Trends in older people's travel patterns

Analysing changes in older New Zealanders' travel patterns using the Ongoing New Zealand Household Travel Survey

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Additional note

The NZ Transport Agency (NZTA) was formally established on 1 August 2008, combining the functions and expertise of Land Transport NZ and Transit NZ.

The new organisation will provide an integrated approach to transport planning, funding and delivery.

This research report was prepared prior to the establishment of the NZTA and may refer to Land Transport NZ and Transit NZ.

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We would also like to recognise the individuals within these and other organisations whose comments helped us to focus the output from this project into the areas of greatest interest and usefulness to them.

Abbreviations and acronyms

CAPI	Computer aided personal interviewing
MUAs	Main urban area
NZHTS	New Zealand Household Travel Survey
NZTA	New Zealand Transport Agency
ONZHTS	Ongoing New Zealand Household Travel Survey
SE	Standard error
SKT	Surface kilometres travelled
U/RAs	Rural and urban areas

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Executive summary

Context

We updated our earlier study (O'Fallon and Sullivan 2003) of older people's travel patterns using the 1997/98 New Zealand Household Travel Survey (Land Transport Safety Authority 2000) with a comparative analysis using the recently compiled 2004–07 Ongoing New Zealand Household Travel Survey database.

Older people's population and demographic characteristics

Demographically, the number of people aged 65+ in the New Zealand population has grown by 31% since 1989/90 (when the first household travel survey was completed). Since 1997/98, there have also been significant increases in the driver licence-holding rates among the older population and older women in particular; in the mean ratio of vehicles to adults (in all age groups); and in the employment rates of those aged 60–64 and 65–74. All of these factors have undoubtedly influenced the travel patterns of the older population. For example, women aged 65+ living alone did 11% of their trip segments as vehicle passengers in 2004–07 compared with 38% for those in households with another adult (ie aged at least 19). Comparable figures for men over 65 varied much less (5%, 7%). Licence-holding rates of older women in 2004–07 were still much lower than those of younger women (eg, 61% in the 75+ age group compared with 91% in the 25–59 age group), with the result that fewer trips as vehicle drivers were undertaken by women aged 75+ (42% compared with 64% for women aged 25–59).

Trends in older people's trip segments

Older people travel distinctively less than the younger adult population (aged 25–59), no matter whether one looks at the total or mean number of trip segments per day, the typical distance per trip segment, average distance per day using 'surface transport' or average distance driven per day. The total number and mean number of trip segments and distances travelled declined steadily across the age groups (25–59, 60–64, 65–74 and 75+), with the 75+ age group undertaking the fewest trip segments and travelling the least kilometres of all the groups.

It was mainly older women whose mode use varied after the age of 65. In 2004–07, the proportion of trips for which women drove decreased sharply from 64% (25–59 year olds) to 42% (75+). Our analysis supported the qualitative research findings of Davey (2004), who explored how people aged 75+ met their transport needs once they no longer had access to a car. She found, as we did, that 'lifts' (or being a vehicle passenger) and walking trips became more predominant in terms of mode share and that 'one way in which older people without transport cope is to stay at home more' (p 20).

Although they travelled less than the general adult population (aged 25–59), older people as a group significantly increased their *volume* of travel, especially their driver trips and distance driven, between 1989/90 and 2004–07. Driving trip segments increased from 174.5 million

per year to 364 million, while the distance driven increased from 1040 million km to 2500 million km. The increased trip segments and distance driven is only partially explained by the 31% growth in population.

In comparing 2004–07 with 1997/98, we also found that:

- Mean surface kilometres travelled (by vehicle driver, vehicle passenger, walk, cycle and bus passenger) per day per person increased in all four age groups analysed, but not to a statistically significant degree.
- The median and mean trip segment length were shorter for the older age groups.
- Older people made a significantly greater share of all trip segments (20% compared with 18%) occurring in New Zealand.
- Older *drivers* (60+) formed a significantly higher proportion of the vehicle traffic stream (18% compared with 15%).
- All age groups were more likely to have travelled on both travel days (in 2004–07 compared with 1997/98), although the proportions were still less in the older age groups.
- Significantly more people aged 65+ in one-adult households travelled on both travel days (60% compared with 48%), whereas those aged 65+ living in two-adult households showed no change.
- People aged 60+ made significantly more of their trips as vehicle drivers, although older age groups still made fewer of their trips as 'vehicle driver' than did 25–59 year olds.
- People aged 60–64 and 65–74 made more trips for 'work/education' purposes (although the numbers involved are too small to reach statistical significance).
- Older people (65+) were still more likely to start trips between 9.01 am and 3 pm than younger adults (aged 25–59): over 60% compared with 40%, respectively.
- Women continued to be far more likely to have a distinctively different mode use after the age of 65 than men of the same age group. For example, in 2004–07, at age 75+, women drove for 42% of their trip segments whereas men drove for 69% of theirs, and women were vehicle passengers for 32% compared with 9% for men.
- Vehicle availability continued to be much lower for those aged 75+: in 2004–07, about one-quarter (24%) of the oldest age group, 75+, did not have any vehicles in their household, compared with 7% of 65–74 year olds and 5% of 25–59 year olds.

Basic results from trip chains and tours analysis

Our full analysis of trip chains and tours will be published separately. We reported some results specifically related to older people here at the request of end users. Generally, it can be said that the findings and trends reported for trip segments are mirrored in the trip chain and tour analysis. Compared with the 25–59 age group, older people made:

- fewer trip chains and tours per two travel days and per person per year. For example, there was very little difference in the mean number of tours per day between 25–59 and 60–74 year olds (mean of 1.5 tours per day compared with 1.3); the sharp contrast was with the 75+ age group, who completed a mean of 0.9 tours per day
- shorter trip chains and tours

- less complex trip chains and tours (ie, had fewer segments per chain or tour). The mean number of segments in a tour for those aged 75+ (2.7) was clearly less than for the 25–59 age group (3.2)
- fewer trip chains and tours as vehicle driver, and more as vehicle passenger or by walking as the main mode. However, older people (aged 60+) increased their vehicle driver tours between 1997/98 and 2004–07 from 60% to 65% of all of their tours, while decreasing their vehicle passenger and walking tours
- far more of their trip chains and tours for purposes (such as personal business, shopping, social, recreational) rather than work or education. Almost all (97%) of the 75+ age group's tours were for non-work and non-education purposes, compared with 89% of the 65–74 and 70% of the 60–64 age groups.

Comments

As a group, older people have increased their volume of trip segments and kilometres travelled, particularly as vehicle drivers. However, both their trip-making and kilometres travelled were at much lower levels than for those aged 25–59, suggesting that older people caused less pressure on the transport network, especially since the majority of their trip segments (60%) occurred during the 'off-peak' hours of 9.01 am to 3 pm

On an individual basis, between 1997/98 and 2004–07, older people made more trips as vehicle drivers (probably reflecting higher licence-holding and vehicle ownership rates), but did not significantly increase their mean number of trip segments and surface kilometres travelled. This corroborates Tacken's (1998) view that there is a limit to the potential growth in trip segments (and kilometres travelled) per person, as he found occurred in the Netherlands.

Our analysis suggests that, over the next 40 years, as older people become a greater proportion of the total New Zealand population (predicted by Statistics NZ (2007) to increase from 12% to 25% or more), there will be a discernible impact on the overall travel patterns of New Zealanders. For example, as older people form an even greater proportion of the vehicle traffic stream, among other things, there may be noticeable differences in the amount (both quantity of trip segments and their length) and timing of travel on the roads and public transport; overall vehicle kilometres travelled per day per person may decline; and walking as a mode share may increase. Of course, some of the change may be masked by overall population growth in New Zealand.

Abstract

We updated our earlier study of older people's travel patterns using the 1997/98 New Zealand Household Travel Survey (NZHTS) with a comparative analysis using the recently compiled 2004–07 Ongoing NZHTS database (ONZHTS).

We found that older people (60+) travelled distinctively less than the general adult population (aged 25–59), whether one looked at the total or mean number of trip segments per day, the typical distance per trip segment, mean distance per day using 'surface transport' or mean distance per day driven. The total number and mean number of trip segments and distances travelled declined steadily across the age groups (25–59, 60–64, 65–74 and 75+).

Between 1997/98 and 2004–07, older people as a group increased their volume of travel considerably, especially their driver trips (from 174.5 million per year to 364 million) and distance driven (from 1040 million km to 2500 million km). Older *drivers* (60+) formed a significantly higher proportion of the vehicle traffic stream (18% compared with 15%) in 2004–07. As the mean distance driven per day per person did not change significantly for older drivers, the increased share of the traffic stream appeared to result from the greater number of older drivers in particular.

1 Overview

1.1 Background

At the time we completed our previous analysis of older people's travel (O'Fallon & Sullivan 2003), we noted that the New Zealand Household Travel Survey (NZHTS) database was reasonably 'old' (being compiled in 1997/98), but that the household travel survey was established as a continuous survey in 2003. Within the continuous survey, people in approximately 2200 households in 280 meshblocks[1] throughout New Zealand are invited to participate in the survey each year. Each person in the household is then visited and interviewed about all their travel for two consecutive days specified by the interviewer. As has been the case for the 1989/90 and 1997/98 surveys, surveying takes place throughout the year, and every day of the year is included in the sampling, thus addressing potential seasonal bias. Day 1 begins at 4 am and Day 2 ends at 3.59 am. In the continuous survey, a 'complete' dataset representing all of New Zealand is compiled every four years.[2]

To enable comparison with the results of the earlier travel surveys, essentially the same questionnaire and response coding was used in the continuous survey as in the 1997/98 and 1989/90 surveys. Minor changes were made to update wording and response categories. One improvement made for the 2004–07[3] survey is that laptop computers were used by interviewers to improve data quality and reduce the time required for the interviews.

Using data from the 1997/98 NZHTS for the three main urban centres (Auckland, Wellington and Christchurch), O'Fallon and Sullivan (2003) did an initial investigation to describe the characteristics of the older people's (60–64, 65+) travel patterns, based on trip segments (also known as 'trip legs'), compared with the general adult population (25–59). We made limited comparisons with the 1989/90 Household Travel Survey results, as we had to rely on the published report (Ministry of Transport 1990) and were not able to generate analysis specifically related to older people's travel.

In our previous analysis, we separated the 60–64 year olds from the general adult population and the older population because this group appeared to be transitional between the two others as 39% of the 60–64 year old group was in paid employment (compared with 80% of the 25–59 and 6% of the 65+ groups). The difference in employment status had an impact on purpose, length and timing of trips. As we were particularly interested in car use, we excluded the 15–24 year old group, because although they are able to hold a driver's licence,

[1] The meshblock is the smallest geographic unit for which statistical data is collected and processed by Statistics New Zealand. A meshblock is a defined geographic area, varying in size from part of a city block to large areas of rural land. Each meshblock abuts against another to form a network covering all of New Zealand (www2.stats.govt.nz).

[2] Further detailed information about the continuous survey can be obtained from the Ministry of Transport website www.transport.govt.nz/ongoing-travel-survey-index/. Information about the 1997/98 NZHTS is recorded in Land Transport Safety Authority (2000).

[3] We have labelled the dataset collected between 1 July 2003 and 30 June 2007 as the '2004/07 dataset', referring to the *end* of the data collection year (which matches the New Zealand Government's financial year, 1 July – 30 June).

proportionately they do very little driving. The resulting paper was presented at the Australasian Transportation Research Forum in Wellington (September 2003).[4]

Generally, our findings were not overly surprising, insofar as the travel patterns of older New Zealanders were found to be similar to older people in other countries such as Australia (Melbourne and Sydney), the United Kingdom, the Netherlands and the United States (Rosenbloom 2001; Tacken 1998). Rosenbloom and Waldorf (2001) reported on the importance of the passenger vehicle as a mode of transport for older people, stating that 80% of all trips in the 1995 United States Nationwide Personal Travel Survey were made by car, either as passenger or driver. All older groups were found to drive for at least one-half of their trips, and walking was the next most important mode of travel after driver and vehicle passenger trips (Rosenbloom and Waldorf 2001). Morris et al (2006) reported that results from the Melbourne Victorian Activity and Travel Survey for 1994–1999 show similar travel patterns for people over the age of 65. We determined that this behaviour was mirrored by older respondents in the 1997/98 NZHTS.

In addition, we found that, compared with younger adults (25–59), the older age groups:

- did fewer trip segments per day
- made shorter trip lengths
- travelled fewer vehicle kilometres per day or year
- made most trips with the purpose of social/recreational/personal business (ie, not work or education).

However, comparing the 1989/90 NZHTS data with the 1997/98 data revealed that the total number of driver trips and the total annual distance driven by the 65+ age group had increased markedly in those eight years, particularly for women aged 65+. This finding is in line with other Westernised countries.[5] We were able to partly explain the nearly doubling of driver trips and annual distance driven by women over 65 as being due to a dramatic change in driver's licence-holding by this population group between 1989/90 and 1997/98. Specifically, Rosenbloom (2001) reported that, according to the 1989/90 NZHTS database, 81% of men and 50% of women in the 65+ age group held driver licences. By contrast, in the 1997/98 NZHTS, the comparable figures were 90% and 80% respectively. However, this did not explain the huge increase in vehicle kilometres driven by older men.

This raised serious questions about what older driver's volume and patterns of travel would be like in future. We found conflicting views about this. Some researchers suggested that the total vehicle kilometres travelled and kilometres travelled per person per day would carry on growing ad infinitum (see for example Rosenbloom 2001). However, Tacken (1998), with more historical data available, found that the growth in the number of trips for the 65+ group in the Netherlands had stabilised over a 15-year period. He suggested that this was due to relatively low increases in incomes creating greater pressure on expenditure.

[4] In the same year, Davey and Nimmo (2003) prepared an unpublished scoping paper for the New Zealand Land Transport Safety Authority (now New Zealand Transport Agency), using the 1997/98 NZHTS dataset, which focused on the travel behaviour of those aged 65+ in five-year age groups. Our study updates and expands on the analysis contained in their scoping paper.

[5] See for example: Rosenbloom 2001 and Tacken 1998.

Even if the vehicle kilometres travelled and total kilometres travelled per person does level off, it is likely that New Zealand will experience an overall growth in travel by older people. In October 2004[6], the Minister of Transport observed that there had been a 66% growth in the number of drivers aged 80+ since 1999. Statistics NZ is projecting that the overall population of people aged 65+ will increase from around 450,000 in 2001 to 580,000 in 2011 and to 1.32 million by 2051 (a 190% increase over 2001). The increase in the 65+ population has generated interest in understanding their transport requirements and travel patterns or behaviour. The Office for Senior Citizens commissioned the report *Coping without a car* (Davey 2004) which explored how people over the age of 75, who no longer had access to a car (for various reasons) managed their transport needs. In 2003, the New Zealand Land Transport Safety Authority commissioned a report by Davey and Nimmo.

Hence, we updated our earlier study with a comparative analysis of older people's travel patterns using the recently compiled 2004–07 Ongoing NZHTS database (ONZHTS). The analysis of changes over a period of time (trend analysis) is useful to detect travel patterns that could lead to future quality or infrastructure provision problems (eg creating pressures or bottlenecks in infrastructure use) as well as to forecast future demand. Understanding the trends in older New Zealander's travel behaviour is also helpful to decision- and policy-makers wanting to select and target travel demand management and travel behaviour change programmes designed to encourage more sustainable transport use while maintaining the high levels of accessibility and mobility that our ageing population expects.

In addition, establishing the trends in New Zealanders' travel behaviour will enable better calibration of existing and new transport models designed to predict future travel patterns in light of changes to the transportation network.

1.2 Age groups and geographical areas for analysis

As mentioned above, in our 2003 analysis of the 1997/98 dataset, we compared the general adult population (aged 25–59) with two older age groups 60–64 and 65+ in the metropolitan areas of Auckland, Wellington and Christchurch. Even given that the sample sizes were very small in the 75+ age group, our preliminary examination of the data indicated few differences between the 65–74 year age group and that of 75+.

However, there has been a great deal of interest expressed by end users (Ministry of Transport, New Zealand Transport Agency (NZTA), Office of Senior Citizens) in disaggregating the older age groups further. As Table 1.1 shows, there would be sufficient sample size to establish an 80+ age category to comment about their travel patterns at a *national level*. Such national level reporting on its own would probably mask some significant differences in items such as public transport use in New Zealand's three *metropolitan areas* (four cities of Auckland; four cities of Wellington and Christchurch) where approximately 90% of scheduled services are provided. Hence for this report, we have created three older people age groups

[6] www.beehive.govt.nz/release/older+driver+licensing+review+announced

(60–64, 65–74 and 75+) so that a geographical split was also possible.[7] We have continued to use the 25–59 age group for the general adult population.

Table 1.1 Comparison of unweighted number of respondents and trip segments by 5-year age groups (1997/98 and 2004–07)

	1997/98		2004–07	
Age group (5-year categories	**Unweighted no. of respondents**	**Unweighted no. of trip segments**	**Unweighted no. of respondents**	**Unweighted no. of trip segments**
25–29	911	8759	746	6699
30–34	1048	10,337	964	8872
35–39	1213	12,612	1032	10,285
40–44	1030	10,757	1039	10,675
45–49	1014	9841	999	10,091
50–54	866	7890	886	8431
55–59	729	6294	818	7605
60–64	566	4554	686	5636
65–69	566	4064	622	4741
70–74	471	2989	535	3921
75–79	354	2049	481	2838
80+/80–84	307	1190	310	1573
85+ (2004–07 only)	NA		156	525
Total	**9075**	**81,336**	**9274**	**81,892**

Looking at both age and geography, we considered which age groups could be used if we disaggregated the older population by the type of geographical location they live in (metro NZ – Auckland, Wellington, Christchurch; other main urban areas (MUAs), population 30,000 or more; other urban and rural areas (other U/RAs) – secondary urban areas (population 10,000 to 30,000; and rural areas with populations less than 10,000). Table 1.2 (1997/98) and Table 1.3 (2004–07) show that there are not enough respondents aged 75+ for us to confidently comment on travel patterns by individual metropolitan areas such as Wellington[8]. Hence we typically combine the three largest centres together under the label 'metro NZ'.

[7] Ultimately, the choice was based on limited resources, and geographical location was repeatedly mentioned by end users. However, in retrospect, we may have gained more 'significant' findings by focusing solely on national level and analysing the 80+ age group separately.

[8] The Ministry of Transport provides the following warning for users of its ONZHTS and NZHTS datasets: 'Analyses by age group, mode, or other sub-setting variables may be undertaken provided sample sizes in the subgroups are large enough (at least 60 people or 120 trip segments). Estimates based on fewer than 100 people should be annotated to the effect that the estimates will be associated with large sampling errors'.

Table 1.2 Unweighted number of respondents by age group and location (1997/98)

	Geographical location					
Age group	Auckland	Wellington	Christchurch	Other MUAs	Other U/RAs	Total
25–59	1161	441	573	1907	2729	6811
60–64	87	26	44	152	257	566
65–74	143	33	77	306	478	1037
75+	73	27	63	207	291	661
Total	**1464**	**527**	**757**	**2572**	**3755**	**9075**

Table 1.3 Unweighted number of respondents by age group and location (2004–07)

	Geographical location					
Age group	Auckland	Wellington	Christchurch	Other MUAs	Other U/RAs	Total
25–59	952	602	524	1745	2661	6484
60–64	70	54	52	206	304	686
65–74	123	56	73	420	485	1157
75+	80	32	90	457	288	947
Total	**1225**	**744**	**739**	**2828**	**3738**	**9274**

Due to the sample design, the unweighted numbers have a greater proportion in other U/RAs than does the weighted sample where just 30% of those aged 25+ are in other U/RAs.

The Ministry of Transport has committed to increasing the annual sample sizes for the ONZHTS, which may permit more extensive geographical-based analysis in the future. It may be useful to increase the rural sample, given the possible transport problems for older people in these areas.

1.3 Trips segments versus tours and trip chains

As this report is building on the previous analysis of the 1997/98 NZHTS dataset, we focus on 'trip segments' rather than a 'trip chain' or 'tour' simply because the work to create trip chains and tours with the 1997/98 dataset was not completed until 2005. A separate report is currently being finalised comparing the 1997/98 trip chain and tour dataset results with the newly derived 2004–07 trip chain and tour datasets.[9] We have taken findings in the new report relevant to older drivers and included them in chapter 4 of this report.

[9] Once finalised, this report will be published as part of the NZT Agency research programme and will be available from www.landtransport.govt.nz/research/reports/index.html

A **trip segment**[10] (often reported simply here as a 'trip') is recorded each time travel is interrupted, whether it is to drop off/pick up someone, buy a newspaper, change modes, etc. A **trip chain** is anchored at home or at work (ie, when an individual is departing from home or departing from work, this begins a new chain), with the current trip chain *ending* when the person arrives at work or at home, or when they stay at one location for 90 minutes or longer (or, in a very few cases, begin to travel by plane). A **tour** is a series of segments that starts from home and ends at home.

1.4 Treatment of 'professional drivers'

People whose job is to transport goods or people for a living pose an issue for travel surveys. Current best practice internationally is to exclude work-related travel by these people (other than the commute to and from the workplace depot or similar) from the scope of household travel surveys. From July 2008, this practice has been implemented in the ONZHTS. The data analysed in this report were collected prior to July 2008. One further complication is that the use of computer aided personal interviewing (CAPI) in the current survey facilitated collection of a larger number of trips per person than the paper forms used earlier. In particular, the paper forms had space for up to 20 trips per day; interviewers were instructed to use another form to collect additional trips but the results suggest this was not always done.

To overcome these problems, the occupational information provided by respondents was used to categorise individuals as 'professional drivers'. This term includes people who walk or cycle as part of their job delivering goods or people, for example, cycle couriers and postmen/postwomen as well as those who drive vehicles of various types. Trips made by these individuals for the purpose of employer's business were then excluded from the analysis dataset. This avoids any potential bias introduced by sampling of one individual with a large number of trips, and increases the consistency with the practice used in earlier surveys.

The decision to remove 'professional driver' trips from the 2004–07 dataset represented a significant change in the structure of the dataset, with respect to comparability with the 1997/98 dataset. Hence, the Ministry of Transport undertook a similar exercise with the 1997/98 dataset. However, it was not possible to identify professional drivers from the occupational classifications captured in the 1997/98 survey database. Instead, this information was inferred from a combination of the trip pattern, activity type, addresses visited and vehicle type used. The trip records of all people who reported more than 20 trips on any day were examined, and people who were identified as likely to be professional drivers (based on the vehicle type, trip pattern and addresses visited) were removed from the dataset used for this project. Twenty-nine people from a total of 14,251 people with full responses were identified in this way.

Ideally, only trip segments which were specifically work-related would have been removed; however, resource constraints and the late decision by the Ministry of Transport to re-structure the 2004–07 dataset in this way meant that we completely removed those people for whom a large proportion of their trip segments were part of their occupation (delivering goods and/or services). Hence, we removed 1425 trip segments (1.1%) made by 29 people.

[10] Ministry of Transport analyses refer to these as 'trip legs'.

Of these, only two people were aged 60+, meaning that there will be very little impact on the analysis contained in this report.

The Ministry has undertaken to make a 1997/98 dataset with the professional drivers removed available to researchers for any future analysis.

1.5 Treatment of distances

1.5.1 Ferry, train, taxi, 'other' and mobility scooter

There are some inconsistencies in how the lengths of trip segments have been treated between the 1997/98 NZHTS and the 2004–07 ONZHTS. In the 1997/98 database, train, ferry, taxi and 'other' modes all had calculated or estimated values for the length of the trip segment. In the 2004–07 dataset, none of these modes (train, ferry, taxi and 'other') have trip segment lengths. Mobility scooter, a mode newly considered in 2004–07, does not have trip segment lengths.

1.5.2 Walk

Walk trip segments do not have values for length attached to them in either dataset, although they do have trip duration.

The process we used to impute lengths for walk trip segments is described in our earlier work (O'Fallon and Sullivan 2005). Essentially we used a single value of 4.4 kilometres per hour to impute distances walked from the times recorded for all walking trips, irrespective of the age or gender of the person undertaking the trip.

We recognise that for older people this value may be considered too high by some people. The Ministry of Transport is intending to complete a project to create a more accurate algorithm for determining walking trip segment lengths. This should be completed in the 2008/09 financial year.

1.5.3 Mobility scooter

In the 2004–07 dataset, there are a total of 70 trip segments made by mobility scooter (respondents aged 60+ made 39 of these trips). This is too few to analyse mobility as a separate mode, so we have recoded mobility scooter to 'other' mode for this report.

1.6 Precision and statistical significance of results

At the time of our analysis, the Ministry of Transport was reviewing margin of error estimates for the ONZHTS in general, and we see extending such complex statistical analysis to all results in a report such as this one as beyond the scope of this project. Hence we have developed a pragmatic rule of thumb for checking on differences highlighted in the text of this report. We did this by comparing the published margin of error estimates for trip segments in the 1997/98 NZHTS with simplistic margin of error estimates that ignore the complex sample design of the survey (ie, by assuming a simple random sample). In short, these comparisons led us to multiply such simplistic estimates by a design factor of 2 (for

both 1997/98 and 2004–07 results) as a tolerably conservative[11] way of deciding which differences to highlight as statistically significant. Where we describe a difference as 'significant', this indicates that we have examined the relevant confidence interval or carried out a formal hypothesis test (using the conventional 95% confidence level). We have also reported a few differences without comment – ie, as if they are significant – that fall slightly below this level (but no lower than a design factor of 1.2) where the difference is supported by other evidence (eg similar patterns in related age groups or similar Statistics NZ results).

1.7 Structure

This paper is structured as follows:

- Chapter 2 describes New Zealand's older population trends, demographic and personal characteristics, such as living arrangements, licence-holding characteristics and gender balance.
- Chapter 3 analyses trends in older people's travel, based on travel segments.
- Chapter 4 highlights some trends in older people's trip-chaining and tour-making travel patterns.
- Chapter 5 summarises our findings.

[11] Design factors (ie, the ratio of observed standard errors for a variable to the standard errors that would be obtained from a simple random sample of the same size) can vary quite a lot between results within the same survey. In the comparisons we made, the design factors ranged from 1.0 to 2.1 with an average of 1.5; this justifies our description of using 2 as conservative. (Some readers may be more familiar with the closely related term 'design effect' rather than 'design factor'; the design factor is simply the square root of the design effect.)

2 Older people's population, demographic and personal characteristics

2.1 Overview

This section describes New Zealand's older population in terms of those characteristics that might have an impact on their travel patterns and mode choices. The information is drawn from Statistics New Zealand reports and information available in the 1997/98 NZHTS and 2004–07 ONZHTS datasets.

As one might suspect, the older population differs from the general population in a number of ways, including living in smaller households (the 2004–07 ONZHTS shows that 88% of people aged 65+ lived in one to two-person households compared with 39% of 25–59 year olds); having lower personal incomes (more likely to be less than $20,000 per annum); and much lower levels of employment beyond the age of 65.

There are also a number of differences between the three different groups (60–64, 65–74 and 75+) of older people which are discussed below.

2.2 Population trends

Between 1901 and 1999, the number of people over 65 increased 14-fold, from 31,000 to 446,000 (Statistics NZ 2000). As a share of the overall population, this represented an increase from 4% to 12%. The 15–64 year old portion of the population remained at around 65%, whereas the proportion of those under 15 fell from 33% in 1901 to 23% (Statistics NZ 2000).

Between 2006 and 2051, the 65+ population is expected to more than double from 512,000 to between 1.17 million and 1.48 million, whereupon the 65+ population will make up one-quarter or more of all New Zealand residents (Statistics NZ 2007). This growth will occur at the 'expense' of both the child population (under 15) and other adult population (15–64). For example, the 15–64 population is expected to increase by 270,000 between 2006 and 2051 while, during the same time period, the under-15 population will decline by nearly 81,000 (based on Table 1.01 in Statistics NZ 2007).

Statistics NZ (2007) also reports that the older population is itself ageing, due to declining mortality and increasing lifespan at advanced ages. The median age of the 65+ population has increased by almost three years since the early 1950s, from 71.4 years to 74.2 years in 2006, and is projected to exceed 77 years by 2051 (Statistics NZ 2007). At the same time, the share of those aged 85+ increased from 3.9% in 1951 to 11.7% of all New Zealand residents over 64 years old in 2006 and is anticipated to rise to 24% in 2051.

2.3 Gender balance

Women will continue to outnumber men by 'a sizeable margin' (Statistics NZ 2007:2). For example, in the 65+ population, particularly in the older age groups: at the 2006 Census, the

gender ratio was 106 females per 100 males at ages 65–69 years, and 221 females per 100 males among the 85+ age group.

In the 1997/98 NZHTS dataset (weighted), the ratio of women to men aged 60–64 was 50:50, shifting to 55:45 at age 65–74 and 60:40 at age 75+. There was a slight shift in the ratios in the 2004–07 ONZHTS dataset: the 60–64 and 65–74 age groups both reflected the general adult population (51:49 and 52:48, respectively, ratio female to male), while the 75+ age category ratio remained at 60:40 (consistent with the ratio in the Census).

2.4 Living arrangements

In 1997/98, in the 75+ group, 40% lived in single-person households, compared with 27% of 65–74 year olds and 15% in the 60–64 age group. In the 2004–07 dataset, the 75+ and 60–64 age groups were the same (40% and 15% respectively), while a smaller proportion (20%) of the 65–74 age group lived in single-person households. The 27% to 20% change was not quite significant using our design factor of 2 (but was higher than the design factor of 1.2), although it is consistent with broader Census trends.

There are also differences between the age groups when living as married or de facto couples is considered. About 58% of those aged 65–74 and 45% of the 75+ age group lived as married or de facto couples in 2004–07, compared with 23% of 25–59 year olds. The figures in the 1997/98 dataset were largely the same.

2.5 Employment status

In 1997/98, few 65–74 year old New Zealanders (as recorded in the NZHTS) were in the paid workforce, whether casual, part- or full-time (11%). Fewer still (2%) of the 75+ age group were in paid work, contrasting with 78% of the 25–59 age group. In the 60-64 age group, there was a 'wind down' in employment occurring: only 42% were in any form of paid work.

By contrast, in 2004–07, 61% of 60–64 year olds and 19% of 65–74 year olds were in some form of paid work. Only the 75+ age group remained relatively unchanged at less than 3%.

Statistics NZ (2007) also reported sharp increases in the labour force participation rates: in 1991, 38% of men aged 60–64 years were in paid work; by 2006 this had climbed to 73%, while women aged 60–64 had increased to over 50%.

Apart from the structural changes in the population (ie, the greater number of people aged 60+), several factors contributed to the change in employment status of New Zealand's older inhabitants (Statistics NZ 2007), including:

- the gradual increasing of 'entitlement' age for New Zealand superannuation from 60 to 65 years between 1992 and 2001
- statutory changes to the Human Rights Act 1993, effective in early 1999, that abolished the compulsory retirement age
- growth in service jobs and other 'non-standard employment' such as part-time and casual work.

2.6 Personal income

As a result of the lower employment rates, the personal incomes of the older population were much lower than the general population. In 1997/98, in the 60–64 and 65+ age groups, 58% and 73% of individuals, respectively, earned $20,000 or less per year. Despite nearly 10 years having passed (where inflation might have had an impact), we did not find too much difference in the 2004–07 figures. The 60–64 age group, where there had also been the dramatic shift in employment levels was an exception: 35% of the 60–64 age group earned $20,000 or less while 58% of 65–74 year olds and 64% of 75+ earned ≤$20,000. 2006 Census data published by Statistics NZ (2007) showed that the median income for people aged 65+ was $15,500, compared with $27,400 for all people aged 15–64 years. The median income for older women was about $2,000 less ($14,800) than for older men ($16,800).

However, note that older people have often been found to be relatively 'asset rich' despite being 'income poor' because they more often have mortgage-free houses.

2.7 Licence-holding rates

Overall, the proportion of the adult population holding driver licences changed little over the period from 1997/98 to 2004–07 (close to 90% both times). However, the size of the 25–59 age group meant that it masked some larger changes within the older population age groups, all of which increased their licence-holding rates as can be seen in Figure 2.1. The biggest increase was in the 75+ age group, going from 62% in 1997/98 to 70% in 2004–07.

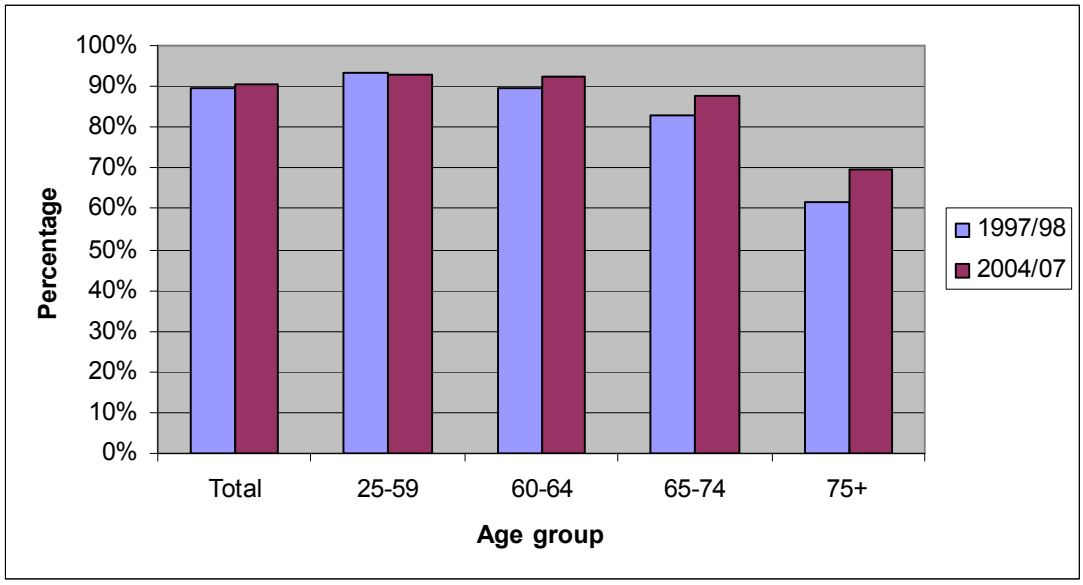

Figure 2.1 Proportion of population (by age group) holding a car driver licence (1997/98 and 2004–07)

If we consider licence-holding rates by gender and age, there were even more striking differences particularly among women (refer Table 2.1). In the 1997/98 NZHTS, 75% of women aged 65–74 and 52% of women aged 75+ held driver licences. In 2004–07, the

licence-holding rate of women in these two groups had increased by 11% and 17% respectively, to 83% and 61%. During the same time frame, men's licence-holding rates in these two groups increased much less: from 92% to 93% for 65–74 year olds and from 77% to 83% in the 75+ age group. Both genders in the 60–64 age group increased their holding rates only slightly (by 3 percentage points).

Table 2.1 Car driver licence-holding by age and gender

		25–59		60–64		65–74		75+	
Year	Total	F	M	F	M	F	M	F	M
1997/98 (N=8983)	89.5%	90.4%	96.1%	84.2%	94.8%	75.0%	92.4%	51.8%	76.8%
2004–07 (N=9274)	90.5%	90.7%	95.4%	87.2%	97.5%	82.9%	93.3%	61.0%	83.1%

2.8 Self-reported driving experience

Along with the increased driver licence holding rates among women, there was a decrease in the number of women reporting that they had 'never driven' in the older age groups (see Figure 2.2). There was an increase in the proportion of women who reported having driven more than 200,000 km in their lifetime. Men across all age groups showed similar proportions of 'never driven' (2–3% in all age groups) and, by age 60–64, 88–90% of men had driven more than 200,000 km (compared with 40–50% of women).

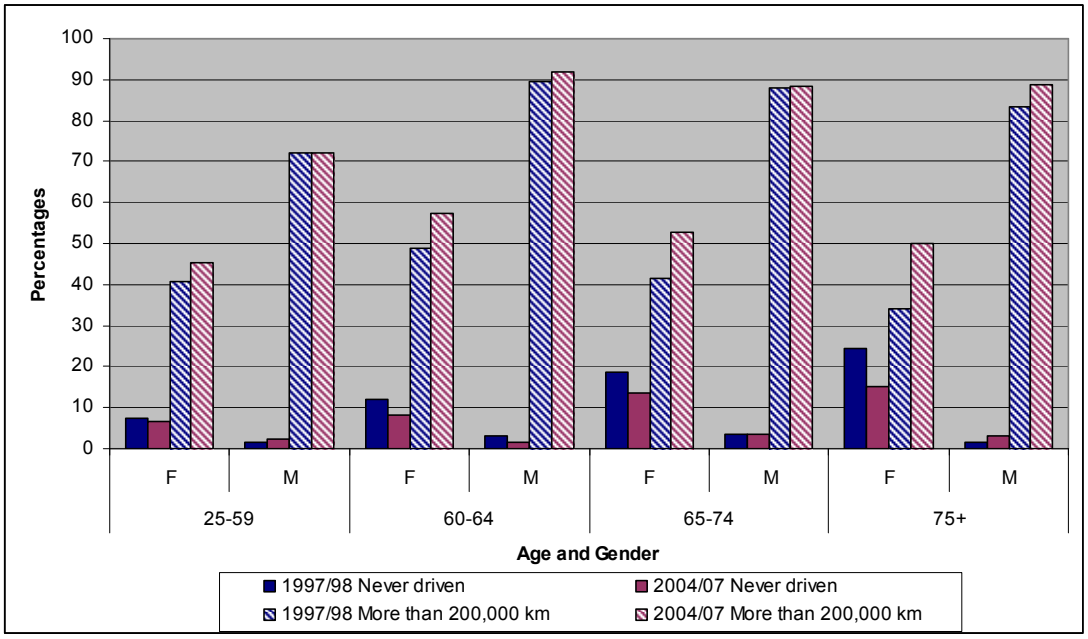

Figure 2.2 Self-reported driving experience by age and gender (1997/98 and 2004–07)

2.9 Number of household vehicles

Given that they have smaller household sizes, it was not surprising to find that adults aged 65+ had fewer cars per household than did other households – in 2004–07, for example, 46%

of adults aged 65–74 and 55% of adults aged 75+ were in households with only one vehicle (Table 2.2 refers). This compared with 43 % of the 25–59 age group owning two vehicles and 28% that owned three or more vehicles per household.

Table 2.2 Number of vehicles by age group (2004–07)

Number of vehicles in household	Total	25–59	60–64	65–74	75+
Unweighted count	*N=9274*	*N=6484*	*N=686*	*N=1157*	*N=947*
0	4.4%	2.8%	2.8%	4.4%	19.6%
1	30.5%	25.8%	29.0%	45.6%	55.0%
2	40.7%	43.1%	47.4%	36.3%	18.7%
3 or more	24.5%	28.3%	20.8%	13.7%	6.7%
	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2.2 also reveals that one in five (20%) of the oldest age group, 75+, had no vehicles in their household, compared with 4% of 65–74 year olds and 3% of 25–59 year olds. Further consideration of the data shows that women aged 75+ were far more likely than men in that age group to live in a household with zero vehicles (27% compared with 9%). There were no such notable differences in other age groups. The ownership rates in 2004–07 by household (ie, without reference to household size) were quite similar to those found in 1997/98 but slightly higher. The overall mean for people aged 25+ of 1.99 vehicles in 2004–07 was significantly[12] higher than the 1.80 vehicles in 1997/98 (t=5.9, p<.001). For people aged 65+, the mean number of household vehicles was higher in 2004–07, but not significantly so (1.42 cf. 1.28; t=1.36).

Note that in 2004–07, 20% of the 65–74 year olds and 41% of 75+ year olds were in households with only one adult (aged 19+), compared with 13% in the 25–59 age group. Hence, it is probably more relevant on the whole, to consider the *ratio of vehicles to adults* in a household. Generally speaking, Table 2.3 shows that as the age of the adults in the household increases, the ratio of vehicles to adults decreases. While about one-half of those up to age 74 had one car per adult, only 39% of those aged 75+ did so. The older age groups (65–74 and 75+) were much more likely to have one car between two people (a ratio of 0.5) than households with adults aged 25–64 (27% of 65–74 and 32% of 75+ compared with 16%). The younger age group was far more likely to have had a ratio of greater than one vehicle per adult in a household (22% compared with 11% of 65–74 and 5% of 75+.) This was reflected in a clearly higher mean ratio for vehicles to adults for people aged 25–64 (1.03) than for those aged 65+ (0.78).

[12] Note that the t value used to test this was substantially reduced by applying a design factor of 2 (as introduced in section 1.6).

Table 2.3 Vehicle to adult ratio (2004–07)

Vehicle:adult ratio in household	Total	25–59	60–64	65–74	75+
Unweighted count	*N=9274*	*N=6484*	*N=686*	*N=1157*	*N=947*
<0.5	7.1%	5.7%	5.3%	7.2%	21.0%
0.5	18.2%	15.7%	15.2%	27.2%	32.0%
0.51-0.99	5.5%	5.8%	4.7%	5.5%	2.8%
1	50.1%	51.0%	56.2%	48.8%	39.1%
>1	19.1%	21.8%	18.7%	11.3%	5.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The ratio of vehicles to adults was significantly higher in 2004–07 than in 1997/98 (mean of 0.98 cf.0.88; t= 6.96, p<.001). This increased mean was also detectable for those aged 65+ (0.78 cf. 0.71; t=2.19, p=0.03). All adult population age groups (25–59, 60–64, 65–74 and 75+) living in 'other U/RAs' (secondary urban and rural areas) had a significantly higher mean ratio of vehicles to adults than those living in metro NZ or other MUAs.

3 Trends in older people's trip segments

3.1 Overview

This chapter analyses trends in older people's travel with a particular focus on trip segments and total distances travelled by specific modes. Some of the trip chains and tours results from our other work (O'Fallon and Sullivan, in publication) are reported in chapter 4.

3.2 Volume of travel

3.2.1 Total 'surface kilometres travelled' (SKT) per day

To quantify the total travel of interest, taking into account both the number of trip segments and distance, we calculated a total daily distance using 'surface transport' for each respondent. Surface transport included these modes: driving, car passenger, cycling, bus, taxi passenger and walking (imputed). It excluded air travel (which is not of interest given our focus on land transport). Surface transport also excluded the minor modes of ferry, train and mobility scooter as the 2004–07 ONZHTS does not have trip length values for these. Walking distances were imputed, as discussed in section 1.5.2.

Overall, we found that older people were not travelling significantly greater distances on average in 2004–07 than in 1997/98, although the mean SKT per day figures increased a little. (Statistically, detecting small changes in distances travelled is difficult because of the effects of a few very long distances on statistical tests.)

Adults aged 25–59 travelled further on a daily basis across all areas (metro, other MUAs, and other U/RAs) than the older age groups. Figure 3.1 shows that the mean surface kilometres travelled (SKT) progressively declined in the older age groups.

Figure 3.1 (top two lines) also shows that those from other U/RAs travelled further on average per day (except perhaps those aged 75+).

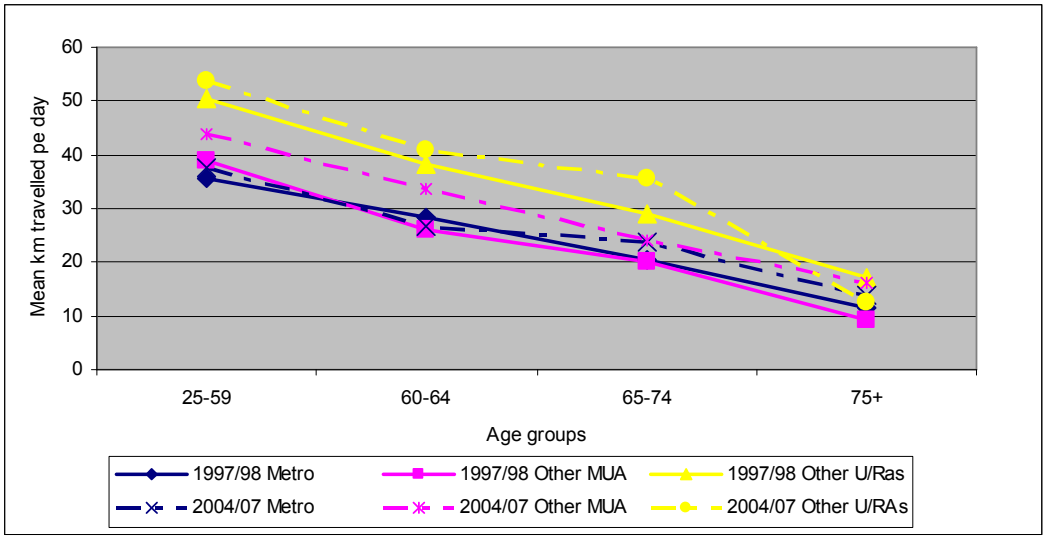

Figure 3.1 Mean surface km travelled per day per person (1997/98 and 2004–07)

3.2.2 Median trip segment length

We identified the 'typical' distance per trip segment as the median[13] trip segment length (using SKT as described earlier). As can be seen in Figure 3.2, the typical (median) segment length was shorter in the older age groups. The graph shows that the trend over time was for the median segment length within each age group to be longer.

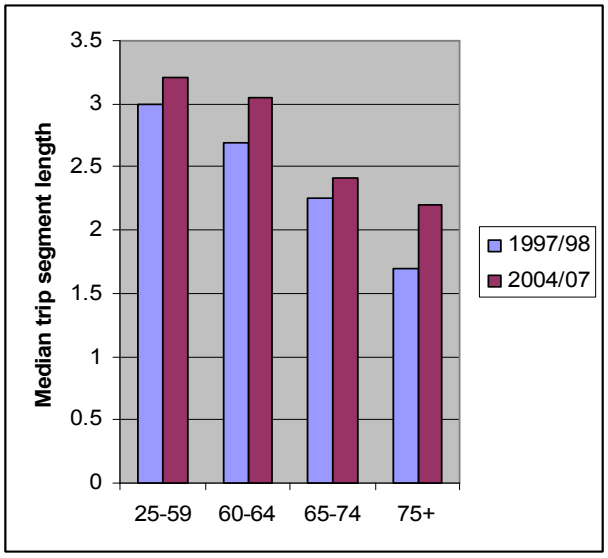

Figure 3.2 Median km travelled per trip segment (walking distance imputed) per person by age group (1997/98 and 2004–07)

[13] The median is the value that divides the distribution into halves; where one-half of the trip segments are above the median length and one-half are below it if the data was arranged in numerical order. Where the data is known *not* to have a normal distribution, as is the case with household travel survey data, the median is an appropriate choice for describing the typical person or situation.

Although the values were quite different, the mean trip segment length showed exactly the same pattern (ie the mean segment length was shorter in the older age groups and it increased in each age group between 1997/98 and 2004–07).

3.3 Number of trips

3.3.1 Mean number of trip segments per day

The mean number of trip segments per day per person aged 25+ was 4.5 in both 1997/98 and 2004–07. However, Figure 3.3 shows that the mean number of trip segments per day decreased clearly with age.

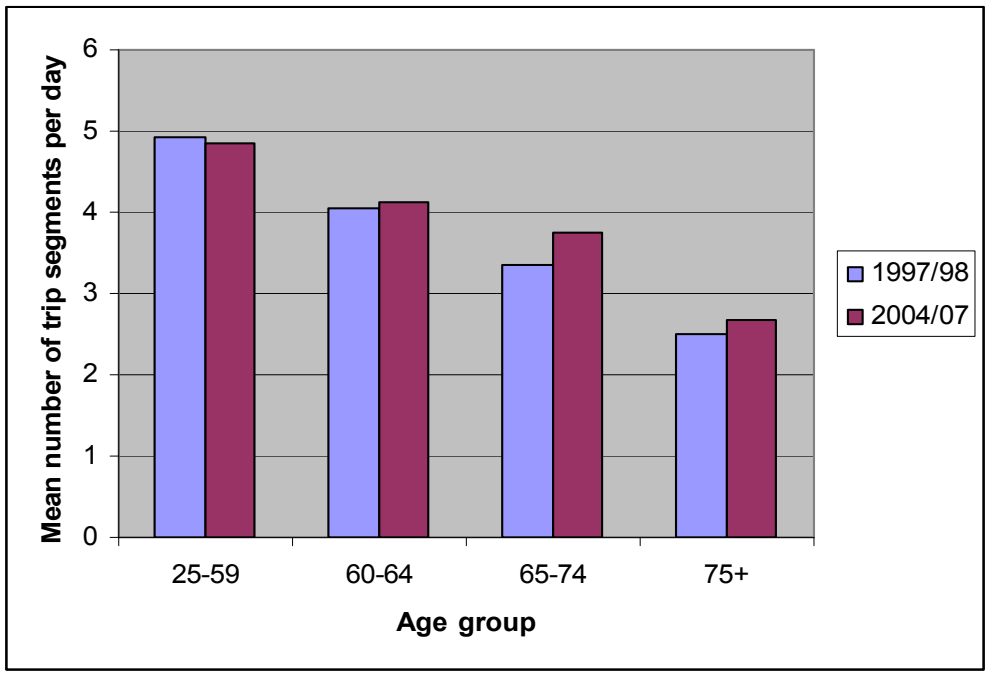

Figure 3.3 Mean number of trip segments travelled per day per respondent by age group (1997/98 and 2004–07)

3.3.2 Share of trip segments

As can be seen in Table 3.1, when considering the adult population aged 25+, older people made a significantly[14] greater share of trip segments in 2004–07 compared with 1997/98 (20% compared with 18%).

[14] Significance tests of such mode share percentages cannot simply use the simple calculations routinely used for opinion polls etc. For significance testing of these (and other later results based on the ratio of two estimates), we have approximated the standard error (SE) through use of the relative standard error (RSE). The RSE expresses the standard error as a percentage of the estimate: RSE%=(SE/estimate)´100. The formula to approximate the RSE of a percentage formed from the ratio of two estimates is: RSE(x/y)= $\sqrt{[RSE(x)]^2 - [RSE(y)]^2}$. Australian Bureau of Statistics (2007, pp 42–43) provides further details and a worked example of this method.

Older *drivers* (60+), formed a significantly higher proportion of the vehicle traffic stream in 2004–07 than they did in 1997/98 (18% compared with 15%).

The proportion of trip segments made by respondents aged 75+ was basically unchanged (4% in 1997/98 and 5% in 2004–07), despite their growth as a population segment.

Table 3.1 Share of all trips made by age group (National estimates 1997/98 and 2004–07)

Age group	1997/98	2004–07
Unweighted respondent count	*N=81336*	*N=81892*
25-59	82.5%	80.1%
60-64	5.1%	6.4%
65-74	8.3%	8.6%
75+	4.2%	4.9%
Total	**100.0%**	**100.0%**

3.3.3 Staying at home on one or both travel days

The survey recorded travel in detail for two 'travel days'. People over the age of 60 were more likely to stay at home on any given day than adults aged 25–59. Figure 3.4 compares the differences in travel patterns between 1997/98 and 2004–07 across the four adult age groups. Only national estimates are provided, as nothing distinctive showed up when we examined the split by metro/other MUA/other U/RAs.

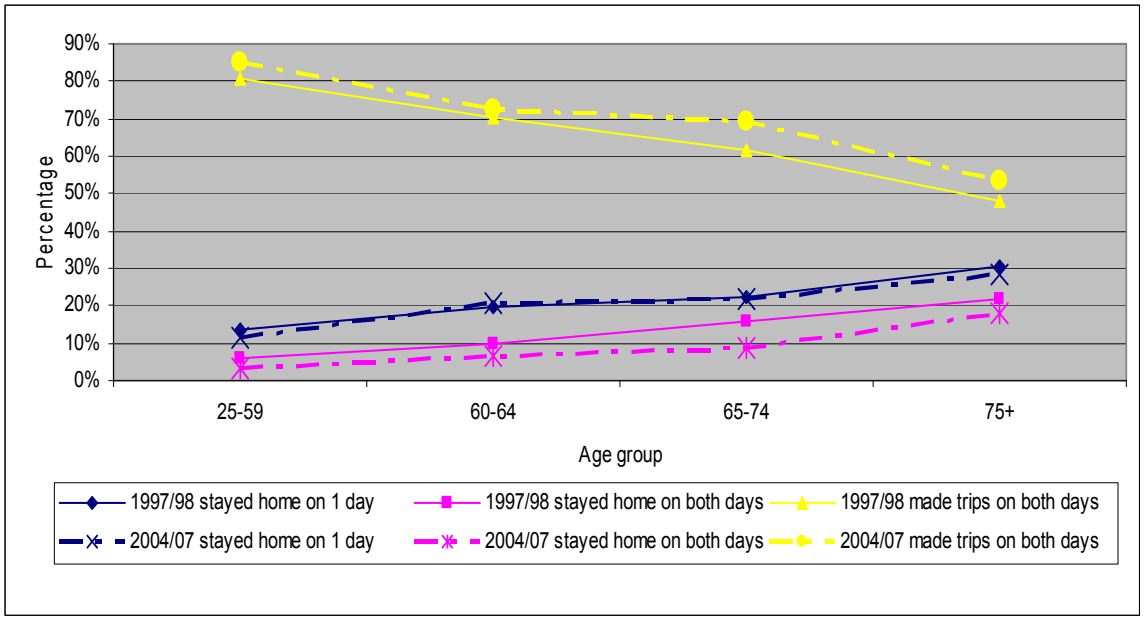

Figure 3.4 Proportion staying at home on one or both travel days by age group (1997/98 and 2004–07)

Older age groups were clearly less likely to have travelled on both travel days (as shown by the strong downward slope in the top two lines in Figure 3.4). For example, the 75+ age group was much less likely to travel on both travel days than the 25–59 age group (53% compared with 85%, respectively, in 2004–07). The lower travel rates of people aged 75+ may reflect, in part, health or physical issues associated with ageing.

All age groups 25+ were recorded as staying at home during both travel days less often in 2004–07 than in 1997/98. Although small in absolute terms, the change from 8.4% in 1997/98 to 5.5% in 2004–07 (for adults 25+ staying at home both days) is clearly significant statistically. It is possible that small changes in the recording of short trips between the surveys could have contributed to this kind of difference.

We compared those aged 75+ with and without car driver licences[15] in terms of staying at home. People aged 75+ had the lowest driver licence holding rates of all adult age groups (70% compared with 88–93% of other age groups in 2004–07). In 1997/98, their licence-holding rate was 62%.

Table 3.2 shows that in 2004–07 those aged 75+ without car licences were far less likely to make trips on both travel days (30% compared with 63% of those with licences) and much more likely to stay at home both travel days (36% compared with 10% of those with licences). The same pattern was found in 1997/98.

Not surprisingly, those aged 75+ who did not hold licences made most of their trips as vehicle passengers (53%) and walking (37%) whereas those with driver's licences made most of their trips as drivers (65%), with far fewer as passengers (15%) and walking (17%). Those without licences also made proportionately more trips by public transport (5% compared with 1%).

Table 3.2 Tendency for 75+ age group to stay at home on one or both travel days by driver licence holding rate (2004–07)

	Hold car licence	Don't hold licence
Unweighted respondent count	*N=672*	*N=275*
Stayed home on both days	10.4%	35.6%
Stayed home on 1 day	26.3%	34.0%
Made trips on both days	63.2%	30.3%
Total	**100.0%**	**100.0%**

The 2004–07 survey suggests a significantly greater propensity for people aged 65+ in one-adult households to travel on both travel days (60% compared with 48% in 1997/98). The rate of making trips on both days was largely unchanged for people in two-adult households (64% compared with 62%) (Figure 3.5 refers). Households with three or more adults are omitted, because there were too few of them with people aged 65+.

[15] We found that most people (over 99%) holding truck or motorbike licences also held car driver licences.

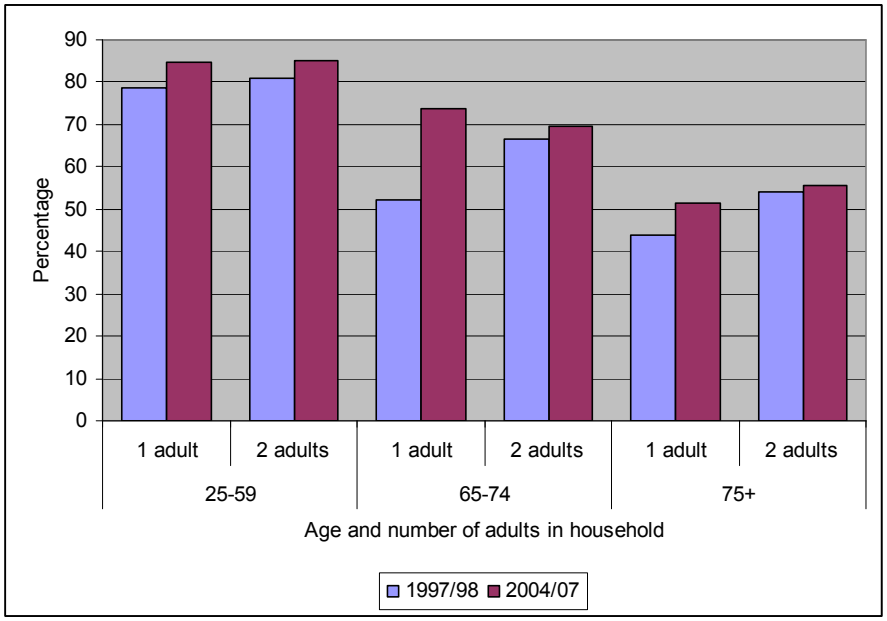

Figure 3.5 Proportion of adults by age group making trips on both travel days (National estimates 1997/98 and 2004–07)

3.4 Mode of travel

3.4.1 Age group differences in mode use

Analysing mode of travel shows that the older age groups made fewer of their trips as 'vehicle driver' than did 25–59 year olds in both datasets. Moving through the age groups, fewer and fewer trips were as a vehicle driver, and greater proportions were by walking or as a vehicle passenger. However, Table 3.3 shows that between 1997/98 and 2004–07, each older age group made a higher proportion of trips by driving (which was also consistent with the higher proportion now having driver licences). When all the age-groups over 60 were combined (to increase sample size for the significance test), the increase is statistically significant[16].

Cycling and public transport use were very similar (and very small) across all age categories in the two datasets, with mode share of around 1%.

[16] This assessment of significance allows a slightly lower design factor (1.7) than our usual rule of thumb of 2 because of the known increase in licence-holding among older people.

Table 3.3 Proportion of trips made as *vehicle driver* trips by age group (National estimate 1997/98 and 2004–07)

Age group	1997/98	2004–07
Unweighted segments	*N=81336*	*N=81892*
Proportion (all age groups combined)	67.2%	68.9%
25–59	69.3%	70.3%
60–64	64.7%	68.5%
65–74	57.3%	63.6%
75+	49.4%	54.5%

3.4.2 Residential location differences in mode use

Vehicle driver trips were a greater share of all trip segments in other MUAs and other U/RAs for both the 25–59 and 60+ age groups, compared with metro areas. Figure 3.6 also shows that walking had the greatest mode share in metro for both the general adult and senior age groups in 2004–07, but was consistently higher for the 60+ age group (compared with the 25–59 group) in all locations. While the percentages varied (eg due to increasing proportions of all age groups in the 'vehicle driver' category), the 1997/98 mode use patterns were very similar.

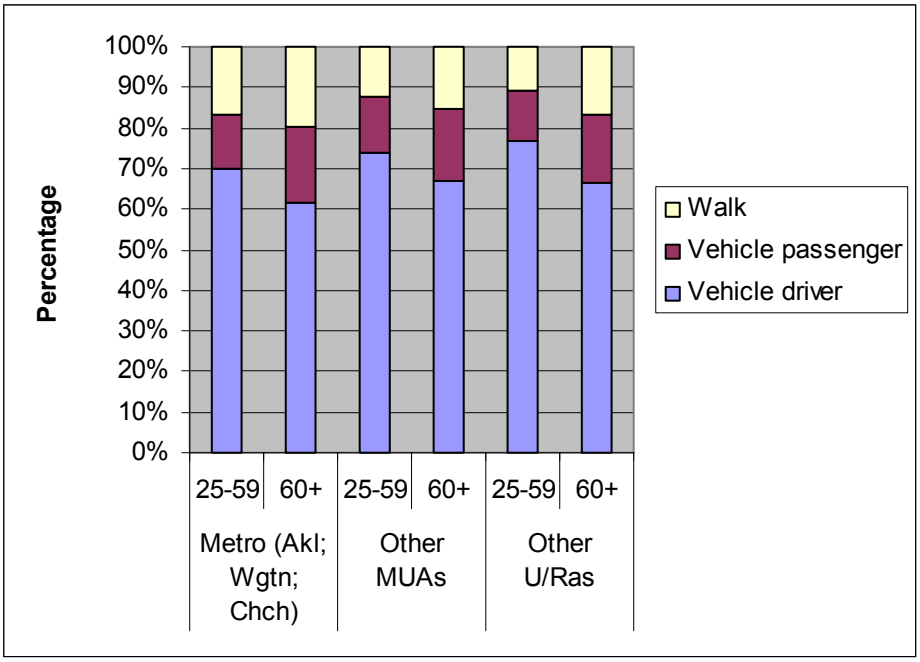

Figure 3.6 Mode share of three main modes by age group and residential location (2004–07)

3.4.3 Gender differences in mode use

A closer look at the data for the main travel modes (vehicle driver, passenger and walking – see Figure 3.7) revealed that it was mainly women whose mode use differed after the age of 65. The proportion of male trips as drivers showed limited variation between the four age groups (ranging from 69% to 80% in 2004–07). Corresponding proportions by women drivers decreased more sharply from 64% (25–59 year olds) to 42% (75+) in 2004–07. This pattern was similar to that of 1997/98, where men in all age groups also consistently made more of their trips as vehicle drivers. This was particularly pronounced for the 75+ age group, where men made double the proportion of trips as vehicle driver (67%) than women did (35%). In 2004–07, this gap had narrowed slightly to 69% of 75+ year old men compared with 42% of women of the same age.

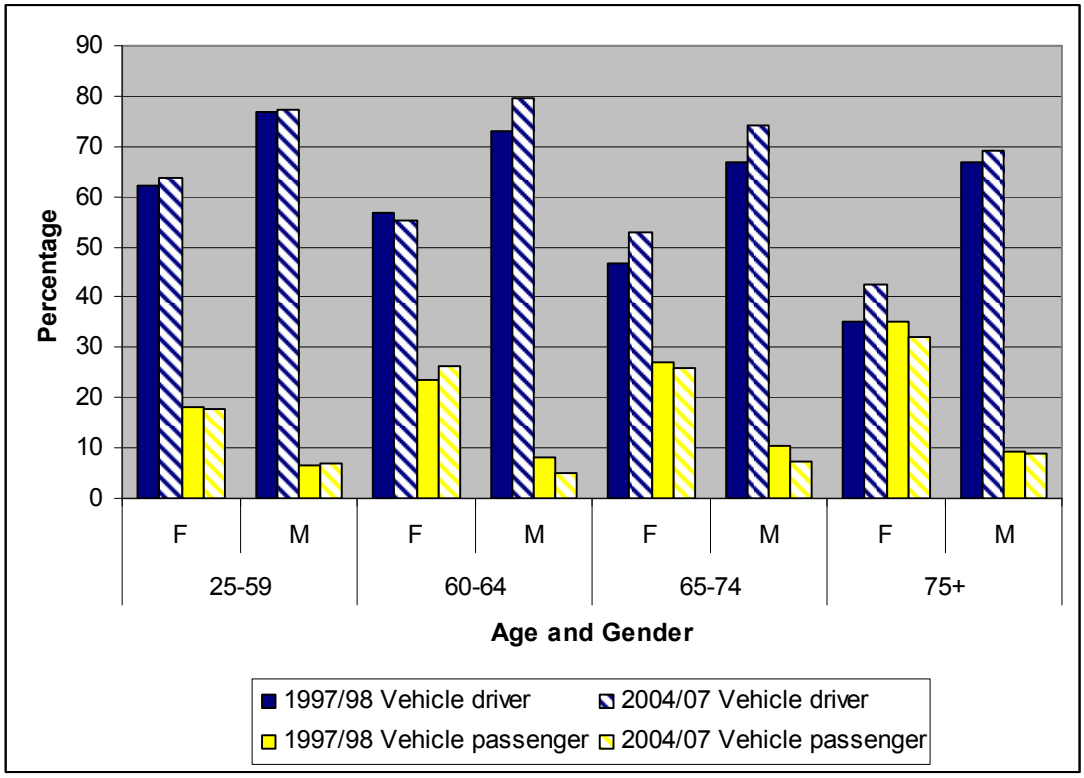

Figure 3.7 Comparing proportion of trips by mode (vehicle driver and vehicle passenger), age group and year (1997/98 and 2004–07)

As Figure 3.7 shows, the differences were even more pronounced when vehicle passenger trips were considered as a proportion of all trips: 75+ year old women made 32% of their trips as a passenger in 2004–07, compared with 9% of men at the same age. While not quite as dramatic in the differences, the proportion of women travelling as vehicle passengers was greater even at the younger age groups (18% of all trips by women aged 25–59 were as vehicle passengers) and then increased further in the older age groups, while for men the level was similar (between 5 and 9%) for all age groups.

Figure 3.8 shows that gender differences for walking were less pronounced. All groups showed some decline in the proportion of walking trips (as a share of all trips made) between 1997/98 and 2004–07.

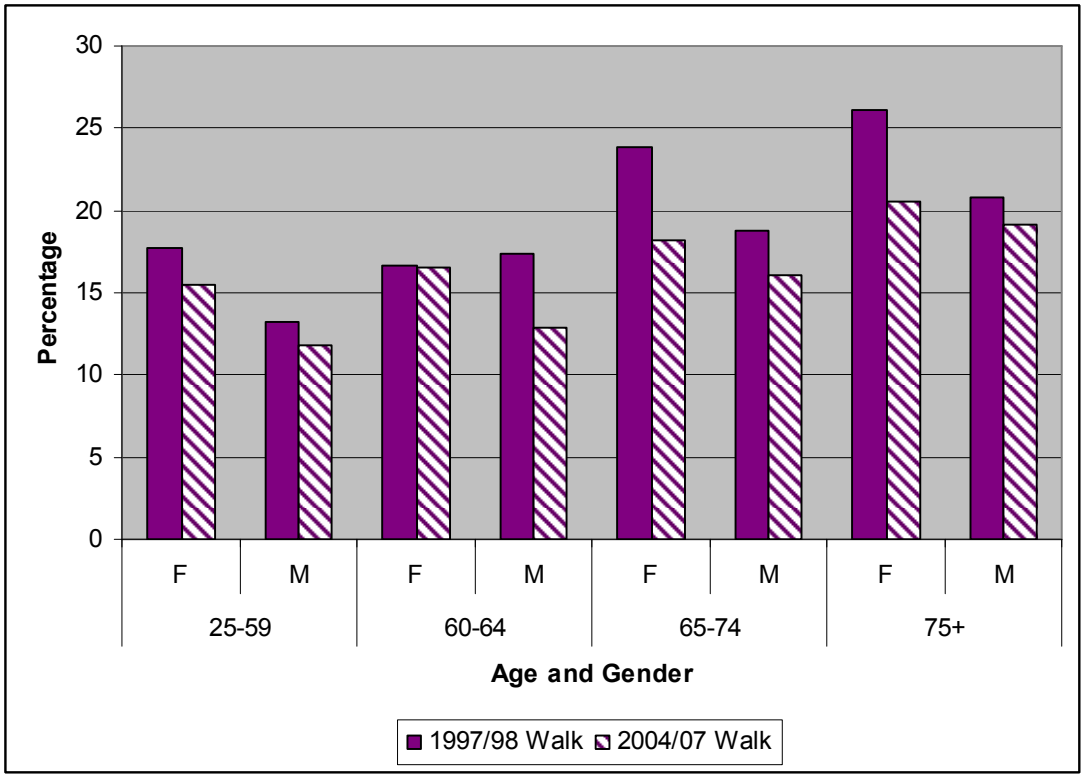

Figure 3.8 Comparing proportion of trips by walking, age group and year (1997/98 and 2004–07)

Cycle and public transport trips were too small to be split into age groups and gender differences without impractically large margins of error.

Of course, household size affected passenger travel. In particular, women aged over 65 living alone did 11% of their trip segments as vehicle passengers in 2004–07 compared with 38% for those in households with another adult (ie, aged at least 19). Comparable figures for men over 65 varied much less (5%, 7%). Presumably this reflected a strong tendency, when older couples travel together, for the man to drive.

3.5 Trip purpose

Although overall there was very little change in the purpose or destination of trip segments for the adult population aged 25+ (refer Table 3.4) between 1997/98 and 2004–07, there were some more noticeable shifts in terms of the *trip purpose* for the older population.

Table 3.4 Purpose/destination of trip segments for adult population aged 25+ (National estimates 1997/98 and 2004–07)

Destination/purpose of trip segment (compressed)	1997/98	2004–07
Unweighted segments	*N=81322*	*N=81813*
Home*	30.2%	31.1%
Work/education	18.4%	18.8%
Shopping	13.3%	14.7%
Personal business/services	6.7%	7.7%
Social/recreational	17.4%	16.1%
Change mode	5.7%	4.7%
Accompany somebody else	8.3%	7.0%
Total	**100.0%**	**100.0%**

*'Home' as a destination generally reflects that following a trip out of home (for work, personal business, social, etc, reasons) there will be the return trip home.

Consistent with their increased employment (noted in section 2.5), Figure 3.9 indicates that people aged 60–64 and 65–74 made proportionately more trips for 'work/education' purposes in 2004–07 than they did in 1997/98 (although the numbers involved are too small to reach statistical significance). All of the older age groups made proportionally fewer trips for 'social/recreational' purposes in 2004–07 than they did in 1997/98.

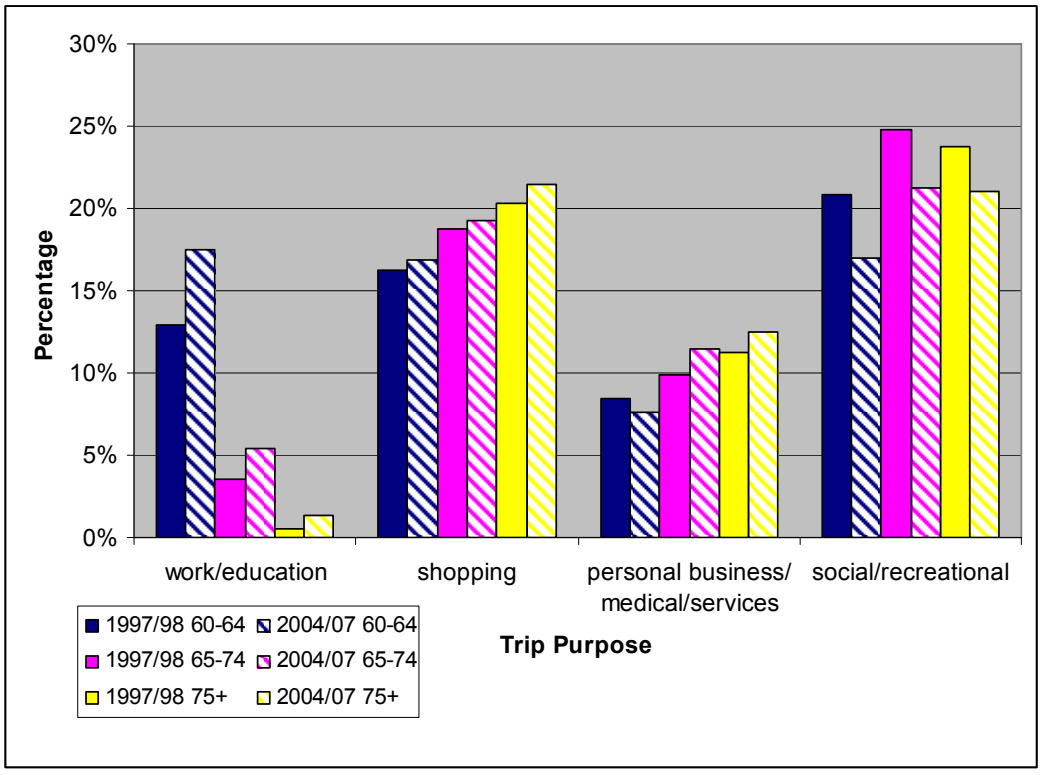

Figure 3.9 Purpose/destination of trip segments by age group (1997/98 and 2004–07)

3.6 Time of travel

3.6.1 Trip-making across the days of the week

As discussed in section 3.3.1, people aged 65+ made fewer trips *per day* than either the 25–59 or 60–64 age groups, irrespective of their geographical location (metro/other MUA/other U/RAs). Figure 3.10 shows that the *pattern* of trip-making by the 25–59 and 65+ age group was quite similar, although the mean number of segments per day was lower for the 65+ age group. This same pattern existed in the 1997/98 analysis.

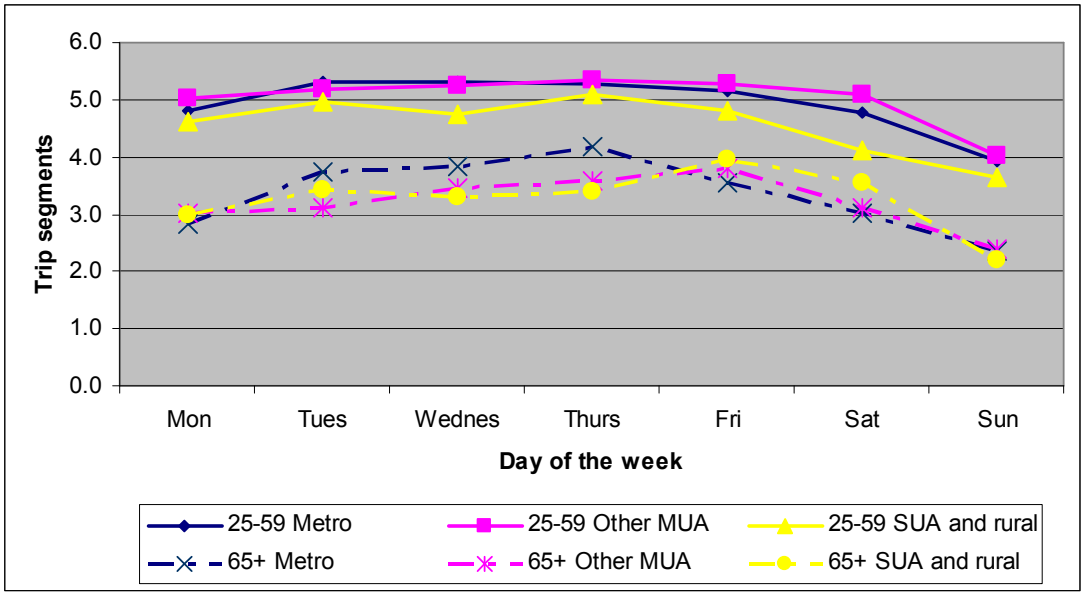

Figure 3.10 Mean number of trip segments per person by day of travel, age group and residential location (2004–07)

Saturday and Sunday continued to be days with fewer trip segments per person, no matter what age group. Thus, in 1997/98 and 2004–07 the split of trip segments weekday:weekend for the total adult population (aged 25+) was 76% weekday and 24% weekend. While there was a little variation around these figures, the older population (aged 60–64, 65–74 and 75+) generally reflected the same 76:24 balance in their trip-making.

3.6.2 Time of trip segments

Older adults (60+) undertook 20% of all trip segments by adults aged 25+ in the 2004–07 dataset. Looking at the time of day (see Table 3.5), we found that older adults (60+) were (relatively) less likely to be travelling after 6.30 pm, when they made 13% of all trips. Adults aged 25–59 made 87% of the trips in this time period. Older adults had a greater share of the 'traffic' stream in the 9.01 am to 3 pm time period, when they made 25% of all the trips by adults. The presence of older adults in the morning (up to 9.00 am) and evening (3.00 to 6.29 pm) peak periods was much lower, being 13% and 18% respectively.

Table 3.5 Age group (2 categories) by leaving time (2004–07)

Age in 2 categories	Total	Up to 9 am	9.01 am to 3 pm	3.01 pm to 6.29 pm	6.30 pm onwards
Unweighted count	*N=81892*	*N=13641*	*N=37927*	*N=21259*	*N=9065*
25–59	80.1%	86.6%	74.5%	82.4%	86.8%
60+	19.9%	13.4%	25.5%	17.6%	13.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Figures for 2004–07 showed an increased number (2–3 percentage points) of older people travelling in each time period compared with 1997/98. This reflected the greater proportion of older people in the general population (older people have increased their share of adults 15+ in the weighted datasets by 3 percentage points since 1997/98).

In 1997/98 and 2004–07, over 60% of trips by people 65+ started between the hours of 9.01 am and 3 pm. In contrast, just over 40% of trips by adults aged 25–59 started then (see Table 3.6). In line with their much greater participation in the work force in recent years, the 60–64 age group had a larger portion of their trips in peak periods (40% in 2004–07 compared with 36% in 1997/98).

Table 3.6 Leaving time of trip segments by age group (2004–07)

Leaving time	Total	25–59	60–64	65–74	75+
Unweighted segments	*N=81,892*	*N=62,658*	*N=5636*	*N=8662*	*N=4936*
Up to 9 am	17.3%	18.7%	14.4%	11.9%	7.9%
9.01 am to 3 pm	44.6%	41.5%	49.5%	57.5%	66.3%
3.01 pm to 6.29 pm	26.3%	27.0%	25.8%	22.9%	20.8%
6.30 pm onwards	11.8%	12.8%	10.4%	7.7%	5.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

In 2004–07, most trips (46%) by 60–64 year olds before 9.00 am were for work/education (up from 36% in 1997/98); while those of 65–74 and 75+ year olds were focused on social/recreation, shopping and personal business.

Comparing the timing of travel between men and women in 2004–07, we found that men of all age groups were somewhat more likely to start trip segments before 9.00 am than women, probably due to their higher full-time employment rates. Women were somewhat more likely to start trips between 9.01 am and 3 pm. Otherwise, there is little to distinguish between men and women in the time of their trip-making. It was essentially unchanged from 1997/98.

3.6.2.1 Timing of public transport trips

In late 2008, the New Zealand government introduced free off-peak travel on scheduled public transport (bus, train and ferry) services for New Zealanders aged 65+. Off-peak travel is specified as travel between 9 am and 3 pm and after 6.30 pm on weekdays and all day/evening on weekends. Not all areas of New Zealand have public transport services.[17] Hence, we examined the *pre-existing* public transport usage patterns (in 1997/98 and 2004–07) by the leaving time of the trip. In order to have a meaningful sample size (and analysis)[18], we examined two clusters: 25–59 year olds and the 65+ age group. Because of the small number of bus, train and ferry trips in the NZHTS and ONZHTS datasets, we have provided national estimates only.

Table 3.7 Public transport trips by 25–59 and 65+ age groups by leaving time (1997/98 and 2004–07)

	1997/98		2004–07	
Leaving time	**25–59**	**65+**	**25–59**	**65+**
Unweighted PT segments	*N=674*	*N=122*	*N=873*	*N=168*
Up to 9 am	24.1%	12.1%	34.5%	12.5%
9.01 am to 3 pm	35.3%	62.8%	20.8%	62.5%
3.01 pm to 6.29 pm	31.8%	23.5%	34.7%	19.9%
6.30 pm onwards	8.8%	1.6%	9.9%	5.1%
Total	100%	100%	100%	100%

As can be seen in Table 3.7, approximately 63% of the public transport trips by people aged 65+ started between 9.01 and 3 pm. Hence, the majority of public transport trips by older people already fell within the period where travel is now free. However, as noted above, well over one-half of the 65+ age group's trip segments by any mode started in the 9.01 to 3 pm period, and over 50% of these were as a vehicle driver. Thus, there is the potential for a fairly significant mode shift from car to public transport at the off-peak time targeted.

3.7 Vehicle driver trip characteristics

Because vehicle driver trips dominate New Zealanders' travel behaviour, we have analysed their characteristics separately.

3.7.1 Total driver trips and distance driven

As can be seen in Table 3.8, there were dramatic increases in the number of driver trips and the annual distance driven by the population aged 65+ across the three datasets. Driver trips increased from 174.5 million trips per year to 364 million, or more than 100%, while annual

[17] The following regions have been identified as participating in the Government's SuperGold Card scheme: Auckland, Waikato, Bay of Plenty, Hawke's Bay, Gisborne, Manawatu/Wanganui, Wellington, Nelson, Canterbury, Otago, Southland, Northland, Taranaki and Marlborough.

[18] There were too few in the 60–64 and 75+ age groups to be able to further divide them by the various modes used and then by the leaving time of the trip segment.

distance driven increased (from 1040 million kilometres to 2500 million kilometres per year or about 150%). Between 1989/90 and 1997/98, women over the age of 65 doubled their trip segments and annual distance driven. During this time (1989/90 and 2004–07), the number of people aged 65+ increased much less rapidly, by a total of 31%, from 379,767 to 495,603 between March 1991 and March 2006 (see Table 3.9).

Table 3.8 Total driver trip segments and distance driven by 65+ age group (national estimates)

	Total	Male	Female
Total driver trips (in millions)			
1989/90[19]	174.5	121.2	53.3
1997/98	270	165	105
2004–07	364	214	150
Annual distance driven (in 100 million km)			
1989/90	10.4	7.9	2.5
1997/98	18.7	12.7	6.2
2004–07	25.0	15.8	9.2

Table 3.9 Aged 65+ population (Census statistics, 1991, 1996, 2006 – source Statistics NZ 2007)

	Population	% increase from previous Census
March 1991	379,767	
March 1996	422,667	11.3%
March 2006	495,603	17.3%

Part of the explanation for the nearly doubling of driver trips and annual distance driven by women over 65 lies in the striking increase of licensed drivers in this population group. Rosenbloom (2001a) reported that in the 65+ age group, 81% of men and 50% of women held driver licences in the 1989/90 NZHTS database. By contrast, in 2004–07, 89% of men and 72% of women aged 65+ held driver licences.

3.7.2 Mean distance driven per day

Given that vehicle driver trip segments form about two-thirds of all trip segments made by adults aged 25+ in New Zealand, it is perhaps not surprising that the graph showing the mean distance driven by drivers per day is very similar to that showing the mean surface kilometres travelled (SKT) per person per day.

[19] 1989/90 figures are taken from Ministry of Transport, 1990.

Figure 3.10 reveals that younger drivers (aged 25–59) drove further on average each day than older drivers no matter where they lived. The average distance driven per day declined across the age groups in all areas.

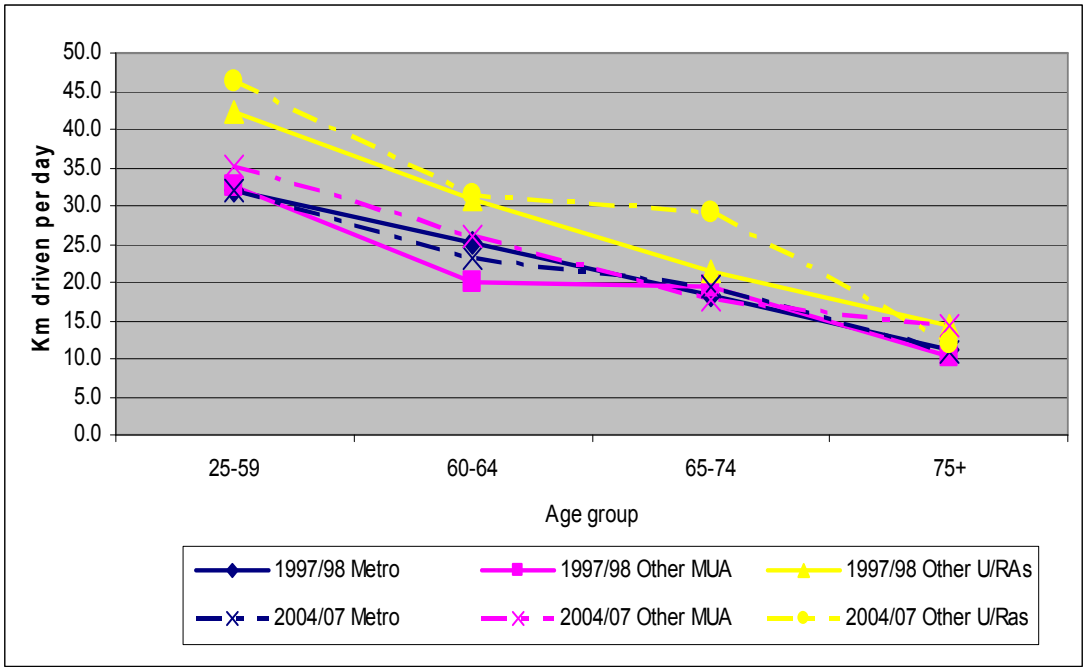

Figure 3.10 Mean distance driven per day (in km 1997/98 and 2004–07)

3.7.3 Vehicle occupancy

As can be seen in Table 3.10, older drivers (65+) made more trips with only one or two in the vehicle than did the 25–59 age group (71% 'driver only' trips compared with 65%; 26% with two people in the vehicle compared with 21%) in 2004–07. The younger age groups made significantly more trips with three or more people in the vehicle (14% compared with 3% of 65+).

These trip-making habits clearly reflected the smaller household sizes (generally limited to one or two adults with no children) of the older population.

Table 3.10 Number of people travelling in a vehicle by age group (National estimates 2004–07)

Number of people in the vehicle	Total	25–59	60–64	65–74	75+
Unweighted segments driven	*N=56047*	*N=44113*	*N=3857*	*N=5388*	*N=2689*
Driver only	66.2%	64.9%	74.9%	70.6%	70.5%
2	21.4%	20.8%	20.5%	25.5%	27.6%
3	7.7%	8.9%	2.7%	2.7%	1.7%
4	3.2%	3.8%	1.2%	1.1%	.2%
5 or more	1.4%	1.7%	.7%	.1%	.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The variable intended to provide occupancy information in the 1997/98 dataset has been found to be 'corrupt', hence we are unable to make comparisons between the two datasets.

4 Trip chains and tours: some basic results

4.1 Background

Recently, we completed the reformulation of the 2004–07 Ongoing New Zealand Household Travel Survey trips database into trip chains and tours and provided some preliminary results using the reformulated datasets. The reformulation of the 2004–07 dataset permitted us to draw some comparisons between New Zealanders' travel patterns in 1997/98 and more recently over the four-year period of 2004–07. Thus, we were able to provide comment on the emergence of some trends in New Zealand travel behaviour. The observations we made regarding older people's behaviour in making trip chains and tours are discussed below.

A **trip segment** (often reported simply as a 'trip') is recorded each time travel is interrupted, whether it is to drop off/pick up someone, buy a newspaper, change modes, etc. A **trip chain** is a sequence of one or more trip segments, anchored at home or at work (ie, when an individual is departing from home or departing from work, this begins a new chain), with the current trip chain *ending* when the person arrives at work or at home, or when they stay at one location for 90 minutes or longer (or, in a very few cases, begin to travel by plane). A **tour** is a series of segments that starts from home and ends at home.

4.2 Trip chain travel patterns

We considered the effect of age, particularly at 75+ (where the New Zealand law requires a driver to be medically assessed for fitness to drive) on the number of trip chains completed across two days; the main mode used; and on the purpose of the trip chains for the 2004–07 dataset.

Trip chain travel patterns essentially mirror those of trip segments. As can be seen from Table 4.1, those aged 25–64 were more likely (44%) to have completed six or more trip chains across two travel days than those aged 75+ (9%). People aged 75+ were much more likely to have completed only one or two trip chains across the two travel days than other age groups. Table 4.1 reveals that there was a steady decrease in the mean number of chains over the two travel days through the age groups from youngest to oldest.

Table 4.1 Number of trip chains completed (over two travel days) by age group (2004–07)

Number of trip chains completed (over 2 days)	Total	25–59	60–64	65–74	75+
Unweighted respondents	*N=9274*	*N=6484*	*N=686*	*N=1157*	*N=947*
0	5.5%	3.5%	6.7%	8.8%	18.0%
1 or 2	15.2%	11.1%	18.9%	25.9%	35.8%
3-5	41.1%	41.2%	40.2%	44.7%	36.9%
6+	38.2%	44.2%	34.2%	20.6%	9.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Mean	5.1	5.6	4.8	3.7	2.6

Older people make fewer longer trip chains than those aged 25–59. In 2004–07, 36% of all trip chains made by New Zealanders aged 25+ were greater than 10 km in length: 37% of the trip chains made by those aged 25–59 were this length, compared with 25% for the 75+ age group and 32% for the 65–74 age group. Table 4.2 shows there was not much variability between the age groups when the shortest trip chains (<2.0 km) are considered: these were 19% of trip chains by all four age groups, with the range being 19% to 23%.

Table 4.2 Total chain length by adult age groups (National estimate 2004–07)

Total chain length (walk dist imputed)	Total	25–59	60–64	65–74	75+
Unweighted chains	*N=45522*	*N=35734*	*N=3191*	*N=4194*	*N=2403*
up to 0.99 km	9.2%	9.0%	11.1%	10.4%	9.2%
1.00–1.99 km	9.8%	9.6%	11.7%	9.4%	12.3%
2.00–2.99 km	9.5%	9.1%	9.6%	10.8%	14.0%
3.00–3.99 km	7.7%	7.6%	7.3%	7.4%	11.0%
4.00–4.99 km	6.7%	6.6%	6.5%	7.6%	7.6%
5.00–5.99 km	5.4%	5.3%	4.6%	6.2%	6.6%
6.00–9.99 km	15.4%	15.4%	14.7%	15.9%	14.6%
10.00–19.99 km	17.7%	18.2%	17.3%	15.5%	12.8%
20.00 km or more	18.5%	19.1%	17.3%	17.0%	12.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

In contrast to 1997/98, when the 60–64 age group had different mode use patterns from either the 25–59 or the 65+ age groups, in 2004–07, the 60–64 age group was very similar to the 25–59 year old group in terms of mode use (Table 4.3 refers). Those aged 25–64 had far more of their trip chains with the main mode as 'vehicle driver' and far fewer as a 'vehicle

passenger' than those aged 75+ (75% vehicle drivers and 13% vehicle passengers for those aged 25–64 compared with 57% and 23%, respectively, for those aged 75+). The 75+ age group had a significantly greater proportion of walking trip chains than the 25–64 age group (15% compared with 9%). The 65–74 year age group was between the younger and the oldest age groups in its mode use.

Table 4.3 Main mode used in a trip chain by adult age groups (National estimates 2004–07)

Main mode of trip chain (mode used for longest distance)	Total	25–59	60–64	65–74	75+
Unweighted trip chains	*N=45928*	*N=36051*	*N=3221*	*N=4224*	*N=2432*
Vehicle driver	73.4%	74.8%	74.5%	67.5%	56.7%
Vehicle passenger	13.4%	12.5%	13.0%	17.2%	22.7%
Walk	9.1%	8.5%	9.7%	11.9%	15.3%
Cycle	1.1%	1.2%	.7%	.7%	.6%
Bus	1.6%	1.6%	.8%	1.0%	2.7%
Other (incl train, ferry, taxi, mobility scooter; not plane)	1.4%	1.4%	1.2%	1.7%	2.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Perhaps not surprisingly, those aged 75+ undertook far fewer trip chains for work or education (3%) than those aged 25–59 (32%) and 60–64 (28%). The 65–74 age group was in between (10%). About one-half (48%) of the 75+ age group's trip chains were for personal business, social welfare and/or shopping, compared with 23% of the 25–59, 27% of the 60–64, and 39% of the 65–74 age groups. The mode use and purposes appeared to be similar to those reported by Alsnih and Hensher (2005) for Sydney, using a travel chain dataset formulated from the 2002 Sydney Household Travel Survey.[20]

4.3 Tour travel patterns

We examined the 2004–07 dataset for differences in the mean number of tours per day and the number of segments in a tour based on age. Although the mean number of tours declined across the age groups, there was very little difference in the mean number of tours per day between 25–59 and 60–74 year olds (mean of 1.5 tours per day compared with 1.3). The sharp difference was with the 75+ age group, who completed a mean of 0.9 tours per day.

We found that there was not much difference between the age groups in terms of the complexity of their tours up to age 65–74. The 75+ age group showed some propensity to have less complex tours (64% are two segments only, compared with 55% for those aged 25–59). The 75+ age group was thus less likely to have tours of five segments or more (9% of

[20] The results are not directly comparable, as Alsnih and Hensher (2005) created a different trip chain typology, more closely resembling the one we created for tours.

their tours were five or more segments compared with 17% of those aged 25–59). Overall, the mean number of segments in a tour for those aged 75+ (2.7) was clearly less than for the 25–59 age group (3.2), with those aged 65–74 in between (mean of 2.9).

As expected from the trip segment and trip chain analysis, older people were much more likely to complete simple and multi-part non-work/non-education tours than any other kind of tour. Non-work/non-education tours include those made for personal business, social welfare, shopping, and social and recreational purposes. In 1997/98, 91% of the 60+ age group's tours were of this type; in 2004–07, this was 85%, with a corresponding increase in work-related tours (particularly 'simple work' tours, increasing from 4% to 8%). This arises from the trend for older people to stay in the workforce longer than previously.

Describing the older population as a homogeneous group labelled 60+ hides some marked differences in the purposes of their tours, as can be seen in Table 4.4. Almost all (97%) of the 75+ age group's tours were for non-work and non-education purposes, compared with 89% of the 65–74 and 70% of the 60–64 age groups. The tour-making behaviour of the 60–64 age group now more closely resembled that of the younger adult population (25–59), than it did in the 1997/98 dataset, when 80% of their tours were for non-work and non-education purposes and only 8% were simple work tours (compared with 15% in 2004–07).

Table 4.4 Purpose and complexity of tours by age group (National estimates 2004–07)

	Total	25–59	60–64	65–74	75+
Unweighted tours	*N=24912*	*N=18644*	*N=1702*	*N=2815*	*N=1751*
Simple work tour	15.7%	17.8%	14.5%	6.9%	2.2%
Multi-part work tour	4.2%	4.9%	4.4%	1.2%	.4%
Composite work tours (all types)	13.3%	15.7%	10.6%	2.7%	.3%
Simple/multi-part own-education tour	.9%	1.1%	.5%	.2%	.3%
Composite own-education & non-work tour	.6%	.7%	.2%	.3%	.0%
Simple non-work/non-education tour	41.2%	37.8%	44.0%	55.0%	62.8%
Multi-part non-work/non-education tour	24.1%	22.1%	25.7%	33.7%	34.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

4.3.1 Tour mode

Comparing the main mode used in a tour with the age of the person undertaking the tour, we found that there were some apparent changes in mode use between 1997/98 and 2004–07, as highlighted in Table 4.5 and 4.6 below.

The main part of the adult population (25–59 year olds) showed no change in its mode share for vehicle driver and vehicle passenger between 1997/98 and 2004–07. But older people in each age group increased their vehicle driver tours as a proportion of all their tours by around 5 percentage points (these differences do not quite reach statistical significance when applying the rule of thumb introduced in section 1.6, but the trend is consistent with other

results such as increased driver licence-holding among older people). Walking and vehicle passenger tours declined correspondingly.

Table 4.5 Main tour mode by age group (National estimate 1997/98)

Main mode of tours	Total	25–59	60–64	65–74	75+
Unweighted tours	*N=24234*	*N=19525*	*N=1356*	*N=2255*	*N=1098*
Vehicle driver	72.2%	75.0%	67.6%	59.9%	51.7%
Vehicle passenger	14.0%	12.9%	17.2%	17.6%	23.3%
Walk	10.8%	9.1%	12.0%	19.0%	21.7%
Cycle	1.0%	.8%	1.1%	2.2%	.9%
Passenger transport	1.5%	1.5%	1.9%	1.1%	.9%
Main mode not defined	.6%	.6%	.2%	.2%	1.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 4.6 Main tour mode by age group (National estimate 2004–07)

Main mode of tours	Total	25–59	60–64	65–74	75+
Unweighted tours	*N=24912*	*N=18644*	*N=1702*	*N=2815*	*N=1751*
Vehicle driver	72.9%	75.0%	72%	65.8%	56.4%
Vehicle passenger	13.5%	12.7%	13.7%	15.8%	20.2%
Walk	9.9%	8.5%	11.6%	15.5%	19.1%
Cycle	1.1%	1.2%	.91%	.8%	.7%
Passenger transport	2.0%	2.1%	1.1%	1.2%	2.1%
Main mode not defined	.6%	.5%	.6%	.8%	1.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

5 Conclusions

5.1 Trends in trip segments

Older people travelled distinctively less than the younger adult population (aged 25–59), no matter whether one looked at the total or mean number of trip segments per day, the typical distance per trip segment, average distance per day using 'surface transport' or average distance driven per day. The total number and mean number of trip segments and distances travelled declined steadily across the age groups (25–59, 60–64, 65–74 and 75+), with the 75+ age group undertaking the fewest trip segments and travelling the least kilometres of all the groups.

It was mainly older women whose mode use varied after the age of 65. In 2004–07, the proportion of trips for which women drove decreased sharply from 64% (25–59 year olds) to 42% (75+). Our analysis supported the qualitative research findings of Davey (2004), who explored how people aged 75+ met their transport needs once they no longer had access to a car. She found, as we did, that 'lifts' (or being a vehicle passenger) and walking trips became more predominant in terms of mode share and that 'one way in which older people without transport cope is to stay at home more' (p 20).

Demographically, the number of people aged 65+ in the New Zealand population has grown by 31% since 1989/90 (when the first household travel survey was completed). Since 1997/98, there have also been significant increases in the driver licence-holding rates among the older population and older women in particular; in the mean ratio of vehicles to adults (in all age groups); and in the employment rates of those aged 60–64 and 65–74. All of these factors undoubtedly influenced the travel patterns of the older population. For example, women aged 65+ living alone did 11% of their trip segments as vehicle passengers in 2004–07 compared with 38% for those in households with another adult (ie, aged at least 19). Comparable figures for men over 65 varied much less (5%, 7%). Licence-holding rates of older women in 2004–07 were still much lower than those of younger women (eg, 61% in the 75+ age group compared with 91% in the 25–59 age group), with the result that fewer trips as vehicle drivers were undertaken by women aged 75+ (42% compared with 64% for women aged 25–59).

Thus, although they travelled less than the general adult population (aged 25–64), older people (65+) as a group significantly increased their *volume* of travel, especially their driver trips and distance driven, between 1989/90 and 2004–07. Driving trip segments increased from 174.5 million per year to 364 million, while the distance driven increased from 1040 million km to 2500 million km.

In comparing 2004–07 with 1997/98, we also found that:

- Mean surface kilometres travelled (by vehicle driver, vehicle passenger, walk, cycle and bus passenger) per day per person increased in all four age groups analysed, but not to a statistically significant degree.
- The median and mean trip segment lengths were shorter for the older age groups.

- Older people made a significantly greater share of all trip segments (20% compared with 18%) occurring in New Zealand.
- Older *drivers* (60+) formed a significantly higher proportion of the vehicle traffic stream (18% compared with 15%). Given that the mean distance driven per day per person did not change significantly for older drivers, the increased share of the traffic stream appeared to particularly result from the greater number of older drivers.
- All age groups were more likely to have travelled on both travel days (in 2004–07 compared with 1997/98), although the proportions were still less in the older age groups. For example, the 75+ age group was much less likely to travel on both travel days than the 25–59 age group in 2004–07 (53% compared with 85%).
- Significantly more people aged 65+ in one-adult households travelled on both travel days (60% compared with 48%), whereas those aged 65+ living in two-adult households showed no change.
- People aged 60+ made significantly more of their trips as vehicle drivers, although older age groups still made fewer of their trips as 'vehicle driver' than did 25–59 year olds.
- People aged 60–64 and 65–74 made more trips for work/education purposes (although the numbers involved are too small to reach statistical significance; this corresponds with the Statistics NZ (2007) figures indicating higher employment rates among these two age groups).
- Older people (65+) were still more likely to start trips between 9.01 am and 3 pm than younger adults (aged 25–59) – over 60% compared with 40%, respectively. About 63% of passenger transport (bus, train, ferry) trips by the 65+ age group started during this time period.
- Women continued to be far more likely to have a distinctively different mode use after the age of 65 than men of the same age group. For example, in 2004–07, at age 75+, women drove for 42% of their trip segments whereas men drove for 69% of theirs, and women were vehicle passengers for 32% compared with 9% for men.
- Vehicle availability continued to be much lower for those aged 75+: in 2004–07; about one-quarter (24%) of the oldest age group, 75+, did not have any vehicles in their household, compared with 7% of 65–74 year olds and 5% of 25–59 year olds.

5.2 Trends in trip chains and tours

Our full analysis of trip chains and tours will be published separately (O'Fallon and Sullivan 2009 – in process). We reported some results specifically related to older people here at the request of end users. Generally, it can be said that the findings and trends reported for trip segments are mirrored in the trip chain and tour analysis. Compared with the 25–59 age group, older people made:

- fewer trip chains and tours per two travel days and per person per year. The mean number of trip chains completed over two travel days by 65–74 year olds was 3.7; for 75+, it was 2.6, while those aged 25–59 completed 5.6 in 2004–07. There was very little difference in the mean number of tours per day between 25–59 and 60–74 year olds (mean of 1.5 tours per day compared with 1.3); the sharp contrast was with the 75+ age group, who completed a mean of 0.9 tours per day

- shorter trip chains and tours. For example, 37% of the trip chains made by those aged 25–59 were greater than 10 km in length, compared with 25% for the 75+ age group and 32% for the 65–74 age group
- less complex trip chains and tours (ie, had fewer segments per chain or tour). The mean number of segments in a tour for those aged 75+ (2.7) was clearly less than for the 25–59 age group (3.2), with those aged 65–74 in between (mean of 2.9)
- fewer trip chains and tours as vehicle driver, and more as vehicle passenger or by walking as the main mode. In 2004–07, vehicle driver tours as a proportion of all tours was 75% for 25–59 year olds and 56% for 75+. Note that, however, older people (aged 60+) increased their vehicle driver tours between 1997/98 and 2004–07 from 60% to 65% of all of their tours, while decreasing their vehicle passenger and walking tours
- far more of their trip chains and tours for purposes (such as personal business, shopping, social, recreational) other than work or education. About one-half (48%) of the 75+ age group's trip chains had the purpose of personal business, social welfare, and/or shopping, compared with 23% of the 25–59, 27% of the 60–64, and 39% of the 65–74 age groups. Considering tours, the differences were even more pronounced: almost all (97%) of the 75+ age group's tours were for non-work and non-education purposes, compared with 89% of the 65–74 and 70% of the 60–64 age groups.

5.3 Comments

As a group, older people have increased their volume of trip segments and kilometres travelled, particularly as vehicle drivers. However, both their trip-making and kilometres travelled were at much lower levels than those aged 25–59, suggesting that older people will cause less pressure on the transport network, especially since the majority of their trip segments (60%) occur during the 'off-peak' hours of 9.01 am to 3 pm.

On an individual basis, between 1997/98 and 2004–07, older people made more trips as vehicle drivers (probably reflecting higher licence-holding and vehicle ownership rates), but did not significantly increase their mean number of trip segments and surface kilometres travelled. This corroborates Tacken's (1998) view that there is a limit to the potential growth in trip segments (and kilometres travelled) per person, as he found occurred in the Netherlands.

Our analysis suggests that, over the next 40 years, as older people become a greater proportion of the total New Zealand population (predicted by Statistics NZ (2007) to increase from 12% to 25% or more), there will be a discernible impact on the overall travel patterns of New Zealanders. For example, as older people form an even greater proportion of the vehicle traffic stream, among other things, there may be noticeable differences in the amount (both quantity of trip segments and their length) and timing of travel on the roads and public transport; overall vehicle kilometres travelled per day per person may decline; and walking as a mode share may increase. Of course, some of the change may be masked by overall population growth in New Zealand.

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