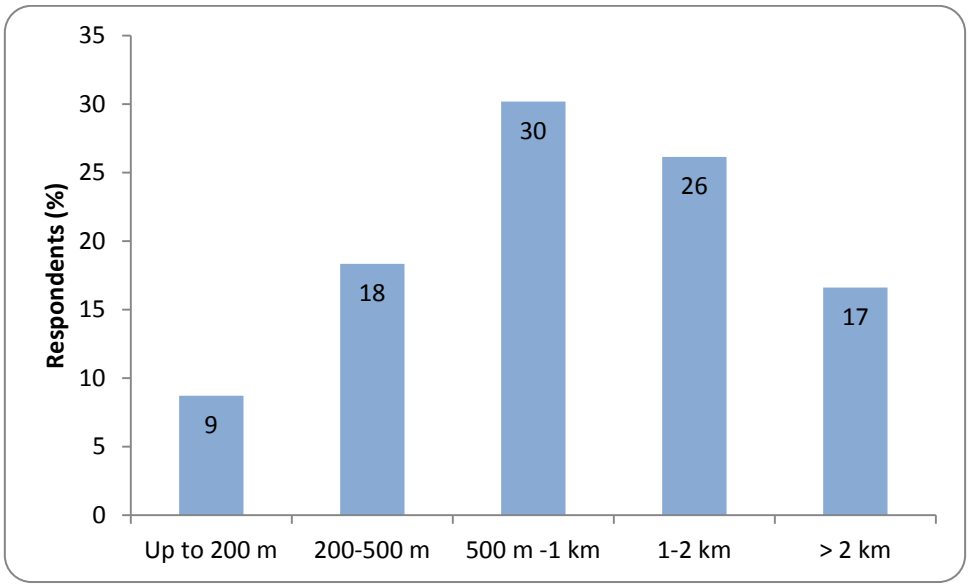


Figure 35: Distance prepared to walk to get to places

A sizable proportion of seniors (43%) are able or prepared to walk ≥ 1 km to get to destinations such as those listed in Figure 34, with 500 – 1 km the most frequently reported distance. These preferred distances are similar to the distances that senior Victorians actually walk to get to places based on VISTA data (mean trip distance of 0.9km) (see Section 6).

Feasible utilitarian walking distance by age

The modal distance (500 – 1 km) did not vary significantly with age (see Figure 36); with 500 – 1 km being the most frequently reported distance, including for seniors aged 80+. These findings suggest that if common destinations such as shops, services and public transport are located within 500m - 1km of homes, these destinations will be accessible by walking for most seniors (73%).

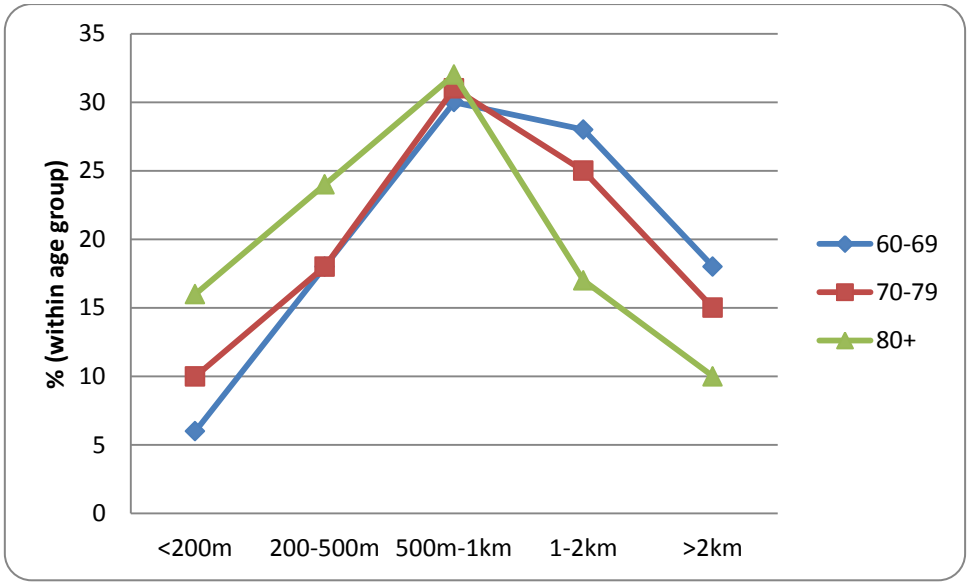


Figure 36: Distance prepared to walk to get to places by age

8.3.6 Preferred walking surfaces

Most seniors prefer to walk on sealed footpaths (83%), with these facilities nearly twice as popular as the next most popular option (shared walking and cycling paths, 45%) (see Figure 37). Streets and roads in built-up areas with no made footpaths were the least popular option (11%). Nearly one third of seniors expressed a preference for indoor walking (30%).

There were some differences in preferred walking surfaces for transport and recreational walkers. Seniors who walk for transport were more likely to prefer sealed footpaths (88%) than those who do not walk for transport (80%) ($p = 0.001$). However, there was no significant difference in preference for sealed footpaths among seniors who walk for recreation compared with those who do not walk for recreation. Seniors who walk for recreation were significantly more likely to prefer shared walking/cycling paths (52%) than those who do not walk for recreation (29%) ($p < 0.0001$). There were no significant differences for seniors who do or do not walk for transport.

Recreational walkers were also more likely to prefer unsealed hiking trails, tracks or paths ($p < 0.0001$) and walking along the beach ($p <0.0001$) than those who do not walk for recreation. In summary, sealed footpaths are important walking infrastructure for seniors, especially for those who walk for transport. Recreational walkers are prepared to use a wider range of walking surfaces, possibly because “interesting or attractive routes” (see Figure 29) may be more important than using the most direct route. There were also indications from open-ended responses that seniors who walk for recreation can be more flexible about where and when they walk (eg to avoid hazardous or unappealing conditions). Those who walk for transport, on the other hand, are more likely to require direct routes to their destinations, and for these routes to have walking infrastructure that is perceived to be safer, such as sealed footpaths.

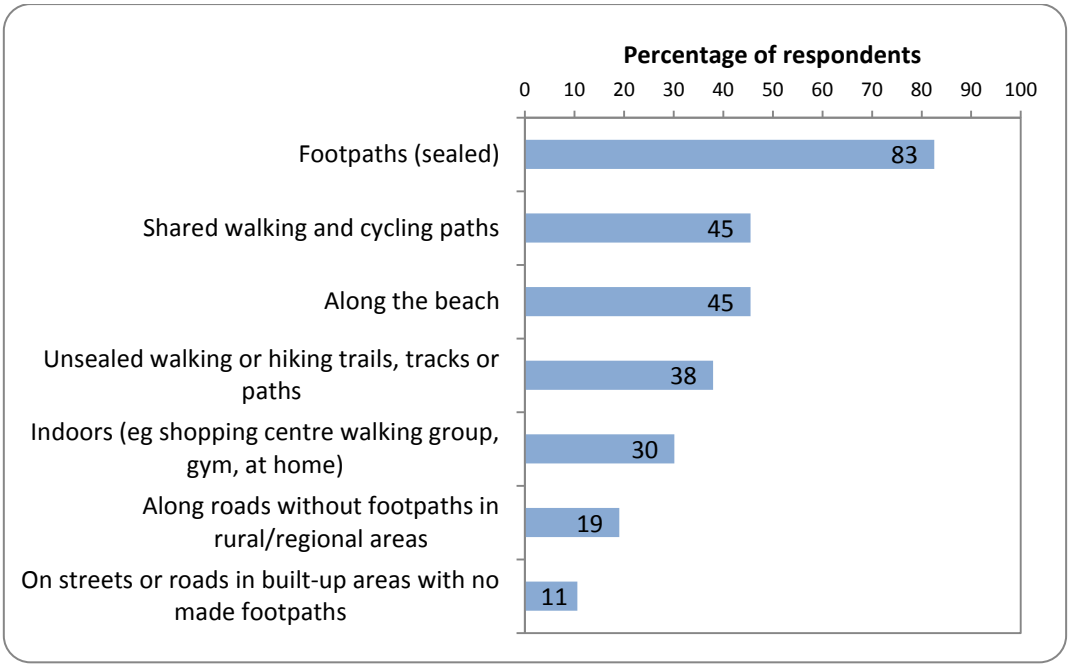


Figure 37: Preferred walking surfaces

8.3.7 Use of motorised travel

The majority of study participants drive a motor vehicle on most days of the week, and few use public transport on a regular basis (see Figure 38). Driving a motor vehicle on 'most days' is associated with less transport walking (see Figure 39). Seniors who walk for transport are about half as likely to drive a motor vehicle on 'most days' ($p<0.001$) than seniors who do not walk for transport. Walking for recreation was not associated with driving on 'most days' ($p = 0.09$).

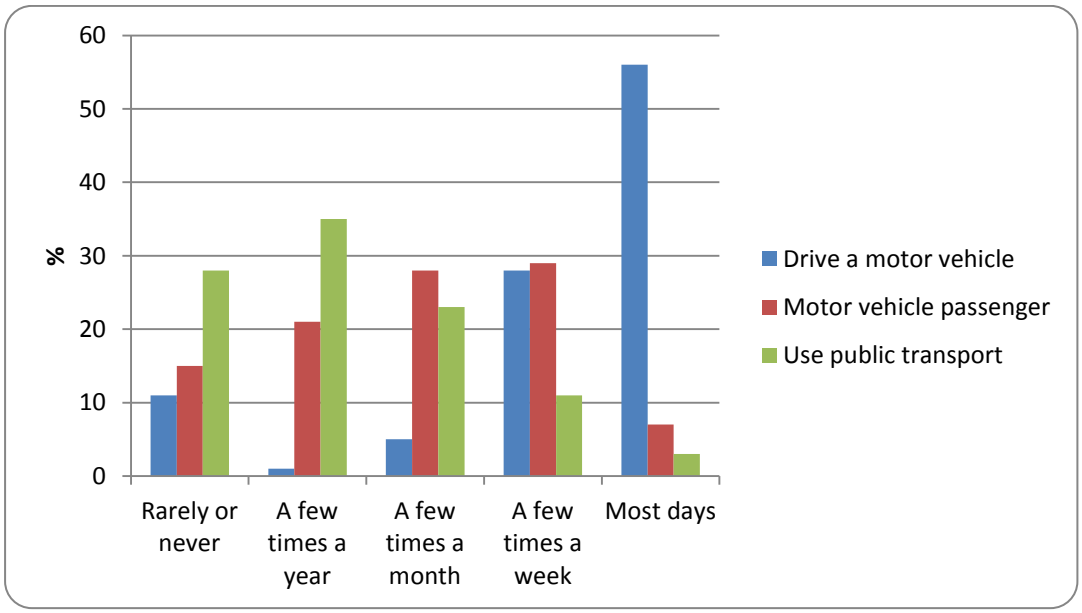


Figure 38: Use of motorised travel

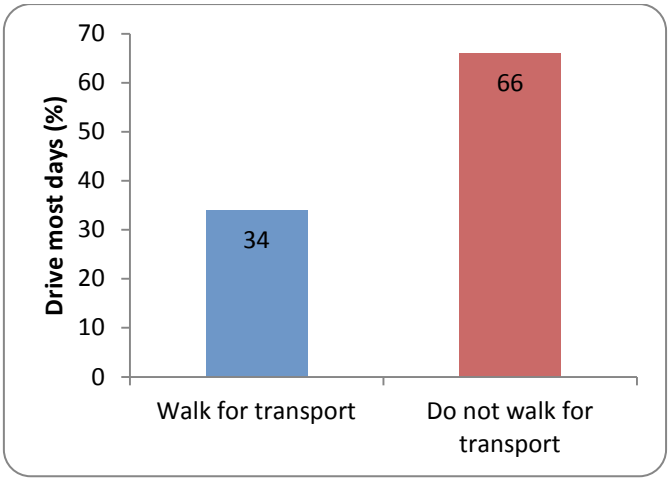


Figure 39: Driving a motor vehicle and walking for transport

Older seniors (80+) are less likely to drive 'most days' than younger seniors (p = 0.0004) (see Figure 40), and more likely to walk for transport (see Figure 32). These findings are consistent with data from several OECD countries which indicate that people make fewer trips as they get older, but the proportion of walking trips increases; sometimes substantially. For example, in Germany, 39% of daily travel trips by adults aged 65-74 are by walking; while for those aged >75, nearly half of daily travel trips (48%) are by walking (Pucher and Dijkstra 2003).

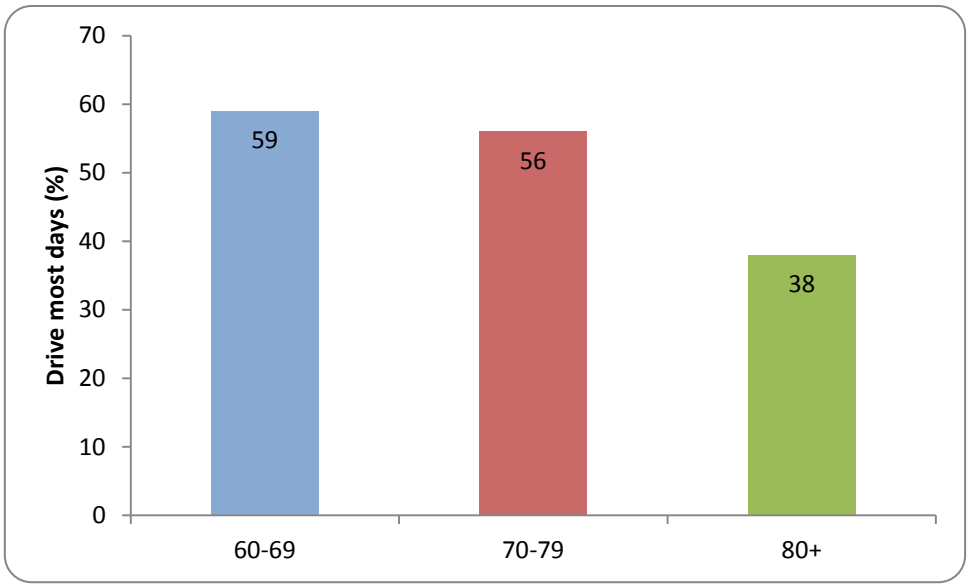


Figure 40: Driving a motor vehicle by age

Seniors who live in the inner Melbourne region are less likely than those who live in other regions to drive a motor vehicle on 'most days' (p = 0.006) (see Figure 41). Seniors who live in inner Melbourne are also more likely to walk for transport than those living in other regions, indicating that reduced motor vehicle use in inner Melbourne LGAs is associated with increased transport walking.

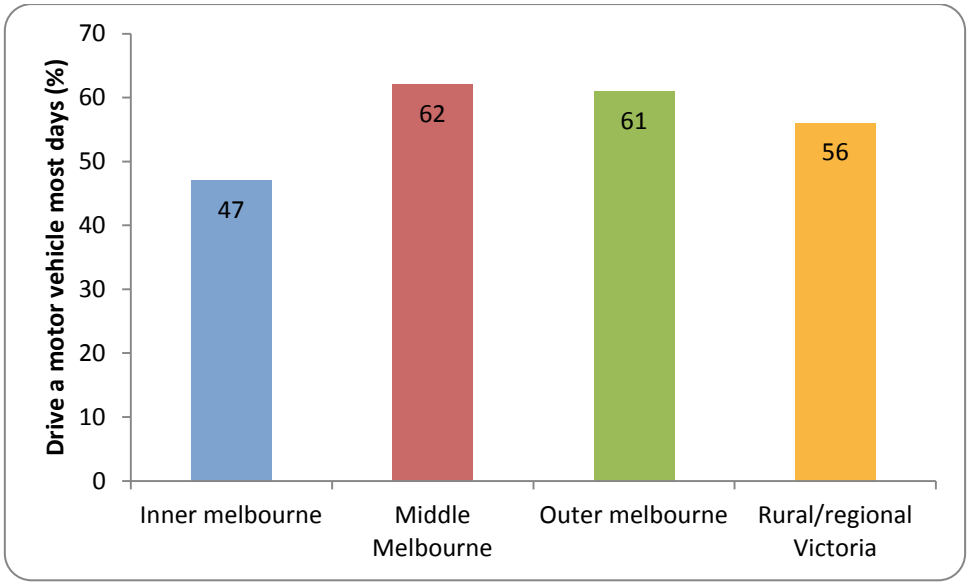


Figure 41: Drive a motor vehicle by region

8.3.8 Factors that would support more walking

All respondents

The main perceived supports for (more) walking were a mix of personal (more time and better health) and environmental factors (better weather and more places to walk to) (see Figure 42). Traffic concerns were less important, though qualitative data from the focus group discussions (see Section 7) and responses to open-ended "Any comments?" questions in the survey indicate that seniors frequently deal with potential traffic hazards by avoiding them if possible. They achieve this by being selective about where and when they walk.

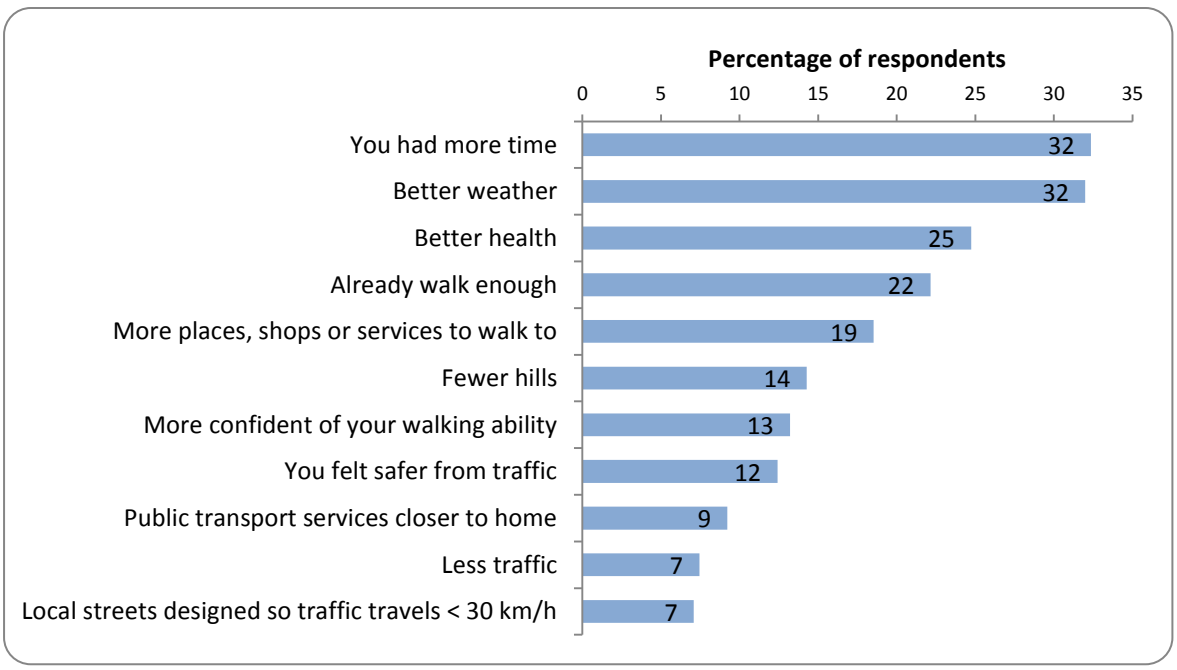


Figure 42: Supports for (more) walking

Supports for walking by location

Seniors who live in Melbourne (all metropolitan regions) were more likely than rural/regional respondents to state that they would walk more if they had more time (p = 0.001); though they were also more likely to state that they already walked enough (p = 0.007) (see Figure 43). Less traffic and slower traffic were also more important for Melbourne residents (p = 0.04 and p = 0.05 respectively). Better health (p = 0.002) and more confidence in walking ability (p = 0.02) were more important for rural respondents, possibly reflecting the higher proportion of older seniors among rural respondents.

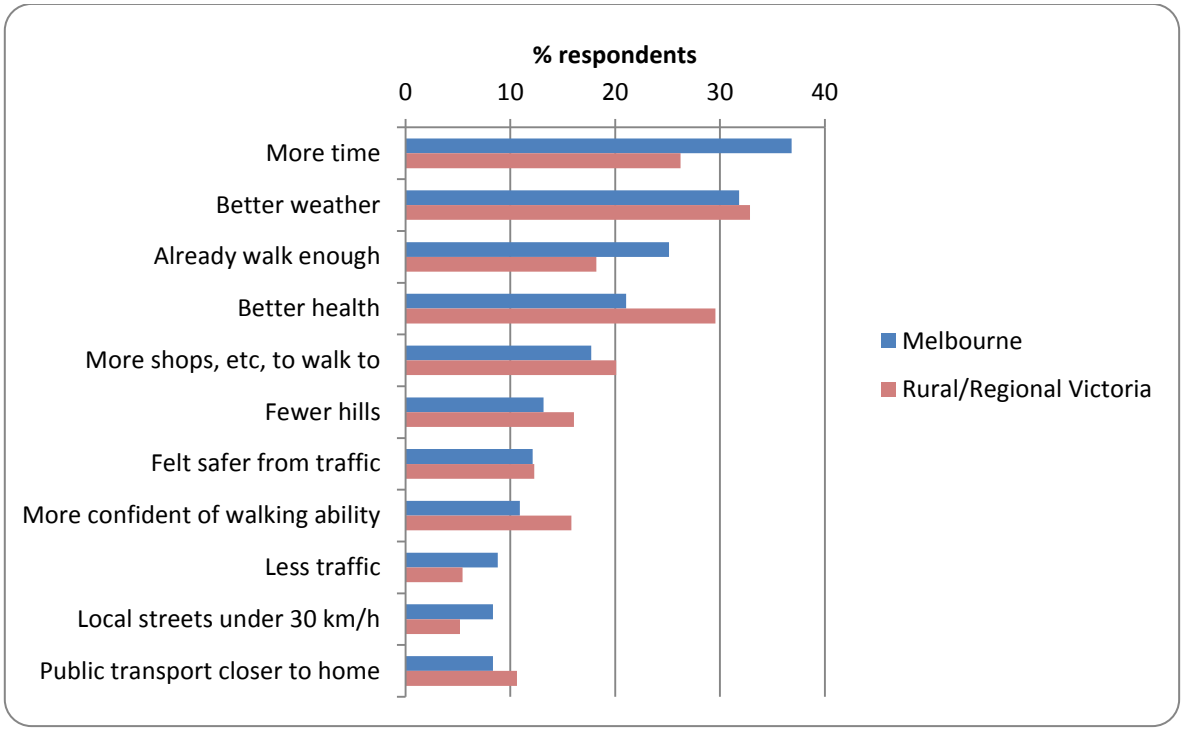


Figure 43: Supports for (more) walking by location

Lower traffic speed by region

The proportion of respondents who stated that they would walk more if local streets were designed so that traffic travels under 30 km/h varied by region (p = 0.006), with 1 in 6 residents of central Melbourne agreeing that the lower speeds would encourage them to walk more (see Figure 44).

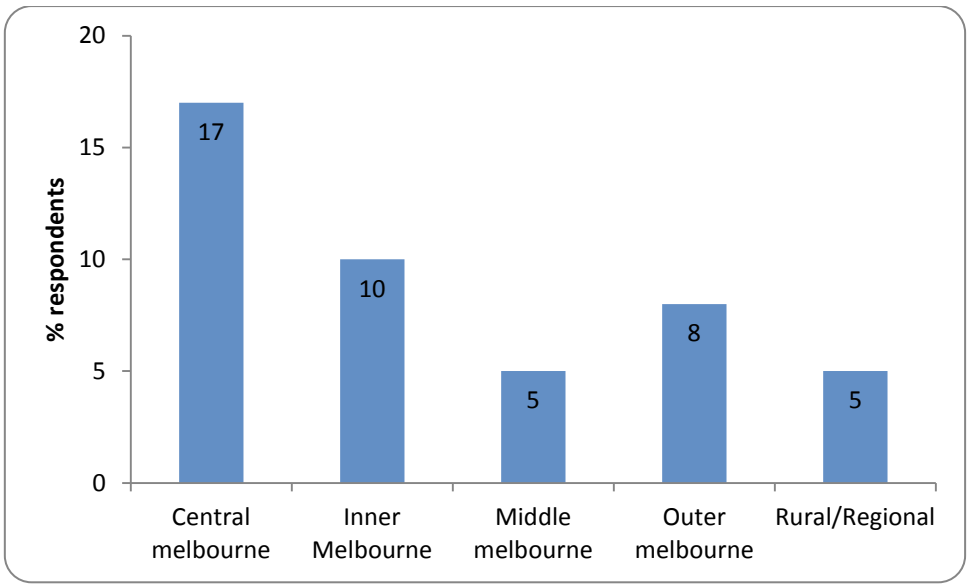


Figure 44: Lower traffic speed as a support for walking by region

Supports for walking: transport and recreational walking

Seniors who walked for transport were less likely to state that lack of time or poor health constrained their walking, and more likely to state that they already walked enough (see Figure 45). Traffic concerns were also more important for transport walkers compared to seniors who don't walk for transport (feeling safer from traffic [p = 0.03], less traffic [p = 0.001], and lower speeds [p = 0.04]).

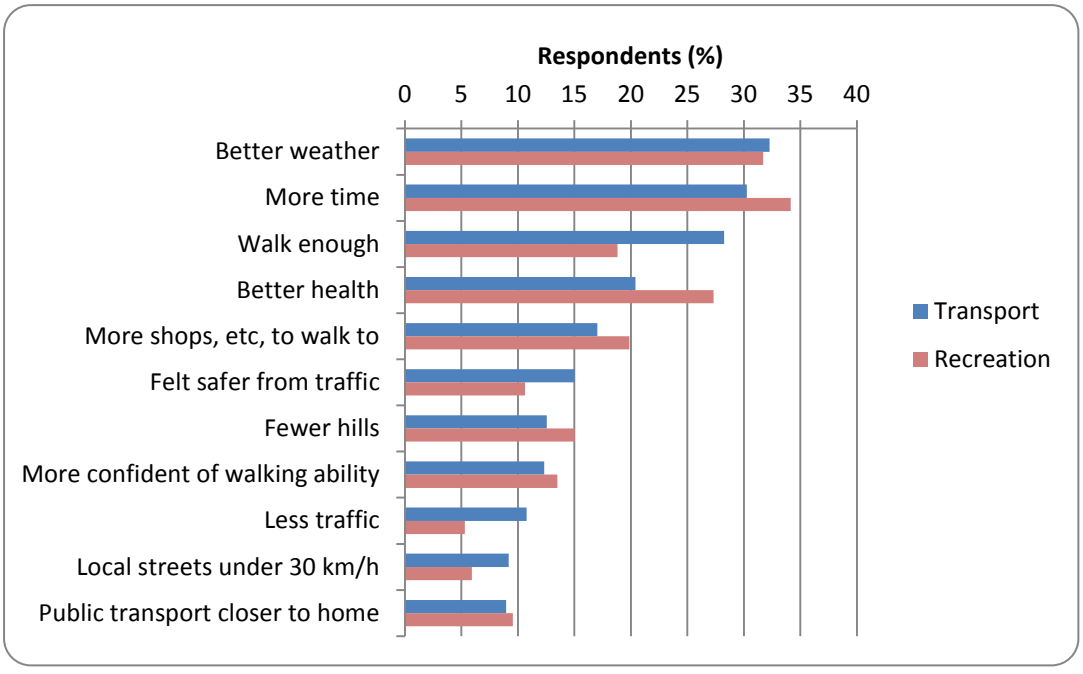


Figure 45: Supports for (more) walking for transport and recreation

8.3.9 Barriers to walking

Barriers to walking were explored in two questions; the first of which asked about factors that constrain walking, and the second asked about factors that impacted on feelings of safety while walking. This section describes responses to the first 'barriers to walking' question, while additional 'feelings of safety' factors as potential barriers to walking are described in Section 8.3.11.

The most important perceived barriers to walking were related to walking infrastructure (ie poorly maintained or poorly lit footpaths) and the behaviour of other path/road users (ie dogs not under control, drivers failing to give way to pedestrians when required, and bicycle riders on shared paths) (see Figure 46).

Interestingly, "No footpaths on streets or roads" was a lower ranked barrier, even though in Section 8.3.6 (Figure 37), sealed footpaths were the most preferred walking surface, and "On streets and roads in built-up areas with no made footpaths" the least preferred walking surface. These apparent inconsistencies may be due to many respondents actually having sealed footpaths to walk on; in which case the *condition* of the footpaths becomes important. For those (minority) respondents who do not have sealed footpaths, their absence is likely to be an important barrier.

Similarly, the 10 factors in Figure 46 that rated on average between 'not a constraint' and 'a minor constraint' (ie average scores between 0.5 and 0.9), may be saying more about the prevalence of these potential barriers than their importance *per se*. Most of these 10 potential barriers were raised by participants in the focus group discussions (see Section 7), where several participants spoke very strongly about their concerns related to these factors. However, results from the survey suggest that these 'barriers' are not wide-spread, but rather, locality-specific.

There were few significant differences in barriers to walking based on participants' location; with the only significant difference ($p = 0.04$) being "Not enough pedestrian crossings": inner Melbourne (22.8% moderate or major constraint); middle Melbourne (15.6%); outer Melbourne (19.9%); rural/regional Victoria (13.5%). As discussed above, the broad-based regional breakdown used in this analysis is probably disguising considerable variation between LGAs in each region, and indeed between neighbourhoods *within* LGAs. Nevertheless, the findings do suggest that many areas are doing quite well in terms of providing useable (though not always well-maintained) walking infrastructure for senior adults. This is supported by the finding (in Section 8.3.12 below) that 79% of respondents rated their neighbourhood as being 'moderately or very walking-friendly'.

There were no significant differences in barriers to walking for those who walked for recreation (>1 hr/week) compared with those who do not; or for those who walked for transport (> 1 hr/week) compared with those who do not. This may be partly due to

'walking for transport' and 'walking for recreation' not being mutually exclusive categories (see Table 6). There were insufficient numbers to compare seniors who walk for transport-only (n = 66) with seniors who walk for recreation-only (n = 444) (see Table 6).

There was a tendency for most of the listed barriers to walking to be considered more of a constraint on walking by older compared with younger seniors; however, none of the differences was statistically significant.

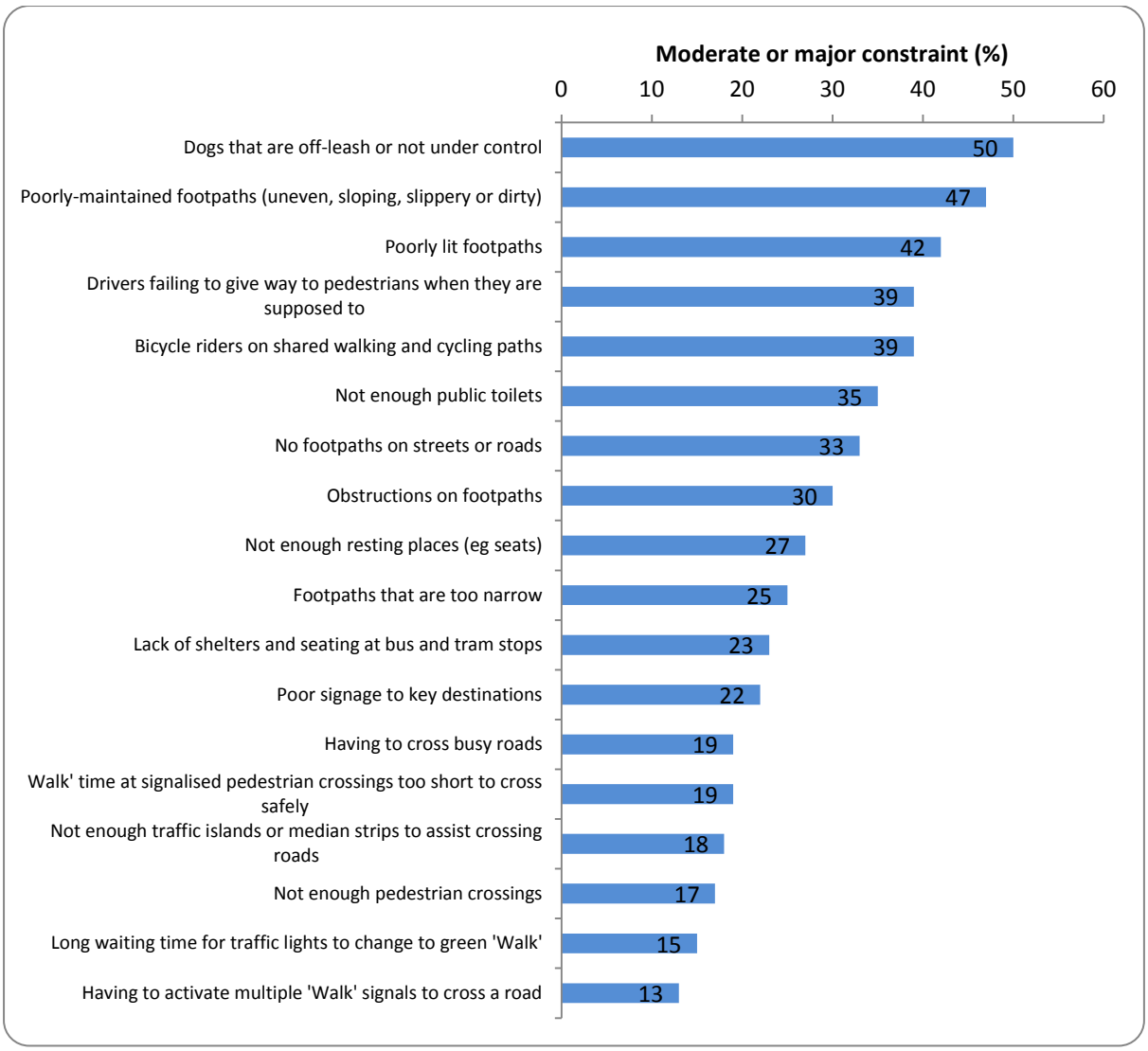


Figure 46: Barriers to walking: percentage of respondents indicating moderate or major constraint

(Response options were: 0 = No, doesn't put me off walking; 1 = Yes, a minor constraint; 2 = Yes, a moderate constraint; 3 = Yes, a major constraint)

8.3.10 Perceptions of safety when walking in neighbourhood

The majority of seniors feel safe or very safe (from assault, falls and traffic) when walking in their neighbourhood, though findings from the focus group discussions and open-ended

survey responses indicate that these levels of perceived safety are at least partly achieved by seniors modifying their walking behaviour. For example, some seniors qualified their responses by adding that they avoid walking at night in unlit areas, or routes without footpaths or that require hazardous road crossings. Thus, feelings of safety are partly a result of when, where and with whom they walk. These findings are consistent with those from a longitudinal study in the UK of seniors participating in a group walking program, where it was found that 'personal safety' was less of a barrier to walking at 12-month follow-up relative to baseline, possibly reflecting improved perceptions of personal safety when walking with a group rather than alone (Dawson et al 2007).

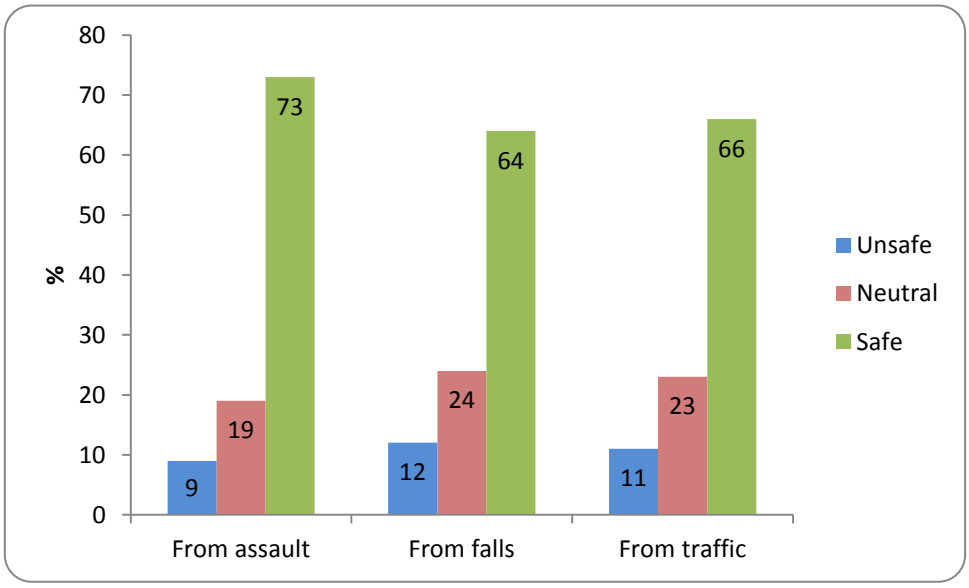


Figure 47: Perceived safety when walking in neighbourhood

8.3.11 Feeling safe while walking

Respondents were asked about the perceived impact of a range of measures on feelings of safety when walking (see Figure 48).

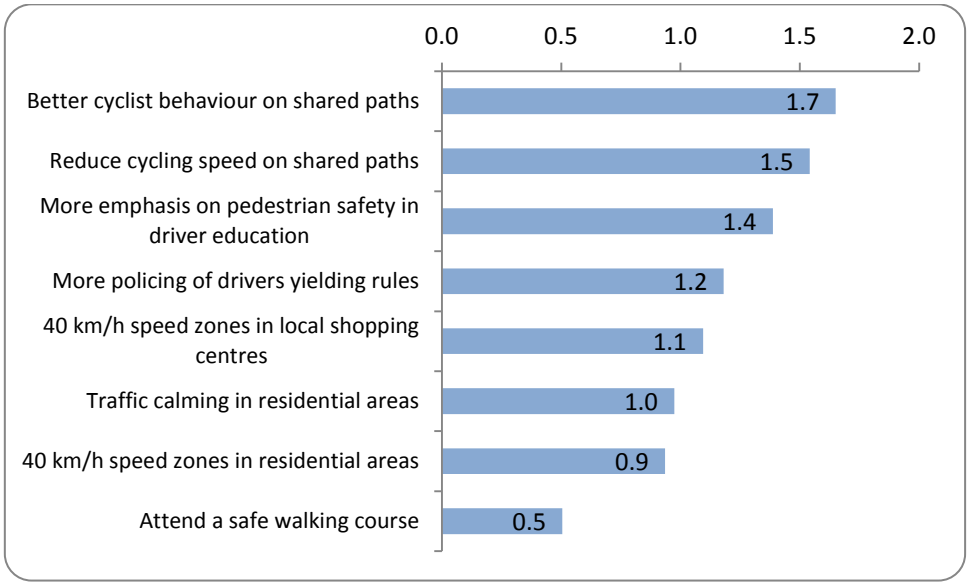


Figure 48: Measures impacting on feelings of safety while walking

(0 = No, wouldn't make me feel any safer; 1 = Yes, a bit safer; 2 = Yes, moderately safer; 3 = Yes, much safer)

As in Section 8.3.9, the behaviours of other path/road users (bicycle riders and drivers) appear to have the greatest impact on feeling safe while walking. Findings from the focus group discussions and responses to open-ended survey questions suggest that these behaviours may rate as more important than structural factors such as traffic calming and lower speed limits because they are more unpredictable hazards that are largely beyond the control of the walker. Traffic speed, on the other hand, is a predictable 'constant' hazard, with injury avoidance seen as largely the walker's responsibility.

Examples of comments reflecting these perceptions include:

> *"As a pedestrian, I am responsible for my own actions to be safe. I cannot blame a car driver for hitting me if I am careless or crossing in the wrong place."*
>
> *"Traffic does not worry me - I adapt to wherever I am."*
>
> *"I know how to walk even in the face of these challenges."*

Nevertheless, seniors largely rejected the need for them to attend an education/skills course on safe walking, with a number of open-ended comments along the lines of "*you're kidding!*" and "*how patronising*!" These responses are not necessarily inconsistent with the 'personal responsibility' responses above, with a likely explanation being that most seniors believe that they already have the knowledge and skills required to walk safely, and that it is

largely factors beyond their individual control (eg slips, trips and stumbles due to poorly maintained footpaths, cyclists passing too close or too quickly without warning, off-leash dogs rushing at them, and drivers failing to yield when they should) that create perceived and actual hazards.

These findings and their interpretation are supported by research literature indicating that older adults are the most cautious and law-abiding pedestrians (Harrell 1996) and that skills/education courses for senior pedestrians have limited effectiveness (Rivara et al 1997; Duperrex et al 2002; Dommes and Cavallo 2011; Dommes et al 2012).

Although the question format was different, there appeared to be more support for traffic calming in residential areas, and 40 km/hr zones in shopping precincts and residential areas (average of "Yes, a bit safer" for each 'speed' item, see Figure 48) than for the "30 km/hr traffic speed in residential areas" item in a previous question about what might assist them to walk more (see Figure 42). In contrast to the previous '30 km/hr' item, support for lower traffic speeds was greater among older seniors ($p = 0.014$, for 40 km/hr in residential areas; and $p = 0.020$ for 40 km/hr in local shopping centres). However, there were no significant differences for transport walking (yes/no) or region.

Lack of consistent, widespread, high-level support for lower traffic speeds may be partly due to the factors described above; namely, existing traffic speeds are a predictable 'constant' that individual walkers are largely deemed responsible for dealing with. The fact that the majority of respondents regularly drive a motor vehicle (see Section 8.3.7) might also influence attitudes to lower traffic speeds, as illustrated by comments such as:

> *"Give the poor motorist a break! It is still (and always will be) the best way to go from A to B."*

In addition, a number of focus group participants (most notably those who lived in outer Melbourne metropolitan and rural/regional areas) expressed the view that lower speed limits might lead to more impatience among drivers, and lack of compliance with the speed limits. This, in turn, may lead to more 'unpredictable' driver behaviour as discussed above; with 'unpredictability' possibly raising more safety concerns that predictably higher vehicle speeds.

Several findings in this study (including from the literature review, focus group discussions, and closed and open-ended survey questions) indicate that 'barriers to walking' for seniors need to be interpreted cautiously. The literature review identified that in some studies seniors who walk identify more barriers to walking than those who don't, possible because they are more likely to experience 'barriers' while walking. Indeed, in the present study, respondents who walked for recreation (< 1hr/week) checked more 'constraints-type' items in Question 8 (see Section 8.3.8) (average of 2.9) than respondents who walked less than 1 hr/week (average of 2.3). Similarly, respondents who walked for transport (< 1hr/week)

checked more 'constraints-type' items in Question 8 (see Section 8.3.8) (average of 3.0) than respondents who walked less than 1 hr/week (average of 2.6).

These findings suggest that it may be important to distinguish between barriers that (i) stop seniors walking; (ii) cause them fear/concern/anxiety, but they do it anyway (possibly because walking is such an important activity for seniors); or (iii) lead them to make different walking choices in terms of where, when and with whom they walk.

8.3.12 Walking-friendly neighbourhood ratings

Respondents were asked "Overall, how walking-friendly is your neighbourhood for you?" The majority of seniors (78%) rated their neighbourhood as moderately or very walking-friendly (see Figure 49), though there was some variation between regions. Seniors in the inner Melbourne region were most likely to rate their neighbourhood as 'Very walking friendly', and seniors in the outer Melbourne region were least likely to rate their neighbourhood as 'Very walking friendly' ($p = 0.02$ for 'Very walking friendly' compared with all other response categories combined) (see Figure 50).

Based on responses to a follow-up open-ended 'Any comments?' question, the main reason for not rating their neighbourhood as 'Very walking-friendly' was lack of footpaths, which appears to be more common in some outer Melbourne suburbs.

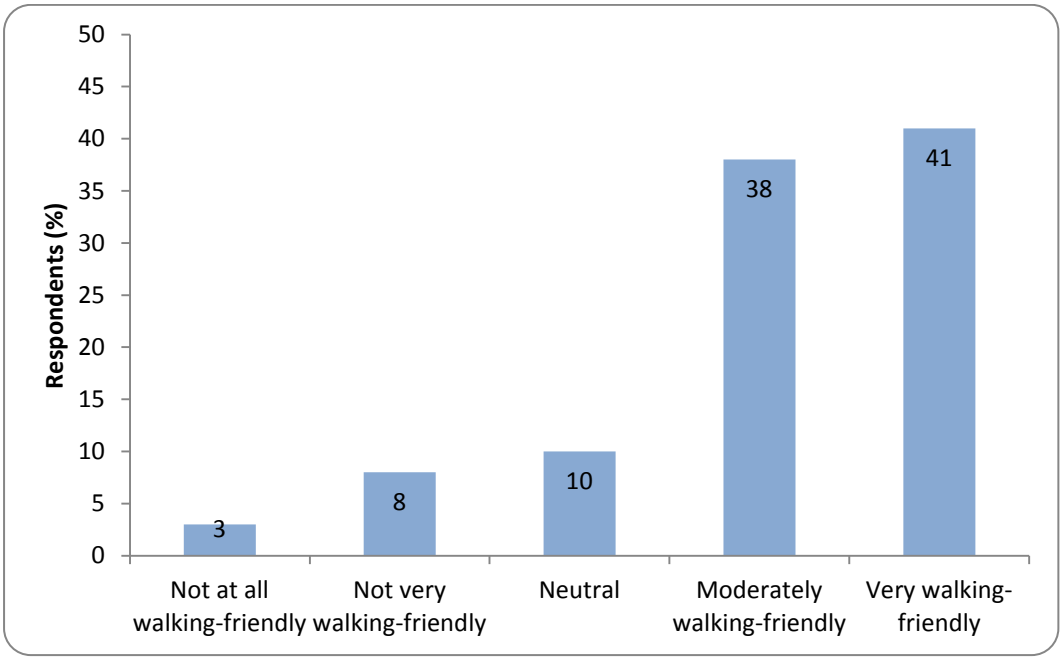


Figure 49: Walking-friendly neighbourhood rating

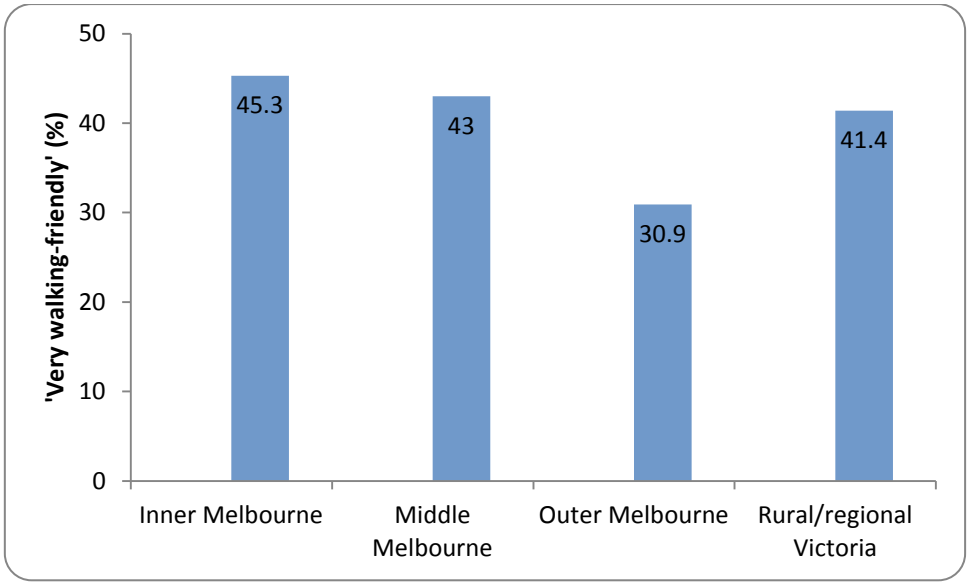


Figure 50: Walking-friendly neighbourhood by region

About a third of respondents (36%) had ever notified their local council or the state government (eg VicRoads) about a pedestrian hazard. Notifications were fairly evenly distributed across the four regions.

For those who had reported a pedestrian hazard, satisfaction with the response was mixed, as shown in Figure 51, with 41% stating that they were satisfied or very satisfied. A similar proportion (37%) was dissatisfied or very dissatisfied.

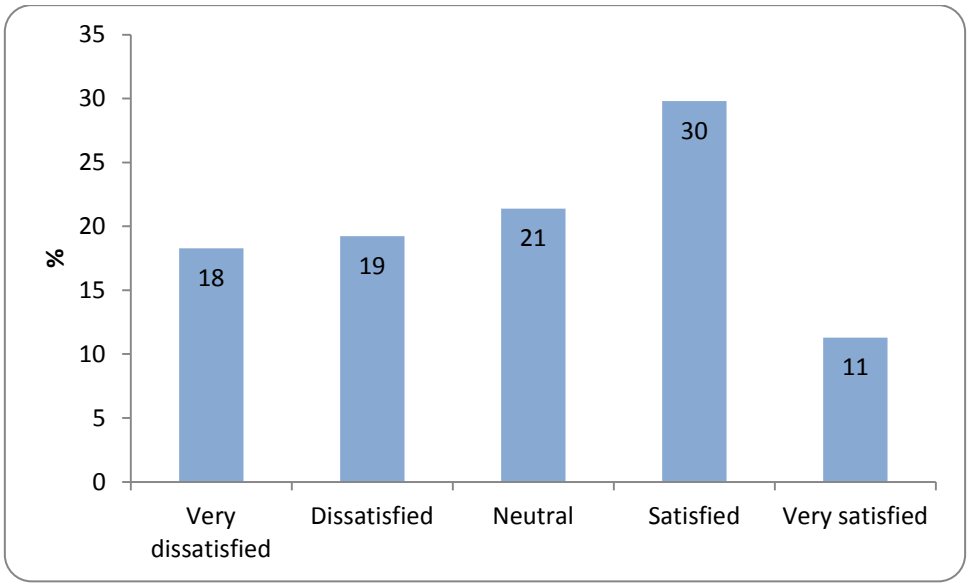


Figure 51: Satisfaction with Council/State Government responses to reporting a pedestrian hazard

There were no significant differences in levels of satisfaction/dissatisfaction across the four regions, suggesting variation by LGA rather than region, as illustrated by a range of positive

(occasionally) and negative (usually) comments in response to a follow-up open-ended question.

The most common concerns were slow (or no) response to notifying councils or VicRoads about a pedestrian hazard; identifying who is responsible for attending to pedestrian hazards (ie council, VicRoads, Telstra, private property owners, businesses); councils unable to take action because VicRoads controls the road; being ignored because they are pedestrians and/or seniors; and taking action to fix a hazard only *after* an injury has occurred.

Examples of comments (total of 109) are as follows:

> *"No-one listens – the aged people, they are treated as non persons."*
> *"Repaired immediately after being informed severe break to arm occurred (usually requests take ages to act on)."*
> *"The time taken to repair the broken footpaths is a real problem. I end up walking on the side of the road to avoid tripping or falling.*
> *"What is the use ??????"*
> *"Why complain? Takes up too much effort to find right people with little or no response."*
> *"A very dangerous pedestrian crossing in main street of our town. Because VicRoads controls centre roadway, no action can be taken. Side service road needs slower speed limit, not allowed under VicRoads criteria. Local residents very concerned and visitors constantly comment on danger and certainty that someone will be killed or badly injured."*
> *"Broken footpath. Caught my foot and landed heavily injuring my knee. Councils could not tell me who was responsible."*
> *"Council and VIC Roads each say it's the other's responsibility."*
> *"These organisations tend to be more concerned with looking after car and truck drivers than pedestrians."*
> *"Nothing was done."*

There were also some positive comments, indicating wide variability among LGAs:

> *"Maroondah has done excellent work."*
> *"It was about a hole in the footpath and it was repaired within days."*
> *"Fixed within hours."*

8.4 Concluding comments

This survey of 1128 senior Victorians provides useful findings regarding the meaning of walking for older adults, and factors that support and constrain walking behaviour. Walking

is important to these senior Victorians; for health, wellbeing, community engagement and mobility. While the sample comprised predominantly recreational walkers, some differences were identified between recreational and transport walkers in terms of reasons for walking, supports for walking, and constraints on walking. There were also some regional differences in walking supports and barriers, and also indications of differences *within* regions (eg at LGA and individual suburb level); however, this survey was not designed to examine differences at this level. Nevertheless, there appears to be potential to increase walking, including in the outer Melbourne region and in rural and regional Victoria, with walking infrastructure such as consistent provision of sealed and well-maintained footpaths a key element.

Many seniors are already motivated to walk. Consequently, increasing walking among seniors will involve providing more opportunities to walk, and reducing barriers to walking, rather than changing attitudes to walking, which are already very positive. Walking opportunities can be increased through the consistent provision of safe, attractive routes to desired destinations for recreational walkers, and safe, comfortable, direct routes to shops and services for transport walkers. Key barriers to walking include absent, poorly designed, or poorly maintained walking infrastructure. Improving safety and perceived safety, from both traffic and falls, is also important. 'Safer by design' measures, together with interventions designed to improve the behaviour of other path/road users such as drivers, bicycle riders and dog owners, will assist more seniors to walk more often, more safely and more confidently.

9 Conclusions and recommendations

This comprehensive study of seniors' walking in Victoria comprised four components: a literature review of supports and constraints on seniors' walking; analysis of seniors' walking data from the Victorian Integrated Survey of Travel and Activity (VISTA); focus group discussions with senior Victorians (8 focus groups, N = 32); and a survey of senior Victorians (N = 1128). This concluding section draws on key findings from the four study components and includes a set of recommendations for creating supportive environments to enable more senior Victorians to walk more often.

In this study, 'seniors' refer to people aged 60 years and over, and walking includes leisure-related walking (for recreation, exercise, fitness or sport) and utilitarian walking (ie walking as a mode of transport). While the study includes both recreational and transport walking, the main focus is on transport walking. Walking for transport has multiple co-benefits in addition to health benefits, and there is considerable potential to increase utilitarian walking among older adults in Victoria.

The conclusions are structured around eight key themes, each drawing on one or more of the four study components.

9.1 Physical activity is important for the health, well-being, mobility and independence of Victoria's large and rapidly increasing population of older adults

As outlined in the literature review (Section 5), there is consistent, strong evidence that physically active seniors are healthier, happier and more engaged in community life than seniors who are inactive. The benefits of physical activity for older adults outweigh the risks, and the maintenance or adoption of physical activity, including walking, is recommended for seniors of all ages (see Section 5.5).

At the population level, ill-health and functional limitations increase with age, but both the rate and the extent of the increases can be modified if more seniors participate in more physical activity. Large variations in seniors' rates of utilitarian walking both internationally and within LGAs in Victoria (see Figures 20 and 21) indicate that physical activity levels (in this case, walking) among older adults at the population level are not defined by ill-health and functional decline, but, rather, shaped by their physical, social/cultural and policy/regulatory environments (see Figure 11). This finding indicates that measures to increase walking among older adults should focus on creating supportive environments for walking.

When the conditions are created that facilitate utilitarian walking, many seniors will obtain the benefits of health-enhancing physical activity incidentally and at low cost, simply as a routine part of daily life. Many of these seniors may not necessarily be motivated to walk for health, but they are motivated to get to places to meet other needs such as shopping and conducting personal business. Utilitarian walking therefore has multiple motivational levers.

This helps to explain why utilitarian walking is a more socially inclusive form of physical activity than leisure-time physical activity, across age, gender and socioeconomic position (see Figure 10).

9.2 Walking is highly-valued among many older adults

Many seniors value walking highly. This was demonstrated consistently in the very positive attitudes to walking expressed in the focus group discussions and the survey, and also in the relatively high rates of walking for both recreation and transport found in national and Victorian surveys (see Section 4). As other forms of physical activity decline with age, walking becomes a more important form of physical activity; and as car use declines with age, walking becomes an increasingly important form of mobility. Mobility, in turn, is an important component of quality of life, social connectedness and community participation among older adults.

These findings suggest that creating supportive environments for walking and removing barriers to walking will be more effective in increasing seniors' walking than awareness-raising and education campaigns aimed at persuading older adults that walking is good for their health and they should do more of it. Awareness and attitudes are already high. What is required is support for doing what many seniors are already motivated to do. Action to achieve this goal is guided by research into factors that support and constrain seniors' walking.

9.3 Building on positive attitudes to walking by creating supportive environments for walking

A great deal of research has been conducted in the last decade or so into what makes an area 'walkable'. However, most of this research has focused on children, young people, and young and middle-aged adults. Although walkability is likely to vary with age, few studies have specifically investigated what constitutes a walkable neighbourhood for older adults. Older adults may have different household structures, lower income, experience health conditions that limit physical activity, be less likely to be in paid employment, less time-constrained, and less likely to drive a car; all of which are likely to interact with neighbourhood characteristics and impact on walking behaviour.

Research findings on supports and constraints on older adults' walking appear to be less definitive than comparable research involving general adult populations, but this may reflect the small volume of research. This study found some similarities between walkable environments for adults in general and walkable environments for older adults. Evidence pointing to similarities includes the strong, positive relationship between the area-level mode share of walking for all adults and the mode share of walking for seniors (see Figure 20); and the inverse relationship between walking trips and distances and distance from

central Melbourne, which is consistent with findings from a study of seniors' walking in Montréal (Moniruzzaman et al 2013).

The current study also found that, as for general populations, proximity to common destinations such as shops, services and public transport supports walking for transport. Further, and somewhat surprisingly, the distance that older adults state that they are able and prepared to walk to these destinations (Section 8), and their actual walking distances (Section 6), are similar to those of younger adult populations (approximately 1 km). This 'walkable' distance appears to decline only marginally for older seniors (aged 80+) (see Sections 6 and 8).

Due to these similarities between seniors and the general population, creating walkable environments for all citizens is likely to lead to more seniors walking. There are, nevertheless, some differences for older adults, suggesting that some seniors-specific measures are also required. This study found that the decision to walk to a destination is influenced by the design and maintenance of walking infrastructure such as footpaths; the behaviour of other path and road users (drivers, cyclists and dogs); the aesthetic appeal of the route; the opportunities for social interactions along the way or at the destination; the desire to "get out in the fresh air"; and the provision of seating, shelter (from rain and heat) and public toilets en route or at the destination. Well-maintained walking surfaces, in particular, are more important for older adults than younger adults because poor conditions can lead to both the fear of falling and fall injuries.

A more walkable environment is also one in which the choice to walk rather than drive short distances is an easier choice because walking is *prioritised* over car travel in the places where people frequently move around. Health-enhancing walking does not need to be undertaken with the intention of improving health. The multiple health benefits of walking can be achieved incidentally through moving around as part of daily life. It is therefore important to create environments where people walk short distances for multiple purposes because it is easier, more convenient, more appealing and more enjoyable than driving a car. This is discussed in the following section.

9.4 Walking for transport is as much a travel mode choice as a physical activity choice

Consistent with international literature, this study found that walking is more common when driving a car is not possible or not appealing. This may occur when older adults cannot, or choose not to drive; or if driving is difficult due to traffic congestion, lack of parking, or expensive parking. Many industrialised European and Asian countries that have high rates of walking for both general and seniors populations place greater restrictions on motor vehicle access, speeds, and parking in residential, shopping and service areas than do car-oriented countries such as Australia.

The community-based social marketing (CBSM) model for understanding and influencing sustainable behaviours such as active transport provides an explicit framework for examining what is frequently an implicit decision (McKenzie-Mohr 2011). As summarised in Table 9, the benefits and disbenefits of walking are weighed up (often implicitly) against the benefits and disbenefits of, for example, driving a car. Influencing mode choices (eg, to encourage walking) therefore involves measures aimed at increasing the perceived[29] benefits of walking and reducing the perceived barriers to walking, whilst also reducing the perceived benefits of driving a car and increasing the perceived barriers.

Table 9: Perceived benefits and barriers of walking and driving to get to places

	Target behaviour (walking)	Competing behaviour (travelling by car)
Perceived benefits	Eg, maintains mobility	Eg, saves time
Perceived barriers	Eg, no footpaths	Eg, car parking difficult or expensive

The social-ecological model of factors that influence walking (see Figure 11) provides a useful framework for understanding and influencing the perceived benefits and barriers of walking and driving. That is, when the built, social/cultural and policy/regulatory environments encourage car use and discourage walking, it is not surprising that people, including older adults, drive cars for short distances that are potentially walkable. These environmental influences are numerous, diverse, and range from the obvious (eg lack of footpaths) to the subtle (eg pedestrian crossings and signal phases aimed at facilitating vehicle flow rather than pedestrian flow). An illustration of the prioritisation of motor vehicle travel over walking in Australia is the failure to include pedestrian waiting time in benefit-cost analyses of road management policies. As described by Job (2012):

> *"...in Australia, estimations of benefit from various options at intersections include a cost for waiting time for vehicles and their drivers, but no cost of pedestrian waiting time. Thus, policy which favours even very small improvement in traffic movement over extensive waiting time for large numbers of pedestrians will still produce a positive benefit in these analyses"* (Job 2012).

Factors such as these represent subtle, but important influences on travel mode choices. They also illustrate the mutually interactive nature of the four domains of influence on

[29] In the CBSM model, 'perceived' is used in the sense of incorporating both perceived and actual benefits and barriers.

walking behaviour in the social-ecological model. In car-reliant countries, social/cultural factors supportive of car use influence policy/regulatory decision-making which in turn shapes the built environment, including transport systems. These interactive processes can equally be used to create change at multiple levels that is more supportive of walking for transport.

The example of bias in favour of motor vehicle mobility noted by Job (2012) is one of many relatively small factors that shape transport systems. However, the sum total of many small influences can add up to large differences in travel mode share; helping to explain, for example, why high proportions of seniors in countries such as Germany, Denmark, Switzerland, and the Netherlands, walk for transport (up to 48% of trips, compared with about 14% in Victoria) (Pucher and Dijkstra 2003). These international comparative data, together with the regional differences in walking behaviour reported in this study, indicate considerable potential for further increases in walking among senior Victorians.

9.5 Reducing barriers to walking

Pedestrian safety is a key focus of research into barriers to seniors' walking. Pedestrian safety generally focuses on traffic-related safety and personal safety. This is also the case for older adults, but for older adults, safety from falls needs to be included in safety considerations. In this study, personal safety was less of a concern than traffic safety and safety from falls (see Section 8), possibly because older adults tend to avoid walking alone at night, or in poorly-lit or isolated areas (see Section 7).

Traffic safety was more of a concern than personal safety (see Figure 47), but it was not considered by study participants to be a major constraint on walking. At first glance, this seems surprising, given that older adults are over-represented in pedestrian fatalities and serious injuries relative to younger pedestrians, and also relative to motor vehicle occupants (see Section 5.6). In fact older pedestrians are among the most vulnerable road users.

Findings from the focus group discussions provide some insight into older adults' perspectives on traffic safety while walking. Older adults are very aware of traffic hazards and adopt a high level of personal responsibility for their safety while walking. This includes selecting when and where to walk to minimise the risk of collision injuries. This is facilitated by many seniors having greater time flexibility than younger adults, though walking time and route selection may be less of an option for utilitarian walkers who require a more direct route to destinations, sometimes at fixed times.

Seniors are also more cautious and law-abiding pedestrians than younger adults (see Section 5.6). Cautious and adaptive walking behaviours identified in this study included yielding to motor vehicles (eg at pedestrian crossings and intersections), including when the road rules require drivers to yield to pedestrians (see Sections 7 and 8). There was a strong sense that drivers failing to yield is 'normal', and it is the pedestrian's responsibility to avoid

a collision because they are the ones who are more likely to be seriously injured. Media and road safety authorities' discourses associated with older pedestrians' traffic fatalities and injuries, which effectively 'blame' older pedestrians for not taking more care on the roads, support this perspective (see Garrard [2008] and http://www.victoriawalks.org.au/News.aspx?NewsID=1406). This differs from the situation in many European countries, where drivers have a high duty of car to avoid collisions with pedestrians, especially older adults and children, who might be expected to make errors while using the road system. Drivers are taught to anticipate these behaviours, and are held responsible for driving accordingly (Buehler and Pucher 2012).

Perhaps surprisingly, there was no consistent, strong support in this study for measures such as speed reduction that have been shown to be effective in reducing pedestrian injuries. A possible reason for this is the 'personal responsibility for safety' perspective noted above. There was, however, among some study participants, also a desire not to impede motor vehicles, and concern that lower speed limits would not be adhered to, thus leading to increased risk. In addition, most study participants were recreational walkers (who can often avoid hazardous road conditions), who also regularly drive for transport and might therefore be less sympathetic to lower speed limits. Consistent with this interpretation was the finding that support for lower speed limits was higher among seniors who walk for transport, and among seniors living closer to central Melbourne who are less likely to drive.

9.6 Other path/road users

Senior Victorians expressed considerable concern about the behaviour of other path users, particularly cyclists and dogs. Cyclists who come from behind quietly, and pass closely at high speed were a key concern for seniors using shared paths, leading some seniors to avoid using shared paths. However, Australian studies of cyclist-pedestrian interactions indicate relatively low rates of cyclist-pedestrian near-collisions, collisions, or injuries (see Section 5.6). Similarly, injuries involving dogs on public streets, paths and roads are relatively infrequent in Victoria (Cassell and Ashby 2009), but unleashed or uncontrolled dogs were a key safety concern for seniors while walking (see Figure 46). These findings highlight the impact of both actual and perceived safety on walking behaviour, and consequently, the importance of understanding and addressing both aspects of safety.

It appears that the unexpected nature of these sudden interactions with bicycles and dogs contributes to concerns about these potential walking hazards, as does the fact that they are largely beyond the control of the walker. This seems to contrast with motor vehicle traffic hazards which are perceived to be more common, predictable and avoidable. This interpretation is consistent with the risk perception literature, which documents that infrequent events over which individuals have little control are perceived as riskier than common, potentially more harmful events over with individuals have greater control (Fischhoff et al 2002). Nevertheless, seniors' walking behaviour is influenced by both actual

and perceived risks, so reducing the fear, anxiety and stress associated with interactions with cyclists and dogs is likely to be as important for increasing seniors' walking as injury risk reduction.

Reductions in both fear of injury and actual injury can be achieved through good infrastructure design and maintenance; regulation and enforcement of behaviour; and education. Study participants recommended all of these measures, though the main focus was on infrastructure and education. Separate paths were the preferred means of reducing fear and injury associated with interactions with other path users. However, several focus group participants also argued strongly for the development of a culture of safe, courteous interactions between all path/road users (see Section 7). Educational measures were seen as particularly important when infrastructure is less than ideal; for example, when separate paths are unavailable, paths are constricted or congested, sight lines are poor, or multiple path/road crossings are necessary.

9.7 Avoiding fall injuries and reducing the fear of falling

Research into the safety of older pedestrians has focused on reducing traffic-related injuries, particularly injuries due to collisions with motor vehicles (Section 5.6). While this is important in view of the over-representation of senior pedestrians in traffic fatalities and serious injuries, reducing fall injuries is also important. Fall injuries (of all types) increase with age, and while Australian data are not readily available, international studies report that fall injuries on public paths and roads outnumber pedestrian traffic-related injuries.

Consequently, safe walking infrastructure for older adults needs to be viewed in terms of falls prevention as well as motor vehicle collision prevention. Of particular importance is the maintenance of walking surfaces to prevent slips, trips and stumbles due to uneven, sloping or slippery surfaces and unexpected obstacles. It is also important to recognise that concerns about falling can contribute to collision injuries, as older pedestrians spend more time than younger pedestrians gazing downwards at the path/road surface when crossing roads than gazing upwards and around at moving vehicles (see Section 5.6).

9.8 The relationship between barriers to walking and walking behaviour

Findings from across the four components of this study indicate that research findings on barriers to walking need to be interpreted cautiously. Some studies have found that (more) perceived barriers to walking are associated with *more* walking; suggesting that the experience of walking may lead to greater awareness of potential walking hazards. The concept of 'barriers to walking' for older adults is therefore complex, with 'barriers' having a number of possible impacts including (a) less walking; (b) less *enjoyable* walking; (c) more hazardous walking; (d) more careful walking; or (e) avoidance of adverse walking conditions by selecting when and where to walk.

It appears likely that all five of these impacts occur to varying degrees in response to 'barriers', with the actual impacts depending on the specific barriers and the personal characteristics of older adults, such as their health status or their motivations to walk (or not). In this study, some participants commented that certain barriers/hazards do not stop them walking, but do stop friends or family members who have health problems or do not enjoy walking.

Research into barriers to older adults' walking tends to focus on the more micro-level barriers identified by older adults, such as the design and maintenance of footpaths and the behaviour of other road/path users. It is important to address these barriers, regardless of to what extent they actually stop seniors walking, or make walking unpleasant or hazardous. It is also important to address macro-level barriers such as urban form and road and transport infrastructure, though these factors rarely emerge from surveys of older adults' walking attitudes, behaviours, supports and constraints.

9.9 Recommendations for increasing walking for senior Victorians

Based on the combined findings from the four components of this study, the following recommendations are proposed to assist more senior Victorians to walk more often.

It is recommended that:

1. The Government of Victoria develop a cross-sectoral Victorian walking strategy that:
    a. acknowledges that walking is an important and legitimate form of personal mobility, especially for older adults;
    b. sets targets for increased walking among all population groups, including older adults;
    c. includes macro-level measures associated with urban form and transport planning, and micro-level measures such as the consistent provision of well-designed and maintained footpaths and road crossings; and
    d. includes a range of measures (as described above in Section 8) that address the needs of senior Victorians who walk for recreation and transport.
2. Planning for walkability recognises that the majority of seniors are prepared to walk up to 1km to reach destinations. Land use planning policies and agencies ensure that housing intended for seniors is located within 1km of activity centres.
3. The Government of Victoria develop a road safety strategy aimed at increasing the safety and perceived safety of walking for older adults that includes safety from traffic and safety from falls, based on creating a *Safe System* for older pedestrians that includes:
    a. ***safer roads and road environments***, including separated walking and cycling facilities, particularly in high pedestrian or cycling areas;
    b. ***safer vehicles***, including adopting the stricter Euro NCAP criteria for pedestrian safety in order to achieve a 5-star vehicle safety rating;

    c. ***safer speeds***, including lowering speed limits in residential and high-pedestrian areas; and
    d. ***safer road/path users***, including regulation, road rule enforcement and education of drivers, cyclists, and dog-walkers.
4. The Government of Victoria establish a walking infrastructure funding program to provide for ongoing investment in walking infrastructure at state and local government levels.
5. Separated walking and cycling paths are provided where high volumes of pedestrians, particularly seniors, or high numbers of cyclists, are present or anticipated.
6. Federal, state and local government policies and programs aimed at increasing active and sustainable transport include senior pedestrians as a specific target group.
7. Support for advocacy for older pedestrians is provided at state and local levels, in recognition of the fact that pedestrians, especially older pedestrians, have specific requirements that need to be represented in urban and transport planning decisions that impact on their health, wellbeing, independence and mobility.
8. Local councils establish a rolling program of auditing the walkability of key areas such as activity centres, retirement villages, aged care facilities and their surrounds and provide follow up maintenance and/or infrastructure improvement.
9. The council audit program includes assessment of the surface quality of footpaths and road crossing points (formal and informal), and adequacy of lighting, to avoid trip hazards for pedestrians.
10. Regular formal crossing opportunities are provided on roads with high traffic volumes or speeds, and areas where seniors are likely to be walking for transport.
11. Longer crossing times are provided at signalised intersections, either generally at intersections that are likely to be used by high numbers of seniors, or with pedestrian responsive signals (eg PUFFIN signals).
12. Council animal control officers are aware of the high importance for senior pedestrians of dog control on footpaths and shared paths.
13. Authorities responsible for shared paths raise awareness among dog walkers of the importance of dog control, particularly for older pedestrians.
14. Relevant government agencies explore options for managing cyclist speed on shared paths, including education and adaption of ‘traffic calming’ measures.
15. Responsible authorities place greater emphasis on policing issues impacting on older pedestrians such as car drivers who fail to yield to pedestrians when required; car drivers who block pedestrian crossings and footpaths; and bicycle riders who ride on footpaths.
16. Road management authorities avoid installing slip-lanes and roundabouts in residential and pedestrian areas unless they include pedestrian crossings.

In conclusion, walking for recreation and transport is important for the health and mobility of older adults, with multiple benefits for seniors of all ages. Factors that support and constrain walking among older adults are numerous and wide-ranging, and, currently, not well understood. The evidence does suggest, however, that creating living spaces that support rather than constrain walking requires an integrated package of measures based on the principle that walking is an important form of mobility that, in many neighbourhood settings, should be prioritised over motor vehicle travel for short, local trips. The precise content of such a package of measures is likely to vary somewhat by location, but broad guidance is available in the form of a growing number of countries, cities and towns that have successfully created the conditions that assist older adults to remain healthy, mobile, socially connected, and engaged in community life through walking as a regular part of daily life (Buehler and Pucher 2012; GOAL Consortium 2012; ITF/OECD 2012).

Appendix A: Focus Group Discussion Format

Seniors walking project

Demographic questionnaire (anonymous)

1. Are you MALE or FEMALE?

   Male ☐
   Female ☐

2. What is your AGE group?

   60-69 ☐ 70-79 ☐ 80-89 ☐ 90+ ☐

3. What SUBURB or TOWN do you live in? _____

4. Are you in paid employment?

   Yes, full-time ☐
   Yes, part-time ☐
   No ☐

5. Approximately how often do you usually walk (i) for fitness, leisure or social reasons; and (ii) to get to places such as shops, services, train, bus or tram stops, work, and to visit family and friends?

	Most days	3-5 days a week	1-2 days a week	Not at all
Walking for fitness or leisure	☐	☐	☐	☐
Walking to get to places	☐	☐	☐	☐

6. How do you <u>usually</u> travel to get to places?
   Please list up to THREE, starting from 1. for most often.

Car as driver	☐	**Car as passenger**	☐	**Walk**	☐
Bicycle	☐	Bus	☐	Tram	☐
Train	☐	Taxi	☐	Other	☐

7. How would you describe your ability to get around by foot?

Excellent	Very good	Good	Average	Poor	Very poor
☐	☐	☐	☐	☐	☐

THANK YOU!

Discussion format

I'd like to just start off with a very general question:

1. When I mention the word 'walking', what words, ideas, or thoughts come to mind?

Thank you. People walk for exercise and leisure, and also to get to places. I'd like to talk about all of these forms of walking.

2. Can you please tell me about any walking that you do for exercise, leisure, or to get to places?
3. Does walking give you a feeling of being connected to your community?
4. Are there times when you would like to walk but don't? What sort of things stop you?
5. Do you have any concerns about your safety when you are walking? (explore what they are, and include traffic safety and personal security)
6. Do you think reducing speed limits in some areas would make it safer and more pleasant for you to get around in your neighbourhood?
7. Does the behaviour of other road users (drivers, motorcyclists, cyclists, skateboarders, other pedestrians) put you off walking, or make it unpleasant? (explore the difference)
8. What about crossing roads at intersections and pedestrian crossings – is this a problem for you? (explore signalised crossings, sliplanes and roundabouts).
9. What about crossing roads away from intersections where there are no traffic lights or pedestrian crossings – is this a problem for you?
10. Do you think older pedestrians take risks on the roads?
11. Overall, would you describe your neighbourhood as walking-friendly? (explore).
12. What could be done to make walking trips safer and more appealing in your neighbourhood?
13. What else would encourage you to walk more in your neighbourhood?
14. Would it matter to you much if you could no longer walk for recreation/exercise or to get around? What (if anything) would you do instead?

THANK YOU!

Appendix B: Survey questionnaire

Seniors Walking Survey

Are you aged 60 years or older and able to walk (including using a walking aid)?

If so, you are cordially invited to complete this survey, which is being conducted for Victoria Walks and COTA (Council On The Ageing) Victoria. The survey findings will be used to help improve walking conditions for senior Victorians.

It will take about 10-15 minutes to complete.

Participation is voluntary, and your answers are completely anonymous.

Please mail your completed survey to Dr Jan Garrard using the attached stamped, addressed envelope (Dr Jan Garrard, PO Box 6126, Cromer, Victoria 3193).

Thank you in anticipation - we appreciate your assistance.

If you have any questions about the survey, please contact Dr Jan Garrard (jgarrard@iinet.net.au or 0400 575 586).

Please turn over to commence the survey.

1. ***Do you walk (for recreation, exercise or to get to places) for any of these reasons? (tick one box for each row)***

	No, not important[1]	**Yes, somewhat important[2]**	**Yes, moderately important[3]**	Yes, very important[4]
To improve or maintain my health	☐	☐	☐	☐
To get around independently	☐	☐	☐	☐
Because I don't drive a car	☐	☐	☐	☐
Getting out in the fresh air	☐	☐	☐	☐
Walking is more enjoyable than driving	☐	☐	☐	☐
Staying fit so I can look after myself	☐	☐	☐	☐
Taking the dog for a walk	☐	☐	☐	☐
To get to public transport	☐	☐	☐	☐
Interesting or attractive walking routes or destinations	☐	☐	☐	☐
Getting out and about in the neighbourhood	☐	☐	☐	☐
Seeing or chatting with people along the way	☐	☐	☐	☐
Walking has become a habit for me	☐	☐	☐	☐
Walking makes me feel good	☐	☐	☐	☐
I enjoy walking with other people	☐	☐	☐	☐

2. ***In an AVERAGE WEEK, how much time do you spend walking for RECREATION OR EXERCISE? (Don't include walking to GET TO PLACES such as shops) (tick one box)***

Less than 30 minutes ☐[1]
30 minutes - 1 hour ☐[2]
1 - 1.5 hours ☐[3]
1.5 - 2 hours ☐[4]
2 - 2.5 hours ☐[5]
2.5 - 5 hours ☐[6]
More than 5 hours ☐[7]

3. In an AVERAGE WEEK, how much time do you spend walking TO GET TO PLACES such as shops, appointments, social activities, or train, tram or bus stops? (tick one box)

- Less than 30 minutes ☐ 1
- 30 minutes - 1 hour ☐ 2
- 1 - 1.5 hours ☐ 3
- 1.5 - 2 hours ☐ 4
- 2 - 2.5 hours ☐ 5
- 2.5 - 5 hours ☐ 6
- More than 5 hours ☐ 7

4. Do you walk to any of the following places? (tick ONE or MORE boxes)

- Shops ☐
- To visit family or friends ☐
- Services such as library, health care, leisure facilities ☐
- Social events/outings/activities ☐
- Train, tram or bus stops ☐
- Work (paid) ☐
- Work (unpaid/voluntary) ☐
- Other places ☐
- None of the above ☐

5. How far are you able to, or prepared to walk to places like shops, services, social events or train, tram or bus stops? (exclude walks that are mainly for recreation or leisure) (tick one box)

- Up to 200 metres ☐ 1
- 200 - 500 metres ☐ 2
- 500m - 1 km ☐ 3
- 1-2 km ☐ 4
- More than 2 km ☐ 5

The next questions are about all forms of walking (ie for recreation and getting to places)

6. Is walking your only or main form of exercise?

- Yes ☐ 1
- No ☐ 2

7. What type of surfaces do you prefer to walk on? (tick ONE or MORE boxes)

Footpaths (sealed)	☐
Shared walking and cycling paths	☐
On streets or roads in built-up areas with no made footpaths	☐
Along roads without footpaths in rural/regional areas	☐
Unsealed walking or hiking trails, tracks or paths	☐
Along the beach	☐
Indoors (eg shopping centre walking group, gym, at home)	☐

8. Would you walk more if: (tick ONE or MORE boxes)

You had more time	☐
Your health was better	☐
The weather was better	☐
There were fewer hills	☐
You felt safer from traffic	☐
You were more confident of your walking ability	☐
There was less traffic	☐
Local streets were designed so that traffic travels under 30 km/h	☐
There were more places, shops or services to walk to	☐
Public transport services were closer to home	☐
I already walk enough	☐

9. Do any of the following put you off walking? (tick one box for each row)

	No, doesn't put me off walking[1]	**Yes, a minor constraint**[2]	**Yes, a moderate constraint**[3]	Yes, a major constraint[4]
Having to cross busy roads	☐	☐	☐	☐
Not enough pedestrian crossings	☐	☐	☐	☐
'Walk' time at signalised pedestrian crossings too short to cross safely	☐	☐	☐	☐
Long waiting time for traffic lights to change to green 'Walk'	☐	☐	☐	☐
Having to activate multiple 'Walk' signals to cross a road	☐	☐	☐	☐
Not enough traffic islands or median strips to assist crossing roads	☐	☐	☐	☐
No footpaths on streets or roads	☐	☐	☐	☐
Poorly-maintained footpaths (uneven, sloping, slippery or dirty)	☐	☐	☐	☐
Footpaths that are too narrow	☐	☐	☐	☐
Obstructions on footpaths	☐	☐	☐	☐
Poorly lit footpaths	☐	☐	☐	☐
Poor signage to key destinations	☐	☐	☐	☐
Not enough resting places (eg seats)	☐	☐	☐	☐
Not enough public toilets	☐	☐	☐	☐

Lack of shelters and seating at bus and tram stops	☐	☐	☐	☐
Drivers failing to give way to pedestrians when they are supposed to	☐	☐	☐	☐
Bicycle riders on shared walking and cycling paths	☐	☐	☐	☐
Dogs that are off-leash or not under control	☐	☐	☐	☐

Any comments? _____

10. How safe from assault/attack do you feel when walking in your neighbourhood?

- Very unsafe ☐ 1
- Unsafe ☐ 2
- Neutral ☐ 3
- Safe ☐ 4
- Very safe ☐ 5

11. How safe from falling do you feel when walking in your neighbourhood?

- Very unsafe ☐ 1
- Unsafe ☐ 2
- Neutral ☐ 3
- Safe ☐ 4
- Very safe ☐ 5

12. How safe from traffic do you feel when walking in your neighbourhood?

- Very unsafe ☐ 1
- Unsafe ☐ 2
- Neutral ☐ 3
- Safe ☐ 4
- Very safe ☐ 5

13. Would any of the following make you feel safer when walking? (tick one box for each row)

	No, wouldn't make me feel any safer[1]	Yes, a bit safer[2]	Yes, moderately safer[3]	Yes, much safer[4]
Traffic calming to slow traffic in residential areas	☐	☐	☐	☐
More policing of the road rules for when drivers should give way to pedestrians	☐	☐	☐	☐
More emphasis on pedestrian safety in driver education and licensing	☐	☐	☐	☐
More 40 km/h speed zones in residential areas	☐	☐	☐	☐
More 40 km/hr speed zones in local shopping centres	☐	☐	☐	☐
Better behaviour among cyclists on shared walking/cycling paths	☐	☐	☐	☐
Reduce cycling speed on shared walking/cycling paths	☐	☐	☐	☐
Attending an education/skills course on safe walking	☐	☐	☐	☐

Any comments?

_____

14. Have you ever notified your local council or the state government (eg VicRoads) about a pedestrian hazard?

Yes ☐[1]

No ☐[2]

15. Were you satisfied with the response? (tick one box)

Not Applicable	☐ 0
Very Dissatisfied	☐ 1
Dissatisfied	☐ 2
Neutral	☐ 3
Satisfied	☐ 4
Very Satisfied	☐ 5

Any comments?

_____

_____

16. Overall, how walking-friendly is your neighbourhood for you? (tick one box)

Not at all walking-friendly	☐ 1
Not very walking-friendly	☐ 2
Neutral	☐ 3
Moderately walking-friendly	☐ 4
Very walking-friendly	☐ 5

Any comments?

_____

_____

Lastly, some questions about you.

17. Are you MALE or FEMALE?

Male	☐ 1
Female	☐ 2

18. What is your AGE group?

60-69 years	☐ 1
70-79 years	☐ 2
80-89 years	☐ 3
90+ years	☐ 4

19. What is your POSTCODE?

_____

20. How often do you: (tick one box for each row)

	Rarely or never[1]	A few times a year[2]	A few times a month[3]	A few times a week[4]	Most days[5]
Drive a motor vehicle	☐	☐	☐	☐	☐
Travel by car as a passenger	☐	☐	☐	☐	☐
Use public transport	☐	☐	☐	☐	☐

21. Do you use a mobility aid for walking (eg walking frame, walking stick, shopping jeep, electric scooter, wheelchair)? (tick one box)

Never ☐[1]
Occasionally ☐[2]
Often ☐[3]
Most or all of the time ☐[4]

22. How would you describe your ability to get around by foot? (tick one box)

Very poor ☐[1]
Poor ☐[2]
Average ☐[3]
Good ☐[4]
Very good ☐[5]
Excellent ☐[6]

23. Is there anything else you would like to comment on?

_____

_____

_____

_____

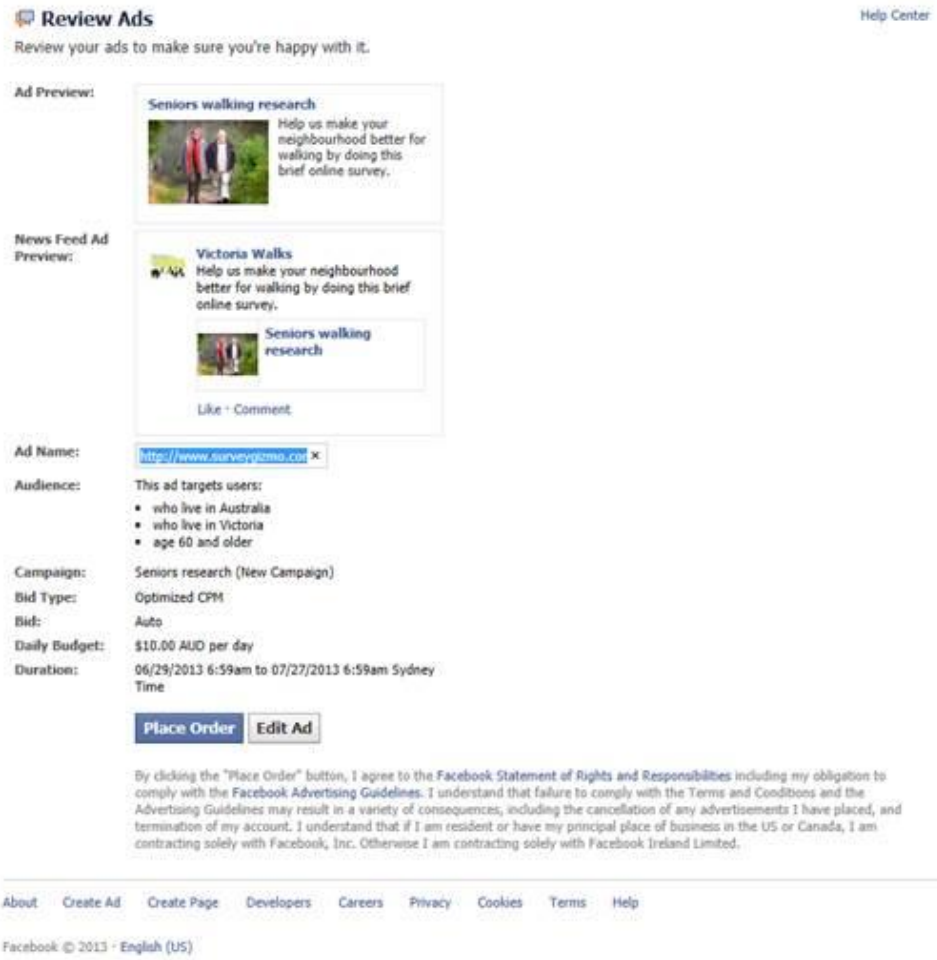
End of Survey

THANK YOU FOR TAKING OUR SURVEY - YOUR RESPONSES ARE VERY IMPORTANT TO US.

Please mail your completed survey to Dr Jan Garrard using the attached, addressed postage paid envelope

(Dr Jan Garrard, PO Box 6126, Cromer, Victoria 3193)

Appendix C: Facebook advertisement



Appendix D: Melbourne metropolitan LGAs and Regions

Central Region	Inner Region	Middle Region	Outer Region
Melbourne	Maribyrnong	Hobson's Bay	Wyndham
Port Philip	Moonee Valley	Brimbank	Melton
Yarra	Moreland	Banyule	Hume
	Darebin	Manningham	Whittlesea
	Boroondara	Maroondah	Nillumbik
	Stonnington	Whitehorse	Yarra Ranges
	Glen Eira	Knox	Cardinia
		Monash	Casey
		Dandenong	Frankston
		Kingston	Mornington Peninsula
		Bayside	

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