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ROADS, SOCIAL SEVERANCE AND ELDERLY PEDESTRIANS: A PALMERSTON NORTH PILOT STUDY.

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Abstract

Social severance, both physical and psychological, refers to the negative social impacts caused by roads and their traffic. Social severance falls most heavily upon groups of people with limited mobility, including the elderly. This thesis examines the extent to which social severance is experienced by elderly pedestrians. A research framework is developed and its utility for identifying and measuring social severance effects on elderly pedestrians is assessed in relation to a pilot study carried out in Palmerston North.

A literature review was undertaken on how the elderly are affected by social severance, as users of both roads and vehicles. Following this, Tate's (1997) framework is adapted for identifying and measuring social severance effects on elderly pedestrians. First, questionnaires were completed by elderly people living in Palmerston North, the majority of whom were from the Palmerston North Senior Citizens Club. Second, semi-structured interviews were conducted with 12 elderly pedestrians drawn from the questionnaire respondents. Findings of both research methods were then analysed.

It was found that social severance is experienced significantly by elderly pedestrians in everyday living in relation to established residential streets. The data suggests psychological severance is experienced more by elderly pedestrians when they and their neighbours have lived and owned their homes for a lengthy period of time. Income, health, disability and lack of choice are identified as factors constraining mobility and access to facilities and social activities. However, this is exacerbated by the lack of knowledge on the part of elderly pedestrians about the facilities and transport services available to them. The mobility and accessibility of elderly pedestrians is also constrained by inadequate public transport, poor road design and, poor crossing facilities. Safety and confidence of elderly pedestrians when walking is decreased at certain times of the day, by people's driving behaviour, lack of lighting and poor road design. These findings point for the need for social severance to be given more weight when improvements to existing road networks as well as new road developments are proposed.

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Chapter One: Introduction

Road developments and transport systems present substantial barriers to many users and more importantly, potential users. Some impacts are obvious; others are hidden. Some are physical; others reside in people's perceptions and attitudes (Ker, 1996). This has led to the study of social severance which examines the social impacts[1] resulting from the development of roads. Social severance is a real and observable problem that disrupts social interaction. However, the complexity of social severance is not well understood (Tate, 1993a).

Social severance effects are not spread evenly amongst people, according to Lee and Tagg (1976). The impacts of social severance fall most heavily on groups of vulnerable people with low mobility. These transport-disadvantaged people use walking as their principal form of transport for reasons that range from emotional to financial (Skelton, 1992). The degree of effect varies with a person's age, being more severe for children and the elderly. Recent work in New Zealand, by Tate (1991; 1993a; and 1996), on the effects of social severance on children, has highlighted the need to find out more about social severance and its effects on the elderly.

Warnes (1992) describes elderly road users as being some of the most vulnerable pedestrians. Transportation gives elderly people a sense of independence and control over their lives. It allows them to do many varied activities including visiting friends, and receiving health care. A lack of transportation can lead to isolation, poor health, and decreased well-being (Novak, 1997). However, there is a research gap in New Zealand and internationally on the effects of social severance on the elderly with even less literature on elderly pedestrians than there is on elderly drivers (Burt, 1972; Lee and Tagg, 1976; Morton-Williams et al., 1978; Tate, 1991; Clark et al, 1992; and Transport and Environment Committee, 1998).

Given the increasing significance of the elderly as a group in the New Zealand population, there is a need to fully understand how the elderly are affected by social severance. The research undertaken in this study is designed to meet part of this identified research gap by examining how elderly pedestrians are affected by transport systems, namely roads.

Thesis aim

The aim of the research is to examine the extent to which social severance is experienced by elderly pedestrians. A research framework is adapted and applied as a pilot study in Palmerston North.

Thesis objectives

In order to achieve the overall aim of this thesis, four objectives have been developed: (1) to understand how the elderly and in particular, elderly pedestrians are effected by social severance arising from road developments; (2) to adapt Tate's (1997) framework for identifying and measuring the effects of social severance on elderly pedestrians; (3) to apply the research framework to a pilot study of Palmerston North; and (4) to evaluate the utility of the research framework for identifying and measuring social severance effects experienced by elderly pedestrians.

Methodology and structure of thesis

Objective one is achieved by conducting a literature review. This review of literature concerning the social severance effects on elderly pedestrians provides the basis for Chapter Two. A variety of literature is canvassed from different fields including transport planning, engineering and social science. The range of problems the elderly face associated with road developments is highlighted as is the lack of previous research in New Zealand. This sets the scene for a more detailed enquiry into the New Zealand context.

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[1] Social impacts and social effects of social severance are used interchangeably in this research.

Chapter Three consists of the research design and methodology for this thesis. Objective two is achieved by adapting Tate's framework (1997) for assessing social severance effects on elderly pedestrians. The Palmerston North pilot study is outlined, and research methods described. The selection of the two methods used in research investigations is discussed, and the questionnaire and interview schedules are developed.

Objective three relates specifically to the application of the research framework achieved by undertaking two phases of research: questionnaires; and semi-structured interviews. Chapters Four and Five contain the findings obtained during these research investigations.

Objective four is addressed in Chapters Six and Seven. Chapter Six analyses the findings from the research investigations. Chapter Seven evaluates the usefulness of the research framework for identifying and measuring social severance effects experienced by elderly pedestrians and presents the conclusions derived from the overall study.

Chapter Two: Social Severance and the Elderly

The objective of this chapter is to outline how the elderly and specifically, elderly pedestrians, are affected by social severance arising from road developments. This is achieved by first, defining 'the elderly' and 'social severance'. Second, the elderly are discussed from a transport perspective. The effects of social severance on elderly pedestrians are examined. Finally, recent work on measuring social severance and assessing social severance impacts in New Zealand is discussed.

Definition of key terms

In discussing the negative effects that roads and their traffic have on the social interaction of the elderly, it is useful to sequentially characterise social severance and the elderly (Tate, 1993a). Both terms are defined and then examined.

Elderly

The elderly are defined by Rosenbloom (1990) and many others including Statistics New Zealand (1997b) as people aged 65 years and over. This is the age specified by the Organisation for Economic Co-operation and Development (OECD) (1985) when most people in Western countries have withdrawn from the labour market. This is important in New Zealand because elderly people are an increasingly significant proportion of the population. Predictions made by Statistics New Zealand (1997b) suggest that one quarter of New Zealand's population will be over the age of 60 by the year 2031 (Figure 2.1) (Land Transport Safety Authority, 1994).

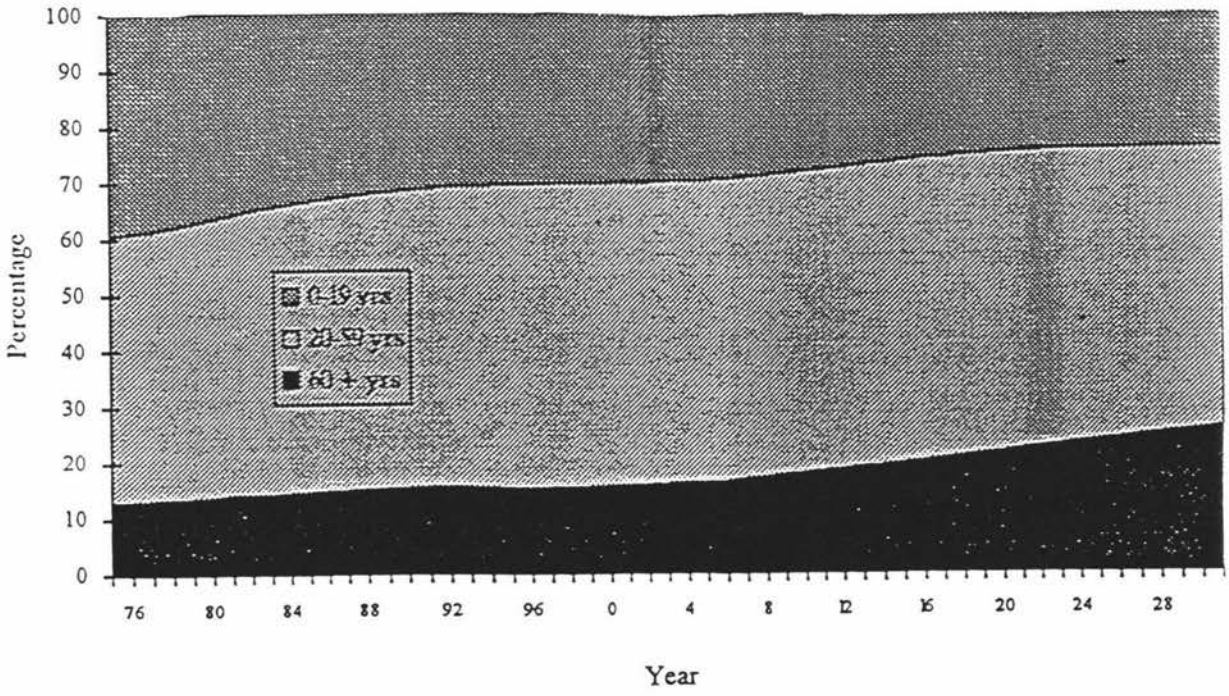
Social severance

The negative impacts of road developments on people's social activities have been described in many ways including severance, social severance and community severance. This has led to confusion and avoidance of these issues in planning transport projects (Tate, 1997).

The Transfund New Zealand Project Evaluation Manual (PEM) (1997) uses the term 'community severance' which is defined as the *"dislocation and alienation a*

community feels as a result of roads which sever communities or hinder access" (Transfund New Zealand, 1997a). However, community severance is only one aspect of social severance because a 'community' may range widely in location and form, and the requirement for one group may impact upon another group (Urban Motorways Committee, 1972). Also, according to Tate (1997), it is most likely that within a highly mobile population, like New Zealand, people are members of more than one "community". Transfund New Zealand's definition of community severance will therefore not be used. Instead the term 'social severance' is used which Tate (1997) defines as the *"divisive effect that results from the provision and use of the transport infrastructure"*.

Figure 2.1: Elderly people as a proportion of total population 1975-2031 (projected)



Source: The Older Road User (Land Transport Safety Authority, 1994)

This definition of social severance is comprised of three key issues. First, communities are far broader than those defined by geographic location and are formed around activities in which people take part. Secondly, the impact on activities within a community may be enhanced or reduced by the development of infrastructure. There may also be some existing severance as a consequence of earlier projects. Thirdly, social

severance effects may be described in two dimensions: physical severance that relates to the direct effect on trips (movement from one place to another) that encounter a barrier, for example a busy road; and psychological severance that stems from the feelings of being cut off and isolated. For example, an elderly person may not be able to cross a street once it has been widened due to the perceived fear of being run over. This has the consequences that the elderly person may not be able to see close friends and family who live nearby as much as they did before the street became busy (Tate, 1993b).

Characteristics of social severance

Over time, the working definition of social severance has changed from considering only the physical separation of activities, to incorporating a variety of psychological effects. Social severance, as perceived by the public, is the fear or feeling of being cut off from services and activities that are important to them, even if it is something that is not used or participated in regularly (Tate, 1997). For example, trips to the dentist or doctor that include effects such as waiting for ten minutes to cross a certain road safely may lead to the trip being put off or permanently stopped (Clark et al., 1991).

Effects of physical and psychological severance may be experienced as increased time spent travelling to places, and difficulty and anxiety in crossing or travelling alongside the road. The long-term effects of social severance may lead to people possibly travelling to alternative, less favoured destinations, and avoiding making certain trips (United Kingdom Department of Transport, 1993).

When assessing environmental effects of road developments, physical and psychological severance effects cannot be treated in the same way as noise or visual effects because there is no single unit or scale of measurement of social severance. Thus, the severity of social severance caused by road developments has seldom been predicted in the past. Further, the little data that is available on the effects of social severance is only available on urban roads and there appears to be a gap in the literature about the social severance effects of rural roads (Lassiere, 1976). The measurement of long term social severance effects is also absent from the literature.

Nevertheless, social severance may not necessarily be a permanent condition. Neighbourhoods can change in size and location over time and a new pattern of trip making and social contacts can grow to replace those lost due to the presence or alteration of a road (Lassiere, 1976).

Physical severance

Physical severance can be examined more easily than psychological severance as it can be measured quantitatively. It is described, in this study, in terms of mobility, accessibility, amenity and physical deterrence factors.

Mobility

Mobility is *" ..the ability of the individual or type of individual to move about"* (Tate, 1997: 17). Mobility relates to both individuals and the availability of facilities. For example, walking or cycling may not be available to the very young, the elderly, or to those with particular disabilities (Tate, 1993a).

Many transportation analyses assume that everyone has equal ability to move around and attach community values to their neighbourhoods. However, mobility, both fast and individually convenient, is not equally available to everyone (Lee and Tagg, 1976). For example, as people grow older their mobility tends to decline. There is a significant drop in the amount of people that travel when they retire from employment, but, beyond this, increasing age also tends to cause a gradual loss of mobility (Koopman-Boyden 1993).

Modes of transport for older people also change as they shift from being car drivers to users of other forms of transport, such as being passengers in cars, walking, cycling and public transport. The Land Transport Safety Authority reported in The Older Road User (1994) that over 50 percent of trips made by those over 60 are as drivers or passengers of cars. Walking increases to over 30 percent of all trips by the age of 70 years old. Table 2.1 illustrates that the travel needs of the elderly are spread over several modes of transport. Thus, it can be seen that there are large changes in people's travel modes once

they are over 60 years of age. The biggest change is the increase in walking at the expense of driving a car.

The loss of the use of the car, perhaps coupled with less than adequate public transport and distances too large to walk, contribute to a significant loss in personal mobility for the elderly (and disabled) people. Many social activities like clubs and sports require considerable amounts of transportation, resources, effort, money and time (Novak, 1997). Therefore when a elderly person's mobility is decreased social activities and the trips they generate are often reduced or stopped.

Table 2.1: Percentage of New Zealand trips made by age and mode of transport (%)

Age (years)	Car	Pedestrian	Bus	Taxi	Air/rail	All
15-24	62	33	4	0.6	0.4	100
25-39	70	26	3	0.6	0.4	100
40-59	73	26	0.5	0.2	0.3	100
60-69	73	25	1.6	0.2	0.2	100
70+	58	36	5	0.7	0.3	100

Source: Land Transport Safety Authority (1994)

The loss of the car has a number of undesirable consequences including: a decrease in personal independence; a greater reliance on special and often publicly provided transport; and ultimately, increased isolation, decreased accessibility to services and a fall in the quality of life (Oxley, Barham and Ayala, 1992).

Accessibility

Accessibility *"..is concerned with the opportunity that an individual, or type of person, at a given location possesses to take part in a particular activity or set of activities"* Jones (1981: 22). Tate (1996) argues that barriers like busy roads increase the 'cost' of the journey, so depending on whether trips are essential or not, like going to the doctor, the number of trips may decrease. Jones (1981) also identified a second type of accessibility associated with changes in opportunities to make journeys. This type of social severance is generally described in terms of 'changes in accessibility' (Tate, 1996). For example, an elderly woman stops driving and now only goes to church when

she can get a ride. Therefore the woman's access to the church is dependent on other people and infrequent compared with when she used to drive her car.

In measuring accessibility, therefore, it is necessary to be clear about the type of person, the modes of transport available to the person, their location and the type of activity for before assessments can be made. The activities and opportunities should be relevant to the person. For example, going to school is not relevant for elderly people, unless they are accompanying children (Jones, 1981).

The fact that walking is so common for the elderly (refer to Table 2.1) may suggest that in many situations the requirements of the elderly pedestrian are met adequately. Yet, accessibility problems are increasing over time, with trends towards lower housing densities and newer housing estates having fewer communal facilities. These factors tend to increase the distance between homes and facilities and social activities and therefore reduce the possibility of travelling on foot. Thus, when valuing the importance of a certain trip route, one should consider the quantity and frequency of use and also include consideration of safety and amenity values (Skelton, 1992).

Amenity

Amenity, in relation to travel is defined by the United Kingdom Department of Transport (1993) as the relative pleasantness of a journey. Notions of safety and pleasantness may be important factors in distinguishing a choice of route. Amenity is affected by changes in the degree and duration of people's exposure to traffic; that is any visual intrusion associated with the trip route, structures and other factors such as noise. For example, for pedestrians, these factors include distance from traffic, any barriers between pedestrian and vehicle traffic such as trees and the quality of any street furniture and plantings (United Kingdom Department of Transport, 1993).

There have been few studies in New Zealand on the different impacts of road transport on rural and urban communities. Effects considered tend to be specific to particular sites or projects, and information is dispersed or anecdotal. There is currently no

national work programme for examining the effects of roads on urban or rural amenity values (Transport and Environment Committee, 1998).

In assessing amenity values for the routes used by pedestrians, a descriptive approach may be employed to indicate changes in amenity and the number of journeys. The description of impacts on amenities should include a reference to forecast traffic flows (United Kingdom Department of Transport, 1993).

It is possible that, with improvements in mobility, accessibility and amenity, new or alternative activities will take place thus decreasing physical severance and potential psychological severance.

Psychological severance

There is a notable absence in the literature on psychological severance which is reflected in this literature review. Psychological severance is often reported in communities with high levels of interaction and identity (Tate, 1996). Aldrous (1975) argues that new developments are often opposed by the public because of fear of change, dislocation of the community, and disruption of people's lives and patterns of movement.

Overseas assessment of psychological severance has been qualitatively presented in environmental impact assessments in most Western countries. However, in New Zealand psychological severance has largely been ignored as evaluation of the impacts of road developments are based on cost-benefit analysis. This method is unable to quantify the qualitative knowledge of the area and various forms of social severance. Thus psychological severance is abandoned in the analysis (Tate, 1997).

Safety concerns can also restrict people's choices (Transport and Environment Committee, 1998). People who perceive that walking is not safe will walk less. This may lead to fewer pedestrians and the disruptive effect of road traffic on social contacts and community life may intensify (Transport and Environment Committee, 1998).

There is a need, therefore, for improved identification and measurement of psychological severance in proposed road developments.

Characteristics of the elderly

Today's road traffic systems are abundant with examples of discrimination by default against elderly road users (Burt, 1972). Examples include the frequent lack of convenient crossing facilities on city streets, difficult entries/exits on public buses, and the very high speed level on motorways in most countries. Roads are equipped and controlled to match the needs and abilities of the young and able, but have little or no regard for the large minority of road users whose maximum functional abilities have suffered the natural decline of age (OECD, 1985). The elderly as a group are now described specifically in terms of their safety, diversity, residential patterns and driving habits.

Safety

A study was carried out by the OECD in 1985 to describe the nature and scope of safety problems encountered by the elderly. In order to achieve safety, discouraging the elderly from driving cars may avoid some serious accidents, but it may also force them into walking. This may result in other accidents, inactivity and withdrawal, with detrimental consequences for the general health and well-being (OECD, 1985). Similarly, coercing elderly pedestrians to restrict their walking and bicycling activities because of their high risk of accidents may well prevent accidents, but also may result in increased mental and physical sickness (OECD, 1985).

Diversity

To present the elderly population as a uniform group is misleading as most extremes of society are found among older citizens. On one hand, there is relative wealth and health of those benefiting from a secure previous lifestyle. On the other hand there is the isolation and low income for those whose job and family circumstances have subjected them to poor working and living conditions (Koopman-Boyden, 1993).

Considerable individual differences also exist within the elderly age group and between various age groups over 65 years of age. In this context, there seems to be a systematic decline in the frequency of driving, with the rate of decline increasing as age increases over 65. Some people give up driving for a variety of self imposed or administratively or economically determined reasons. Physical ability varies among elderly people and that age alone cannot predict a person's physical or driving ability (Novak, 1997). Also, little data exists regarding the travel patterns of elderly passengers except for the New Zealand Household Travel Survey (1999) and the soon to be released 1999 New Zealand Household Travel Survey (Land Transport Safety Authority, 1997).

According to the OECD (1985), elderly people only travel about 30 to 40 percent as far as younger age groups. This may be a consequence of the removal of the work trip from the lives of elderly people. As mentioned previously, the elderly also appear to have a different reliance on the various modes of transport, relying on public transport and walking twice as much as people under 65 years of age. The diversity of the elderly population is demonstrated when considering disability, gender, socio-economic status and ethnicity.

Disability

Everyone is impaired in some way or other (Galgali et al., 1998). Designing systems to be accessible means constructing them to be easily used by the widest spectrum of people possible. Even though some people's impairments probably means that the use of mass transport systems will always be beyond them, the better the design of a system, the wider the spectrum of the population it can serve, and the easier and safer it is for all its users (Coster 1998).

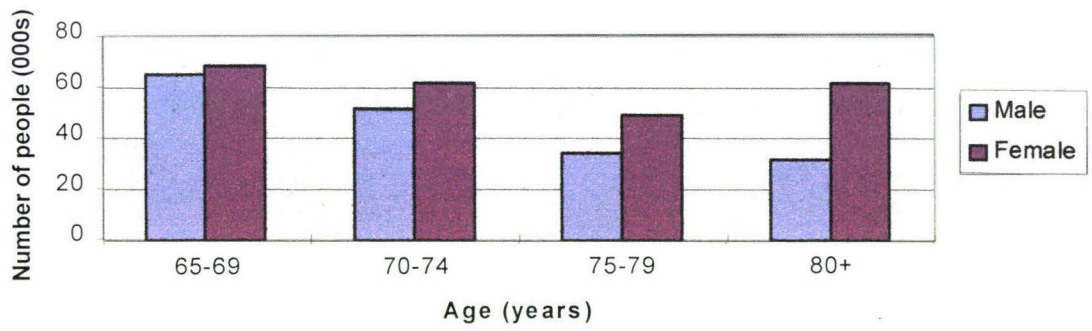
It is also important to distinguish between healthy and disabled elderly. Most elderly remain fit and well and, given adequate income, access to health care and other associated services, lead independent lives, like the rest of the population. But some will become disabled and require assistance with everyday living (Koopman-Boyden, 1993).

Gender

In the next few decades, there will be a steep increase in the population of older people in New Zealand. There will also be substantially more females than males in this age group. For example in 1996, according to the Department of Statistics, 57 percent of those aged 65 or more were female, compared with 43 percent in the rest of the population (Figure 2.2).

For some elderly, especially women, access to a car is restricted simply because they never learnt to drive (Morris et al., 1996). This is also compounded with the fact that men travel more than women. But the cohort of elderly women who never obtained their driver's licence is dying (Rosenbloom, 1990) so this dimension will be reduced over time.

Figure 2.2: Number of elderly males and females aged over 65 in New Zealand in 1996 (000s)



Source: Statistics New Zealand (1997b)

Also, unlike women of working age, the majority of elderly women have fewer time constraints, being comparatively free of work and family responsibilities. At some stage, however, a significant number of elderly persons may be required to take on a caring role for family members whose health begins to fail. Such constraints may range from being confined, as a caregiver, almost entirely to the house, to that of being required to provide constant assistance with mobility and other tasks (Morris et al., 1996).

Fear is also a determinant of travel behaviour for elderly women, which leads sometimes to psychological severance. This perception of vulnerability is thought to underlie women's unwillingness to travel on public transport at night, as well as nervousness expressed by some women about driving alone at night (Morris et al., 1996).

However, when age-related issues are investigated from a gender perspective, most policies are based on men's experiences, which does not necessarily match those of the mainly female elderly population. The 'invisibility' of old women is something of a mystery. This also can be seen by the way 'the elderly' are discussed without gender differentiation (Wilson, 1992).

Socio-economic status

Along with the lack of gender differentiation, many elderly are also faced with declining financial resources. This is because incomes are reduced upon retirement. In addition, many elderly persons have been hit by higher user charges resulting from increases in indirect taxation, increasing privatisation of public service, and increased petrol and public transport costs (Morrison, 1996).

According to the OECD report (1985), the elderly tend to have below median income levels with more fixed sources of income, as a result of retirement and pensions, and therefore command fewer consumer market goods and services. As such, the expense of owning and running a car, or catching public transport in general is now taking up more of elderly people's dispensable income (Morrison, 1996).

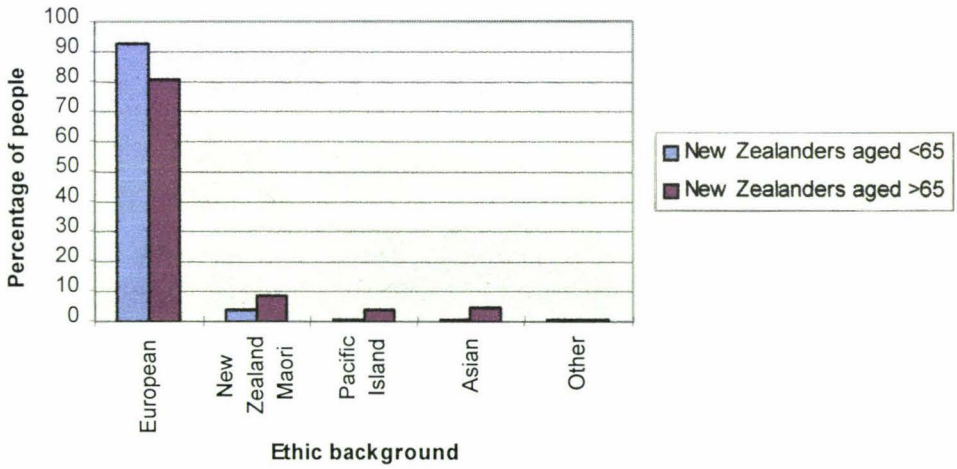
There is also an increasing concentration of elderly people in the urban environment. This may require a more focused road safety programme which is directed especially towards the needs of elderly pedestrians in urban traffic situations (OECD, 1985).The socio-economic situation of the elderly is influenced by migratory factors, for example ex-urbanisation and urbanisation, which tend to cause increases in the proportions of elderly in rural areas and in city centres. This gives rise to rather specific transport and traffic safety problems (OECD, 1985).

Ethnicity

Increasing life expectancy also contributes to population growth in older age groups. Medical advances, improvements in preventative health care and lifestyle changes have resulted in people living longer (Statistics New Zealand, 1997a). Maori have a lower life expectancy than non-Maori, although the gap has narrowed over recent decades. The ethnic and gender make-up of the elderly population differs from the rest of the population because of these differences in life expectancy, and because of historical differences in fertility between ethnic groups (Figure 2.3).

In 1996, people who belonged to the European ethnic group made up 81 percent of those under the age of 65, compared with 93 percent of those aged 65 and over. Among the European ethnic group, 16 percent were aged 65 and over, compared with six and five percent respectively in each of the Maori and Pacific Islands ethnic groups (Statistics New Zealand, 1997a).

Figure 2.3: Comparison of ethnic backgrounds of people resident in New Zealand aged under 65 years and 65 years and over



Source: Statistics New Zealand (1997a)

Residential patterns

The elderly tend to move (when they shift) from major urban areas to the suburbs or rural areas. In 1991, 93 percent of people aged 65 or over, and almost two-thirds of those 85 or over, still lived in a private dwelling (Statistics New Zealand 1997c).

Elderly people are becoming concentrated in towns and settlements with lower population densities, where it is becoming increasingly difficult to provide health and amenity services as a consequence of centralisation of these services in major cities..

Other significant trends are that older people increasingly live alone. Moreover, the average older person has, with each passing year, more driving experience. Though more mobile in this sense, they will, however, frequently suffer important limitations on this mobility, such as being able to drive in the day but not at night, to walk to a bus in summer but not winter, or to drive but not maintain a vehicle (Land Transport Safety Authority, 1994).

Elderly as drivers

It is clear that the automobile continues to be a principal mode of transport for many people over 65 years old. And, given the shifting demographics as described previously, the proportion of total travel accounted for by drivers over the age of 65 may increase steadily over the decades.

Elderly people, like all age groups, are becoming more dependent upon the private car for their mobility. The problem is that the more people adapt to the current road system, the more society is likely to compromise transport services for the non-driving, low income and single elderly population (Warnes, 1992). For example, in a rural area, a new road may mean both improved access to a nearby town and closure of a local store. In both urban and rural areas, car dependence reduces both the perceived and actual mobility of those without independent access to vehicles, such as children and the elderly (Transport and Environment Committee, 1998).

Kastenbaum (1993) says that the elderly associate driving to freedom, competence, and youthfulness. However, there is also a significant voluntary reduction in driving by able-bodied elderly who are not low income but have some difficulties driving. Planners have traditionally focused on the carless or those without licences, ignoring the real mobility losses faced by those who still have their licences but who need other options such as public transport from time to time (and increasingly as they age) (Rosenbloom, 1991).

Increased fragility with age is widely recognised in the literature (Frith and Jones, 1991; Ministry of Transport, 1991). The ratios of deaths to serious injuries for car occupants increase with age, from which it can be surmised that given the same accident and expectations of injuries, an older person is more likely to be seriously injured or killed. (Land Transport Safety Authority, 1994).

Often education and training programs also provide a valuable approach to continued road safety for older road users. The "Safe with Age" programme, developed in New Zealand while drawing from overseas experience, is a good example of the packages available. The programme consists initially of a series of activities for groups of older road users: group discussions, simulations and practice exercises. Such programmes need to be more widely used and promoted throughout the community both with public and private transport in mind (Land Transport Safety Authority, 1994).

Elderly pedestrians

Lee and Tagg (1976) have shown that the burden of social severance falls most heavily on groups of people with low mobility for whom walking is the principal form of transport. The social severance problems of the elderly pedestrian will now be examined by looking at the characteristics of elderly pedestrians, their access to public transport, the ways of measuring social severance.

Characteristics

Walking is the second most common leisure activity after (gardening) in New Zealand and an important means of personal transport for older people (Galgali et al., 1998). The New Zealand Household Travel Survey (1991) showed that those aged over 60 years or more made 27 percent of their trips on foot, compared with 18 percent for 15-59 year olds, and spent 21 percent of all their travel time as pedestrians, compared to 10 percent for 15-19 year olds (Land Transport Safety Authority, 1994).

Elderly people who use walking as their main mode of transport, have a higher rate of fatalities than any other transport mode used by the elderly (OECD, 1985). In many Western countries, the elderly account for more than one-fifth of pedestrian fatalities.

This high accident rate is argued by Warnes (1992) to be a consequence of their reduced physical, visual and cognitive abilities and a poor ability to anticipate traffic and vehicle behaviour (Warnes, 1992).This may be due to the inherent characteristics of the group and the limitations these impose upon their capacity for swift and evasive action in a threatening situation. It was also argued by the OECD (1985) that the fatality risk for the older group of elderly (80 year and over) is almost three times as high as for the 65-75 year group.

Walking is an important form of recreation for older people, but because of their fragility it can be an occasion of great risk or injury or death if they are involved in an accident with a vehicle. It is important for older people that pedestrian routes and areas are well-designed to reduce conflict with motor vehicles, to have resting places and to have adequate intervals for road crossings. The hazards of falls resulting from uneven surfaces and kerbs can be reduced by good maintenance programmes (Land Transport Safety Authority, 1994). Yet policies for the pedestrian are conspicuously absent from most transport legislation around the world (Stanfield 1996).

Physical activity is known to have a protective effect for the elderly against a variety of common medical conditions including coronary disease, osteoporosis, cancer, and anxiety (Pate et al., 1995). It was found, by the United States Surgeon General (1996) that significant health benefits, including reductions in physical impairment, can be obtained by undertaking a moderate amount of physical activity, such as 30 minutes of brisk walking a day. Galgali et al. (1998) suggest that policies should focus on encouraging older people to become more physically active by engaging in physical activity. This could lead to more reliance on a pedestrian-friendly infrastructure where the elderly people's safety is of utmost importance and social severance is minimal.

Access to public transport

For public transport to provide adequate means of getting about for the elderly pedestrian, three requirements must be met. First, there must be a public transport service at suitable times and with adequate reliability between, or near to, the locations where people are and where those people want to get to. Second, the fare must be

reasonable, given a person's income. Third, a person must be able to walk to and from the public transport service stop, to sustain the necessary wait often while standing and without shelter from the weather, to be able to get on and off the transport service, and to have the capacity to stand and move around the vehicle even when it is moving (Skelton, 1992).

The greatest risk of public transport (on a per trip basis) is associated with walking to and from public transport stops, according to the OECD (1985). However, this is only part of the general problem for the elderly pedestrian. Current emphasis is on allowing the elderly to travel easily rather than safely. Public transport is often inconvenient for elderly travellers. Long corridors and stairs virtually exclude those who have difficulty in walking, particularly without handrails, though urban buses and trains can be adapted for use by the elderly. Therefore the aim should be made to improve pedestrian access to public transport stops, ensuring sufficient space for people to queue, avoiding crush and giving priority to pedestrians over other road users (OECD, 1985).

Measures for assessing social severance

As mentioned previously by Lee and Tagg (1976), Kaplan et al (1972) and Burt (1972), there are indications that social severance has a worse effect upon those with a greater dependency on walking as a mode of transport. This often is reflected in the dominance of the use of pedestrian-based measures in the analysis of severance (Tate, 1993).

There is no perfect method for measuring the effects of social severance. This has created some difficulty in attempting to quantify and compare the effects of different road projects, establishing causes and impacts, and assessing the need or effectiveness of amelioration measures (Tate, 1993b). For this research, three types of social severance measures are considered: community, accessibility and barrier measures.

Community measures

The concept of 'community cohesion' can be identified, according to Tate (1997), on the basis of factors like geographic location, employment and ethnic origin. However

the key to the amount a community will be severed, or rather fear social severance, will depend on how 'cohesive' the community was in the first place (Tate, 1997).

Kirby's model (1981) is an example of a way in which psychological severance can be maesured. It confirmed previous studies (Burt, 1972; Kaplan, 1972; and Lee and Tagg, 1976) and found that highly mobile communities are less susceptible to social severance. This model considered the potential for psychological severance based on consideration of the linkages that define a community, such as household size, income, proportion of young and old people, ethnic composition and the length of time spent at the current residence. The model considers how such linkages may be related to other readily available data and emphasises social interaction. It has the potential to identify, from readily available data, areas where social severance is likely to be more severe. This type of assessment would be relatively inexpensive and provide supporting evidence for project assessments (Tate, 1997).

Accessibility measures

The second type of measure is accessibility measures which are used for dealing with the spatial separation of activities, and the ability of the transport system to link these activities. Accessibility measures are generally used in the context of land use and transport planning since they consider people's ability to reach and take part in activities (Tate, 1993a). For example, if an elderly person cannot drive, then the person's ability to get to their weekly club will be need to be ascertained.

Catchment analysis in the form of origin/destination surveys is considered to be the first step in identifying locations and the extent of potential severance (Tate, 1997). Origin/destination surveys are considered in cases where the travel patterns of pedestrians and others are complex and a road development could have a major impact on the local community. For example, vulnerable groups, like the elderly, should be separately identified where they constitute a disproportionate number of users of a route or community facility. Key destinations defined on a catchment map could include locations like shops, churches, libraries and shopping centres (United Kingdom Department of Transport, 1993).

In 1959, Hansen developed a measure of 'equivalent attraction' to consider the attractiveness of facilities or social activities which decreases as they become more difficult to reach. It attempts to calculate the combined effect of the transport and land-use systems as seen by the user. It considers all the opportunities in the study area to be relevant. Thus it is more suited to measuring access to a wide range of facilities or social activities, such as jobs, than to activities for which there is little or no choice, for example, if there is only one hospital (Jones, 1981). An example would be measuring the accessibility of a number of jobs with increasing distance from a particular residential zone (Tate, 1997). This theme may be extended to include the total accessibility of a particular zone to other zones (Hansen, 1959). Based on this type of analysis an overall index of accessibility could then be generated for intra-development comparisons (Tate, 1997).

Memory maps (Gould and White, 1986) also describe accessibility measures and perceived opportunities (Lee and Tagg, 1976). The use of memory maps as a tool was based on the idea that the information people held, or received about places, was related to the population, or level of activity, at the place and that it reduced with distance. On a large scale, the knowledge levels that people hold about an area can be derived by asking respondents to rate, or rank, locations in order of preference, or by asking them to perform a task such as naming the towns in the area (Tate, 1997). Then respondents would be asked about reasons why they take the routes they do to get to certain places. The memory map technique can be used to measure social severance effects by accounting for a number of inter-related effects, such as fear, intimidation, excessive delay and psychological boundaries, while at the same time accounting for the power of attraction that may continue to draw people across a barrier. For example, people having to cross a very busy street to get to the hospital walk extra distances to get across the road safely. It is, in essence, a complete measure of social interaction and therefore should be available as a measure of social severance (Tate, 1997).

Barrier measures

The final type of measure, barrier measures, investigates the impacts on existing travel patterns that will result from a specific road development. One approach Tate (1993b) describes is to obtain information on community concerns, about potentially severing effects, through public consultation. Indices or proxy (representative) measures that are in tune with the concerns of the community could then be developed. For example, if a particular community group, such as the elderly is concerned about their safety as they travel to a given shopping centre, an index that examined this type of access could be employed. Other measures such as pedestrian delay, for example, such as how long someone has to wait before being able to cross the road safely, may be used as a direct measure as well as a proxy measure for other components of the impact.

The use of pedestrian delay as a proxy measure of social severance has been common in the United Kingdom. This is probably due to its consideration by Buchanan (1963) who used pedestrian delay as measure to try to minimise social severance (Clark et al., 1991). However, one of the problems with the use of pedestrian delay, as a proxy measure, is that a strong argument exists for these delays to be quantified in dollar terms and fed into the cost benefit analysis. However, in practice the monetary value of pedestrian delay is often found to be small and the worth of calculating this measure is often questioned. Combined with this, psychological severance is often ignored because, amongst other things, the intangible feelings of a person having to wait for a length of time before being able to cross the road safely cannot be measured (Tate, 1993a).

Studies carried out in Britain from the late 1970s (Morton Williams et al, 1978; and May et al, 1985) identified the danger from road traffic (perceived danger) as a major concern of pedestrians. For example, an elderly person's trip to hospital or medical treatment, is a trip they have no choice but to make because it is a matter of survival. If, because of an increase in traffic volumes, an elderly person cannot walk unaccompanied, the costs will be likely to be embedded in a change of mode of transport (such as getting a taxi to drive the elderly person to the hospital) or taking a longer trip to get to the hospital, not cancellation of the trip (Tate, 1996).

Increased traffic volumes or physical barriers, like uneven footpaths, require longer journeys. The additional time taken to avoid these problems can be valued. However, as trip length increases, trips are made less frequently (trip suppression) and trip suppression is difficult to assess (Tate, 1996). For example, if an elderly person cannot travel to a club anymore it is difficult to measure the value of social contact that will be lost and difficulty that the person faces having had choice taken away from them (OECD, 1985).

Assessment of social severance in New Zealand

In New Zealand the assessment of social severance effects generally not given a high priority in proposed road development assessments. This lack of attention is because social severance effects is not given sufficient weight by project evaluation criteria used to allocate funding in New Zealand. These criteria favour quantitative costs and benefits including traffic congestion and vehicle occupancy costs.

The Transport and Environment Committee is a select committee set up by New Zealand's House of Representatives which produced a report in 1998 investigating the environmental effects of road transport. The committee was established in response to environmental issues being largely removed from consideration in the current road reform process. The Transport and Environment Committee (1998) found that in the assessment of effects of roads on the environment, there is a narrow focus on profit maximisation to assess the effects of road transport on community, amenity and urban form.

The absence of readily available information on the effects of transport on the human environment within New Zealand, such as the effects of social severance, was another major finding of the Committee. Coupled with this, the information that exists on the environmental effects of road transport is not freely or widely available and is not in a standard format (Transport and Environment Committee, 1998).

It is useful to briefly review two key agencies, along with regional councils and territorial local authorities, involved in transportation policy and instruments used to assess social severance.

Transit New Zealand

At a central government level, Transit New Zealand (a government department) has principal control over the evaluation of state highway projects. Transit New Zealand is also responsible for preparing an Annual National Land Transport Programme and managing and controlling the State Highway system (Transport and Environment Committee, 1998). Transit New Zealand is responsible for overseeing the planning design and implementation for work on State Highways.

Transfund New Zealand

Transfund (a government department) aims to achieve a safe and efficient roading system via an evaluation procedure (cost-benefit analysis) which provides a basis for allocating funds for new projects (Transfund New Zealand, 1997a). In 1997 Transfund New Zealand developed a set of project evaluation procedures (Transfund Project Evaluation Manual (PEM)) to assess the eligibility of road projects for funding.

The PEM (1997) highlights social severance as an intangible effect. However, it provides no guidance in assessment methods that could be used to measure these effects. Intangible assessment describes the psychological aspects of social severance that are not quantifiable. The PEM (1997) states that where values cannot be determined for intangibles, like psychological severance, the intangibles will be described and, where possible quantified. Nonetheless, because psychological severance effects, are difficult to measure, describe and be monetarily valued, when assessing road proposals, the effects of psychological severance, for example feelings of isolation, are subsequently ignored (Tate, 1993b).

Physical severance effects such as changes in trip length to avoid a busy street are more easily used as indicators to assess the significance of social severance than the psychological severance effects. However, because of the strong emphasis on cost-

benefit analysis in New Zealand, measurement of physical severance of proposed road projects has often also been ignored (Tate, 1997). In addition, as Transfund New Zealand's cost-benefit analysis technique takes a national viewpoint, locally-specific costs and benefits are often not considered because they are often thought to represent a transfer of advantage from one person to another (Transfund New Zealand, 1997a). This has led to inconsistent treatment of social severance in New Zealand as the benefits to one group have been found not to necessarily cancel out the disbenefits experienced by another group (Clark et al., 1991; Department of Transport, 1983). However, in all but the clearest of cases it is not possible to compare the effects of various alternatives and while amelioration measures are often recommended, there has been considerable debate on to their effectiveness and suitability (Tate, 1993b). This is particularly important when considering transport disadvantaged groups like the elderly.

Nevertheless, the role and status of the PEM remains unclear. For example, the PEM provides direction in terms of which techniques that are to be adopted when assessing road development proposals by stating that certain valuation techniques 'shall' be used. However, the definition of 'shall' is open to the interpretation of developers, consultants, and councils ranging from considering the PEM as a 'guide', to perceiving the PEM as a strict 'training' manual.

Regional councils and territorial local authorities

The territorial authorities administer land use activities under the Resource Management Act (RMA) 1991. Regional councils administer air and water discharges under the RMA, amongst other activities, and integrate transport infrastructure under the Land Transport Act 1993 (Transport and Environment Committee, 1998).

Regional Councils

Regional Councils also must develop a Regional Land Transport programme, Regional Policy Statement, Regional Land Transport Strategy and Annual Regional Safety Reports. Therefore Regional Councils have an important role co-ordinating the road safety effort of all relevant agencies and community groups. For example, the

Palmerston North Land Transport Strategy has the long term objective to make sure that all transport systems are safe to use, including roads, cycling and pedestrian facilities (Manawatu-Wanganui Regional Council, 1995).

Total Mobility is a special service provided by regional councils which is aimed at improving recipients mobility so that they can have access to facilities and social activities. Total Mobility Vouchers provide a 50 percent subsidy on the use of taxi services. This scheme presently covers people with physical, sensory and intellectual disabilities as well as some people with psychiatric illnesses. The scheme operates through use of individual and agency vouchers that are returned by the taxi companies to regional councils for reimbursement (Lawlor, pers. comm., 1998).

Territorial Local Authorities

Territorial Authorities must prepare a District Land Transport Programme and a District Plan for its area. The District Land Transport Programme sets out all projects planned for the following year which get reviewed by Regional Councils before funding is sought from Transfund New Zealand (Transport and Environment Committee, 1998).

To facilitate development on State Highways Transit New Zealand issues designations to territorial local authorities. These are publicly notified and open for public submissions. While not formally required by the Resource Management Act, it is usual practice for Assessment of Environmental Effects of road proposals to be lodged with the designation. These assessments would be prepared in accordance with the Fourth Schedule of the RMA.

New roads, other than state highways, enter the planning process as applications for designations by the relevant 'requiring' local authority, under their current District Plan, and are assessed under RMA 1991. Territorial authorities are ultimately responsible for the assessment process because they have a 'requiring authority' status under Section 168 of the RMA. This status enables territorial authorities to require specific pieces of land to be designated under the district or city plan for their public works. These procedures potentially enable a requiring authority to override the provisions of a

district plan, regional plan, or regional policy statement since they are relegated to the status of matters to be considered, rather than binding controls (Transport and Environment Committee, 1998).

Summary

Elderly road users are often described as the most vulnerable pedestrian group of the population (Davis, 1992). This is highlighted in many Western countries by the elderly accounting for more than one-fifth of pedestrian fatalities (Warnes, 1992). However, as long as employment and the ability to consume are the two main sources of social esteem in contemporary society, measuring the social severance of the elderly will continue to be seen as a minor issue and policies for dealing with social severance will be avoided (Wilson, 1992).

There is a trend at the moment to address the minimal physical social severance needs of the general population (Tate, 1997). But the physical needs and quality of life issues of the elderly are barely met and rarely addressed. Many elderly would like to go visiting and just break the patterns of loneliness, isolation and neglect. However, for social severance effects on the elderly to be decreased, certain factors must be considered. First, methods to identify the social severance effects of road developments on the elderly need to be determined and second, practical ways of measuring both physical and psychological severance of road developments need to be developed.

Only once these factors have been considered can an opportunity be identified in the decision making process early enough for major options to be changed if social severance problems are identified (Lee and Tagg, 1976). The next chapter presents the research design and methodology for this research.

Chapter Three: Research Design and Methodology

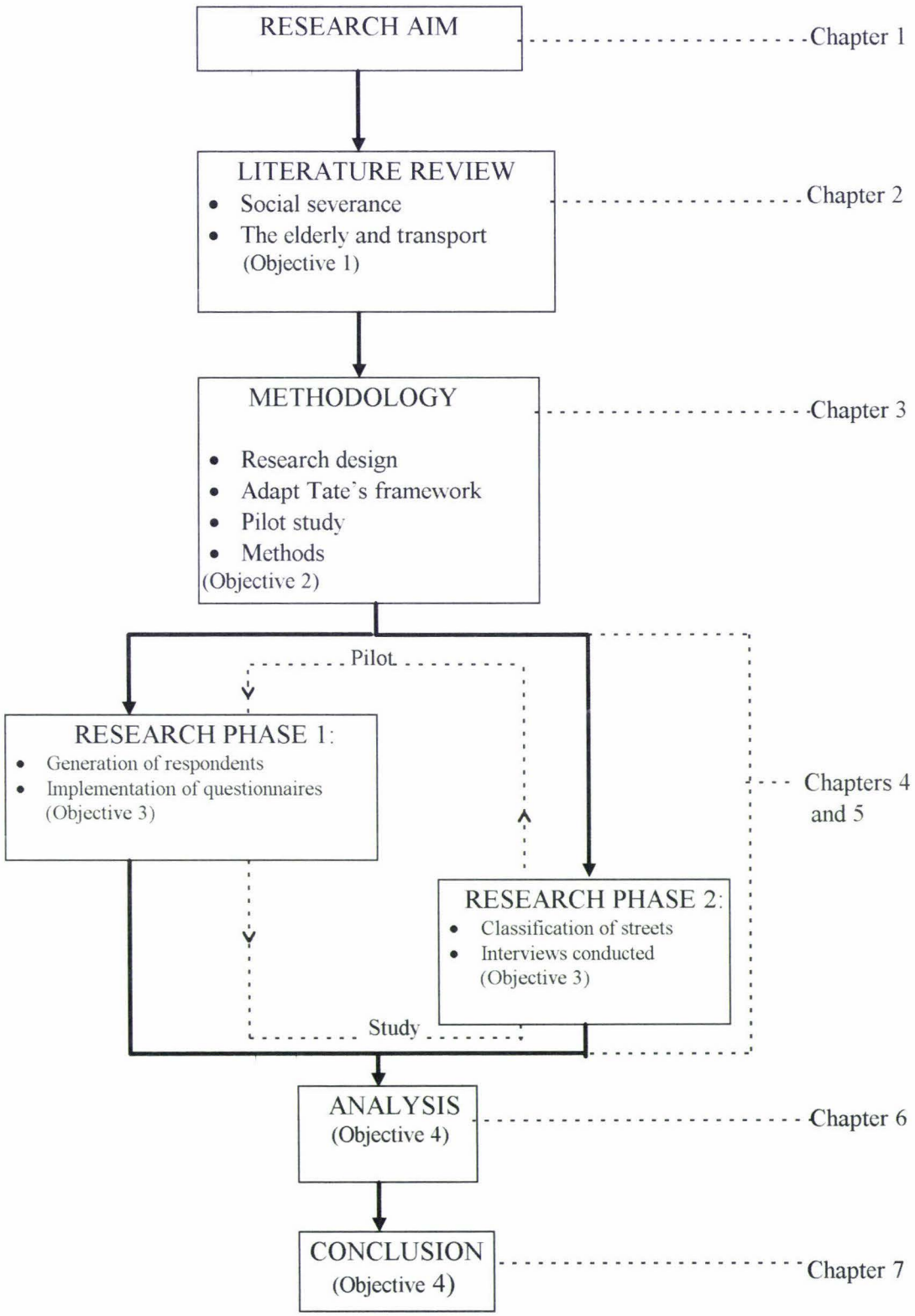
This chapter presents the research design and methodology of the thesis. Following a brief explanation of the thesis objectives, the research design and methods are explained. A feature of the research is the adaptation of a framework developed by Tate (1997), a New Zealand roading engineer, for assessing the impacts of social severance. The adaptation of this research framework for identifying and measuring the effects of social severance is explained. Following this, the two research methods used in this thesis, questionnaires, and interviews, are outlined, and applied in a pilot study to assess the utility of the research framework.

It is useful to reiterate the four objectives of this thesis. They are: first, to understand how the elderly and in particular, elderly pedestrians are effected by social severance arising from road developments; second, to adapt Tate's New Zealand framework for assessing potential effects of social severance on elderly pedestrians; third, to apply the research framework to a pilot study of elderly pedestrians in Palmerston North; and fourth to evaluate the utility of the research framework for identifying and measuring social severance effects experienced by elderly pedestrians.

Research design

The research design, methods and phases of research are shown in Figure 3.1. Initially, a literature review was undertaken on how the elderly were affected by social severance, both as users of roads and of vehicles (objective one). Objective two, the adaptation of Tate's framework, is addressed in this chapter. Objectives three (the application of the research framework) and four (an analysis of the research framework's utility) are dealt with in subsequent chapters.

Figure 3.1: Research design and methodology



As shown in Figure 3.1, this chapter focuses on the development of the research design, adaptation of a framework, the pilot study and research methods. Chapters Four and Five involve two distinct phases of research within the pilot study of Palmerston North in which data is collected for use in the research framework. Phase one of the research involves classifying the elderly population into four different age groups. Following this, elderly respondents were surveyed, using questionnaires from the Palmerston North Senior Citizens' Club and a Palmerston North newspaper. This group provided the elderly pedestrian population from which Phase two was conducted.

In phase two of the research questionnaire respondents' residential streets were classified as busy, moderately busy and quiet volume categories, according to Palmerston North City Council's technical classification of streets. Second, a selected group of elderly pedestrians are then interviewed. This research phase addressed objective three. Objective four is achieved in Chapters Six and Seven. First, the findings derived from the application of the research framework are analysed in Chapter Six. Following this, conclusions about the utility of the research framework for identifying and measuring social severance effects on the elderly pedestrians are presented in Chapter Seven.

Methodology

Tate's framework will now be described. Following this, the development of a pilot study and the research phases are described in more detail.

Tate's Framework

Tate (1997) developed a framework to assess potential social severance effects of road developments on children. Specifically, Tate defined social severance, provided guidance for choosing tools to identify significant social severance impacts and also provided methods to assist in the quantification and reporting of the impacts. Tate's framework was modified for this research. In the original framework, Tate outlined community, accessibility and barrier measures which were used to identify and measure social severance effects. He then formulated a model based on barrier measures which predicted

the probability of a child being allowed to cross the road unaccompanied. This measure is used to describe the characteristics of the road and its associated traffic. This framework is described and then adapted for application to elderly pedestrians (Transfund New Zealand, 1997b).

Palmerston North pilot study

This research uses the adapted framework to examine the effects of roads and their traffic on the independent mobility of elderly pedestrians, as part of a pilot study in Palmerston North. In this initial study the focus is on elderly pedestrians, who are particularly affected by social severance, and who have not yet been studied in detail in New Zealand.

Tate's framework is now described and a research framework is developed by adapting research framework to be applied to elderly pedestrians.

Tate's framework

Tate's framework was derived from United Kingdom, Swedish and Danish models. The key elements of the framework are: identification of potential social severance effects through travel destinations; the separation and valuation of the costs of social severance; and the use of proxy measures, like pedestrian delay and perceived danger[1], to indicate the significance of intangible components. This framework was viewed by Tate as adaptable to the elderly and adults who are transport disadvantaged (Tate, 1997).

Tate's framework also included a model to assess the direct effects of perceived danger and to identify areas whether there were specific barriers which created safety concerns. It sought to investigate whether or not parents would allow their children, aged six to twelve years of age to cross the road unaccompanied. It was found that parents' knowledge about a site, the age of the child in question and traffic volume and speed were the most significant variables (Tate, 1997).

[1] Perceived danger is the perception of the danger posed by road traffic (Morton William et al., 1972).

Tate (1997) stated that the study of social severance is intricately linked to accessibility, which is the ability to participate, and mobility (which is ease of movement). He also argued that a combination of community, accessibility and barrier measures, rather than a single measure, should be used to indicate social severance.

Adapted framework

Resource constraints meant that a similar number of subjects (265) could not be used in this research as in Tate's original model. This was because of the differences in the population types. For example, large numbers of children can be easily accessed with co-operation from schools, allowing a representative sample to be taken. Accessing a representative sample of elderly people in New Zealand is difficult, not only because of the Privacy Act, but because there is no set place where a range of elderly people congregate.

Therefore, there is a stronger emphasis on accessibility and barrier measures in the adapted framework than in Tate's (1997) framework. Elderly pedestrians are generally more exposed to psychological severance than children because the elderly constantly experience a greater need to access facilities than children. Elderly people (unlike children) generally do not have able bodied people in the 15-65 age group looking after their immediate needs. Thus, a combination of community, accessibility and barrier measures has been used in the following pilot study in this research.

Community measures

Community measures attempt to ascertain the effects of road developments on pedestrians' perceptions of their 'neighbourhood', and whether road developments disrupt the cohesiveness and function of their neighbourhood. The social feasibility measures were adapted from Tate's framework and applied to the elderly.

Social feasibility

Tate's framework identified this measure as being able to indicate when psychological severance is more acute, but this was not applied to children. Nevertheless, the adapted framework used information such as household size, income, car ownership and length of time spent at current residence which was provided in the questionnaires. This information was then used to obtain the sample of elderly pedestrians to be interviewed, to examine elderly pedestrians' perceptions of their residential neighbourhoods. This measure, identified by Kirby (1981), considered the social interaction of elderly pedestrians and their perception of 'community'.

The adapted framework then investigated interviewees' perceptions of traffic on their residential streets in relation to their perception of community. Appleyard and Lintell (1969) related the feeling of 'community' to the volume of traffic on a road whereby the higher the volume the less the feeling of community, and the greater the effects of social severance are on a person's neighbourhood.

Accessibility measures

Accessibility measures identify the spatial separation of activities and investigate opportunities pedestrians have to use facilities or take part in activities (Jones, 1981). Both psychological and physical severance were assessed by catchment measures and using memory maps. Each measure analysed trips likely to be undertaken and whether the trip is influenced by social severance effects.

Catchment measures

From Tate's framework, key facilities and social activities for children, such as schools and sports grounds, were replaced in the adapted framework by destinations important to the elderly, such as libraries, shops and medical centres. Initially, from the questionnaires, the facilities and social activities that respondents visit frequently and not so frequently (but are still important to them) were identified. This was then expanded upon in the interviews:

interviewees had to rank the importance of being able to access facilities and social activities, for example.

Memory maps

Memory maps were not used in Tate's framework but were included in the adapted framework. Memory maps account for inter-related effects such as fear and intimidation, while at the same time accounting for the attraction that may continue to draw people across the barrier road (Tate, 1997). The 12 interviewees therefore had to draw their daily, weekly, monthly and yearly trips on a map of Palmerston North. The location and number of journeys elderly pedestrians' journeys were identified and particular destinations mapped. This type of measure is an important indicator of the social impact the transport infrastructure is having on elderly pedestrians.

Barrier measures

Barrier measures endeavour to measure physical severance by investigating impacts on existing travel patterns that may result from the provision of a specific road. Perceived danger is assessed in the adapted framework.

Tate's model used speed data for assessing perceived danger. However, the adapted framework uses volume data only because speed and heavy vehicle content data was not readily available in Palmerston North. Also, some traffic volume data may be biased because certain streets, particularly streets which are 'quiet', have volume estimates rather than measurements. This led to the adapted framework having a greater qualitative focus than Tate's quantitative framework. Another notable difference is that the adapted framework also used a much smaller number of people than Tate's framework.

Perceived danger

The effects of specific streets were examined, which act as barriers to the movement of elderly pedestrians'. Interviewees' mobility, trip making behaviour and perceptions of safety were assessed and constraints to crossing the road identified. Interviewees made

assessments of the perceived danger of specific roads which they believed that they were exposed to. Characteristics were then identified which contributed to perceived danger and actual danger (Tate, 1997). The adapted research framework was then applied in a pilot study of Palmerston North.

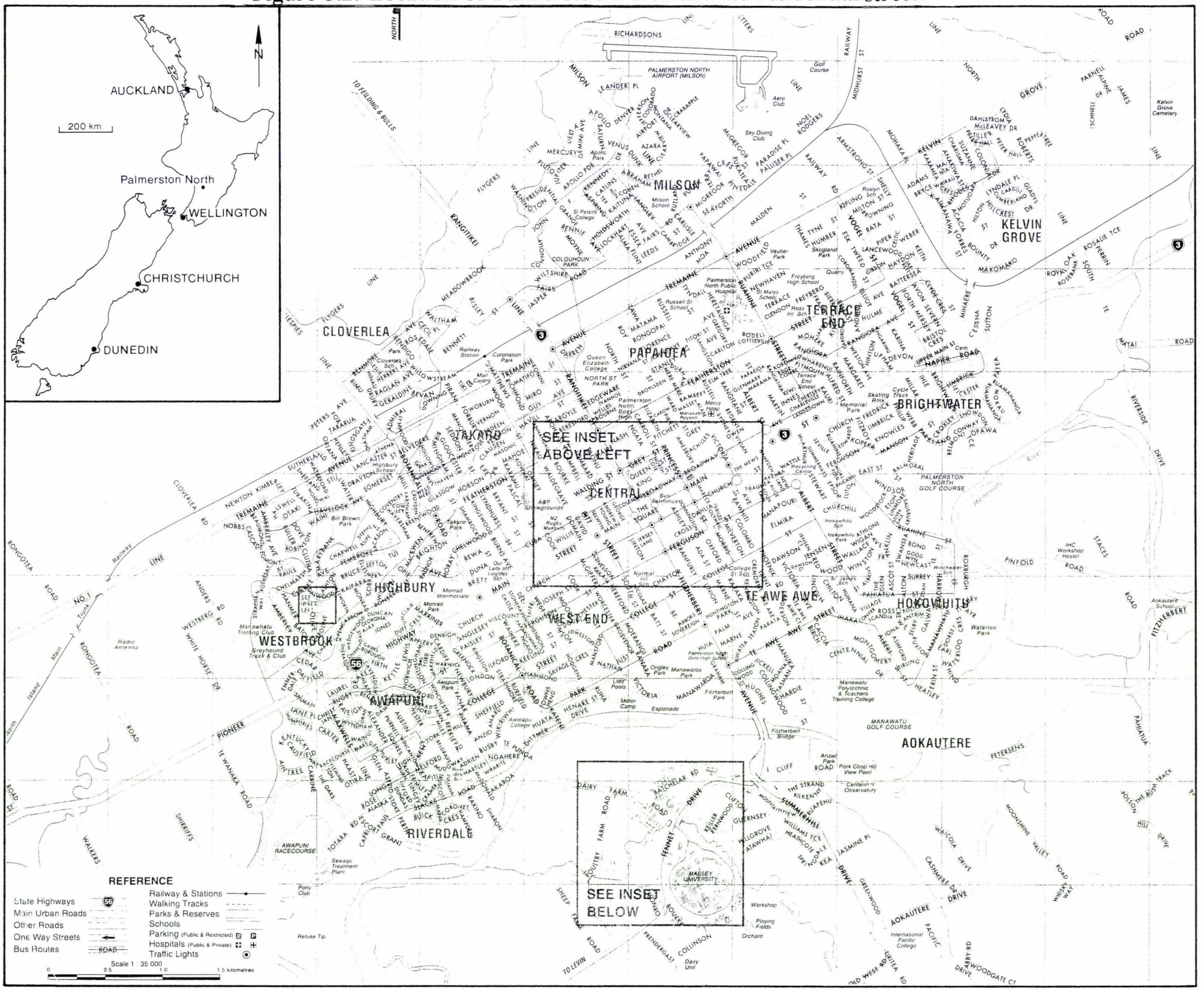
Pilot study

The aim of the study was to examine the extent to which social severance is experienced by elderly pedestrians. When first developing this research topic, it was thought that Tate's framework could be applied to several roading case studies where social severance had occurred, and others where social severance was likely to occur. However, it was difficult to find examples which would be manageable as cases for this research. Therefore it was decided to apply the research framework in one pilot study, as an initial test of its relevance and refine it for subsequent application elsewhere.

Thus a Palmerston North pilot study was designed to compare the experiences of elderly pedestrians living in quiet streets with those of people living in busy streets. Because this is a new area of research, it was important to find out whether social severance exists at all and if so, whether social interaction of elderly pedestrians was disrupted because of traffic and road developments.

Palmerston North is a city of over 73 000 people situated two hours north of Wellington (see insert, Figure 3.2). Palmerston North is an optimal environment for people with reduced physical abilities like the elderly. The town's flatness and generally good layout provides easy foot access for residents, including the elderly, to shops and other facilities. However, Palmerston North has a transport scheme which is based around a ring road system and often leads to people and vehicle conflict (Palmerston North City Council, 1994). Palmerston North has an elderly population of approximately 7600 people, containing approximately three percent of all elderly people in New Zealand. Palmerston

Figure 3.2: Location of Palmerston North and its residential streets



Source: InfoMap, 1996.

North's elderly population has more females (4578) (60 percent) than males (3029) (40 percent).

These figures are confirmed by the national figures which show a larger number of women over 65 (240552) (57 percent) than men (182112) (43 percent men) (Statistics New Zealand, 1997b).

The research methods for identifying and measuring social severance effects of road developments on elderly pedestrians are as follows: first, the elderly population is classified into age groups; second, measures for classifying 'busy', 'moderately busy' and 'quiet' streets were selected; and finally, questionnaire and interview methods were developed in detail with respect to the pilot study.

Methods

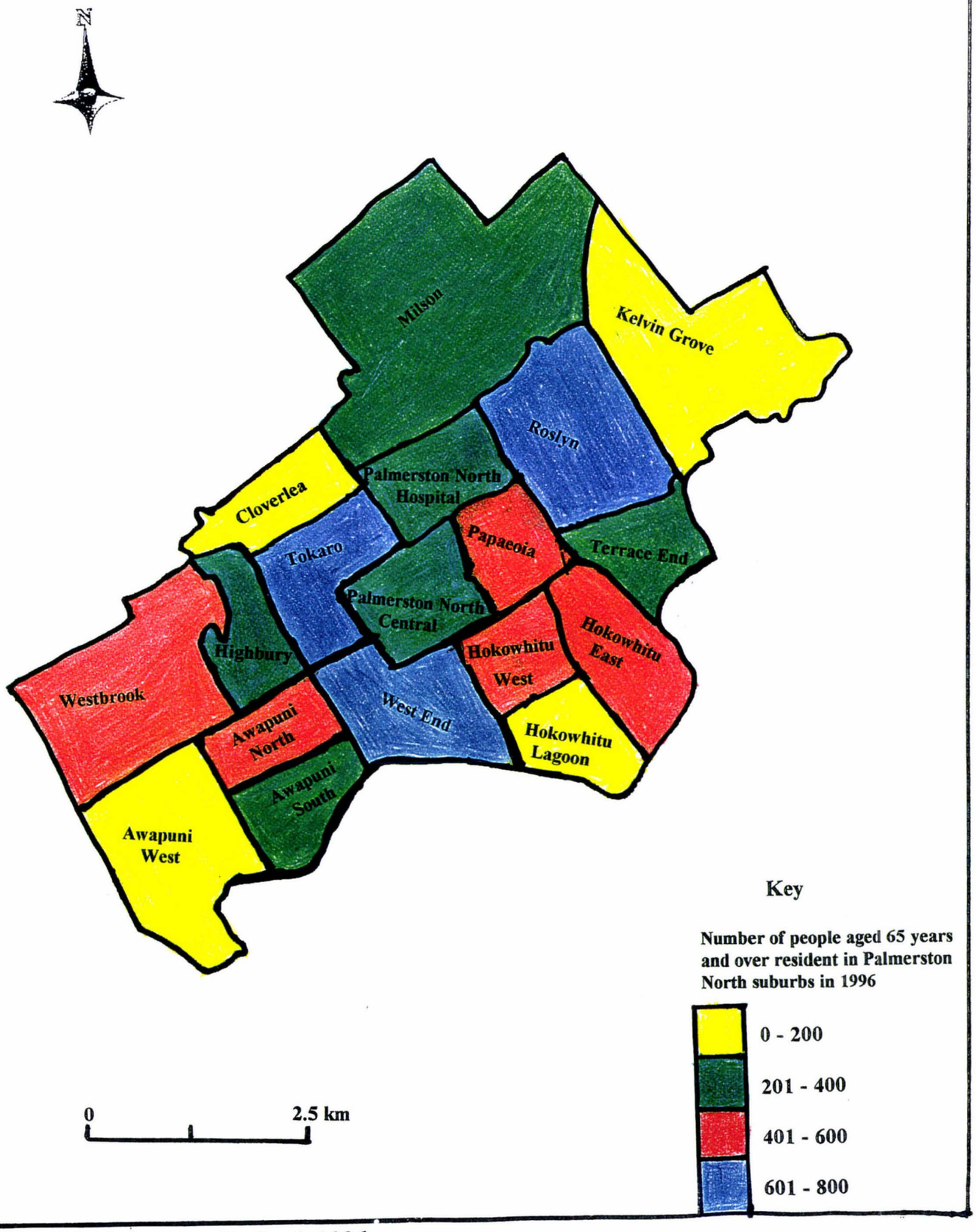
Elderly classification

As mentioned in Chapter Two, an elderly person is defined by Rosenbloom (1991) as a person over the age of 65 years old. Interviewees were chosen by developing an age classification system of elderly pedestrians, aged 65-69, 70-74, 75-79 and 80+. Age data was chosen because it was easily obtained from the 1991 New Zealand Household and Travel Survey (Ministry of Transport, 1991). The 1996 Census data was then manipulated in SUPERMAP 3 (Statistics New Zealand, 1996a) to identify and map the characteristics of the population in the chosen pilot study area. For example, Figure 3.3 shows that a large concentration of elderly people live close to the Palmerston North city hospital and city square.

Selection of measures for classifying 'busy', 'moderately busy' and 'quiet' streets

Traffic flow data is collected by Palmerston North City Council and collated on the RAMM (Road Asset Maintenance and Management) database for all of the main streets in Palmerston North. The streets in Palmerston North have been classified by Palmerston North City Council in terms of volume. The Council classifies a 'quiet' street as having fewer than 500 vehicles per day, a 'moderately busy' street as having more than 500 but

Figure 3.3: Distribution of residents aged 65 years and over in Palmerston North suburbs in 1996



Source: Statistics New Zealand, 1996.

fewer than 3000 vehicles per day, and a 'busy' street as having more than 3000 vehicles per day (Connelly, pers. comm., 1998).

In Tate's (1997) study, the streets studied were divided into ten visible sections. However, in the adapted framework, the traffic flow was measured in street blocks. Street blocks were also used because that is how traffic flow is measured by Palmerston North City Council and thus the only way that the data was available for use in this pilot study.

Questionnaires

Ackroyd (1983) outlines the four main types of questionnaires used in social research. These are the *factual questionnaires*, the *attitudinal questionnaires*, the *social psychological questionnaires* and the *explanatory questionnaires*.

Explanatory questionnaires were chosen as the most appropriate method for this research. Appendix One shows the questionnaire schedule that has been developed. Explanatory questionnaires use methods of explanation which locate people within particular groups to see if there are any similarities within groups along such dimensions as class, mode of transport and gender (May, 1993). The 'target group', for example, elderly pedestrians living in Palmerston North, can then be ascertained using such methods.

The first phase of research involved asking elderly people to fill out questionnaires to obtain common trip types, street type, initial mobility, accessibility, age, income, trip making and modes of transport data. From this, the trip characteristics of the elderly population were identified. The questionnaires also helped to address the third objective of the thesis, by providing the sample of people to be interviewed. This enabled the research framework to be evaluated for assessing social severance effects on elderly pedestrians.

Selection of people to receive questionnaires

Initially, the sample of elderly was to be chosen randomly from the entire elderly population of Palmerston North city. However, it was not possible to establish this information because of the Privacy Act (1993). Groups including Grey Power (an elderly people's political lobby group) and Age Concern (an elderly people's welfare and safety organisation) clients were considered. However they were ruled out of selection because the agencies were unable to release the names of their clients, also because of the Privacy Act (1993). Sampling the elderly people who rent the low income housing units in Palmerston North was also an option but the sample population (although accessible) was considered not to be representative of all elderly income groups.

The sample was finally chosen from the Palmerston North Senior Citizens Club which is a organisation that elderly people frequently visit. The aim of the Senior Citizens Club is to maintain contact between the elderly people and keep them active. This organisation has a diverse number of members from the elderly population of Palmerston North city (Collins, pers. comm., 1998). From the Senior Citizens Club of about 338 members, 47 out of 70 members who attended Senior Citizens meeting on the week on May 14 1998 completed questionnaires. The number of elderly pedestrians surveyed was subsequently increased to 55 due to the assistance of a local newspaper.

Questionnaire format

The questionnaire forms (Appendix One) were completed over the period of the week 14 May - 28 May, 1998. The questionnaires consisted of 18 questions which took under 20 minutes to complete. The questionnaires collected all types of data including age, income, trips by all modes (in particular the number of accompanied trips, that is passenger trips), and trip types.

Interviews

Interviews bring together different people and personalities (Glesne et al., 1992). Allan et al.

(1991) argues that the interviewer can encourage the potential respondent to participate, can make sure the respondent understands the question, and can follow up incomplete or non-responsive answers. However, the disadvantages of interviewing are that the process can introduce bias because it is difficult to treat all respondents in the same way. Interviewing is also costly in time and money and difficult to justify if the questions asked are not easy to answer. Interviewing is the best method for obtaining high quality detailed responses which is what was required for this research (Allan and Skinner, 1991).

Krathwohl (1993) describes interviews as a continuum of increasing amounts of structure. This continuum is described by May (1993) as being divided into three main types of interviews used in social research (excluding group interviews). These are the *structured interview,* the *semi-structured interview* and the *unstructured interview*. A mixture of more than one type of interview may also occur in research (May, 1993).

A semi-structured interview lies somewhere between structured and unstructured interviews. They contain elements of both structured and unstructured interviews, for example questions and order of presentation may be determined, but the questions may be open-ended (Krathwohl, 1993). Sarantakos (1995) argues that, depending on the research topic and purpose, semi-structured interviews may alternate between being closer to either structured interviews or unstructured interviews. Semi-structured interviews can be both qualitative and quantitative, allowing collection of data but at the same time following up on the interviewee's unexpected thoughts and feelings. Therefore the semi-structured approach was chosen as being the most appropriate interview method for this thesis. Appendix Two shows the interview schedules that were developed.

The second phase of research involved interviewing a selection of people living on quiet, moderately busy and busy streets who had identified on the questionnaires that they were willing to be interviewed. The interviews provide the qualitative information required to address the third objective of the thesis, which was to apply the adapted framework to elderly pedestrians for assessing social severance.

It should be noted that interviewing elderly people demands particular skills on the part of the interviewer. A great deal of patience and time is needed, especially when questioning those who live alone and those who enjoy the company of visitors. It is for this reason semi-structured interviewing is appropriate, as the interviewer needs to keep the interview focused on a schedule of questions.

Selection of interviewees

From the initial 55 questionnaires that were completed by people from the Senior Citizens Club and newspaper advertisement respondents, interviewees were chosen. From this group, twelve elderly pedestrians were selected with four from each of the three street classification being interviewed.

Interview format

Developing a rapport with interviewees was a big part of being able to interview elderly people because many people were afraid of being robbed or attacked. Going to a club like the Senior Citizens Club, and being able to talk to people to gain their trust was a very important process before being able to obtain people willing to complete questionnaires. However, the problem was getting enough pedestrians over 65 years old who wanted to be interviewed. Most people did not mind completing questionnaires but did not want to be interviewed.

Interview questions were sent out in June and consent was obtained at least a week before interviews began. Each interview was conducted at either the interviewee's house or at the Senior Citizens clubrooms. Interviews were completed at a time convenient to both the interviewer and interviewee between the period of July to September, 1998. They were no greater than one hour in length. Notes were taken by tape recorder and later transcribed.

Information from the questionnaires and interviews are drawn on to assess the effects of social severance as experienced by elderly interviewees. Findings from the questionnaires and interviews are presented in the next chapter.

Chapter Four: Questionnaire Findings

This chapter presents the questionnaire findings which completed the first phase of research. The main findings from the questionnaires are presented under four headings; general characteristics of respondents, household characteristics of respondents, mode of transportation and mobility patterns.

There were fifty-five respondents to this questionnaire, all 65 years old or over. As mentioned in Chapter Two, the majority of elderly respondents willing to answer questionnaires were from the Senior Citizens' Association. However, there were not enough men or respondents under 80 years of age. Thus, the remaining respondents were drawn from an advertisement placed in a local newspaper. People over 65 and under 80 years of age who were walkers were invited to contact the author. This drew a response from people who both walked and drove. This suggests that when recruiting elderly people to take part in research, social networks and personal contacts are more likely to be successful than advertising in a newspaper.

General characteristics of respondents

The respondents were asked to provide their age, sex, ethnicity, employment status and income information. Most of the respondents were over 70 years old and most were women, with only 12 out of 55 questionnaires being answered by men. Respondents were European, not employed and most earned less than $11 000 per year.

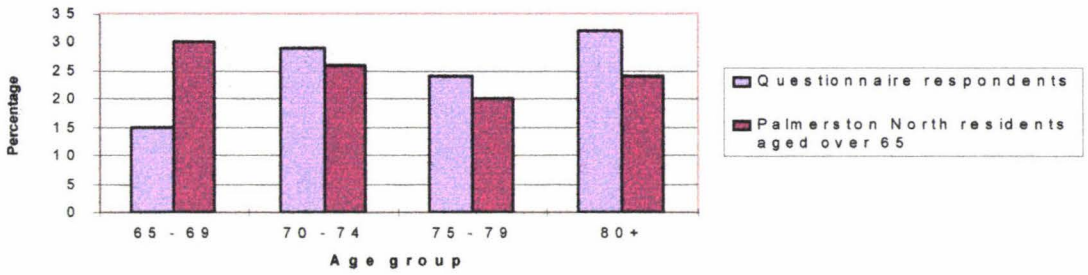
Age of respondents

Out of the 55 respondents who answered the questionnaire, most were over 70 years old.

- 18 (33) percent were over 80 years old
- 13 (24) percent were aged between 75 and 79
- 16 (29) percent were aged between 70 and 74
- 8 (14) percent were aged between 65 and 69

It was very difficult to obtain enough respondents between the age of 65 and 69. Figure 4.1 shows the comparative percentages for the age groups of respondents and those of the elderly population in Palmerston North.

Figure 4.1: Comparison of the age groups of questionnaire respondents with Palmerston North's total elderly population



Source: Statistics New Zealand (1997c)

When comparing the number of respondents to the general Palmerston North elderly population, questionnaire respondents were very under-represented in the 65 to 69 age group and over-represented in the 70 to 74, 75 to 79, and 80+ age groups. However, the demographic spread does not reflect the decline in the number of elderly people in the 75 to 79 age group as shown in the overall 1996 Palmerston North statistics (Statistics New Zealand, 1997c).

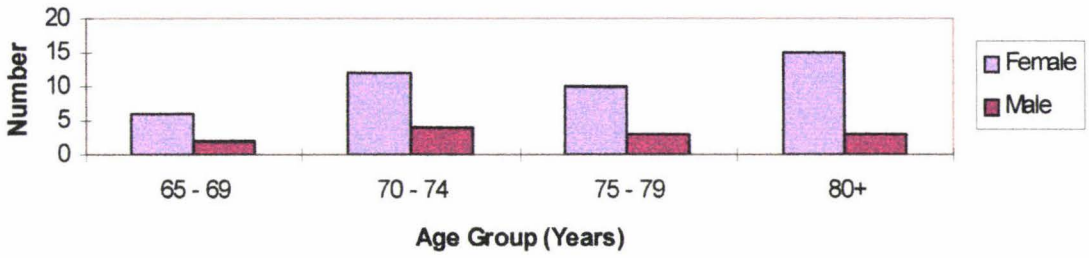
Gender distribution of respondents

Figure 4.2 shows that 22 percent of respondents were male and 78 percent of respondents were female. The percentage of elderly males and females in Palmerston North are 40 percent and 60 percent respectively (Statistics New Zealand, 1997c). As a consequence of the under-representation of elderly males it is not possible to draw valid distinctions in respect to gender. Nevertheless, some observations about differences between elderly males and females will be made in this study.

Figure 4.2 also shows that the number of female respondents generally increased by age from six respondents in the 65 to 69 age group to 15 respondents in the over 80 year old age group. The male respondents, however, remained generally constant over the age groups, ranging from two to four respondents in each category. It should be noted that I had

difficulty getting enough male respondents, particularly in the under 80 age groups. The low male representation in the pilot study may reflect a difficulty in contacting males over 65 years old and may also suggest that elderly men are less social than elderly women.

Figure 4.2: Gender of interviewees



Ethnicity of respondents

All of the respondents identified themselves as being European, reflecting Palmerston North's main ethnic group (76 percent) (Statistics New Zealand, 1997a). Other ethnic groups (for example, Pacific Island, Maori and Asian) are not represented. This suggests that researchers would need to approach other forms of social organisations to obtain a more representative sample.

Employment status

None of the respondents to the questionnaire said they were employed. This was expected because 65 years is the standard retirement age in New Zealand. However, this measure did not identify any volunteer work or undeclared work that elderly people undertake.

Average household income per year

Table 4.1 shows the elderly respondents' average household income per year. Just over half the respondents (29 people) earned less than $11 000 per year. This was to be expected because all of the respondents are no longer working for paid employment and would qualify for a benefit. For single people aged over 65 who have not saved for their retirement, New Zealand's Superannuation Benefit is less than $11 000 (Collins, pers.

Comm., 1998) Elderly people who earned less than $11 000 per year were represented amongst all four of the respondents' age groups.

Eleven people earned between $11 000 and $20 000. Nine people earned between $21 000 and $30 000. Three people earned between $31 000 and $40 000. However, no one aged over 80 earned more than $30 000. Three people earned over $40 000 and they were aged from 65 to 74 years of age.

Table 4.1: Respondents' average household income per year

Elderly age group (Years)	<$11 000/year	$11 000 - $20 000/year	$21 000 - $30 000/year	$31 000- $40 000/year	>$40000/year	Total
65 - 69	2	2	2	1	1	8
70 - 74	8	2	3	1	2	16
75 - 79	9	3	0	1	0	13
80+	10	4	4	0	0	18
Total	29	11	9	3	3	55

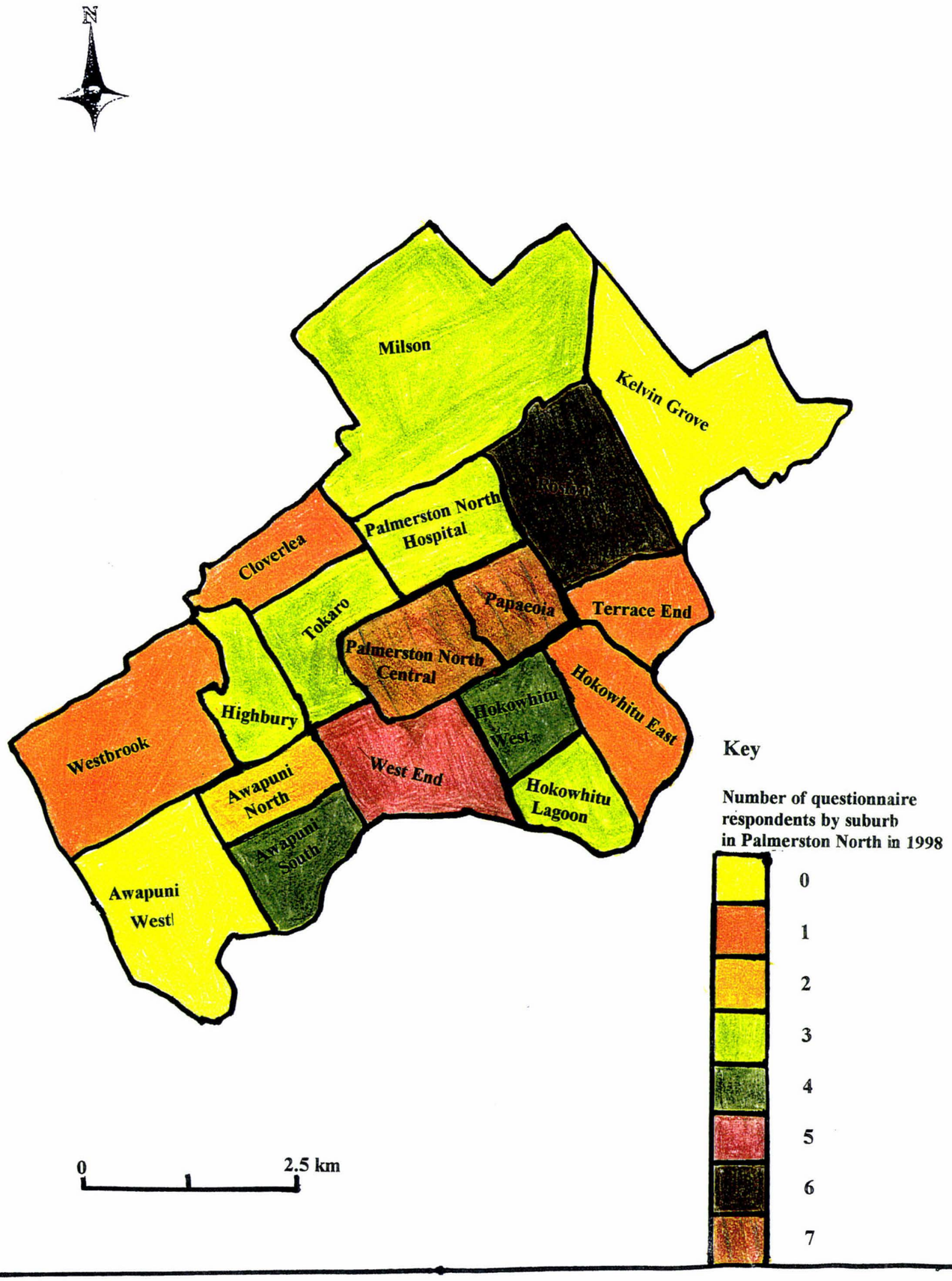
Household characteristics of respondents

The respondents were asked to give information about their current residential location, length of time lived in current residence, ownership of their home and the number of people living in their household. The respondents are mainly concentrated in three Palmerston North suburbs and the length of time respondents have lived there is dependent on their age. High home ownership and independence is reflected by the elderly respondents. Eighty-two percent of respondents own their own homes with 93 percent of respondents living in homes by themselves or with one other person.

Residential location

The Palmerston North suburbs in which the elderly respondents live are shown in Table 4.2 and pictorially in (Figure 4.3). There is a good spread of respondents from most suburbs

Figure 4.3: Location of questionnaire respondents by suburb (1998)



in Palmerston North. The highest number of respondents are from Palmerston North Central, Papaeioa, West End and Roslyn.

Length of time respondents have been living in current residence

The four different age groups of respondents demonstrate different residential patterns. For example, the eight 65 to 69 year old respondents have tended to have lived in their current residences for over 16 years. In the 70 to 74 age group, the respondents seemed to have lived in their homes for either less than 11 years or for more than 22 years. One third of the respondents over 80 had lived in their homes for over 22 years.

Table 4.2: Suburbs respondents live in

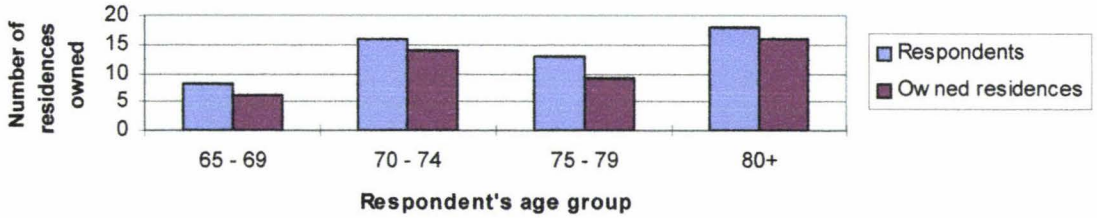
Palmerston North Suburb	Total	65-69 age group	70-74 age group	75-79 age group	80+ age group
Milson	3		2	1	
Kelvin Grove					
Tokaro	3			1	2
Cloverlea	1	1			
Palmerston North Hospital	3	2		1	
Papeaoia	7		2	2	3
Roslyn	6	1	1	2	2
Terrace End	1				1
Highbury	3			1	2
Westbrook	1		1		
Palmerston North Central	7		5	1	1
Awapuni North	2	1			1
Awapuni West			1		
Awapuni South	4		1	2	1
West End	6	3		1	1
Hokowhitu Lagoon	3		1	1	2
Hokowhitu East	1				
Hokowhitu West	4		2		2
Total	55	8	16	13	18

This data tentatively suggests that people may live in their homes for long periods of time up until the age of 70 years. Then between 70 to 74, as they get older people start moving into new homes. From 75 years onwards, respondents settle into their (maybe) smaller home until later when they need to move to a unit or a home. Despite this apparent trend, one third of the interviewees aged over 80 had lived in their homes for over 22 years.

Ownership of current residence

New Zealand has a very high rate of home ownership (Statistics New Zealand, 1997c). This is reflected in the home ownership figures for Palmerston North (69 percent). This percentage is higher for people over 65. For example, Figure 4.4 shows that 82 percent of respondents in Palmerston North own their residence, indicating that very few people over the age of 65 rent or lease their homes.

Figure 4.4: Number of respondents who own their current residence



Number of people living in each respondents household

Table 4.3 shows that 93 percent of the 55 elderly respondents live in single or two-person households. Twenty three respondents live by themselves while 28 respondents live with only one other person.

Table 4.3: Number of people living in each respondent's household

Elderly Age Group (Years)	Living alone(1)	Living with one other person (2)	Living with 2 or more people (2+)
65 - 69	3	4	1
70 - 74	3	12	1
75 - 79	5	8	1
80+	12	4	1
Total	23	28	4

The household size changes as the respondent gets older. More respondents in the 65 to 69 bracket live with one other person than live alone. In the 70 to 74 age group 12 out of 16 people are living in a household with another person. However, from age 75 to 79, there appears to be an increasing number of people living alone. This is probably caused by the death of a partner or a partner leaving (for example, to live in a rest home). Living alone

then becomes very dominant for people 75 years old and over. For example, 12 out of 18 respondents in the over 80 year old age group live alone.

Mode of transportation

Respondents were asked to identify the modes of transport they use, how often they use different modes of transport, the number of cars people have in their household and whether they had a current driver's licence. This information was used to assess respondents accessibility around Palmerston North. The car is the respondents' dominant mode of transport. However, just over half of the respondents do not own cars and just under half of the respondents have their driver's licence. There is also a trend for the number of cars and driver's licences to decrease with respondents' increasing age.

The frequency of use of transport modes

It appeared that the respondents were very dependent upon cars as their main form of transport. Figure 4.5 shows that the respondents identified the most important mode of transport when travelling was the car (49 percent). The second most important mode of transport was walking (31 percent) while the third most important mode were taxis (11 percent). The least used mode of transport was identified as buses.

Figure 4.5: Mode of transport most frequently used by elderly respondents

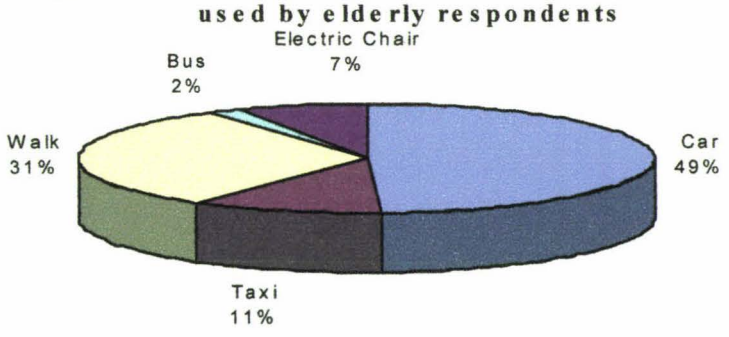


Table 4.4 shows the modes of transport used by the different groups of elderly respondents. The table shows that as age increases, the use of the car as the main mode of transport increases.

Respondents aged in the 65-69 and the 75-79 age groups used the car and walking as modes of transport when making trips. Respondents aged 70-74 walked mainly and taxied a little to get to places. In the over 80 year old age group, respondents mainly used the car either as a passenger or a driver to get to places.

Table 4.4: Modes of transportation used

Elderly Age Group (Years)	Drive Car	Passenger in car	Taxi	Walk	Bus	Electric Chair	Total
65 - 69	3	1	0	4	0	0	8
70 - 74	4	4	2	5	1	0	16
75 - 79	5	2	1	4	0	1	13
80+	6	2	3	4	0	3	18
Total	18	9	6	17	1	4	55

Note: car passenger and car driver modes separated

Number of cars in respondent's household

Table 4.5 shows the number of cars per respondent household. Eighteen respondents have one car in the household (33 percent) and 6 respondents (11 percent) have two or more cars in the household. However, the numbers of self-identified drivers (18) is less than those households with cars (24). This suggests that the number of cars in the household do not necessarily reflect the number of people who drive cars and that cars are not regularly being used in some households. Therefore, it can be assumed that many of the respondent's car trips must be as passengers rather than drivers.

Mobility patterns

Respondents were asked to identify whether they make more than five trips per day, the type and frequency of trips they make, physical problems they have which affects their mobility and whether they receive Total Mobility Vouchers (previously mentioned in Chapter Two). This information was then used to try to ascertain how mobile respondents are around Palmerston North. None of the respondents make more than five trips per day. As could be expected, physical problems and the number of respondents receiving Total Mobility Vouchers increase with age.

Table 4.5: Number of cars in respondent's household

Elderly Age Group	No cars in household	One car in household	Two or more cars in household
65 - 69	4	3	1
70 - 74	7	6	3
75 - 79	7	4	2
80+	13	5	0
Total	31	18	6

Type and frequency of trips

A trip is movement from one destination to another destination, for example, travelling from home to the shops. The return trip home is counted as another trip. For the purposes of this study, daily trips are taken approximately every first or second day, weekly trips are those taken one to two times a week, monthly trips occur approximately every four to five weeks and infrequent trips are taken every four to five months.

None of the respondents made more than five trips per day. However, when looking at Table 4.6 it can be seen that weekly and monthly trips predominate and daily trips are seldom made. Popular trips include journeys to clubs including Senior Citizens' Club and various church organisations. Recreational activities, like visiting friends also seemed to be popular forms of social interaction.

Daily facilities and social activities identified most often were shopping and visiting supermarkets, then clubs and visiting the post office. Weekly activities undertaken most frequently by the respondents were visiting supermarkets (most frequently, as previously mentioned), clubs, shops, and church. Monthly facilities visited and social activities identified most often by the respondents were the pharmacy, medical centre, hairdresser and food outlets. Less frequent trips were identified as food outlets, the hospital, the dentist and parks and gardens.

Table 4.6: Trip destination and frequency

Facilities and social activities	Daily	Weekly	Monthly	Infrequently
Family	1	18	9	4
Friends	2	19	14	
Church		23	1	3
Clubs	4	36	6	
Post Office	3	19	12	6
Library	1	11	3	4
Hairdresser		17	23	
Banks		15	9	1
Laundrette		1		
Shops	7	29	2	
Supermarkets	5	41	2	
Food outlets		5	18	21
Parks/Garden		3	13	12
Public Transport	1	10	3	4
Medical Centre		2	34	7
Pharmacy		6	37	3
Hospital		1	7	18
Dentist			1	18

Note, food outlets include both takeaways and restaurant facilities.

Respondents with physical problems limiting their mobility

Figure 4.6 shows that respondents' physical problems increase significantly with age. While only four percent of the 65 to 69 age group identified physical problems limiting their mobility, this increases to 48 percent of respondents for over 80 year olds. This indicates that with increasing age, people's mobility becomes more limited.

Number of respondents with Total Mobility Vouchers

The number of respondents who receive Total Mobility Vouchers can be seen on Table 4.6 to increase with age. While only one respondent is given Total Mobility vouchers in the 65 to 69 age group, this compared with 11 of the respondents over 80 years of age.

With increasing age and disability, the number of questionnaire respondents who receive Total Mobility vouchers increases. Benefits or comfort of knowing a facility or social activity exists without having to 'use' it gives an elderly person the psychological

confidence of having a choice. For example, the fact that a hospital exists may provide someone with 'security' without necessarily having to visit it.

Figure 4.6: Respondents with physical problems limiting their mobility

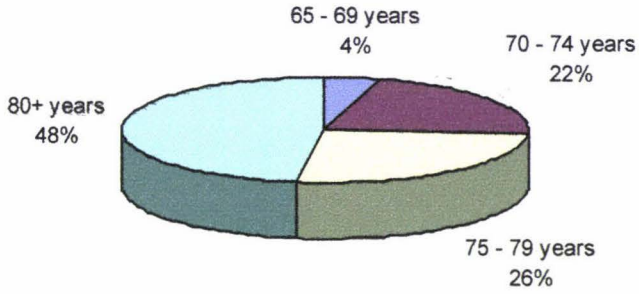


Table 4.7 also shows that, while 26 of the 55 respondents receive Total Mobility Vouchers, only six respondents use taxis as their main mode of transport. This may be a consequence of respondents trying to retain their independence and mobility by walking or relying on other people to give them rides.

Table 4.7: Number of respondents with Total Mobility Vouchers and the number of respondents who use taxis as their main mode of transport

Elderly Age Group	Taxi	Total Mobility Vouchers	Total Elderly Population
65 - 69	0	1	8
70 - 74	2	6	16
75 - 79	1	8	13
80+	3	11	18
Total	6	26	55

Summary

The age of respondents to the questionnaire varied slightly with the majority being aged over 70 (Figure 4.1). This sector of the group is dominated by women. Most respondents live in their own home and live by themselves or one other person. Respondents generally use the car when making trips and make most of their trips weekly and monthly. As the respondents' age increases, so does the number of respondents who receive Total Mobility vouchers and those who have physical problems.

The following chapter presents the findings from follow up interviews with 12 of 55 people who answered the questionnaire.

Chapter Five: Interview Findings

This chapter presents the findings from the twelve interviews undertaken. The findings of the interviews are described under key headings. The headings are designed to organise responses to interview questions in a way which allows different perspectives of interviewees to be compared and contrasted.

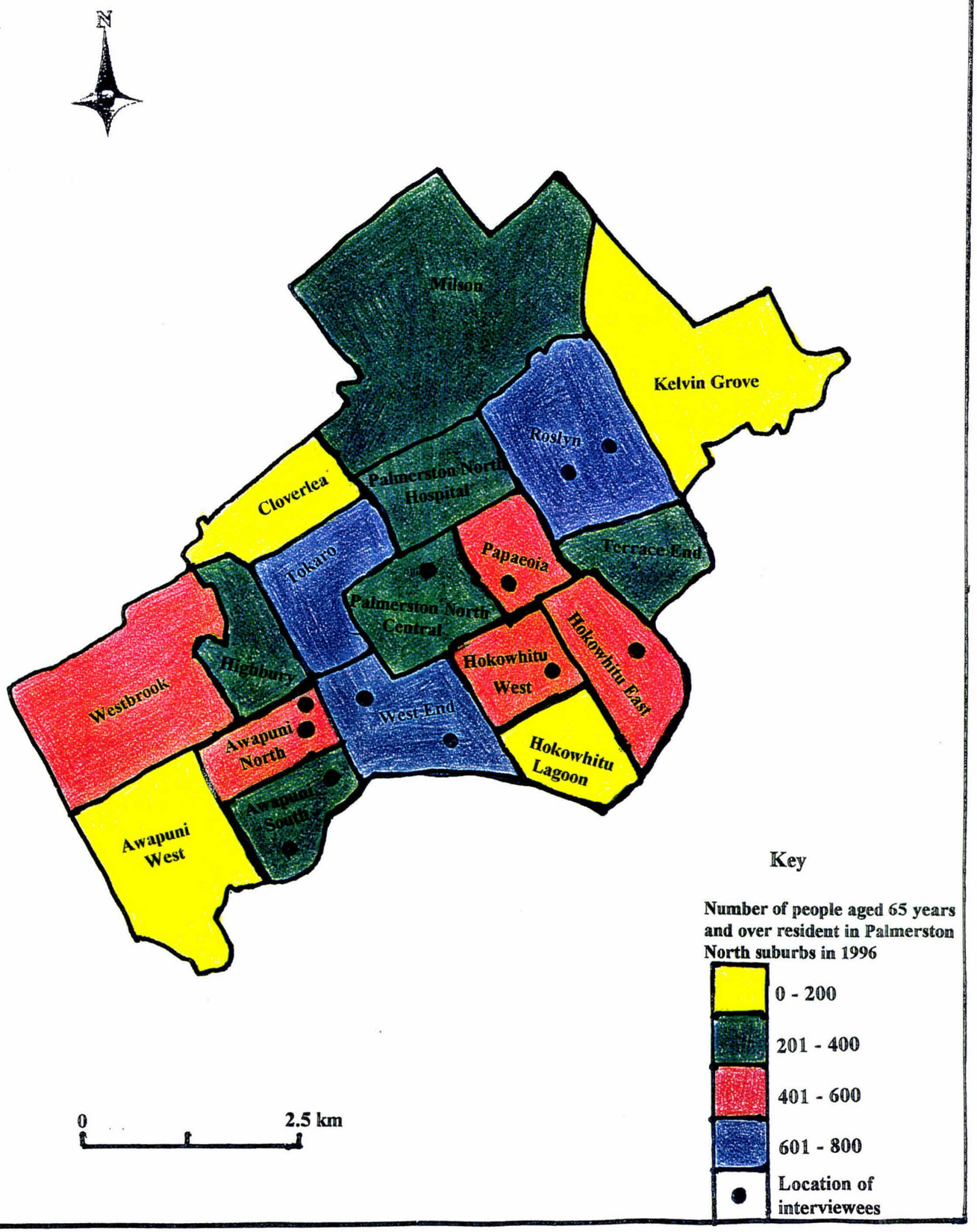
Twelve interviewees (three people from each of the four age groups over 65 years old) were chosen out of the 55 questionnaire respondents in relation to the following criteria. Interviewees needed to be: over the age of sixty five years; not reliant on an electric cart, walking chair or a wheel chair; using walking as their main mode of transport; and not currently drive a vehicle. This last point is very important as many older people still hold a driver's licence but do not drive for various reasons. Interviewees were drawn from a range of quiet, busy and moderately busy streets from various suburbs in Palmerston North (Figure 5.1).

Each interview was fully transcribed and coded according to the third objective which was to apply the adapted version of Tate's framework in a pilot study. The transcribed interviews were divided into common themes using interviewees' direct speech. In this way established trends were verified and modified (Sarantakos, 1995).

Interview Procedure

The interviews varied in time, depending on the willingness of the interviewees to talk freely about their mobility and life experiences. The interviews were tape recorded with the interviewees' permission. This allowed the interview to be focused upon. To 'break the ice' at the beginning of the interviews the interviewees were asked to describe their perceptions of their neighbourhoods. This proved successful as a rapport was gained between the interviewer and interviewees before moving onto more personal questions.

Figure 5.1: Location of interviewees by suburb (1998)



Unforeseen situations disrupting the interview procedure did occur. Some interviewees who went into hospital around the arranged interview time were not able to be interviewed until several weeks later. Nevertheless, this was expected when dealing with interviewees, particularly in the over 80 years old age group.

Some people were concerned about their identification in the research and the amount of information that would be given about their residential location. Every person who was interviewed had been burgled in the last five years. Fear of being a victim of a criminal attack is obviously heightened when living alone. This concern emphasised the importance of maintaining confidentiality of the data and thus the exact street number on the interviewees' streets could not be identified. Also, in undertaking this research, all interviewees were assured that they would not be identified in any published results. Therefore the memory maps, drawn by each of the interviewees, showing their exact residential location in Palmerston North were not included in this pilot study to ensure confidentiality. However, the number, type of trips and kilometres travelled by interviewees were collated and are shown in Appendix Three.

Interviewee profiles

Carp (1980: 23) points out,

> *"Older persons are more different from each other than are persons in any other age group...With regard to any characteristic, diversity may be as great within as between age groups".*

It is therefore important to describe each of the individual interviewee's situations. The following descriptions are based on information gathered in the interviews and accompanying questionnaires. All names have been changed to protect the identity of the participants and to assure their anonymity.

Sarah

Sarah is in the 65 - 69 age group. Sarah is divorced and has lived alone for the last 20 years.

She has high blood pressure. Sarah lives in West Street, a moderately busy street in West End. She owns her home and has lived in it for over 17 years. Sarah has a dog which she takes out walking at least once a day. She is extremely mobile, does volunteer work, and walks everywhere. Sarah goes to a line dancing club four times a week and lives within walking distance of everything she needs and rarely gets driven anywhere.

Mary

Mary is aged between 65 and 69 years. Mary and her husband live on Kettle Street, a quiet street in Awapuni North. Neither Mary or her husband drive. Mary has two daughters living in Palmerston North who regularly give Mary rides. Consequently Mary tends to look after the grandchildren a lot when her daughters are at work. Mary is involved at least three times a week with a club for several hours. She and her husband own their own home and have lived in it for over 22 years.

Judith

Judith is in the over 80 age bracket. Judith has shortness of breath, arthritis and is waiting for a knee operation and thus cannot walk too far. She lives alone in a unit she has owned for more than five years on Main Street, a very busy street in Papaeoia. She moved into her unit four years after her husband died.

Bob

Bob is aged between 65 and 70 years old. Bob has degenerating retinas, vascular problems with his legs and is a heavy smoker and thus cannot walk too far. Bob and his wife live on Tweed Street, a quiet street in Roslyn where they have lived for over 22 years. Bob's wife has a car and drives Bob to many places.

Lucy

Lucy is in the 71 to 75 age bracket. She has a hearing disorder which makes her feel

unbalanced much of the time. Lucy has to use her peripheral vision frequently when she is crossing the road otherwise she loses her balance. Lucy has lived alone on her quiet cul-de-sac (Cramer Place) in Awapuni South for over 22 years. Lucy has been widowed since she was 42 and so is very independent. Lucy is involved in a Marching Club which she goes to twice a week. She walks everywhere and seldom gets a ride from anyone. However, Lucy has had several falls when she has been walking and has broken bones several times.

Jean

Jean is aged between 76 and 80 years old. Jean has just had two knee replacements. Jean and her husband have lived on Pitama Road, a busy street in Awapuni South for more than five years. Jean and her husband had two cars when they lived in their previous house so that they could be independent. However, since they do not hold their driver's licences anymore, Jean and her husband now walk to most places that they need to visit. Otherwise they get a ride from a friend. Jean and her husband both go to Senior Citizens at least three times a week.

Frank

Frank is in the 76 to 80 age group. He lives with his disabled wife in Andrew Avenue, a quiet street in Roslyn. He has lived there for more than five years. While he does not receive Total Mobility Vouchers, his wife does. His two daughters drive Frank and his wife around Palmerston North frequently. Frank does not get to go out very much as he has to care constantly for his wife.

Stuart

Stuart is in the 71 to 75 year age group. Stuart lives with his wife, who has a heart condition, in Fitzroy Street, a moderately busy street in Hokowhitu East. Stuart has to rely on friends to take him places which he does not like doing as he would much rather be independent. However, the social contact of clubs, in particular the Heart Beat Club and Senior Citizens Club, are a big part of the quality of his life.

Amelia

Amelia is aged between 71 and 75 years old. Amelia and her husband, who cannot drive because of his eye condition, live in a busy street, Amesbury Street, in Palmerston North Central. Amelia and her husband both are very active, walking everywhere and they play golf two or three times a week.

June

June is over 80 years old. She lives alone in Nairn Crescent which is very close to the College Street/Pitama Road shopping centre in Awapuni North. June has a hearing aid, a blood clot, and is just recovering from a bout of pneumonia. She walks regularly even though she has just been in hospital. It is her goal to get out of the house at least once a day. June's friends and her cousin's daughter (particularly) drive her around. Age Concern also provides June with considerable help.

Rachel

Rachel is also in the over 80 age category. Rachel lives alone on Main Street, a busy street in Hokowhitu West. Rachel has asthma and has been in and out of hospital a lot over the last two months with blood clots. Nevertheless, Rachel tries to remain active by setting mobility goals and walking as much as she can without having to rely on taxi vouchers.

Dawn

Dawn is an asthmatic aged between 76 and 80 years of age. She lives in a small flat on her son's property in Keeling Street, a quiet street in West End. However Dawn does not rely on her son for anything. Dawn is heavily involved in about three or four different clubs and is out walking every day. Dawn walks everywhere she wants to go and rarely accepts a ride in a car from anyone and is fiercely independent.

The interviews were informed by use of a schedule as shown in Appendix Two. Many of the interview questions overlap to some extent. The interview questions drew a range of responses from a number of different perspectives. The answers to the questions also varied

in specificity and relevance, and key points tended to be spread throughout the entire interview transcript. Thus it is necessary to organise the main findings of the interviews under the key headings used below.

The following discussion is presented under four headings. Under each heading, a short explanation is given of the exact nature of the question(s) put to the interviewees. Thus, both the headings and the key findings are able to be related back to specific questions which are shown in Appendix Two. For ease of reference, the fictitious name of each interviewee is mentioned when the interviewee is cited.

Neighbourhood perceptions

Interviewees were asked what the traffic was like on their street, how they explained the traffic patterns and whether noise is a problem on their street. Most interviewees considered their respective streets had a feeling of community. Speed, volume and noise were also often used by interviewees to describe the traffic in their street.

Community feeling

The interviewees were asked whether there is a feeling of community, that is, whether there is a feeling of belonging in their street. Out of the twelve people interviewed, eight people perceived that their residential street has a feeling of community. This feeling of attachment to a person's street was experienced not only in quiet streets but in moderately busy and busy streets. For example, Dawn who has lived on quiet Keeling Street for over 12 years views the people living on her street as very sociable. "*There are always street social events being organised*".

June, who is another interviewee, lives on quiet Nairn Crescent.

> "*My street is a friendly place with a real feeling of a neighbourhood. I know most people in my street because amongst other things neighbourhood watch puts out a paper with everyone's name on it and describes what has been happening in the street*".

June says the residents in her street have changed considerably over the last ten years from being mainly elderly people to people who work. Nevertheless, June says most people own their own homes and there is only one family that rents their house.

In contrast, Bob has lived in quiet Tweed Street for over 22 years and knows just about everyone on his street. He believes that his street has not got a community feeling because of the types of people he has in his neighbourhood.

> *"I have some types of people in my street that you wouldn't want in your community and other types that use the street as a speedway, revving up cars at all hours of the night".*

This is supported by Stuart who has lived on Fitzroy street which he considers has a feeling of friendliness and community only at his end of the street.

> *"This end is friendlier because most people down our end own their own houses and have been living in the street for longer than 5 years. The people who rent houses in this street are down the other end of the street."*

The lack of community spirit as a consequence of people renting is also highlighted by Mary who has lived on quiet Kettle Street for over 22 years. Mary thinks that there is no feeling of community in her street now.

> *"The street has changed completely since I first moved to Kettle Street when everyone used to own their own homes. Today there are a lot of rented houses and people keep moving on. The street doesn't mix much now and feels almost disjointed even though there is neighbourhood support. I find there is a real difference between people who rent and people who own their houses".*

Traffic, noise and personal safety

Speed, volume, accidents, noise and safety were used by interviewees to classify traffic on their streets.

Seven out of 12 people used noise as a criterion to classify traffic in their street. However, only two out of 12 people found noise from the road affected them. Out of the twelve people interviewed, seven people perceived the traffic on their street as it has been technically classified by the Palmerston North City Council (Connelly, pers. comm., 1998). From the five people that perceived the traffic differently from the technical classification of their streets, three overestimated the traffic and two underestimated the traffic (Table 5.1).

Table 5.1: Interviewees' perceptions of traffic on their street in relation to actual traffic on their street

Interviewee	Street	Volume	Technical classification	Quiet	Moderately busy	Busy
Sarah	West	e=1450	M		1	
Mary	Kettle	e=400	Q	1		
Bob	Tweed	c=278	Q			1
Lucy	Cramer Pl.	e=50	Q	1		
Amelia	Amesbury Ave	e=3001	B		1	
Frank	Andrew Ave	e=450	Q		1	
Stuart	Fitzroy	e=1200	M	1		
Jean	Pitama Rd	c=3664	B			1
Dawn	Keeling	c=452	Q		1	
Judith	Main	c=8240	B			1
June	Nairn Cres	e=150	Q	1		
Rachel	Albert	c=10284	B			1
Total				4	4	4

Note: c = technical traffic volume count, e = technical traffic volume estimate.
Q = Quiet street, B = Busy Street, and M = Moderately busy street.

Classification of road traffic

Judith and Jean both portray their respective streets as being busy because of the traffic's speed and volume (Table 5.2). Judith says, *"My road is rather like a straight race track"*.

Jean describes Pitama Road as being busiest when people are going to work in the mornings, and when they are coming home. Sarah described West Street as being moderately busy during the week, but very busy on weekend nights when cars race each other down the road.

Stuart and Amelia both underestimated the nature of the traffic in their respective streets. Stuart describes the traffic as being quiet because, *"During the day most people are working and otherwise if they are retired they don't go out more than once a day"*.

Table 5.2: Reasons given by interviewees to classify their perception of traffic on their street

Street classification	Frequency(out of 12 interviewees)
Volume	10
Speed	9
Noise	7
Safety	4
Visibility	3
Accidents	1
Type of vehicles	0

Noise

Some people said they were not affected by noise because they either make allowances for it, have grown accustomed to it or actually like it. Sarah describes the noise on her moderately busy street,

> *"The noise doesn't really affect me. The noise from traffic racing down Church Street at night (mainly in the weekends) can be heard in my bedroom and sometimes keeps me awake. However, now I have grown used to it"*.

Amelia, in contrast, is actually used to the noise which she heard on her street when she was surrounded by a car yard and a bus company. *"We became accustomed to the noise. And now, the street without these businesses seems extraordinarily quiet"*. This sentiment is reinforced by June who has found that the noise from the road does not affect her at all. *"I rather like hearing the traffic. It makes me feel safe"*.

Bob perceives Tweed Street to be busy and noisy. Bob and his neighbours have complained to the council several times and says, *"The noise from the road affects us and keeps my wife and I awake at night"*.

Personal safety

As previously mentioned, all interviewees had been burgled in the last five years. However, most people still believe they feel safe walking and living on their street. Feelings of safety do not appear to be associated with street classification. Mary lives on a quiet street and says, *"Security on my street for walking is good although we have had problems with a few break-ins"*. Judith's house (on a busy street) was broken into two weeks before she was interviewed and says, *"I do not feel safe living on this street, not because of the road being so open and wide, rather it is because the neighbours have trees"*.

Lucy lives on a quiet cul-de-sac (Cramer Place). Lucy believes the cul-de-sac's shape and location is really the cause of her house being so quiet. *"My personal security on the street is good and there is a very good neighbourhood support group running in the street"*. However, Frank and his wife have been burgled several times when they have been in their house and Frank says, *"We have our house locked all the time as we do not feel safe"*.

Accessibility

The interviewees were asked to draw the destinations they visit daily, weekly, monthly or infrequently. Interviewees were also asked: to rank facilities and social activities in order of importance; to identify social activities and facilities that they would not stop visiting if their mobility decreased and why; to describe how often they had to depend on people to do things for them; and to identify constraints on their travel around Palmerston North.

In general, it was found that interviewees made weekly walking trips most often, and considered they had good access to the most important facilities and social activities such as the doctor and their family. However, factors like not being able to drive and poor public transport means reaching these facilities is made more difficult. If interviewees' mobility decreased they perceived their quality of life would suffer with a decrease in access to certain social activities and their independence may be compromised.

Places visited daily, weekly, monthly and infrequently

Walking trips drawn on Palmerston North maps by interviewees were measured separately using a cartometer to obtain individual daily, weekly, monthly and infrequent trips and measure kilometres travelled (Appendix Three). Table 5.3 shows that none of the interviewees regularly make many daily trips (trips every one or two days and make even less infrequent trips (that is trips every four to five months). There is no relationship with age and the number of daily walking trips made.

Table 5.3: Number of daily, weekly, monthly and infrequent walking trips and the number of kilometres travelled by interviewees

Interviewees	Age (Years	Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Sarah	65-69	2	3	5	15.6	5	12.4	1	3.6
Mary	65-69	4	10.7	4	19.7	2	6	2	5.8
Bob	65-69	1	0.9	3	10.7	4	22.7	0	0
Lucy	70-74	4	14.3	5	19.3	3	11.2	0	0
Amelia	70-74	0	0	8	21.2	5	9	2	3.5
Frank	70-74	1	1.1	4	5.6	2	6.6	2	15.9
Stuart	75-79	1	3.9	5	17	6	30	1	5.1
Jean	75-79	2	3.2	4	6.6	2	9.8	4	12.8
Dawn	75-79	3	13.9	5	18.8	4	22.3	0	0
Judith	80+	0	0	5	7.6	0	0	0	0
June	80+	4	5.7	2	2.3	4	6.4	1	0.6
Rachel	80+	1	0.3	5	15.2	1	1.3	0	0

The interviewees make more regular trips weekly (trips made once or twice a week) than trips of any other frequency. There appears, with increasing age, fewer kilometres travelled by interviewees. There also seems to be fewer monthly trips (once every four to five weeks) made by interviewees with an increase in age. However, because there are only 12 interviewees, it is not possible to draw reliable generalisations about elderly people's trip making behaviour.

The need for facilities and social activities closer to home

Facilities and social activities are defined as places that interviewees visit or activities they undertake. Most of the interviewees thought that they did not need facilities and social

activities closer to their homes. Bob thinks there are good facilities close to his house for everything he requires. He considers that he is close enough to most facilities and would not consider moving again.

Mary, Jean and June said they would like a supermarket down at the College Street shopping centre but they would not move to be closer to a supermarket themselves. June complained, *"I have to go all the way into town to go to the supermarket because all the dairies in the area are too expensive. However, I would not move to be closer to the supermarket"*.

Often interviewees mentioned they had moved to be closer to certain facilities (see residential information from questionnaires) when they had either got older or stopped driving. Jean and her husband moved to Pitama Road eight years ago because Jean had sore knees and needed to live somewhere flat and close to shops. June and Sarah also respectively changed to doctors more accessible to where they lived. June explains, "*When my husband got really sick I changed to Doctor Ting when he moved across the road. I couldn't drive and I realised how handy a doctor over the road would be"*.

However, changing doctors may depend on people's preferences. For example, Stuart is very happy with the facilities that he has in his area. However, he likes his doctor and will go anywhere to consult the same doctor he has had since he has been in Palmerston North. This is supported by Judith who says there would have to be a very significant factor to make her change doctors, *"I will go anywhere to keep the same doctor as my doctor knows all of my medical history and really understands me"*.

Ranking facilities and social activities in order of personal importance to interviewees

A ranking in Table 5.4 was achieved by tallying up the number of interviewees' personal order of importance for each separate facility or social activity. In general, the interviewees found it hard to rank some facilities and social activities against each other to develop an order of importance. For example, interviewees found that physical health facilities were

extremely hard to rank against social activities important for mental health like family, friends and clubs. Ranking depended on what priorities people had. A rank for each facility was given by interviewees with family, medical centre and church of highest importance to interviewees. The facilities with lowest priority to the interviewees were the dentist, parks and gardens and food outlets respectively.

Table 5. 4: Interviewees' facilities and social activities ranked in order of importance

Rank	Importance
1	Family
2	Medical centre
3	Church
4	Bank
5	Friends
6	Clubs
7	Pharmacy
8	Library
9	Supermarket
10	Hospital
11	Shops
12	Public Transport
13	Post Office
14	Hairdresser
15	Dentist
16	Parks
17	Food outlets

However, when discussing the potential impact of reduced mobility on activities, interviewees identified that almost all of the facilities on the ranked list could be delivered to the home. For example, someone from church could visit. Most of the interviewees said they would have to stop going to facilities like clubs which provide companionship because they cannot be accessed in the home. Interviewees recognised that library books could be delivered to their homes, but most of the interviewees preferred going to the library themselves, not just for books but for the social contact. Dawn says, *"I have to go to the library everyday at three o'clock because I get to see the children"*.

Quality of life with reduced mobility

Judith who lives alone said that her quality of life would suffer if she could not go to places

such as clubs and the library *"When you lose your partner you HAVE to get out and keep meeting other people to keep sane"*. Bob says he would find it hard to compensate for the loss of social activities as he has been involved with his rugby club for 52 years, and he would be 'lost' without it. Stuart confirms this by saying he would not be able to cope very well without clubs, *"I would hate losing contact with my friends. Social contact is a big part of my life"*.

If Rachel's mobility decreased she would be able to get all of the services she needs for survival. For example, she has a lady who comes in on a Thursday to help her with her money, and housework as well as a gardener who visits every two weeks. Rachel also has two daughters in Palmerston North who would do anything if she asked them. However, socially Rachel's quality of life would decrease a lot. *"It is important to go to clubs especially in the winter because you cannot get out as much and it is a long day by yourself"*. Rachel says it is very important to be independent and keep active, not just for her physical well-being but mental well-being as well.

Dependence on people

The interviewees' dependence on other people to help them increases with age. For example, people in the 65 to 69 age group need little help from other people compared to people in the 80+ age group who require significant help from many more people. For example, 67 year old Sarah is very independent and relies on no one. She thinks she is an active person. Judith, in her 80s, in contrast relies on family to do many things for her.

Constraints on travel in Palmerston North

The majority of the interviewees have difficulty travelling around Palmerston North because they cannot drive, public transport is inflexible and inaccessible, and they have health and income constraints.

Car access

The interviewees all thought their independence had decreased since they had stopped

driving. Rachel, Judith and June's lifestyles have changed since they have stopped being able to drive vehicles. Now these women are not as independent as they were previously and only go to places when they walk or if someone takes them somewhere. Lucy thinks that friends become very important for people living on their own. For example, Lucy's trip making increased after her husband died because she started visiting her friends more often as she was lonely.

Public transport

Most of the interviewees thought that Palmerston North's public transport system was inaccessible and infrequent. Mary lives within walking distance of the bus stop. However, the bus is too infrequent to be useful for Mary. Judith also does not use buses because she hurt her leg badly getting onto a bus three years ago and has lost her confidence in using buses. Lucy uses public transport coming home from town as long as she has somewhere covered to sit.

Sometimes if Frank has too many groceries when he is doing the weekly shopping he will catch a bus home from the supermarket. However, Frank finds the bus steps are too high and the bus service infrequent and unreliable.

Health

Most of interviewees said that their health constrained the amount they travelled around Palmerston North. For example, Mary, Jean, Rachel, June and Judith consider that their health constrains their travel in Palmerston North because they stay at home when they are not feeling well.

Income

Some interviewees described their income as constraining their access to certain facilities and social activities. Sarah admitted that nothing constrains the amount she travels other than money. Frank had to give his car up last year because he could not afford to keep

running it. None of Rachel, June and Judith use taxis as much as they would like because they cannot afford to pay for taxis (even with Total Mobility vouchers).

Mobility

Most of the interviewees gave their driver's licences up voluntarily and have noticed changes in their mobility since they stopped driving. Interviewees also described certain factors like uneven pavements which affect their ability to walk around Palmerston North.

The interviewees identified losing some of their mobility, albeit temporarily as a result of themselves or their spouse becoming ill. Frank, especially, noted his loss of mobility and his social activities declining as he has become the caregiver of his wife. Once spouses had passed away, however, interviewees resumed their social activities, and hence, their mobility increases. However, some people's own health circumstances have moved on to the point where their life is deteriorating.

Driving history

The interviewees do not drive for both non-voluntary reasons such as failing the driver's licence medical test and voluntary reasons. For example, Sarah and Frank do not drive because of the cost of running a car. As shown by Table 5.5, most of the interviewees stopped driving voluntarily.

Mary and Stuart do not drive because they failed their respective eye sight tests to get their licence. Bob, on the other hand, gave up his licence because of his legs being too sore when he drove his car. Judith does not drive because she had an accident three years ago on a roundabout, lost all of her confidence and did not renew her licence. She kept her car for another year for family to use. Lucy does not have her licence. She was never very confident when she learnt to drive so her husband always drove. She started to drive again when her husband died but thought she drove too cautiously and was a liability on the road, so she stopped driving.

Table 5.5: Interviewees' reasons for not driving

Interviewee	Age	Street	Stopped driving	Reason
Sarah	65-69	West	V	Money
Mary	65-69	Kettle	NV	Failed eye test
Bob	65-69	Tweed	V	Loss of confidence (bad legs)
Lucy	70-74	Cramer Place	V	Never had any confidence
Amelia	70-74	Amesbury	V	Feels a danger to other people
Frank	70-74	Andrew Avenue	V	Money and too many cars on road
Stuart	75-79	Fitzroy	NV	Failed eye test
Jean	75-79	Pitama Road	V	Feels a danger to other people
Dawn	75-79	Keeling	V	Driving reminds her of her dead husband
Judith	80+	Main	V	Loss of confidence (accident)
June	80+	Nairn Crescent	V	Never had licence as husband always drove
Rachel	80+	Albert	V	When moved, was close to town and never renewed it

Note: NV = Driver's licence was given up non-voluntarily

V = Driver's licence was given up voluntarily

June has never had her licence but used to drive around the farm. When she and her husband moved into town her husband always drove. June was widowed earlier this year, and does not feel confident enough to get her licence. Dawn used to have her driver's licence but her husband always drove the car. When her husband died 25 years ago she sold their car. She could not bring herself to drive again because every time she saw the car she would see him sitting there.

Rachel had a car accident eight years ago which brought the onset of asthma and loss of confidence in her driving. Furthermore, Rachel's husband always drove her everywhere. When her husband died, Rachel was not confident enough to begin driving again.

"I feel it was the worse thing I ever did not renewing my licence and not looking

far enough ahead. I don't like taking advantage of people when they offer to help you as it is very easy to become reliant on people".

Benefits of walking in Palmerston North

Eight of the interviewees noted that benefits of walking in Palmerston North is that walking is 'good for you', the city is flat, and the streets which have median strips are good (Table 5.6). For example, Mary says making it to the median strip on Main Street gives her time to catch her breath and wait for the next break in the traffic to cross safely. Jean also considers that walking is very important because it keeps her mobile. Jean believes she has to keep moving otherwise she will find that her mobility has gone.

Table 5.6: Benefits of walking in Palmerston North.

Benefits	Frequency (out of 12 interviewees)
Flat	8
Good for you	8
Median strips	8
Well laid out	5
Sloped edges on footpath	4
Public transport	4
Nice gardens	2

Negative aspects of walking in Palmerston North

Most of the interviewees found that traffic speed, and people's driving behaviour are their biggest problems when walking in Palmerston North (Table 5.7).

Amelia and Mary consider that, since the police service and the traffic department have merged together, people's driving behaviour has got worse. They think there needs to be more traffic officers visible on the streets. Mary perceives most cars on Main Street/ Pioneer Highway as exceeding the speed limit.

"Since the police have merged with the traffic officers I think the traffic/car speed hasn't been monitored like it used to and people tend to speed more. This makes it harder for me as a pedestrian to feel safe when I am walking".

Table 5.7: Negative aspects of walking in Palmerston North.

Problems	Frequency (out of 12 interviewees)
Traffic speed	12
People's driving behaviour	12
Long delays when trying to cross	11
Uneven footpaths	11
Lack of pedestrian/signal crossings	10
Cyclists	10
Lack of traffic police around	10
Crossing roads	10
Wide streets	8
Traffic volume	8
Traffic lights change too quickly	8
Roundabouts	7
Skateboarders/roller bladers	6
Lack of lights	6
Trucks, lorries and buses	6
Sloping accessways	5
Noise	4
Public transport	4
Non-lining up streets	4
Grassy medium strips-slippery	3
No bus shelter	3
Vegetation by crossings/roundabouts	3
Footpath width	1

Judith also finds it is hard crossing the road because of traffic speed and behaviour. Judith finds the turning traffic at Ruahine Street will never give way to you which is a big problem even though you have the signal to cross with. *"I have had to jump onto the footpath two or three times now because I thought a car was going to hit me".*

Nearly all the interviewees thought uneven footpaths and long delays when trying to cross the road were further negative aspects to walking in Palmerston North. For example, Jean says,

> *"I find the uneven footpaths in Palmerston North like College Street and Kettle Street very difficult to walk on as I trip easily because I don't raise my legs as high as I used to when I have been walking".*

Judith thinks that the council urgently needs to do something about the tree roots sticking out of the footpaths which she finds are frequently tripping people up. Ten people considered that crossing roads, lack of traffic police, lack of pedestrian/ signalised crossings, and cyclists were their second biggest problems when walking in Palmerston North. For example, Mary finds it hard crossing roads like Pioneer Highway which seems to have cars speeding down it.

> *"I find it is too hard to get across Pioneer Highway from Cavendish Crescent and so I have to go to Botanical Road to get across on the pedestrian crossing. This is such a timely process that it often defeats the purpose of my trip".*

Lucy, Dawn, Rachel, Jean, Frank and Mary also get frightened when cyclists come up behind them when they are walking, giving them a fright and make them nearly lose their balance and fall over. Mary says, *"Pedestrians should not have to move off the footpath for a cyclist"*. Frank says,

> *"I often need to get off the footpath onto a lawn or someone's garden if I see bikes, cyclist or roller bladers coming. I find people on motorised scooters are also very dangerous".*

Other issues identified by half of the interviewees included roundabouts, lack of lighting, buses, and rollerbladers. For example, Frank finds crossing near a roundabout very dangerous as he never knows if a car is turning or not as often they do not indicate. *"I have waited ten minutes by a roundabout to make sure that I am safe before crossing the road".*

Finally, further concerns voiced about walking in Palmerston North included sloping accessways, and streets not lining up. For example, Sarah says Linton Street, College Street and recently Main Street have a rolling hill look and feel due to the undulating, deep driveways .*"I know a lot of people who have put their hips out and twist their ankles on accessways. When I walk I have to look constantly at the ground for fear of tripping up".*

Temporal and seasonal variations when walking

Most of the interviewees do not walk at night and vary the amount they walk during the day and with a change in seasons.

Walking at night

From Table 5.8 it can be seen that not one of the 12 interviewees would walk anywhere at night. Most of the interviewees said they would not walk at night because they did not feel safe. Sarah avoids walking at night because she cannot see easily at night and because of 'dangerous and drunk young people'. June would never walk at night because she feels unsafe and thinks her street needs more lighting.

Daily variations when walking

Most of the interviewees vary what time they walk during the day to avoid traffic. Frank only walks in the mornings. Frank finds that even in broad daylight when he is walking on his own he can sometimes feel unsafe when he sees two young men coming towards him, *"I cross over to the other side of the road to avoid the young men because I do not feel safe"*. Bob and June never walk at nine o'clock in the morning or at five o'clock in the evening. Neither Stuart or Jean walk at nine o'clock and both avoid walking between twelve o'clock and four o'clock in the afternoon.

Table 5.8: Temporal and seasonal variations in interviewees' walking patterns

Interviewee	Street	Walk at night	Daily Variations	Seasonal Variations
Sarah	West	No	Yes	No
Mary	Kettle	No	None	No
Bob	Tweed	No	Yes	No
Lucy	Cramer Place	No	No	Yes
Amelia	Amesbury	No	No	No
Frank	Andrew Ave	No	Yes	Yes
Stuart	Fitzroy	No	Yes	Yes
Jean	Pitama Road	No	Yes	Yes
Dawn	Keeling	No	No	No
Judith	Main	No	Yes	Yes
June	Nairn Cres	No	Yes	Yes
Rachel	Albert	No	Yes	Yes

Seasonal variations when walking

Most of the interviewees vary the amount they walk with a change in seasons. Lucy, Frank, Jean, and Rachel all walk more in the summer than in the winter. Jean feels that in the winter it is easy to spend most of the day asleep. *"It is difficult to keep mobile in winter when the weather is bad. I instead do a lot more walking in the summer"*. Stuart walks more in the winter than in the summer because it is cooler and he can walk further.

Crossing the road

Most of the interviewees avoid crossing certain streets in Palmerston North and have to cross streets in certain places to get across safely.

Avoidance of certain streets in Palmerston North

Eleven streets were identified by interviewees as streets that they try to avoid when walking. Table 5.9 shows that interviewees avoid crossing College Street/Pitama Road, Main Street, and Pioneer Highway due to lack of help for pedestrians to cross the street safely, leading to long pedestrian delays and interviewees often getting trapped on the median strip in the middle of the traffic.

Mary finds crossing from College Street over to the Pitama/College Street shops can be quite dangerous as there is no crossing, only a sign saying, 'Beware of Elderly Pedestrians'. When crossing at this corner, because of the vegetation and cars parked along College Street, cars turning out from Pitama Road can be a real hazard to pedestrians.

> *"The whole road must be clear before I can make a dive over to the shops which is often a long time to wait. I find it strange that there is an alleyway for people to get to the shopping centre but nothing to get you across the road"*.

Interviewees also said that they are afraid when crossing on pedestrian crossings and signalised crossings on streets like Main Street, Ruahine Street, Pioneer Highway and

Pitama Road. Frank, Rachel and Stuart avoid the Ruahine/Main Street intersection because cars never give way to them when they are crossing the road. Stuart says,

> *"I always feel really scared when I cross the Ruahine/Main Street intersection especially after a woman was killed at this intersection earlier this year. I feel that I need eyes in the back of my head".*

Table 5.9: The streets interviewees avoid crossing

Street	Reason street is avoided by pedestrians
College Street/Pitama Road	• No crossing facility to get across College Street except a 'Beware of Elderly Pedestrians' sign. • Long traffic delays • Pitama Street crossing too close to Pitama Street/College Street intersection. • Cars parked and overgrown vegetation on the intersection corners block turning vehicle's ability to see pedestrians on Pitama Street crossing. • College Street garage (with little off street parking) creates congestion stopping cars from seeing pedestrians.
Pioneer Highway/Monrad Street	• No crossing facility to get across Pioneer Highway safely • Traffic speed, volume and driving behaviour very dangerous • Long traffic delays • Pedestrians often get trapped on median strip
Pitt/Cuba/Bourke Streets	• Traffic lights with no pedestrian signal • Streets do not line up and 'traffic comes from all directions'.
Pitt/Main Streets	• Traffic volume and speed scares pedestrians even when crossing with traffic lights • Often get trapped on median strip
Albert/Main Streets	• Traffic volume and speed scares pedestrians even when crossing with traffic lights • Often get trapped on median strip
Princess/Main Streets	• Pedestrian signal on traffic lights is not long enough • Traffic volume and speed scares pedestrians even when crossing with traffic lights • Often get trapped on median strip
Princess/Grey Streets	• Badly planned and understood corner, with several traffic signs and drivers 'acting erratically'.
Ruahine/Featherston Streets	• Traffic lights with no pedestrian signal.
Ruahine/Main Streets	• Traffic lights with no pedestrian signal • Traffic volume and speed scares pedestrians • Someone killed at this intersection
Broadway Avenue	• Erratic driving behaviour • Unknown nature of speed bumps

Interviewees also identified that they avoid crossing streets which have traffic lights but no pedestrian signal. For example, ten out of twelve interviewees find crossing the Cuba, Pitt and Bourke Street intersection very dangerous. Sarah says, *"I avoid crossing there, but*

when I have no other choice but to cross at this intersection I shut my eyes and hope that I won't get hit.".

The corner of Main and Princess Streets is very dangerous because the fast moving traffic and the signalised lights which do not give interviewees long enough to get across the street. Amelia says,

> *"I find the Princess/Main Street traffic lights do not give you enough time to get across the road. Drivers who are turning the corner very rarely give way to pedestrians who are trying to cross".*

Interviewees highlighted people's driving behaviour as erratic and very dangerous on the Grey Street/Princess Street intersection. Amelia avoids walking at the Grey Street/Princess Street intersection and says, *"There are signs everywhere and people get very confused. I never know what the cars are doing and I don't know if they know what they are doing either".*

Points at which people cross the road

All of the interviewees cross the road in certain ways to avoid crossing at roundabouts, street corners, uncontrolled intersections and stepping off high footpaths. The interviewees also look for pram crossings (sloping footpaths) and pedestrian crossings to help them cross the road. For example, when Bob crosses the road near a roundabout, Bob crosses before or after the roundabout and walks further up the street until he has clear vision up and down the street before crossing. Judith, Rachel and Lucy would also never cross a street on a corner.

Problems which affect interviewees' freedom to cross the street

Problems perceived as affecting most interviewees' ability to cross the street include the lack of controlled crossings, lack of confidence, long delays when waiting to cross the road, traffic lights without pedestrian signals, driver behaviour and certain intersections.

Table 5.10 shows that all of the interviewees consider their safety when crossing the road is affected by traffic speed, traffic behaviour and lack of controlled crossings. For example, Stuart and Sarah think that the lack of pedestrian crossings on Main Street/Pioneer Highway really affect their freedom to cross the road easily and safely. Interviewees also think that having to wait for a long time before being able to safely cross the road, signalised lights with no pedestrian signals and not enough police traffic controlling the traffic affect interviewees' ability to safely cross streets. For example, Mary has once waited ten minutes before she was able to safely cross Pioneer Highway.

> *"I wanted to see how long it took me to cross the road without having to wait in the middle of the road. I don't feel safe standing on the median strip on Pioneer Highway because I was scared that people would hit me".*

Table 5.10: Problems which affect interviewees' ability to cross the street safely

Problem	Frequency (out of 12 interviewees)
Not enough signalised or pedestrian crossings on busy streets	12
Traffic speed and behaviour	12
Long delays when trying to cross	11
Signalised traffic lights with no pedestrian signals	10
Not enough traffic surveillance	10
Lack of confidence	7
Cars stopping on controlled crossings	4

Another concern affecting interviewees' ability to cross the street safely was their lack of confidence when walking. For example, Lucy tries to avoid walking along or crossing roads with fast, heavy traffic since she fell over and broke her wrist. Now Lucy will not take risks and is frightened of falling over again. She is extremely cautious where she walks, choosing the routes that she is least likely to hurt herself on.

Summary

This chapter has shown that most of the interviewees think that their streets have a feeling of community associated with it, irrespective of the type of traffic on their streets. Interviewees made most of their walking trips weekly. With an increase in age, there was often a decrease in mobility, loss of confidence, fear of crossing the street, and dependence on others. Interviewees considered access to family, the medical centre and church were the most important facilities and social activities for them. Most of the interviewees had given up driving voluntarily and felt that their mobility was constrained by traffic speed, and people's driving behaviour. When crossing the street, interviewees indicated their ability to cross the street safely was reduced because of erratic traffic behaviour, lack of controlled crossings and lack of confidence.

The next chapter analyses the questionnaire and interview findings in relation the analysis in to the research objectives of this study.

Chapter Six: Analysis

The overall aim of this thesis is to examine the extent to which social severance is experienced by elderly pedestrians. This chapter partially addresses research objective four, along with Chapter Seven, which is to evaluate the utility of the research framework for identifying and measuring social severance effects experienced by elderly pedestrians. Chapter Six does so, in a four-part analysis, by analysing the findings from the research investigations. Three types of methods for identifying and measuring social severance are analysed in light of literature outlined in Chapter Two: community measures; accessibility measures; and barrier measures.

Community measures

The community based measures attempt to identify where psychological severance will be more severe by measuring linkages that define elderly pedestrians such as socio-economic factors, community perceptions, and traffic perception.

Community characteristics

Koopman-Boyden (1993) argued that describing New Zealand's elderly population as a homogeneous group is very misleading. Age is not a completely reliable variable and homogeneity cannot be assumed for elderly people. This diversity was reflected in both the interview and questionnaire results. For example, the interviewees were a diverse group of people aged over 65, ranging from Bob, in his late 60s who was quite physically inactive because of his disabilities, compared with Dawn, who at 79, walked everywhere.

The questionnaires also reflected an under-representation of male respondents. As a result, fewer males were interviewed, compared with females. The men interviewed had different trip making patterns than women and made fewer trips than the women. This supports Walker's (1997) findings that women's social networks are far more elaborate and supportive than those of men.

Community perceptions

Appleyard and Lintell (1969) found that traffic volume is related to people's perception of community/neighbourhood. However, this was not evident from the interviews. Most people, regardless of whether the traffic in their street was quiet, moderately busy or busy, described their residential streets as having a feeling of community.

Interviewees who perceived their residential street to have no "community" were often living in streets that had high numbers of people renting houses. Interviewees often perceived people who rented homes in their streets in a negative light. For example, Mary who lives on a quiet street says that there is no feeling of community on her street. *".... I find there is a real difference between people who rent and people who own their own homes"*. Interviewees never described traffic at all when they described what their feeling of community on their street was related to, but described factors such as the length of time neighbours had lived in the street, the number of people in their street, and the number of people who rented houses on their street.

This supports Kirby's (1981) findings that psychological severance would be experienced more in the neighbourhoods where the majority of people owned their homes and there was a high feeling of community. Tate (1997) also supported this finding and argued that psychological severance would thus be more severe in communities with high levels of interaction and identity.

Traffic perceptions

Most interviewees perceived the traffic on their street by speed, volume and noise. Only two people underestimated traffic on their street which contradicts the findings of Appleyard and Lintell (1969) who found that people usually overestimate traffic on their street.

Nevertheless, the pilot study did re-affirm Appleyard and Lintell's (1969) findings that, when vulnerable members of the community live on streets where the traffic is very busy, their behaviour adapts to the situation. This was shown by the views of interviewees. Those people aged over 80 seemed to be "locked in" to their busy street

through lack of income and disabilities, and were therefore likely to suffer the most from changing environmental quality. However, the negative effects of traffic often have to be weighed up against the positive effects of the location. For example, Judith said it would almost have to be a matter of life or death to make her move from her house on Main Street because moving would require so much effort and, *"I couldn't be closer to the shops"*.

Accessibility measures

Accessibility measures were used to identify potential physical and psychological severance by examining trip making patterns, access to facilities and social activities, elderly pedestrians' independence and choice.

Trip making patterns

The Land Transport Safety Authority (1994) has described elderly people, as their age increased, as shifting from being mainly car drivers to using several modes of transport. However, this is not entirely reflected by the questionnaire respondents who are still very dependent on cars. They identified the car as their most frequent mode of transport, with walking the second most favoured mode, and taxis the third most important mode. It is significant to note that the frequency of car/taxi use is dependent on the size of the trip between the participant's location and destination. The car/taxi is used the most frequently when shopping and visiting. In the case of shopping, the use of the car/taxi/bus is dependent on the distances travelled. The shorter the distance to the shops, the less need for a car and the more walking is relied upon. Walking and public transport are now discussed in further detail.

Walking

Walking is an important form of recreation and transportation in elderly people's lives (Oxley and Barnham, 1992). Furthermore, walking provides a way of interacting with the social environment. Rosenbloom (1991) acknowledges that it is the physical abilities, not the age of a person that determines how much they are able to carry and walk. For example, Judith needs both of her knees replaced and she has to rely heavily on taxis, cars and other people to help her travel to places. She adds, *"...I am very*

dependent on getting a ride in someone's car almost all the time I go out... However, I do feel the lack of exercise quite frustrating".

The interview results showed that with increasing age, there was increasing disability and fewer kilometres travelled by interviewees. There also appeared to be fewer monthly trips made by interviewees as age increased. Proximity to the centre of Palmerston North determined whether a taxi or private car was used and the frequency with which each is used. Frank says, *"You do a lot more things when you've got a car. Otherwise, you would just stay at home and go as far as you can walk because you can't afford taxis all the time".*

Public transport

Skelton (1992) identified that elderly people seldom use public transport. This was confirmed in the pilot study as few questionnaire respondents and interviewees using the Palmerston North public transport system. Reasons included infrequency, unreliability, and inaccessibility of the bus service and having a lack of bus shelter in the suburbs. Interviewees also acknowledged that they preferred the privacy and reliability of a car or a taxi.

The interviewees also considered that their access to facilities and social activities was constrained by inadequate public transport, and limited access to a car. This supports Novak's (1997) findings that transportation gives elderly people a sense of independence and control in their lives. However, a lack of transportation can lead to isolation, poor health, and decreased well-being.

Access to facilities and social activities

The type of facilities and social activities that elderly pedestrians are involved with are similar to the facilities and social activities involved with before retirement. As Stuart noted, *"When you retire it's not the end of the world. You're just not involved in work activities"*. Work trips were described by interviewees as being replaced by voluntary work and clubs including the Senior Citizen's Club, various church organisations and the Return Servicemen's Association (RSA). Recreational activities, like visiting friends

also seemed to be popular forms of social interaction for the elderly people in the pilot study.

Age Concern (1998) found that 85 percent of people over 65 years of age are totally or mainly dependent on New Zealand's Superannuation. It was, therefore, understandable that some of the interviewees perceived their income to be a constraint on their access to certain facilities and social activities. Even with Total Mobility vouchers which allowed the interviewees to have half-priced taxi fares, interviewees still thought that their lack of money constrained how much they used taxis. This may also have been due to the interviewees' mind set about the 'extravagance' of using taxis.

The most regular trips by elderly pedestrians were weekly outings to the supermarket, clubs and church and monthly visits to the pharmacy and medical centre. Less frequent trips by elderly pedestrians were made to parks and gardens, the hospital and the dentist. Most interviewees mentioned they did not regularly travel outside of Palmerston North because of health and income constraints. It was found that if interviewees suffered a reduction in their ability to walk, facility services essential for interviewees' survival could be delivered to the home. However, interviewees would not be able to access social activities easily.

There was strong recognition by interviewees that if there was a decrease in access to certain social activities such as clubs and the church, then the interviewees' 'mental health' and quality of life would decrease (particularly if the interviewee lived alone). These feelings of being cut-off and isolated through lack of social activity were recognised by Tate (1993b) as a psychological dimension of social severance.

Independence

Novak (1997) highlighted that with an increase in age there is often an increasing loss of independence. This is reiterated by the finding that interviewees' dependence on other people increases with age. This dependence includes even visitors to 'break the pattern of loneliness'. However, all the interviewees insisted that they did not like relying on other people and try as hard as they can to retain their independence. June says,

"I don't like taking advantage of people when they come over to help you as it is very easy to become reliant on people. It is not fair on the person helping because they have lives of their own. I also find it hard getting people to do things for me if they won't accept things I try to give them for having helped me".

Novak (1997) identifies these characteristics as the 'exchange theory' whereby elderly people feel that they cannot accept help unless they can compensate tangibly for every service they receive from others.

The questionnaire respondents showed that they value their mobility and independence by the fact that while 26 people receive Total Mobility Vouchers (half priced taxi fares), only six people use taxis as their main form of transport. Reasons for this include people relying on other people or other modes such as walking or public transport to travel to various destinations.

None of the interviewees had current drivers' licences which was one of the criterion used to choose the interviewees. All of the interviewees recognised that their independence had decreased since they had stopped driving their cars or their spouse (usually the husband who always drove the car) had died, except for Bob whose wife still drives.

Colmar Brunton Research (1990) highlighted that one third of people over 60 are caregivers for another person which disputes myths about elderly people being completely dependent on other people (Coster, 1997). Interviewees identified significant changes in their mobility when their partners became ill. For example, before June's husband became sick, she was very active. Then, when her husband became sick, she looked after him for a lengthy period of time and her mobility decreased substantially. However, after the death of her husband, she has become far more active and involved with more social activities than she was before her husband became ill.

Choice

The number of elderly people with driving licences decrease with increasing age. For example, questionnaire respondents under 74 years of age have more cars than driver's licences in their household. This reflects an ability to drive compared with respondents over 80 years old who have more driving licences than cars. This may indicate that these respondents have voluntarily given up driving their cars. However, some interviewees aged over 80 identified that they do not want to give up their licences because they feel that they will be giving up their independence. Nevertheless, interviewees also pointed out that their freedom of choice has decreased substantially since they stopped driving. For example, Judith says, *"When I want to do or get something quickly I really wish I had a car...like going to visit my daughter"*.

Benefits or feelings of comfort from knowing people are close by, or a facility or social activity exist without having to 'use' it also gives elderly people the psychological confidence of having a choice (Novak, 1997). For example, the fact that a hospital exists may provide someone with 'security', without them necessarily having to visit it. However, Colmar Brunton Research (1990) identified that most elderly people are not aware of many of the choices available to them. For example, elderly people are often not aware and rarely use some services like Total Mobility Vouchers and Disability Allowances. For example, Frank was not aware when the bus service made changes to their time-table. Frank found out only after waiting for three quarters of an hour at a bus stop before he realised that the bus service must have changed its time-table.

Barrier measures

Barrier measures used included pedestrian delay, routine, confidence, safety, avoidance and amenity to identify physical severance effects on elderly pedestrians.

Pedestrian delay

Lengthy waiting times (pedestrian delay) were identified as problems for elderly pedestrians when crossing busy streets (Lassiere, 1976). June says,

> *"The corner of Main and Princess is very dangerous and I usually avoid it because it is such a wide and busy corner. The pedestrian signal does not last*

for very long and I often got stuck on the median strip and marooned amongst the cars until it was safe to cross again".

This supports the physical severance findings by Clark et al. (1991). The study found that if people's trips were delayed too frequently and people could not get across particular streets safely, the trip may be put off or permanently stopped.

Routine

Elderly pedestrians lack confidence when trying to break habits and change routines. The memory maps identified that the routes walked by interviewees did not often vary. Several interviewees gave up their licences because their husbands had always routinely driven and did not like their wives driving 'their' cars. Dawn identified that she gave up driving because every time she went to drive her car, *"I was put off driving because I kept seeing my dead husband sitting in the car"*. Dawn's husband always drove and, because he did not like it when Dawn drove, now, Dawn would never try to drive again.

Another example of commitment to routine was confirmed by Amelia whom was rung at six o'clock one evening to arrange an interview. However, I was told to ring back "after the news finished". This was further highlighted by Amelia saying they never go out at night because of safety reasons and because they like to watch the news.

Lack of desire to break routine was also identified in the interviews by Judith who said she promised herself that she would give up her driver's licence no matter what when she turned 80 years old. This was irrespective of her physical ability and the fact that Judith's mobility and accessibility around Palmerston North would decrease dramatically once she stopped driving. People under as well as over 65 years of age also have a mind set about age and its constraints rather than valuing their actual physical and mental ability.

Loss of confidence

June says an example of getting old is losing your confidence which leads to a decrease in both accessibility and mobility. She says,

"I don't like escalators because I have to take my glasses off to focus on safely going up the escalator. I can go up on the escalator but going down I cannot step onto the steps. The spikes and the speed of the stairs are too much and the shop assistant now has to help me downstairs".

Elderly people find it very hard to cross the road when they have lost their confidence when walking as a consequence of falling over (OECD, 1985). However, most interviewees are not afraid to go walking during the day as long as there are people around and the interviewees are not travelling to an isolated place. Frank says that he will cross the road during the day to avoid young men who look frightening. He also walks into people's gardens to avoid cyclists biking on the footpath. Dawn and Lucy, both cross the road if they can, to avoid stray dogs. The OCED (1985) highlighted the importance of elderly pedestrians feeling safe when walking to keep their activity levels up because the lack of activity may lead to decreased physical and mental health.

The Land Transport Safety Authority (1994) referred to the systematic decline of driving with age. The majority of interviewees gave up their licences voluntarily after a loss in their driving confidence because of accidents, near accidents or just feeling unsafe when driving. Most elderly pedestrian's travel patterns, destinations, and length of trips are often constrained by lack of confidence and usually avoidance of travelling at certain times of the day and in certain seasons. Uneven footpaths, erratic traffic behaviour, cyclists and traffic lights changing quickly are some of the problems which interviewees encountered when they were walking. These cause the interviewees to become frightened, lose their confidence and start changing trip making or avoid making certain trips altogether.

Lack of traffic police was highlighted as a cause of lack of confidence when walking in Palmerston North. For example, Mary says, *"Since the police have merged with the traffic cops into one force, the traffic speed does not seem to have been monitored like it used to. I now feel very scared when I am walking down the street because of the dangerous traffic"*. Therefore, with an increased police presence certain streets may become safe places to walk once more.

Perceived safety

Elderly pedestrians regard their personal safety and safe mobility as a very important part of their ability to walk confidently in town (Lassiere, 1976).

Personal safety

All of the Palmerston North interviewees had been burgled in the last five years. Feelings of safety were not related to interviewees' perception of community or their perception of traffic on their street. Some respondents recognised that perceived amenity values such as thick vegetation sheltering interviewees from the road made the interviewees feel isolated and unsafe. Fear of being a victim appeared to be heightened when an interviewee was living alone.

There appeared to be no indication in the interviews of Morrison's (1996) findings that women have more fear when they walk than men. This may be because none of the interviewees walk at night and they may subconsciously avoid certain areas during the day. However, one of the male interviewees, Frank (as mentioned previously) identified that he was scared of many things when he is walking during the day.

Safe mobility

A major finding was that none of the interviewees would go walking at night by themselves. This reflects the Transport and Environment Committee study (1998) which found that people who perceive that walking is not safe, will walk less. This may be partially out of routine but mainly because the interviewees were afraid of walking at night for reasons such as being scared of getting attacked and lack of street lighting.

Elderly pedestrians' safety concerns when walking include traffic speed, people's erratic driving behaviour and uneven footpaths. 'Beware of Elderly Pedestrians Crossing' signs were also identified by interviewees as not being adequate to change people's speed or driving behaviour and caused elderly pedestrians to feel unsafe crossing the road. This supported the United Kingdom Department of Transport findings (1993) that notions of safety and pleasantness are important factors in distinguishing the choice of a route.

Avoidance

Interviewees identified that they often walk further down the street to avoid crossing at roundabouts, street corners, uncontrolled intersections and stepping onto or off high footpaths or grass covered median strips. Badly planned intersections that do not line up, badly controlled intersections and misunderstood traffic designs, such as pedestrian platforms, are identified as problems by elderly pedestrians. Lassiere (1976) identified that pedestrian crossings located too close to the intersection are putting pedestrians crossing in danger. This was also highlighted by the interviewees and reiterated the finding by the OECD (1985) that roads are often equipped for able drivers, not pedestrians.

Amenity

Elderly people have different tolerances to noise as was shown in the interviews. Road developers should be aware of this as there might be differing noise tolerance levels within a supposedly 'homogenous' group of people. Nonetheless, noise complaints by people over 65 years of age should be taken seriously because more people in this age group have hearing disabilities than any other group. Therefore, if an elderly person complains about noise then the noise may be even more damaging for someone with no hearing difficulty at all.

The conclusions from the study are now presented in the final chapter of this thesis.

Chapter Seven: Conclusions

This chapter presents the conclusions derived from this study. There are four parts to this chapter. First, there is an overview of the research aim and objectives. Second, the major research findings of the thesis are outlined and synthesised into a discussion of key points pertaining to the extent to which social severance is experienced by elderly pedestrians. This discussion leads into the third section of this chapter, evaluating the utility of the research framework for identifying and measuring social severance effects experienced by elderly pedestrians which addresses research objective four. Finally, the fourth section concludes with suggestions for modification of the research design and methodology and some issues for future consideration.

Research aim and objectives

The aim of the research was to find out the extent to which social severance is experienced by elderly pedestrians. A framework was adapted and a pilot study of elderly pedestrians in Palmerston North was carried out to evaluate the utility of the research framework for identifying and measuring social severance effects of road developments on elderly pedestrians. Four research objectives were developed to meet the research aim.

The purpose of objective one was to understand how the elderly and in particular, elderly pedestrians are effected by social severance arising from road developments. This was achieved in Chapter Two by defining and then investigating how the elderly are affected by social severance as both users of roads and of vehicles. The purpose of objective two was to adapt Tate's (1997) framework for identifying and measuring social severance effects on the elderly pedestrians which was carried out in Chapter Three. Then Chapters Four and Five applied the research framework to a pilot study conducted in Palmerston North, using questionnaire and interview instruments, which met objective three. Objective four was concerned with the evaluation of the utility of the research framework for identifying and measuring social severance effects experienced by elderly pedestrians. This was achieved in Chapter Six through an evaluation of the findings and in Chapter Seven by using the

evaluation of findings to assess the utility of the research framework for identifying and measuring social severance effects.

The methodology used in this thesis was effective in achieving the research aim and objectives. The literature review outlined research which has been undertaken to identify and measure social severance in New Zealand and, and to set the scene for more detailed enquiry in the New Zealand context. Tate's (1997) framework was a useful basis for the identification and measurement of social severance effects on elderly pedestrians in the pilot study.

Analysis of questionnaires was helpful in providing an overall picture of the characteristics of elderly people in Palmerston North in relation to their travel patterns, and was particularly useful in generating interview candidates. Interviews with elderly pedestrians were very revealing. Analysis of their responses allowed a comprehensive picture of the psychological and physical severance effects on elderly pedestrians, complete with the insight into the problems practitioners face when trying to identify and measure social severance. Indeed, it would have been very useful to conduct more interviews for this research, particularly with pedestrians aged between 65 to 70. However, time and resource constraints made it necessary to keep the research tightly focused. The methodology also provided a sufficient foundation upon which to conduct the analysis, and enabled the following research findings to be distilled.

Research findings

The research showed that interviewees experienced the effects of social severance when undertaking everyday activities in established residential streets. It was found that the effects of social severance are both psychological and physical and are not easily quantified.

The research showed that it is likely that psychological severance would be experienced more often when people and their neighbours who have owned and lived in their homes for

a lengthy period of time. Therefore when assessing proposed road developments, neighbourhood characteristics such as home ownership and length of residency should be investigated. This type of assessment would be relatively inexpensive and could provide useful insights.

There was a strong recognition by elderly people of the importance of ready access to social activities. This once again supports the view that psychological severance is likely to be experienced by residents and is a noteworthy concern for developers and planners to assess when selecting a site for a road project. This may be assisted by a consultation process which does not frighten or deter people but generates detailed information about the proposed road project and eases community concerns about the proposed development. In turn, the community would provide useful, locally specific planning and design information for the proposed road project.

Income, health, disability and lack of choice were all identified as constraining elderly pedestrians' mobility and their access to facilities and social activities. However, most elderly people are not aware of the facilities and transportation services available to them. A detailed information telephone service could be established, providing people with facts about facilities and services in their area, including, for example, information about public transport services and other community services available to the public.

It became evident that easy access and mobility to facilities and social activities can lead to perceived feelings of confidence and of being useful, vital for an elderly pedestrian's continued well-being. However, this is unlikely to be experienced by elderly pedestrians where they are constrained by inadequate public transport and poor road design. Nevertheless, this may be countered by providing adequate mid-day and off-peak public transport services and extending public transport routes and service hours.

Physical severance experienced by elderly pedestrians included: decreased choice of route through the avoidance of some streets, disruption to routine, loss of independence, and a

resultant decrease in confidence. Elderly pedestrians avoided crossing at roundabouts, street corners, uncontrolled or badly controlled intersections and stepping onto or off high footpaths or grass covered median strips. The importance of adequate road design and crossing facilities was also stressed by the interviewees. This indicates that measures of social severance based on pedestrian delay will be irrelevant in the instances where poor traffic design features causes pedestrians to avoid crossing the street where traffic delay measurements are made.

Amelioration for problematic road design features could include: placing pedestrian crossings away from corners or intersections, putting pedestrian signals into all traffic lights, putting pram crossings (sloping footpath curbs) onto intersections, and placing concrete walking paths through median strips. Pedestrian crossings could be built further away from intersections and roundabouts to increase drivers' visibility of pedestrians crossing the road. Driveways onto properties (access-ways) could be better planned so that footpaths are not uneven or like 'roller coasters' causing people to trip. This could be achieved by establishing a minimum standard for driveway depths and pavement heights to even up the heights. However, this may be expensive to implement.

There were several Palmerston North streets with particular traffic designs that were identified as problematic by interviewees. For example, Pioneer Highway needs a traffic control system such as a pedestrian crossing to slow traffic so that pedestrians are able to cross the road. Pitt Street/Cuba Street and Ruahine Street/Featherston Streets have traffic lights with no pedestrian signals making it very difficult and dangerous for pedestrians to cross the road. Signs such as, 'Beware of Elderly Pedestrians Crossing" on Main Street/Albert Street and Pitama/College Street were also reported by interviewees as having no effect on driver behaviour or improving safety for pedestrians crossing uncontrolled roads or streets.

Safety was identified by interviewees as important when choosing a route. This was highlighted by issues such as the lack of desire to walk at night for fear of being attacked,

people's driving behaviour and lack of lighting on streets. Safety concerns were also related to the design of the street such as uneven footpaths, signalised crossings with no pedestrian crossings, vegetation blocking drivers' vision of crossings, and lack of traffic signs warning motorists of crossing pedestrians. Mitigation measures could include controlling the growth of vegetation beside signs and pedestrian crossings and regularly maintenance of footpaths. The hazards of falls resulting from uneven surfaces and kerbs can also be reduced by good maintenance programmes (Land Transport Safety Authority, 1994). This confirms Mitchell's (1992) findings that the better designed road systems will cater for a wider range of the population and thus will be safer and easier to use for disabled and able-bodied people alike.

Lack of confidence is a very big issue affecting both elderly pedestrians and drivers. Nevertheless, it may be improved by implementing education and defensive driving for elderly people. There also should be education programmes promoted for over 65 year olds to keep physically active to encourage good health and increased life expectancy (Pate, Pratt, Blair et al., 1995).

Development of policies relating to the social interaction of elderly people are crucial. The respondents noted a time of decreased social interaction during the illness of their spouse. Opportunities should be made available for caregivers to maintain some social life despite their partner's illness. This of course is independent of transportation concerns. It should also be recognised that by the time a person is widowed, they may have spent some years with a restricted social life and this, combined with the loss of a driving partner, can make it very difficult to drive again and re-enter clubs and other social activities.

The findings have importance for project developers when considering likely effects of new road developments. First, it is likely that social severance may already exist within communities . In this respect, it could easily be exacerbated or mitigated by project planning and design. Second, the interviewees identified a number of simple but important measures which can be taken account of by traffic engineers when integrating the design of

works and adjacent land uses. Third, constructive dialogue with residents can readily yield site-specific information and insight which may not often be obtained from the local council.

The utility of the research framework

The research framework was useful for identifying and measuring the social severance effects on elderly people. It provides a baseline on which further social severance work can build upon. The research framework consisted of a number of community, accessibility and barrier measures customised to assess specific community concerns about Palmerston North's transportation infrastructure. In this respect, the framework used in this research differed considerably from Tate's framework in that it relied more heavily on qualitative measures that were not used in his study.

The pilot study highlighted that there was no ideal method for measuring social severance and that a combination of community, accessibility and barrier measures is a comprehensive way of identifying social severance. Each of these measures is reflected upon in turn.

Community measures

The study of residential and trip patterns made it possible to determine the level of social interaction within the community. Many elderly are very concerned with their personal safety. Most respondents did not mind anonymously completing a questionnaire but did not want to be interviewed. Most of the information required to assess the level of 'community' in a street is readily available and inexpensive. This information is very important for ascertaining how much people fear the severance effects of proposed road developments.

Social feasibility

The perception of community on elderly pedestrians' streets was able to be measured easily using combined information from the questionnaires and interviews. In repeating this measure on proposed road projects, important information would be home ownership,

length of time at current residence, and traffic volume data. People would have to be interviewed about safety and perception of community on their residential street before and after the project is developed.

Accessibility measures

Accessibility measures were used in the context of land use and transport planning since they consider the potential to reach and take part in activities.

Catchment measures

The location and extent of social severance was identified using 1996 Census information, then key facilities which people travel to were identified and ranked by respondents. This information was quite difficult to obtain because respondents and interviewees often could not remember all the places they visited. However, the soon-to-be released 1996 National Household Travel Survey by the Ministry of Transport could provide useful, comparative information.

Memory maps

When interviewees were drawing memory maps, it was often difficult for elderly pedestrians to remember all journeys made because often their short term memory was starting to decline. There were only 12 interviewees and so reliable generalisations could not be drawn about their trip making behaviour. Memory maps were drawn for each of the interviewee's daily, weekly, monthly and infrequent trips. It was successful at identifying a number of interrelated effects, such as fear, excessive delay and psychological boundaries. This memory map procedure was very time consuming, particularly for the more elderly people.

A cartometer was used to calculate the number of kilometres travelled for each trip walked. This was a very time consuming task. The actual trip taken was proposed to be mapped against the shortest trip to get to the destination for every individual trip. However, this was too time consuming and prone to error and so was not attempted. It was also difficult to

portray individual trip numbers and routes. Therefore, in the future, these maps needed to be presented in one overlay per frequency of trip instead of on a single map. This may, therefore, not be an appropriate method for assessing social severance effects on elderly pedestrians. This is because memory maps are complex to implement and, in the context of studies of specific road, are less likely to provide additional insight into road developments effects without considerable effort.

Barrier measures

The research framework had a more qualitative focus in the assessment of social severance than Tate's original framework. The research framework used volume data because speed and heavy vehicle content data was not readily available in Palmerston North. Thus Tate's model predicting whether a child would cross the road could not be adapted for the elderly. However, in future studies where speed data is available this model could be adapted to elderly pedestrians.

Perceived danger

Information was obtained on community concerns, about potentially severing effects of traffic design, through interviews. It was then able to be assessed whether a change in location, mode or abandonment of journey might result. This information was specific to elderly pedestrians with an emphasis on factors important to their accessibility and mobility such as confidence, routine and safety. This information was inexpensive to collect and specific concerns, such as lack of pedestrian crossings, were easily addressed.

Suggestions for further research

This research was conducted as a pilot study. It has enabled an insight into the effects of social severance on one group of elderly who, for the most part, are highly socially involved and vary in their mobility. With the above discussion in mind, it is now possible to suggest some improvements to the research framework, make some general observations on the identification and measurement of social severance effects on elderly pedestrians, and some recommendations for future research.

This thesis has raised a number of issues which could be subject to further research. The first relates to the number of elderly pedestrians that were interviewed. A study could be attempted with a larger group of people aged over 65, with a more representative number of people aged between 65 and 69. In this way, a larger sample of people could be assessed using quantitative techniques. Second, this research is biased towards women's experiences although it was not clear to what extent gender makes a difference. Furthermore, the comments of the widows and widowers are reflections from only one person in the relationship. Time permitting, future studies could focus on identifying and measuring social severance effects on specific cohorts of the elderly and include more couples and widowers as participants. Also, the research framework for identifying and measuring social severance effects could be extended to include elderly people with disabilities and other mobility-disadvantaged people.

The research framework could be evaluated over a long time frame from when a road development was proposed through to when it was implemented. From this type of study, recommendations could be made on the stages of planning, development and implementation within the consultation process where the framework could be usefully implemented to assess social severance effects on elderly pedestrians. It may be, for example, that particular combinations of methods assessing social severance may be applied at different stages of a project. Methods for mitigating social severance could then become established as a part of formal evaluation techniques.

Finally, identifying and measuring social severance is intellectually and resource demanding. Like 'sustainable management', social severance is an ill-defined concept that is subject to a wide range of interpretations. Given the intangible nature of social severance, it may always be difficult to determine where social severance effects are occurring. However, this difficulty may be overcome by using a variety of community, accessibility and barrier measures, combined with continual community involvement in improvements to road schemes and new road developments.

Appendix One: Questionnaire Schedule

1. ARE YOU MALE OR FEMALE?
(PLEASE CIRCLE)

2. DO YOU HAVE PHYSICAL PROBLEMS WHICH LIMITS YOUR MOBILITY IN ANY WAY (i.e. reduce your ability to walk)?

3. WHAT AGE GROUP ARE YOU IN? (PLEASE CIRCLE)
(1) less than 65 years old
(2) 65- 69 years old
(3) 71 - 75 years old
(4) 76 - 80 years old
(5) greater than 80 years old

4. WHAT ETHNIC GROUP DO YOU BELONG TO? (PLEASE CIRCLE)
(1) European
(2) New Zealand Maori
(3) Pacific Island
(4) Other

5. HOW MANY PEOPLE LIVE IN YOUR HOUSEHOLD (counting yourself)? (PLEASE CIRCLE)
(1) 1
(2) 2
(3) 3
(4) greater than 3

6. DO YOU HOLD A CURRENT DRIVER'S LICENCE? Yes/No (PLEASE CIRCLE)

7. DO YOU RECEIVE TOTAL MOBILITY VOUCHERS?

8. HOW MANY VEHICLES IN YOUR HOUSEHOLD? (PLEASE CIRCLE)
Note: This does not include electric wheelchairs or carts
(1) 0
(2) 1
(3) 2
(4) more than 2

9. WHAT STREET DO YOU LIVE ON?

10. HOW LONG HAVE YOU BEEN LIVING AT YOUR CURRENT RESIDENCE?
(PLEASE CIRCLE)

(1) less than 5 years
(2) 5 - 10 years
(3) 11 -16 years
(4) 17 - 22 years
(5) more than 22 years

11. DO YOU OWN YOUR CURRENT RESIDENCE? Yes/No
(PLEASE CIRCLE)

12. WHAT MODES OF TRANSPORT DO YOU USE TO TRAVEL AROUND PALMERSTON NORTH? (MORE THAN ONE MODE CAN BE TICKED)

MODE	USE	
	YES	NO
(1) walk		
(2) bike		
(3) electric chair/cart		
(4) motorbike		
(5) drive own car		
(6) car passenger		
(7) taxi		
(8) bus		
(9) other(name)		

13. IF YOU SAID YES TO TRAVELLING VIA ANY OF THE ABOVE MODES, HOW FREQUENTLY DO YOU USE/DO THEM?

MODE	FREQUENCY OF USE			
	DAILY	WEEKLY	MONTHLY	YEARLY
(1) walk				
(2) bike				
(3) electric chair/cart				
(4) motorbike				
(5) drive (vehicle)				
(6) car passenger				
(7) taxi				

(8) bus				
(9) other				

14. WHAT IS YOUR MAIN FORM OF TRANSPORT FROM THE ABOVE CATEGORIES?

15. DO YOU MAKE MORE THAN 5 TRIPS A DAY? Yes/No
(A trip is counted as one movement from one destination to another, for example travelling from home to the shops. The return trip home is counted as another trip.)

16. WHEN YOU MAKE TRIPS WHAT PLACES DO YOU VISIT AND HOW OFTEN?

FACILITY	FREQUENCY (Tick boxes where appropriate)				
	Daily	Weekly	Monthly	Yearly	Never
Family					
Friends					
Church					
Clubs for example, Senior Citizens', Bowls, Bridge, Walking Club.					
Post Office					
Library					
Hairdresser and other services, for example podiatrists					
Laundrette					
Shops					
Supermarkets					
Take-away outlets					
Restaurants and cafes					
Parks and gardens					
Public transportation stops, for example bus stops, car parks					
Medical Centre (includes Doctors)					
Chemist					
Hospital					
Dentist					
Other					

Note: If you wrote other, could you please name those destinations/facilities

17. ARE YOU CURRENTLY EMPLOYED? Yes/No
(PLEASE CIRCLE)

18. WHAT IS YOUR AVERAGE HOUSEHOLD INCOME (PER YEAR):
(PLEASE CIRCLE)

(1) Less than $11 000
(2) $11 000 - $20 000
(3) $21 000 - $30 000
(4) $31 000 - $40 000
(5) Greater than $40 000

19. WOULD YOU BE AVAILABLE FOR A LATER INTERVIEW? IF SO, COULD YOU PLEASE WRITE YOUR DETAILS BELOW:

Appendix Two: Interview Schedule

Neighbourhood perceptions

1. Is your street a friendly place or is it a hostile place? Is there a feeling of community/neighbourhood on your street?

2. Do you know many people who live on your street?

3. What is the traffic like on your street? Can you give reasons to clarify your answer? Q = Quiet traffic, M = Moderately busy traffic, B = Busy traffic.

4. What are the main reasons why you think your traffic on your street is like it is -explain and try to specify? Is it because of the:

- traffic speed
- traffic volume, for example never a break in the traffic
- not enough visibility
- personal security, for example do not feel safe living on the street
- other things?

5. Does the noise from the road affect you? -If yes, in what way? Do you change your behaviour to avoid this. For example, can you hear the traffic in your house with all the doors shut? Does the noise from the traffic effect your sleep patterns?

Accessibility

6. On the provided map can you please draw the places (that you listed in the facilities you visit) that is, draw a line from your home to your destinations following your typical route:
   -Include Senior Citizens Clubrooms.
   -Purpose and frequency need to be noted for all categories.
   Daily (red pen) -*approximately every one or two days*
   Weekly (blue pen) -*approximately one to two times a week*
   Monthly (green pen) -*approximately every four or five weeks*
   Yearly (black pen)? -*approximately every four or five months*

7. Do you think there needs to be facilities for example, doctors closer to your home? If yes,
   how could this be achieved? Would you ever consider moving to be closer to certain facilities?

8. Could you rank the facilities in order of importance. This includes those that are visited regularly and those that are not (but access is still important).

9. Of the services that you indicated in your questionnaire that were important to visit, if your ability to walk and get around (general mobility) was decreased, what facilities would you stop visiting out of list and why and what facilities would you have to keep visiting and why?

10. Do you think your quality of life would suffer because you couldn't go to these places?

    If yes, in what way?

11. Do you have to depend on friends, neighbours or family now to do things for you and take you to places?

12. What constrains the amount you travel in Palmerston North? For example, a disability?

Mobility

13. Have you ever been able to drive/owned a car? Has the amount of travelling you do around Palmerston North changed since you stopped driving ?

14. What are the benefits of walking in Palmerston North for you?

15. What are the negative aspects of walking in Palmerston North for you?

16. Do you choose what time you go walking? For example, in the middle of the day? Are there any places you avoid during the day? Do you walk at night? If not, why not?

17. Does the amount you walk change with the seasons, e.g. in winter? If yes, are there specific routes you take in different seasons?

Crossing the road

18. Do you avoid crossing any streets? -Can you name some of these streets?

19. At what points do you cross the road? Why do you choose particular routes and travel patterns?

20. What affects your freedom to cross? (Delays in crossing, insufficient crossings, inadequate crossing). What makes it easier for you to cross the road?

21. Do you like crossing at intersections?

Safety

22. What type of streets in Palmerston North (or elsewhere in New Zealand) do you consider to be the safest? For example, one way, median strips (pelicans), signalised junctions, wide footpaths, and pedestrian crossings. How could safety of streets be improved?

23. Are your feelings of traffic safety concerned with:
    -Danger from vehicles
    -Speed of excess traffic
    -Intimidation by buses and lorries
    -Intimidation by bikes, roller bladers and skateboards
    -People's driving behaviour

24. How long do you have to wait before crossing the road? Are there any particular streets where you have to wait for a long time before being able to cross? Do you avoid crossing any roads by taking longer routes because the road is too busy, like Main Street?

25. Have you had had an accident walking in the last 12 months?

Appendix 3: Trip Frequency and Distances Travelled by Interviewees

Sarah's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Exercise	2.6	Shop	1.5	Volunteer/shops	2.6	Dentist	3.6
Supermarket	0.4	Volunteer	4	Optometrist	4	**Total**	3.6
Total	3	Volunteer	4.7	Doctor/supermarket	2.4		
		Club	2.4	Shops/friends	3.4		
		Library/shops/ friends	3	**Total**	12.4		
		Total	15.6				

Mary's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Exercise	3	Post Office/Club	6.2	Hairdresser	3.4	Park	3.2
Shops	2.6	Clubs	5.8	Takeaway outlet	2.6	Chemist/doctor	2.6
Friends	4	Friends	4.3	**Total**	6	**Total**	5.8
Family	1.1	Friends	3.4				
Total	10.7	**Total**	19.7				

Bob's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Shops	0.9	Post Office/Bank	4.7	Library	5.1	0	0
Total	0.9	Parks/Gardens	2.8	Hairdresser	4.7		
		Clubs	3.2	Doctor	6		
		Total	10.7	Chemist	6.9		
				Total	22.7		

Lucy's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Exercise/friends	3.6	Library	4.5	Hairdresser	1.1	0	0
Exercise/friends	4.5	Shops	2.4	Bank/shops	9		
Shops	1.1	Parks/friends	8.1	Doctor/pharmacy	1.1		
Exercise/friends	5.1	Supermarket	4.1	**Total**	11.2		
Total	14.3	Public transport	0.2				
		Total	19.3				

Amelia's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
0	0	Supermarket	2.6	Hospital	3.9	Hearing aid place	1.1
		Supermarket	2.1	Pharmacy/Blood test	1.3	Church	2.4
		Supermarket	3	Hospital (Mercy)	0.8	**Total**	3.5
		Library	1.7	Doctor	1.3		
		Shops	3	Dentist	1.7		
		Friends	2.6	**Total**	9		
		Shops	1.5				
		Hairdresser	4.7				
		Total	21.2				

Frank's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Shops	1.1	Friends	0.4	Shopping/dentist	6.2	Clubs	5.6
Total	1.1	Supermarket	3	Haircut	0.4	Parks/gardens	10.3
		Takeaways	1.1	**Total**	6.6	**Total**	15.9
		Bus stop	1.1				
		Total	5.6				

Stuart's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Exercise/shops	Km	Supermarket	4.7	Hairdresser	5.1	Hospital	5.1
Total	3.9	Post office	2.6	Friends	2.6	**Total**	5.1
		Bank	4.3	Friends	3		
		Library	2.6	Parks/gardens	8.1		
		Clubs	2.8	Chemist	3.9		
		Total	17	Clubs	7.3		
				Total	30		

Jean's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Exercise	1.3	Shops	0.2	Supermarket	4.7	Friends	1.5
Exercise	1.9	Hairdresser	0.2	Dentist	5.1	Friends	5.1
Total	3.2	Chemist	0.2	**Total**	9.8	Friends	3.4
		Clubs	6			Shops	2.8
		Total	6.6			**Total**	12.8

Dawn's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Exercise	6.4	Clubs	3.6	Volunteer	6.6	0	0
Parks/gardens	2.4	Clubs	3.9	Hospital	12.4		
Shops	5.1	Clubs	5.1	Doctor/chemist	2.4		
Total	13.9	Library	4.7	Public transport	0.9		
		Supermarket	1.5	**Total**	22.3		
		Total	18.8				

Judiths Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
0	0	Supermarket	1.3	0	0	0	0
		Friend	1.1				
		Shops	2.6				
		Recreational	1.3				
		Recreational	1.3				
		Total	7.6				

June's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Shops/ Post office	0.6	Public transport	0.4	Doctor	0.9	Takeaways	0.6
Library	0.6	Shops/clubs	1.9	Friends	2.1	**Total**	0.6
Exercise	1.5	**Total**	2.3	Exercise	2.8		
Friends	3			Pharmacy	0.6		
Total	5.7			**Total**	6.4		

Rachel's Individual trip description

Daily trips	Km	Weekly trips	Km	Monthly trips	Km	Infrequent trips	Km
Shop	0.3	Shops/club	6.2	Doctor/pharmacy	1.3	0	0
Total	0.3	Club	3.4	**Total**	1.3		
		Supermarket	1.5				
		Hairdresser	1.1				
		Shops/bank	3				
		Total	15.2				

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