National Travel Profiles Part A: Description of Daily Travel Patterns

Steve Abley, Michael Chou
Abley Transportation Engineers Ltd

Malcolm Douglass
Douglass Consulting Services Ltd

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Private Bag 6995, Wellington 6141, New Zealand
Telephone 64-4 894-5400; Facsimile 64-4 894-6100
Email: *research@nzta.govt.nz*
Website: *www.nzta.govt.nz*

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1 Abley Transportation Engineers Ltd
2 Douglass Consulting Services Ltd

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Contents

Executive summary

The opportunity to undertake this research resulted from a discussion and an offer from Ministry of Transport officers in 2006. They indicated that the very extensive survey information collected in the New Zealand Household Travel Survey (NZHTS), while being collected in primarily for government policy purposes, was also intended to be a database of continuing information for use by transportation researchers and practitioners. As a result, in 2007, Land Transport New Zealand (now part of the NZ Transport Agency) awarded this research contract to the New Zealand Trips and Parking Database Bureau.

The objective of this research is to describe New Zealand travel behaviour by different modes and for different purposes as defined in the NZHTS. In the first instance, this is a comprehensive coverage from the database as it relates to travel patterns by mode and purpose. The NZHTS provides continuous, up-to-date data on personal travel, and monitors changes in travel behaviour over time. This report provides a detailed description of individual travel profiles in different areas, along with tables and plots of trip leg related survey results from the continuous travel survey data collected in 2003–2006.

The report is designed to be useful to practitioners in their understanding of travel patterns in the:

- Major Urban Areas: populations over 30 000;
- Secondary Urban Areas: populations between 10 000 and 30 000; and
- Rural Areas: lesser populations and all other rural areas.

Following the introductory background and literature review, the report deals with the survey results in the following sequence:

- personal travel,
- travel mode,
- travel purpose,
- travel by trip purpose and mode of travel,
- social inclusion and accessibility, and
- travel by time of day.

The surveys provide a vast array of information. A few selected items give a sample of the type of information available from the NZHTS:

- The NZHTS survey breaks journeys up into ‘trip legs’, each having its own origin and destination, and relating to each particular mode used in the journey. Overall, the average number of trip legs/person/day for all areas is 4.4.
- Nationally, trip legs made as ‘vehicle drivers’ exceed all other modes and, on average, represent 55% of all trip legs. The mode percent varies from 52% in MUAs to 58% in SUAs.
- Trip legs ‘to home’ make up the largest trip leg purpose, closely followed by the ‘to work – main job’ trip legs.

- It will not be a surprise that individuals whose dominant travel mode is as a 'vehicle driver' make more trip legs and travel greater distances per year for all purposes compared to individuals using all other modes of travel.
- Individuals who fall into the $10,001–$15,000 income category make fewer trip legs than those with larger incomes.

This report explains the NZHTS mode and purpose definitions, and includes a wide range of comparative information describing travel in New Zealand. It may provide a suitable framework to continue recording the NZHTS results for publication in the years ahead.

Complementing the description of travel, this report includes some conclusions and recommendations for future consideration. At the head of the list is a recommendation for further analysis of the NZHTS, with a view to improve the description of the predictive variables associated with different modes of travel and journeys, made up of trip chains, for various trip leg purposes. This should enable improved travel predictions for the future. It will be possible, with the completion of four survey years in 2007, to demonstrate trends in travel changes over time. It is also recommended that geographic regional comparisons be made and compared with the results arising from recent regional household surveys and transportation planning studies undertaken in Auckland, Wellington and Christchurch.

Abstract

Gaining a thorough understanding of daily travel for all trip purposes and by all modes of travel is essential to policy and planning. The Ministry of Transport's New Zealand Home Travel Surveys (NZHTS) have, since 2003, been undertaken as continuous ongoing surveys. The dataset resulting from these years of survey include 13 000 people from 6000 households. This large database is a valuable resource covering accidents and safety issues as well as travel profiles. The national statistics are broken down into major and secondary urban areas, and also rural areas as the basis of reporting and presentation.

This report makes this information more readily available to researchers and practitioners involved with transportation. The report provides a wide range of tables and graphs relating to modes, purposes and trip legs for weekdays and weekend travel. It concludes with recommendations that the research should continue to provide more detailed investigation of trips, travel trends and regional comparisons. It also recommends that the variables surveyed in the NZHTS be further assessed for use in the development of transportation models for future travel projection.

1. Introduction

1.1 Background

The first Ministry of Transport New Zealand Household Travel Survey (NZHTS) was undertaken in 1989/90, followed by the second in 1997/98. These surveys were designed to provide a databank of personal travel information for New Zealand. The results of these one-off travel surveys have been used by transport planners, road safety researchers and engineers to formulate transportation policies, and to improve the safety and efficiency of the New Zealand transportation system. However, in earlier research documents undertaken using this survey data, little focus has been placed on analysing trip profiles. Trip profiles, such as trip length and trip durations categorised by different modes and trip purposes, are particularly valuable for future planning for sustainable transportation modes and transport assessments. The 1989/90 and 1997/98 surveys were discrete. Since 2003, these have now been complemented by ongoing continuous survey processes.

Given that researchers need to investigate and describe New Zealand travel profiles more fully, Land Transport New Zealand[1] (LTNZ) commissioned the New Zealand Trips Parking Database Bureau to undertake analysis on 'National Travel Profiling: Description of Daily Travel Patterns' in 2007. This report provides a detailed description of the individual household travel profiles in major urban, secondary urban and rural local government areas, along with tables and plots of trip related survey results from the 2003 to 2006 continuous travel survey data. This report has not attempted to analyse trends or undertaken any time series analysis.

The datasets (dated 23rd of April 2007) used in this analysis included the information from the 2002/03 surveys which were low samples and could not be adjusted to account for a full year's seasonal variations. The analysis in this research has not been able to include more detailed regional comparisons or trends over time. When the 2007 surveys have been added to the dataset, it will be possible for more detailed regional and trend analysis to be undertaken.

[1] While this report was being prepared for publication, LTNZ was merged with Transit New Zealand to form the NZ Transport Agency (NZTA).

1.2 Research objective

The objective of this research is to investigate and determine New Zealand travel behaviour for main urban and rural areas by different modes related to different land uses for varying trip purposes. This will provide practitioners with better quality information to make transport planning decisions from.

The analysis includes daily trip leg profiles (including arrivals) by:

- purpose,
- mode,
- types of households with defined vehicle ownerships.

Daily trip leg arrival profiles are analysed by region and area type (main urban, secondary urban or rural). All the trip leg purposes included in the national travel survey data have been considered, including trip legs to home, work (main job, other job, employer's business), education, shopping, social welfare, personal services, medical/dental, social/recreation, accompanying someone else and to change mode.

This research project was defined as Part A (description of daily travel patterns). It was seen as an opportunity to describe the travel profile of the whole of New Zealand on a typical weekday or weekend. This preliminary travel profile investigation has been summarised according to Major Urban Areas (MUAs), Secondary Urban Areas (SUAs) and Rural Areas (RAs) as defined by the Statistics Department. In this report, the trip legs have not been related to specific land uses but rather to types of activity (e.g. work, education, shopping, etc.). Because of the limitations of only having four years of data, it was not possible to consider trends over time. Similarly, it has not been possible to undertake detailed regional comparisons. Such analysis should be undertaken as a further  ect.

Much more information is available from the NZHTS data files, which can be analysed for a variety of purposes, including travel trends in each of the regions and developing travel projection models based on the trip modes and purposes already surveyed in the NZHTS. This project shows the value of the NZHTS as a national information database. This, in turn, leads to a recommendation for further analysis designed to identify regional contrasts and to develop transportation models for assisting future transformation planning.

1.3 Report structure

This report includes the following sections:

- **Background:** descriptions of the NZHTS survey procedure and database, and its uses;
- **Literature review:** international research on travel profiling consulted during research;
- **Personal travel:** includes information on area variations and personal travel from 2003 to 2006;
- **Travel mode:** includes details about how residents travel within New Zealand, categorised by mode;
- **Travel purpose:** includes details about why residents in New Zealand travel;
- **Travel by trip purpose and mode of travel:** details individuals' travel, categorised by the purpose of the trip and mode of transport;
- **Social inclusion and accessibility:** includes information on how vehicle availability and income affect households' and individuals' travel profiles;
- **Travel by time of day:** includes information on personal travel patterns, categorised by time and purpose; and
- **Summary and recommendation:** a list of recommendations for further research topics.

The supplementary material in the Appendices covers:

- Appendix A: the household form used for the NZHTS;
- Appendix B: the person form used for the NZHTS;
- Appendix C: the coding tables used for analysing the NZHTS responses;
- Appendix D: unweighted trip legs by time of day for home-based arrivals and departures; and
- Appendix E: glossary, abbreviations and acronyms.

2. Background

2.1 About the Household Travel Survey

The NZHTS is a series of travel surveys designed to provide a databank of personal travel information for New Zealand. It is part of a continuous survey that began in 2003 and will be useful in enabling identification of long-term travel trends. This databank will continue to be an important source of information to influence government policies and monitor transport and safety performances. The Ministry of Transport (MoT) states that 'the aim of this survey is to increase our understanding of travel behaviour by people in New Zealand, including travel by car as a driver or passenger, walking and cycling,' (MoT 2007).

The current travel survey differs from the previous one-off surveys that were conducted in 1989/90 and again in 1997/98 in that the survey is now continuous rather than discrete. Discrete surveys are not as reliable in developing valid estimations of changes in accident risks and travel patterns occurring over time. The continuous survey ensures the availability of up-to-date travel data to formulate new transport and road safety policies.

2.2 Survey procedure

The NZHTS dataset analysed in this report includes travel by approximately 13 000 people from some 6000 households in sample areas throughout New Zealand between 2003 and 2006. The NZHTS is administered by an independent contract on behalf of the MoT. Households are selected and an initial letter is sent from the MoT to each household, which includes a pamphlet briefly describing the aims and content of the survey.

The interviewer then calls at the address to gather household information, explains the purpose of the survey and informs the household what days are their 'travel days'. The 'travel days' are two consecutive days for which the household records all travel. The two consecutive days may be two consecutive weekdays or weekends. An even spread according to the day of the week was maintained by systematic allocation of travel days. The survey includes trips beginning between 0400h on Day 1 to 0359h on Day 3, a 48-hour period. A memory-jogger was left behind for the respondents to use for recording travel. The survey is voluntary. The response rate calculated in 2003/2004 was 64% (MoT 2007).

Finally, the interviewer returns to conduct the interviews as soon as possible after the travel days. The 2003 household travel survey form and person form are included in Appendix A and Appendix B respectively. It should be noted that Questions 26 to 76 in the person form relate to alcohol and accidents, and are not applicable to purposes of this particular National Travel Profiling research project.

A detailed description of the NZHTS methodology can be found on the MoT website (MoT 2008a).

2.3 Data description

2.3.1 Categories

This research relies on a household travel survey undertaken in fourteen local government areas in New Zealand. Approximately 12 700 people were interviewed from 5650 households between March 2003 and June 2006. The data supplied by the MoT was dated 23rd of April 2007. In general, the data collected divides into the categories shown in Table 2.1 and the inter-relationships shown in Figure 2.1. This research project only focuses on analysing household, person and trip data to achieve the research objectives. The variables supplied by MoT and used in these surveys and this analysis are listed in Appendix C.

Table 2.1 Main data categories and descriptions in the NZHTS.

Main data category	Description
Household	Details about the household and its response to the survey
Person	Details about people in the household (information such as age, gender, experience, accident totals, occupation, income, driving, and work and school locations)
Trip	Purpose, mode, date, time and distance of each trip leg, and vehicle information
Vehicles	Type, make, model, year, engine CCs and owner information for vehicles driven during the survey
Alcohol	Drinking session times and locations
Accidents	Accident involvement over the last two years
Address	Text description of trip destinations
Accident locations	Text description of accident locations
Trip geocoding	Trip location (map references) and geocoded distance estimates
Address geocoding	Address location (map references)

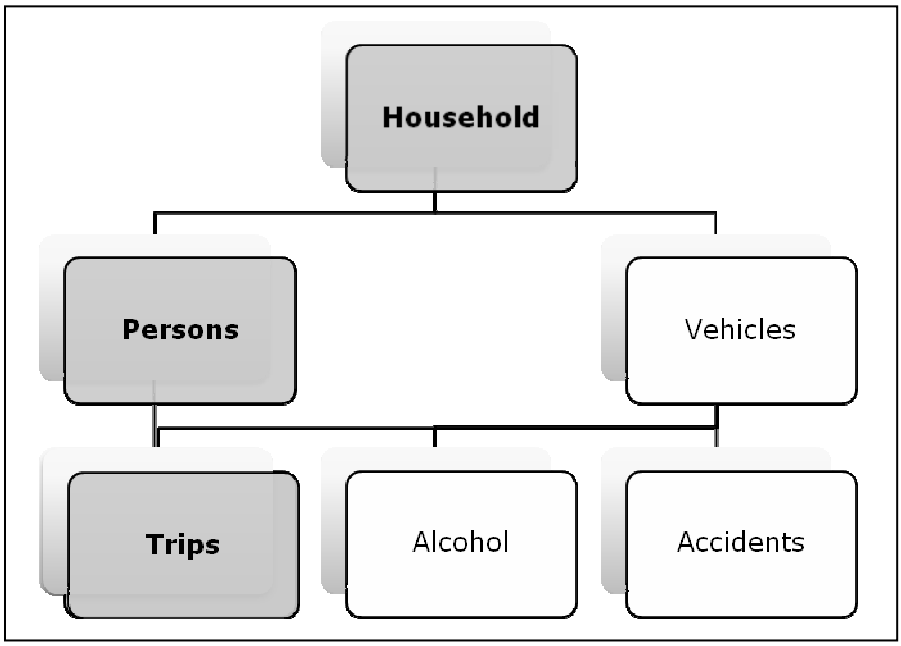

Figure 2.1 Inter-relationships of the main HTS variables.

Note: grey fill indicates the variables considered by this study.

2.3.2 Stratification

The sample strata and substrata were geographically based using Statistics NZ definitions for the 1996 Census of Population and Dwellings (see Statistics NZ 2008). The strata were based on the fourteen Local Government regions, further stratified into MUAs, which have a population of at least 30 000; SUAs, which have a population between 10 000 and 30 000; and RAs, which includes minor urban areas with populations less than 10 000 and all other rural areas.

The sample sizes per Local Government Region were proportional to 2001 Census populations except the initial survey emphasis was as follows:

- Less than proportional: Auckland, Canterbury, Wellington;
- More than proportional: Hawkes Bay, Nelson/Marlborough, Northland, Southland, Taranaki, Gisborne and the West Coast Regions.

2.3.3 Participants

All household members, including babies, were eligible for inclusion in the survey. Travel by household members aged nine and under was reported by a parent or caregiver who had been with the child on all travel.

2.3.4 Off-road travel

Off-road travel, such as on off-road tracks or around private property (e.g. farms), was excluded from the survey. All on-road travel, including farmers' work travel, was included in the survey criteria.

2.4 Weights

Since the sample is not a simple random sample of the population, a simple total of the sample observations is not appropriate for estimating population means and totals. Weighted means and totals are used, where the weights are approximately equal to the reciprocals of the probability of selection of the respondents. Weights are also used to reduce the inevitable bias due to non-response.

The appropriate weights provided by the MoT and included in the datasets have been applied in calculation of all the travel profiles contained in this research.

2.5 Filters

'Filters' are applied to select households, people and trips by people with full responses only. Filters applied to the 'household', 'person' and 'trip' datasets provided by the MoT are presented in Table 2.2.

Table 2.2 Filters used with each dataset of the NZHTS.

Dataset	Filter	Description
Household	hhrespstat=1	Households with full response only
Person	perespstat=1	People in the survey with full responses
Trip	perespstat=1	Trips by people with full responses

2.6 Day of travel and selection of individuals

After applying the filters, the entire analysis has accounted for those people who travelled on both Day 1 and Day 2. The analysis also includes people who did not travel on their designated travel days.

2.7 Definitions of trips and purposes

2.7.1 Usage

The definition of 'trip legs', 'modes' and 'trip purposes' can often vary between countries. The perception of these terms also varies between research documents depending on how the terms are applied in practice. For example, the *Travel Survey – 1997/1998* (Land Transport Safety Authority (LTSA) 2000) has used trip legs to understand New Zealanders' travel behaviour. It is noted that O'Fallon & Sullivan (2005) have used 'trip chains' to understand how New Zealanders link their travel into journeys. Consequently, it is important to define these terms to ascertain the results contained inside this report. This allows practitioners to understand how the travel profiles are generated, and allows for comparisons with other national and international research.

For this research, all the analysis uses 'trip legs' and 'trip leg purposes' as defined by the MoT (2007). This section outlines how 'trips legs', 'trip chains' and 'trip leg purposes' are defined.

2.7.2 Trip legs

The 'Trip data' contain over 108 400 separate rows, one for each trip leg. The MoT (2008b) defines a trip leg as follows:

> *A trip leg is a section of travel by a single mode with no stops. Thus if one walks to the bus stop, catches the bus to town and walks to his/her workplace, he/she has completed three trip legs (home-bus stop, bus stop 1 to bus stop 2, bus stop 2-work).*

Trip leg departures consider the start time of a trip leg for a given purpose. Trip leg arrivals consider when the trip leg ends. 'Home-based' departures and arrivals are made to and from home, but a 'home-based daily departure' refers to the first trip leaving home

at the start of the day for a given purpose, while a 'home-based arrival' is any trip leg that ends at home irrespective of the time of day (i.e. subsequent trip legs away from home may be made).

2.7.3 Trip leg purpose

Each trip leg has a trip leg purpose and the trip legs contained in the 'TR14' database are categorised by the 'Tractiv' column. This column provides details of what activity is done at a trip leg destination. Fifteen activities (trip leg purposes) are listed:

- **Home:** This is used where the person is returning home or to a temporary place of residence at the end of a trip leg.
- **Work – main job:** This indicates trip legs to work at a fixed work address. The main job is the job at which most hours are worked.
- **Work – other job:** This is used to describe trip legs to a secondary or other job at a fixed work address.
- **Work – employer's business:** This describes all work-related stops that are not to a fixed work address. Employed or self-employed people without a fixed place of work (e.g. plumber) are included in this category.
- **Education:** This includes travel as a student to institutions such as primary and secondary schools, colleges of advanced education, technical colleges, universities etc. This also includes school-related activities that are not at school, e.g. school outings, school patrol or school sports in school time. Sports at the weekend or after school are coded as 'recreation'. This does not include trip legs to pre-school care/education facilities, as these are considered to be 'social visits'.
- **Shopping:** This describes any trip leg ending at premises which sell goods or hire goods out for money. Premises which provide services only (e.g. solicitors, banks) or repairs only (e.g. appliances or shoe repairs) should be coded as 'personal business/services'. Shopping is defined as any time the respondent enters a shop, whether or not a purchase is made.
- **Social welfare:** This includes stops made at government agencies involved in welfare, e.g. WINZ, guidance counsellors, employment offices, etc. and also includes collecting pension or unemployment benefit cheques. In this report, however, trips that fall under this definition are usually included in 'personal business/services' unless otherwise stated.
- **Personal business/services:** This includes stops made to transact personal business where no goods are involved, e.g. banks, hairdressers, laundromats, libraries, veterinary surgeons and government offices other than social welfare agencies (e.g. City Councils and voluntary work).
- **Medical/dental:** This includes any stop made for personal medical or dental needs. Stops made by a respondent who is accompanying another person are coded under the purpose of 'accompany[ing] someone else'.
- **Social visits:** These include visits to a private home; visits to a non-private dwelling (e.g. visiting a friend in hospital, visiting a friend staying in a hotel); pre-school activities such as kindergarten, crèche, day-care, kohanga reo or nursery school; and all entertainment activities occurring in a public or private place. Such

entertainment activities include dining out, clubs, hotels, concerts, religious meetings, and off-road driving or motocross. Walking or cycling for social purposes involve exercise and are therefore coded as 'recreational'.

- **Recreational:** This includes participation in sporting activities and travelling to sporting or recreational activities (e.g. driving to the park to go jogging). It excludes watching someone else play sport, which is a 'social visit'; and off-road driving or motorcycling, which are coded as 'social visits' as these have no exercise component.
- **Change mode:** This records all cases where the purpose of the stop was to change to another mode of transport.
- **Accompany someone else:** This is used in cases where the purpose of the travel was to go somewhere for someone else's purpose. This is usually to pick up, drop off or accompany another person (or persons) e.g. a parent who walks to school in the afternoon to pick up their children.
- **Left country:** This is used where the respondent leaves New Zealand during the travel days. Their travel while in New Zealand should be recorded but any travel outside New Zealand is not part of the study and does not need to be recorded.
- **Other:** This covers any other trip leg purposes not defined by all the trip leg definitions above.

2.7.4 Modes

The following definitions were used when defining modes:

- Trip legs made by motorbike (either as driver or passenger) were classified as 'vehicle driver' or 'vehicle passenger' rather than as cycling.
- For the analysis of motorised modes (see Chapter 9.4), buses and taxis were not included. Motorised trip legs included trip legs as vehicle drivers or passengers only.
- Trip legs made by walking included skateboards, scooters, prams, tricycles and children carried in backpacks, but mobility scooters and wheelchairs were classed as 'other'.
- Trips legs made by professional taxi and bus drivers as part of their work were classified as 'vehicle driver' (with the purpose classified as 'work – employer's business') rather than as public transport.
- Emergency vehicles (e.g. ambulances, police cars) were classified as vehicles rather than as a form of public transport.
- Public mode includes train, bus, ferry, plane and taxi.
- Private mode includes vehicle driver, vehicle passenger, bicycle and walking.

2.7.5 Trip chains

For some purposes, it is desirable to link travel into longer trip chains. For example, if one drives from work to home but stops 200 metres from home to buy bread, this may be considered as a single trip chain (work to home travel).

The current dataset does not permit the analysis of trip chains, but this work is being done under a separate commission.

2.8 Uses of the NZHTS

The NZHTS provides detailed information on where individuals' travel, distance, time and purpose as well as what kinds of individuals are doing the travelling and their frequency of travel. The *Pedestrian Planning and Design Guide*, published by LTNZ (2006), made use of the 1997/98 NZHTS data to show the proportion of all walking trips categorised by different trip purposes. Other important uses of the NZHTS that relate to travel profiles may include:

- identifying changes in personal travel over time for different types of travel modes and areas;
- understanding how individuals travel to different activities;
- examining travel among different age groups, gender and income categories of individuals; and/or
- identifying travel demands at different time periods of the day, different days of the week and for different travel purposes.

3. Literature review

3.1 Introduction

A review of international literature on household travel surveys has been undertaken. The principal aim of this was to consult valuable outputs that have been generated internationally and that would assist in producing travel profiles in New Zealand. This chapter summarises the basic survey methodologies that have been developed in different countries and highlights some of the travel profile outputs that are pertinent to this research. The most constructive travel surveys consulted were those of Britain, Australia and the United States. The final subsection summarises several research projects that have been undertaken in New Zealand, and places this topic in the context of where further research in New Zealand's travel profile may prove of value.

3.2 Great Britain

The continuous travel survey in Great Britain began in 1988. Field work is carried out every month of the year so that weekly, monthly and seasonal variations in travel patterns are fully monitored. The initial survey made use of data collected from 5050 household samples; subsequently, the number of households surveyed increased to around 8300 households in 2006.

The sample sizes are drawn randomly each year. In general, the selected households are informed by mail explaining the purpose of the travel survey. Those who respond are followed up by 'placement' interviews that gather information about the household, its individual members, household vehicles and long-distance journeys that household members have recently made. A seven-day travel diary is then given to each of the household members after the interview.

Households that have agreed to do the survey receive a reminder call prior to the specified travel week, a mid-week checking call, and a subsequent pick-up call to collect the travel records and check the information recorded with the informants.

In 2002, an experiment was undertaken by the British Ministry of Transport to examine the effect of offering incentives to the selected sample. Each household was given a £5 voucher and a signed promissory note if all household members completed the placement interview and a travel record. Hallar et al. (2005) state that 'there was a significant and large rise in response rate using a £5 incentive, caused primarily by a shift from partial to full responses'. In 2003 and 2004 – after the incentives were employed – the response rate was 60%, compared with a response rate of 54% in 2002.

In summary, the *2006 National Travel Survey* (Department for Transport 2006) includes the following sections that touched on personal and household travel profiles:

- **Trends in personal travel:** This section shows changes in personal travel from 1988 to 2006 including mean trips, distance and time travelled per person per year. In addition, trends in distance travelled by mode are also illustrated.
- **How people travel:** This section provides details about how individuals travel in Great Britain, using different modes. It also includes information about how far people travelled and how many trips were made, by gender and age group.
- **Why people travel:** This section focuses on trip purpose, illustrating mean trips, distance and time travelled per person per year by purpose, gender and age group.
- **Social inclusion and accessibility:** This section shows how income levels and vehicle accessibility affects personal and household travel. It also shows personal travel by ethnicity, and individuals' frequency of bicycle use, public transport and international flights. Moreover, the accessibility of bus services and local facilities is also presented.
- **Other factors affecting travel:** This section shows some of the other factors that affect travel, including car mileage, car occupancy, working at home and time of day. Of most relevance in this section is travel by time of day, which identifies morning and evening peak periods where the highest trip demands occur.

3.3 Australia

The New South Wales (NSW) household travel survey has been conducted annually since June 1997. It is a continuous survey that covers the travel patterns of residents of the Greater Sydney Metropolitan Region. Approximately 8500 people in 3500 households are surveyed annually.

Households are chosen at random to participate in the survey and selected households are notified by mail prior to the survey. Those who respond are given a travel diary that collects information on all travel undertaken by all household members for a nominated 24-hour period. Subsequently, travel data are collected though face-to-face interviews. The travel survey is voluntary. The response rate was 67% in 2006 (NSW Government Department of Planning 2007).

The latest *2005 Household Travel Survey Summary Report* (NSW Ministry of Transport 2007) contains the following sections that are relevant to this research:

- **Purpose of travel:** This section illustrates the annual proportion of trips and distance travelled on weekdays or weekends, categorised by purpose.
- **Mode of travel:** This section focuses on an individual's choice of travel mode. It shows the annual number and proportions of trips categorised by mode on weekdays and weekends.
- **Purpose by mode:** This section illustrates proportion of trips by purpose and mode in 2005.
- **Trip duration:** This section illustrates mean trip duration by purpose and mode on weekdays annually.

- **Time of day of travel:** This section illustrates the number of people travelling, categorised by time of day on weekdays and weekends. The proportion of motorised trips categorised by purpose is also included in this section.
- **Profile of travellers:** This section compares the travel pattern of individuals categorised by gender and age, and includes the proportions of trips categorised by mode, gender and age group.

The *2005 Household Travel Survey Summary Report* also includes tables showing the different reasons in percentages for individuals travelling to work by public and private modes on weekdays. The 2005 results indicate the top three reasons for travelling by public transport:

- It avoids parking problems (48%).
- Some public transport users do not have a car (25%).
- Public transport is cheaper than private transport (24%).

On the other hand, those who travel to work by private transport do so because:

- they feel that their vehicle is faster (48%),
- public transport is unavailable/inaccessible (33%) and
- public transport is problematic (26%).

3.4 United States

The National Household Travel Surveys (NHTS) conducted in the US are discrete as opposed to continuous. The first NHTS was conducted in 1969, followed by surveys in 1977, 1983, 1990 and 1995. The latest survey was undertaken in 2001. Samples were selected by creating a random-digit dialling (RDD) list of telephone numbers. The sample size includes 60 282 individuals from 26 038 households and represents 0.02% of the population.

The data collection consists of three main phases:

- A household interview collected demographics and vehicle ownership data.
- A personal interview collected the travel data for all the one-way trips that were taken during a designated 24-hour period. The designated travel day started at 0400h and ended at 0400h the next day.
- Two vehicle odometer readings were collected for each household vehicle. The first was at or around the time of the personal interviews. The second was at least two months later. The dates of each reading were recorded to facilitate the estimation of annual mileage.

Cash incentives were offered to the selected households by including $5 in the pre-interview letter and $2 in the travel diary mailing. The overall response rate in 2001 was only 41% (FHWA 2004).

The 2001 NHTS report *Summary of Travel Trends* (Hu 2004) details the United States travel profiles extensively, covering the following sections:

- **Travel and demographic summary:** This section is a summary of travel trends of the individual NHTS that were undertaken in the previous years, including 2001.
- **Household travel:** This section focuses on household travel profiles. Of relevance are the mean annual person miles travelled, person trips and trip distance categorised by the trip purpose. Trips per household categorised by household income are also presented in this section.
- **Person travel:** This section provides information on personal travel profiles covering trip distance, time and mean number of trips, categorised by purpose, gender and mode.
- **Private vehicle travel:** This section focuses on vehicle travel, showing mean distance, time spent in vehicle per person and mean vehicle occupancy for selected trip purposes.
- **Commute travel patterns:** This section compares vehicle commuting trips by year looking at annual commuting trips per worker. It also illustrates the proportion of commuting trips by usual mode, and mean commute trip distance, trip time and speed in different years.
- **Temporal distribution:** This section shows distribution of person trips, categorised by trip purposes and the start time of the trip.

3.5 New Zealand

The previous NZHTSs, undertaken in 1989/90 and 1997/98, have resulted in the publication of *New Zealand Household Travel Survey* (Ministry of Transport 1990) and *The New Zealand Travel Survey – 1997/1998* (Land Transport Safety Authority 2000) respectively. The survey procedures for these discrete surveys are equivalent to the current continuous NZHTS procedure, as mentioned earlier. The full response rate from all household members for the 1997/98 travel survey was 74.9%.

LTSA (2000) provides detailed tables and plots showing New Zealanders' travel profiles in the 'Travel' section. The section contains the following areas that are relevant to this research:

- **Comparing travel modes:** This includes trips and distance travelled by mode and overall purpose; trips by mode, categorised by gender and age groups; and trip distance and duration by mode, categorised by duration and distance intervals.
- **Time of day and day of week (all drivers and motorcycle riders):** This includes distance driven by day of week and hour of day.
- **Trips by private modes** (i.e. vehicle driver, vehicle passenger, walking and cycling): This includes trips and distance travelled by age groups and gender, trip distance per trip categorised by age groups and gender, and total annual distance and time travelled categorised by age groups for the 1989/90 and 1997/98 comparison.
- **Trips by public modes** (i.e. bus and taxi trips): This includes trips and distance travelled, categorised by age groups.

- **Urban and rural residents:** This includes comparisons between urban and rural areas of trips per year by mode, percentage of trips by purpose, and distance and hours spent travelling per person per week by mode.
- **Regional analysis:** This includes trips; annual distance travelled by mode, categorised by region; and annual kilometres travelled per person as a vehicle driver, passenger or cyclist, categorised by region.

O'Fallon & Sullivan (2005) used the 1997/1998 New Zealand Household Travel Survey database to derive 'trip chains' and 'tours' to understand New Zealanders' travel behaviour. O'Fallon & Sullivan (2005) define a trip chain as:

a series of one or more segments [trip legs] *defined by starting a new chain whenever:*

- *The segment* [trip leg] *is the first one recorded in the respondent's travel diary (excluding trip legs by plane).*
- *The starting point of the segment* [trip leg] *is home or their workplace.*
- *The origin of the trip is neither home nor work, but the respondent has been at that location for more than 90 minutes (and the purpose of the immediately preceding segment* [trip leg] *was not change mode).*

On the other hand, O'Fallon & Sullivan (2005) define a 'tour' as 'a series of segments [trip legs] that start from home and ends at home'. The authors class tours into ten different types, as shown in Table 3.1.

Table 3.1 Classes of tours used by O'Fallon & Sullivan (2005).

Tour description	Sequence[a]
Simple work	h[b]–w[c]–h
Multi-part work	h–w–(–w–)–w–h
Composite to work	h–nw[d]/e[e]–(nw/w/e)–w–h
Composite from work	h–w(–nw/w/e)–nw/e–h
Composite to and from work	h–nw/e–(nw/w/e)–w–(nw/w/e)–nw/e–h
Composite at work	h–w–(nw/w/e)–nw/e–(nw/w/e)–w–h
Simple/multi-part education	h–e–(e)–h
Composite education and non-work	h–nw–e–(nw)–h and h–(nw)–e–nw–h
Simple non-work/non-education	h–nw/ne–h
Multi-part non-work/non-education	h–nw/ne–nw/ne–(-nw/ne-)–h

Notes to Table 3.1:
a The bracketed terms represent additional trips that may be in the tour.
b h = home
c w = work
d nw = non work (including personal business, shopping and leisure/recreational purposes)
e e = education

Given the definition of a 'trip chain', 124 089 trip legs contained in the 1997/98 database were aggregated into 65 077 trip chains. The trip chain analysis revealed the following key points:

- On average, an individual travels 2.3 trip chains per day, compared with 4.4 segments (trip legs) per day.
- Nearly half (48.3%) of all trip chains consist of one segment (trip leg). On average, a trip chain consists of 1.9 segments (trip legs).

- Ninety percent of all trip chains use a single mode of transport, and trips made as a 'vehicle driver' make the highest proportion (48%) of all the modes used within a trip chain.
- Of the trip trains with 'vehicle driver' as the main mode, 42% have a total trip chain distance of greater than 6 km.
- For all modes of travel, trip chains by 'subsistence' (work or education), 'maintenance' (personal business, shopping, etc.) and 'discretionary' (social, recreational, leisure) occur in fairly equal proportions, 24%, 21% and 24%, respectively.

Similarly, 37 565 'tours' were validated from the database. The 'tours' analysis shows that:

- on average, an individual travels 1.3 tours per day;
- 56% of the tours have two trip chains in each tour;
- 66% of the tours are non-work/non-education tours and 23% are for work purposes;
- 84% of all tours use a single mode, with 'vehicle driver' accounting for the highest proportion of all the modes used within a tour (47%);
- more than 28% of all tours are less than 4 km in distance and over 50% of all tours are less than 10 km in distance;
- the proportion of tours made as a 'vehicle driver' in Wellington (40.5%) is relatively lower than in Auckland (45.8%) and Christchurch (44.2%). On the other hand, Christchurch has higher proportions of cycling tours (3.8%) than Wellington and Auckland (3.2% and 1.9%, respectively);
- individuals make higher proportions of shorter trips (up to 1.99 km) in Christchurch, (14.7%) compared with Auckland (10.9%) and Wellington (12.9%).

O'Fallon & Sullivan (2003) also used the 1997/98 NZHTS to investigate the weekday and weekend travel patterns for three main urban centres (Auckland, Wellington and Christchurch).

Key points revealed from the weekday and weekend analysis include:

- Sundays have the lowest trip legs (3.6 trip legs/person) compared with weekdays and Saturdays (5.2 and 4.4 trips legs/person, respectively).
- Fridays have the highest number of trip legs per person (5.8). Individuals travel less on Sundays, making only 3.6 trip legs per person.
- The proportion of trip legs made for a work purpose is higher on weekdays compared with weekends. On the other hand, proportions of social/recreational and shopping trip legs are higher in the weekend compared with weekdays.
- Over 50% of weekend trips depart between 0900 and 1500, while just over 37% of weekday trips occur during this period.
- The proportion of trip legs made as a 'vehicle driver' are relatively lower on Sundays (43.1%) compared with weekdays (48.3%) and Saturdays (48.1%).
- The proportion of trip legs made by public transport (bus and train) and walking are relatively higher on weekdays compared with weekends.

- A higher proportion of trip legs are made as a ‘vehicle passenger’ on the weekends.
- Wellington has a higher proportion of trip legs made by public transport (bus and train) and walking on weekdays compared with Auckland and Christchurch. This also explains why the proportion of trip legs by ‘vehicle driver’ and ‘vehicle passenger’ is relatively lower in Wellington.

3.6 Summary

The literature reviewed in this section has a twofold function. Primarily, it provides supplementary information regarding travel patterns within New Zealand and around the world. Additionally, it operates as a control on the methodology used in the NZHTS as well as in the analysis of the data collected. By consulting outputs generated internationally, we were able to ensure that both the survey and subsequent analysis of the results were in line with international methods for investigating travel behaviour. This results in high quality information upon which transport planning decisions can be made.

4. Personal travel

4.1 Introduction

Tables and charts in this chapter show the personal travel profiles for all travel surveyed between 2003 to 2006 in different areas. The analysis includes all areas, MUAs, SUAs and RAs. The personal travel profiles included are:

- mean trip leg distance, trip leg time and number of trip legs/person/day; and
- proportion of trip legs by categorised by private and public modes.

Trip leg distances used in the travel profiles were calculated by mapping the quickest route (or via a given waypoint) between origin and destination. Trip leg distances were calculated for road-based modes only; these modes were vehicle driver, vehicle passenger, bicycle, bus and taxi.

4.2 Mean trip leg distance and time, and number of trip legs per person

The distance, number of trip legs and mean trip leg time travelled per person per day categorised by area are presented in Table 4.1. The mean number of trip legs/person/day, mean trip leg distance and mean trip leg time are illustrated in Figures 4.1 to 4.3.

The analysis of the mean trip leg distance, trip leg time and the number of trip legs/person/day shows that:

- The mean amount of trip legs /person/day for all areas is around 4.4 trip legs.
- SUAs have the highest mean amount of trip legs /person/day, with 4.7 trip legs.
- RAs have a mean trip leg distance of about 13 km per trip leg. This reflects the remoteness from origin to destination in rural areas.
- SUAs have the lowest time per trip leg (13.4 min) compared with other area types. This reflects less congestion than MUAs and shorter trip lengths than in RAs.

Table 4.1 Mean trip leg distance, trip leg time and amount of trip legs / person / day, categorised by area.

Area	Distance travelled / person / day (km)*	Trip legs / person / day	Time travelled / person / day (min)	Mean trip leg distance	Mean trip leg time (min)	Unweighted sample size (people)
All	35.6	4.4	67	9.7	15.3	12 698
MUA	32.1	4.5	69	8.7	15.4	7645
SUA	39.1	4.7	63	9.4	13.4	1189
RA	44.5	4.0	64	13.0	16.0	3864

* Only includes vehicle passenger, vehicle driver, bicycle and bus and taxi trip leg distances.

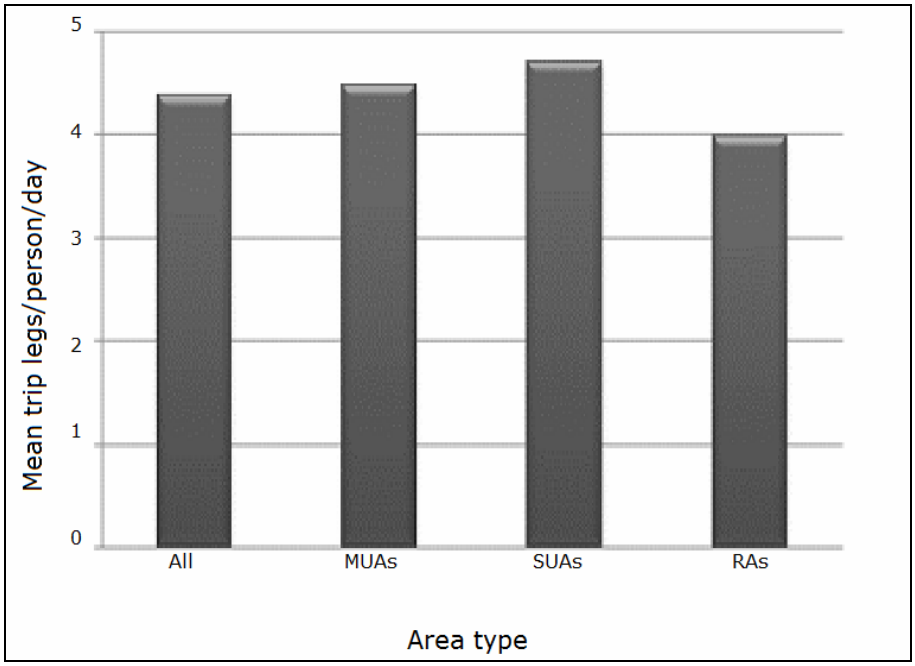

Figure 4.1 Mean trip legs / person / day, categorised by area.

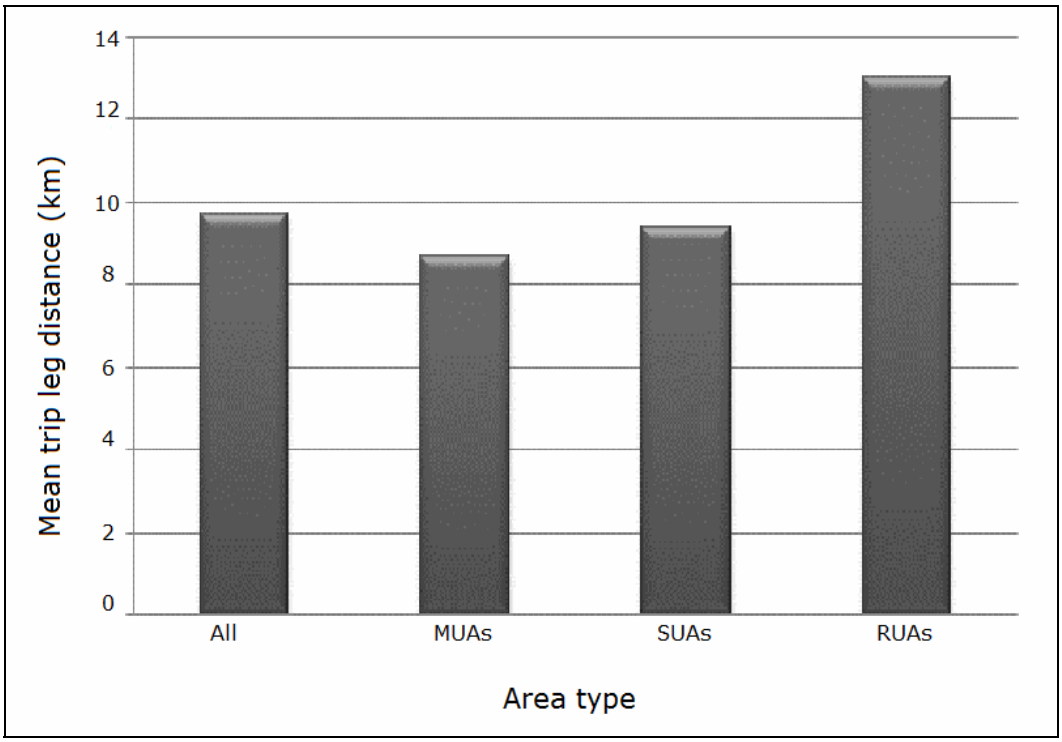

Figure 4.2 Mean trip leg distance, categorised by area.

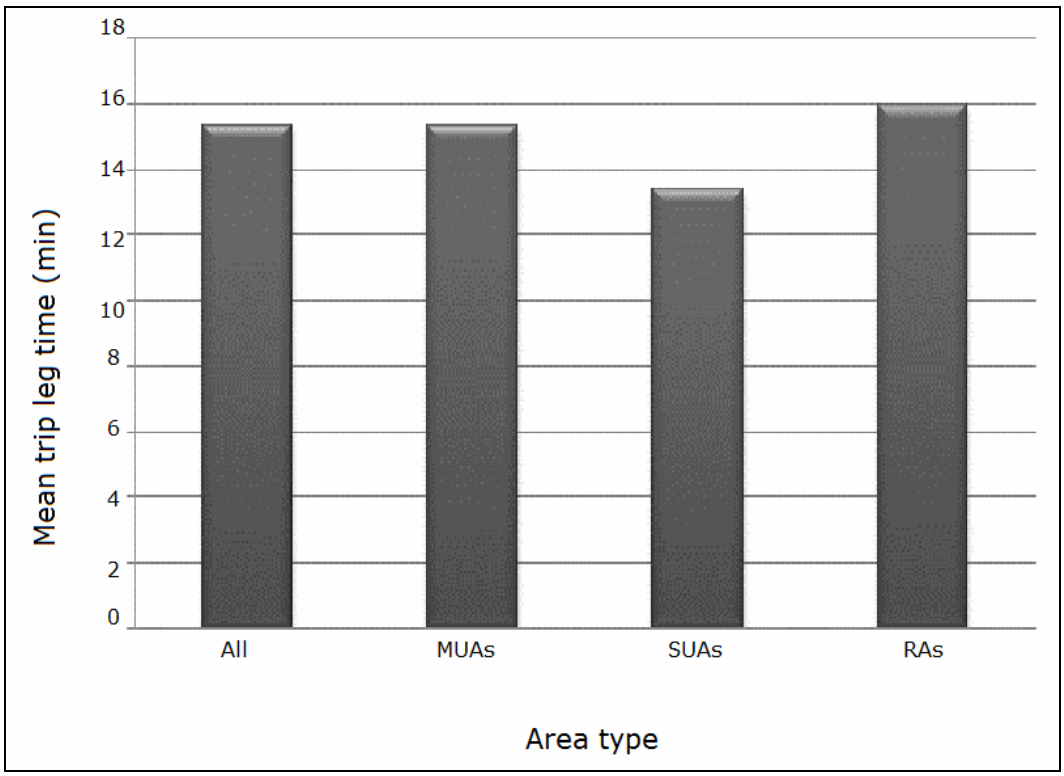

Figure 4.3 Mean trip leg time, categorised by area.

4.3 Proportion of trip legs taken by private and public modes

The proportions of trip legs made by modes, categorised by area, are presented in Table 4.2. The proportion of trip legs taken by selected private and public transport modes are illustrated in Figures 4.4 and 4.5, respectively. These show the selected mode as a proportion of total trip legs by all modes.

The analysis of the proportions of trip legs taken by selected private and public transport modes shows that:

- Travel mode as a 'vehicle driver' has the highest trip leg proportion, accounting for over 50% of all trip legs taken from 2003 to 2006 in all area types.
- The proportion of 'vehicle driver' trip legs in SUAs is 58%, which is relatively higher compared with 53% and 56% in MUAs and RAs, respectively.
- The proportion of walking trips legs in MUAs is 16%, which is relatively higher compared with 11% and 14% in SUAs and RAs, respectively.
- In terms of public modes, the proportion of trip legs made by bus in RAs is 2.9%, which is relatively higher compared with 2.4% and 0.8% in MUAs and SUAs, respectively. This is possibly because in SUAs and RAs, bus trip legs are more inter-town/regional, and probably reflects the high proportion of rural school children taking the bus to school.

Table 4.2 The proportions of trip legs made by modes, categorised by area.

Mode description	Trip leg proportion			
	All areas	MUAs	SUAs	RAs
Walk	15.5%	16.5%	11.3%	13.7%
Vehicle driver	54.1%	53.0%	58.5%	56.1%
Vehicle passenger	25.5%	25.5%	26.9%	24.9%
Bicycle	1.4%	1.2%	1.9%	1.8%
Bus	2.4%	2.4%	0.8%	2.9%
Train	0.3%	0.3%	0.1%	0.1%
Taxi	0.4%	0.5%	0.4%	0.2%
Other*	0.5%	0.6%	0.3%	0.4%
Total	100%	100%	100%	100%
Unweighted trip legs (all modes)	108 482	67 589	10 775	30 097

* The 'other' category may include trips by train, ferry, plane and mobility scooter, as well as trips which were classified as 'other' on the survey forms. These may include travel by boat, horse, electric wheelchairs etc.

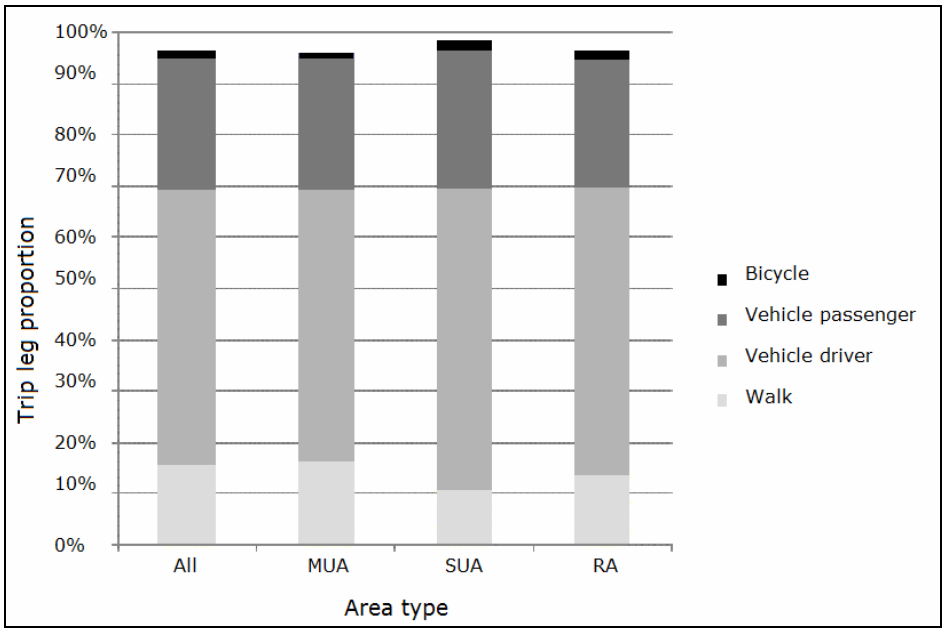

Figure 4.4 The proportions of trip legs made by private transport modes, categorised by area.

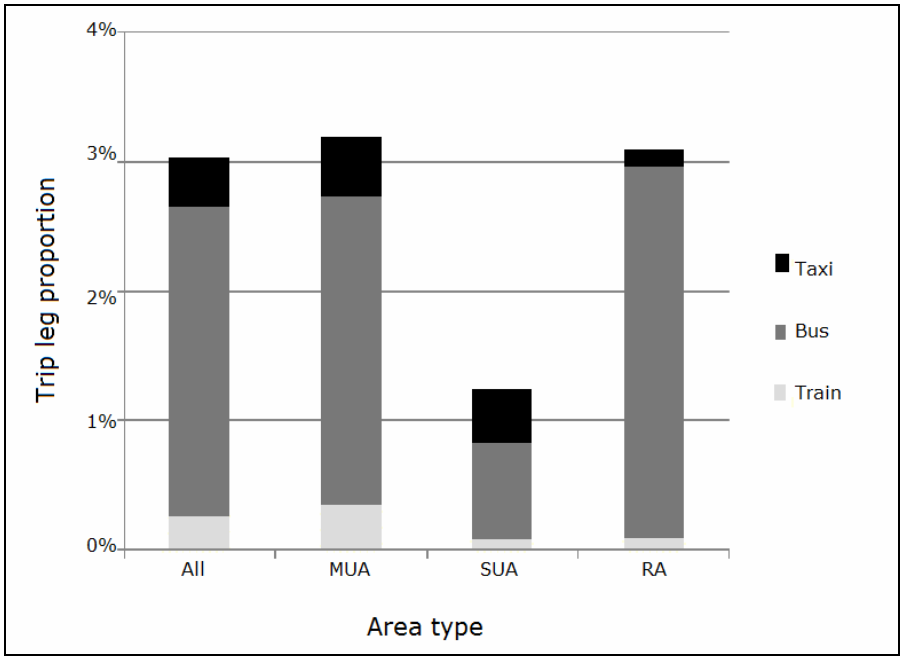

Figure 4.5 The proportions of trip legs made by public transport modes, categorised by area.

4.4 Summary

This chapter has provided details about how New Zealanders travel in different areas and regions. Highlights of the analysis by different area types and regions include:

- Overall, the mean number of trip legs /person/day for all areas is around 4.4 trip legs; and
- Trips where the mode was 'vehicle driver' have the highest trip leg proportion, accounting for over 50% of all trip legs taken on a national basis.

5. Travel mode

5.1 Introduction

This chapter provides details about how residents of New Zealand travelled using different transport modes between 2003 and 2006. It also shows the individual choice of travel mode by identifying different area types and days of the week. In addition, the number of trip legs made per person by members of different age groups and genders are also shown. It is noted that a trip leg is an arbitrary unit based on stops; not every trip leg represents a new purpose or opportunity for mode choice.

In all figures and tables, the category 'other' may include trips by train, ferry, plane and mobility scooter, as well as trips which were classified as 'other' on the survey forms (these may include travel by boat, horse, electric wheelchairs etc.).

5.2 Trip legs/person/day, mean distance and time by mode and area

The number of trip legs/person/day, total travelling time/person/day and the mean trip leg distance and duration, categorised by mode of travel and area, are presented in Table 5.1. The number of trip legs/person/day by mode and area are illustrated in Figure 5.1. Figure 5.2 shows the mean trip duration by mode and area, while Figure 5.3 shows the mean trip distance by mode and area.

The analysis of the number of trip legs/person/day and the mean trip leg distance, as categorised by the mode of travel, shows that:

- The number of trip legs/person/day made as a 'vehicle driver' is substantially higher compared with other travel modes. On average, an individual travels 2.4 trip legs per day as a vehicle driver nationally.
- The amount of trip legs/person/day made as a 'vehicle driver' and 'vehicle passenger' are 2.8 and 1.3 trip legs, respectively, in SUAs. This is a relatively higher number of trips than reported in other area types.
- Individuals in MUAs travel more trip legs by walking compared with other area types. On average, an individual travels 0.7 trip legs per day by walking in MUAs.
- RAs have the highest mean trip leg duration in all modes (16 minutes) compared with SUAs (13 minutes) and MUAs (15 minutes).
- Similarly, RAs have the highest mean trip leg duration and distance for 'vehicle driver' and 'vehicle passenger' compared with other area types.

Table 5.1 The number of trip legs/person/day, total travelling time/person/day and the mean trip leg distance and time, categorised by mode of travel and area

Mode description*	Unweighted trip legs	Trip legs/person/day by mode	Mean trip leg length (km)	Mean trip duration (min)	Total travelling time/day/person (min)
Area: All					
Walk	16 530	0.7	–	12	8.1
Vehicle driver	58 239	2.4	9.1	15	35.1
Vehicle passenger	28 384	1.1	11.2	17	18.5
Bicycle	1901	0.1	2.8	15	0.9
Bus	2200	0.1	11.7	27	2.9
Taxi	442	0.02	7.4	17	0.3
Other	786	0.03	-	196	1.4
All modes	108 482	4.4	9.7	15	67.2
Area: MUA					
Walk	11 066	0.7	–	12	9.0
Vehicle driver	35 326	2.4	8.1	15	35.4
Vehicle passenger	17 768	1.1	10.0	16	18.8
Bicycle	1065	0.1	3.0	16	0.9
Bus	1422	0.1	9.8	26	2.8
Taxi	353	0.02	7.5	17	0.3
Other	589	0.04	–	193	1.6
All modes	67 589	4.5	8.7	15	68.8
Area: SUA					
Walk	1374	0.5	–	13	6.9
Vehicle driver	6182	2.8	8.3	12	32.7
Vehicle passenger	2851	1.3	11.4	15	19.4
Bicycle	216	0.1	1.7	11	1.0
Bus	76	–	–	–	–
Taxi	42	–	–	–	–
Other	34	–	–	–	–
All modes	10 775	4.7	9.4	13	63.1
Area: RA					
Walk	4090	0.5	–	11	6.1
Vehicle driver	16 710	2.2	12.4	16	34.8
Vehicle passenger	7765	1.0	15.1	18	17.4
Bicycle	620	0.1	2.5	15	1.1
Bus	702	0.1	14.1	30	3.4
Taxi	47	–	–	–	–
Other	163	0.02	–	199	0.8
All modes	30097	4.0	11.2	16	63.6

* Estimates could not be made in categories where the number of trip legs sampled was less than 120.

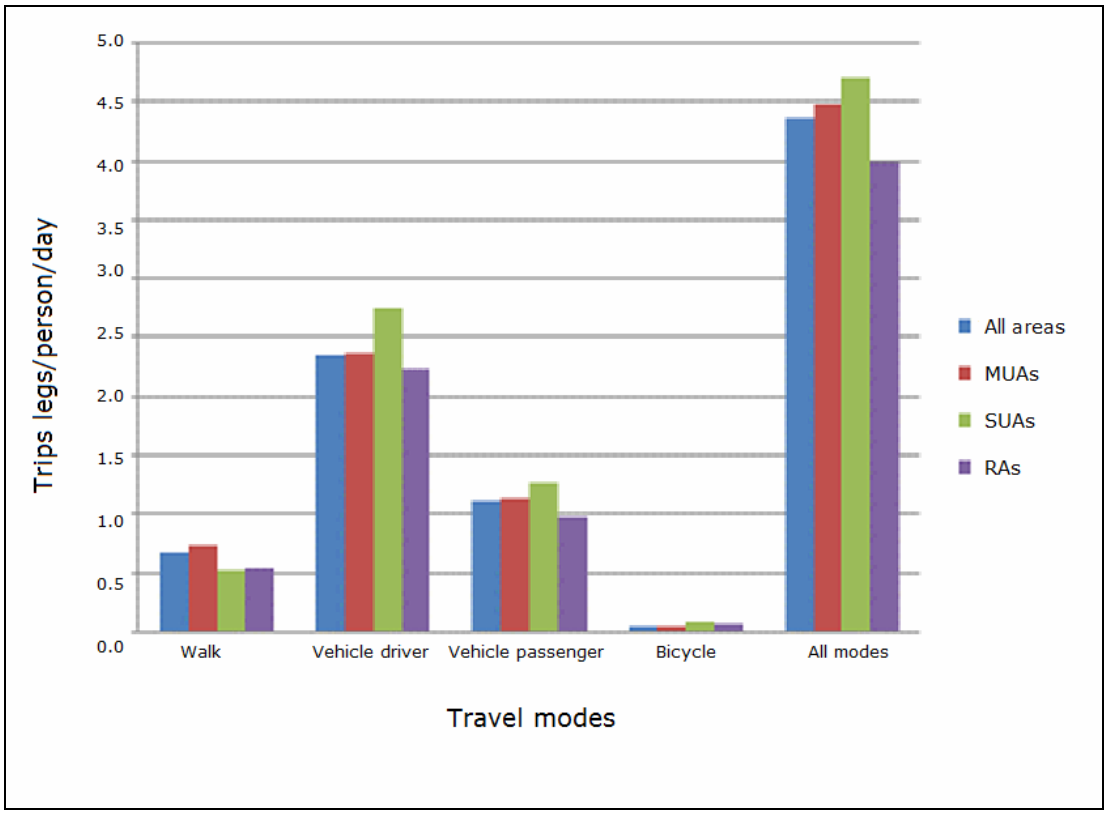

Figure 5.1 The mean number of trip legs / person / day, categorised by mode of travel and area.

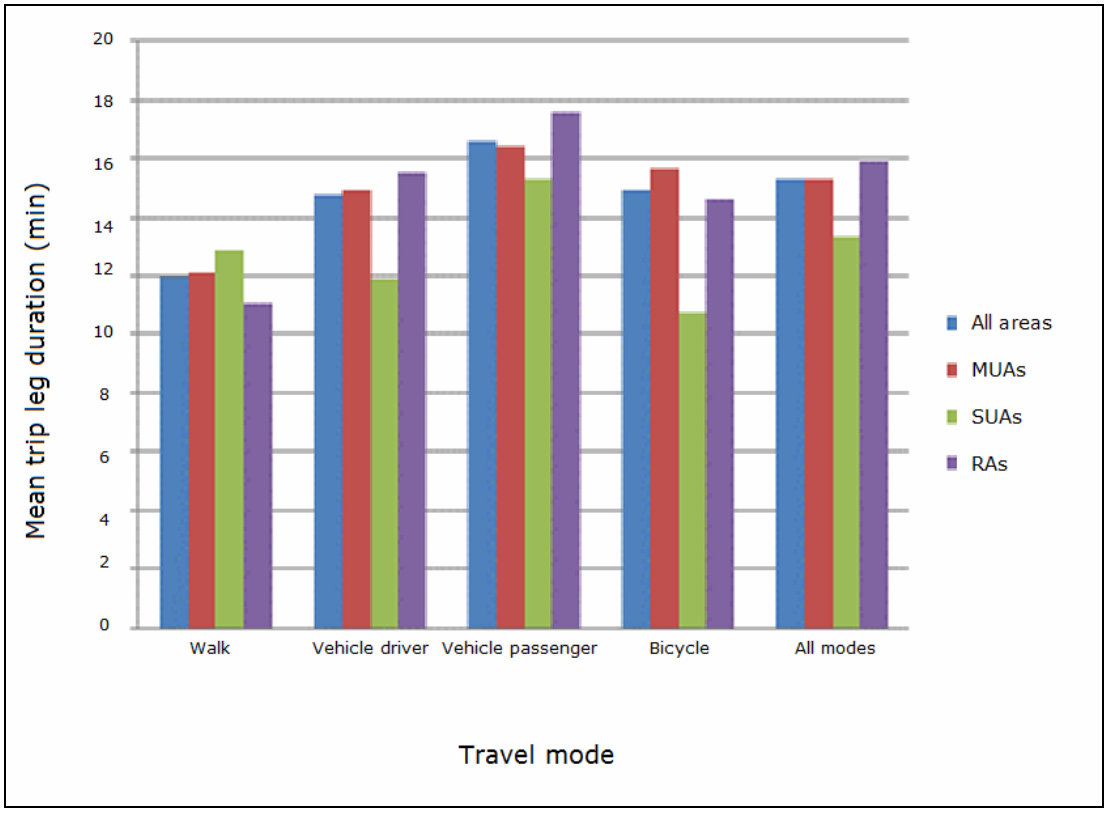

Figure 5.2 The mean trip leg duration, categorised by mode of travel and area.

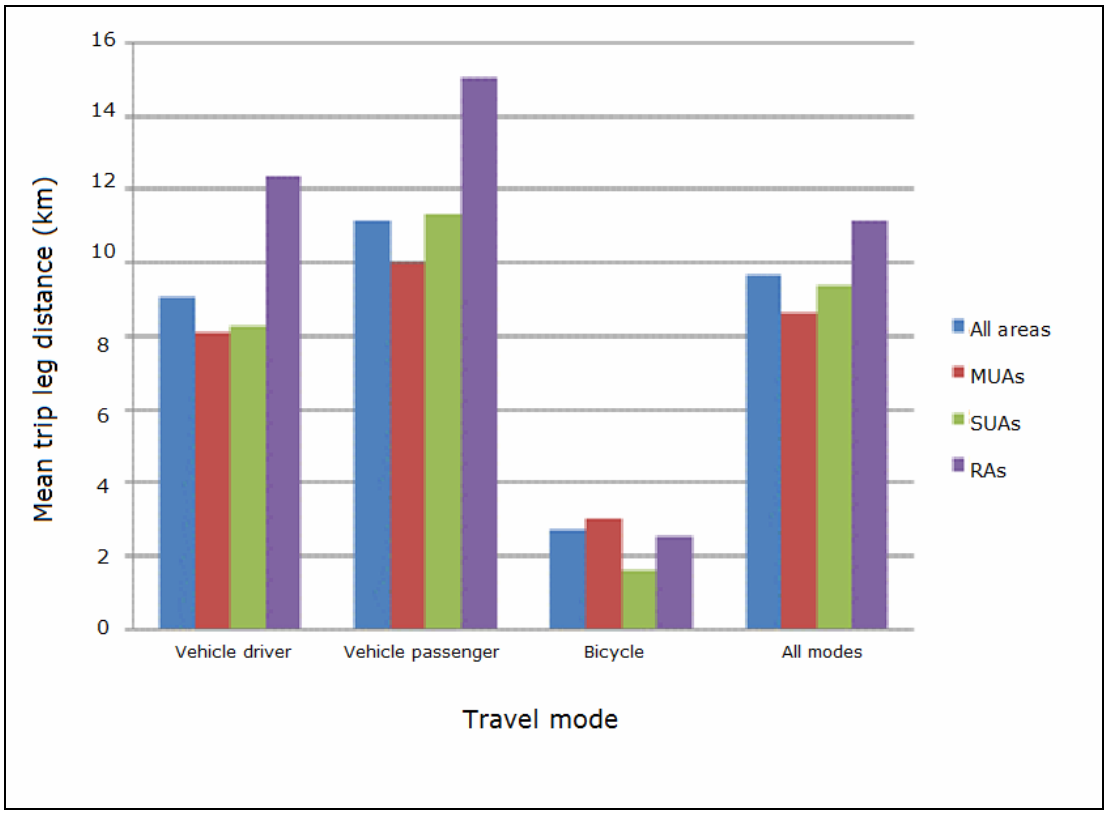

Figure 5.3 The mean trip leg distance, categorised by mode of travel and area.

5.3 Proportion of trip legs/person/day by age, gender and mode

The proportions of trip legs/person/day, as categorised by age, gender and mode of travel, are shown in Table 5.2. The numbers of trip legs/person/day are illustrated in Figure 5.4; Figure 5.5 shows the trip leg distance travelled per person per day.

The analysis of the travel profile between people of different age groups and genders shows that:

- The number of trip legs/person/day broadly increases from ages 5–9 until 40–49, after which, it begins decreasing. The distance travelled per person per day broadly increases from age 10–14 to 40–49 and then decreases above the age of 49.
- Up until the age of 50, females make more trip legs on average than males of the same age group. Beyond 50, males make more trip legs than females.
- Males travel 22% further than females, averaging 39 km per day compared with 32 km for females.
- Children aged 14 and under make over 50% of their trip legs as vehicle passengers, with the majority of the remainder of their trip legs being made on foot. Males and females 14 and under have the same vehicle passenger and walking mode use.

Table 5.2 The weighted proportions of trip legs/person/day, categorised by age, gender and mode of travel.

Mode	0–4	5–9	10–14	15–19	20–24	25–29	30–39	40–49	50–64	65+	All ages	All ages (Trip legs/ person/day)
All people												
Walk	12%	16%	26%	25%	20%	16%	13%	11%	13%	18%	16%	0.7
Vehicle driver	0%	0%	0%	30%	56%	60%	72%	75%	71%	59%	54%	2.4
Vehicle passenger	87%	76%	59%	35%	17%	19%	11%	11%	13%	20%	25%	1.1
Bicycle	0%	3%	7%	2%	0%	1%	1%	1%	1%	1%	1%	0.1
Bus	0%	4%	7%	6%	5%	2%	1%	1%	1%	1%	2%	0.1
Taxi	0%	0%	0%	1%	1%	1%	0%	0%	0%	1%	0%	0.02
Other	0%	1%	1%	2%	1%	1%	1%	1%	1%	1%	1%	0.03
All modes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	4.4
Distance travelled/day (km)*	26	25	25	27	35	37	41	49	45	22	36	
All trip legs (trip legs/ person/day)	3.3	3.4	3.7	3.9	4.6	4.7	4.9	5.2	5.0	3.4	4.4	
Unweighted sample size (people)	885	905	942	846	730	671	1781	1873	2169	1897	12699	
Males												
Walk	13%	14%	24%	22%	16%	15%	11%	9%	10%	17%	13%	0.6
Vehicle driver	0%	0%	0%	37%	65%	67%	79%	83%	81%	72%	61%	2.7
Vehicle passenger	86%	75%	58%	31%	14%	13%	6%	5%	6%	8%	20%	0.9
Bicycle	0%	4%	10%	3%	1%	1%	2%	1%	1%	1%	2%	0.1
Bus	0%	5%	7%	5%	3%	3%	1%	1%	1%	1%	2%	0.1
Taxi	0%	0%	-	1%	1%	1%	0%	0%	0%	0%	0%	0.02
Other	0%	1%	1%	2%	1%	1%	1%	1%	1%	0%	1%	0.04
All modes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	4.4
Distance travelled/day (km)	23	23	24	27	36	43	47	57	53	25	39	
All trip legs (trip legs/ person/day)	3.3	3.2	3.5	3.8	4.7	4.5	5.1	5.2	5.3	3.8	4.4	
Unweighted sample size (people)	444	462	479	434	347	304	823	905	1059	848	6105	
Females												
Walk	10%	18%	27.2%	27.4%	25%	18%	16%	13%	15%	20%	18%	0.8
Vehicle driver	0%	0%	0%	23%	46%	55%	65%	67%	61%	45%	47%	2.1
Vehicle passenger	89%	77%	61%	39%	21%	24%	16%	17%	20%	31%	31%	1.4
Bicycle	0%	1%	4%	1%	0%	1%	1%	1%	1%	0%	1%	0.04
Bus	0%	3%	8%	8%	7%	2%	1%	2%	1%	2%	3%	0.1
Taxi	0%	0%	0%	1%	1%	0%	0%	0%	0%	1%	0%	0.02
Other	0%	0%	1%	2%	1%	1%	0%	1%	1%	1%	1%	0.03
All Modes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	4.4
Distance travelled	30	27	25	29	33	32	36	43	37	20	32	
All trip legs (trip legs/ person/day)	3.2	3.5	3.8	4.1	4.6	4.8	4.8	5.2	4.8	3.1	4.4	
Unweighted sample size (people)	441	443	463	412	383	367	958	968	1110	1049	6594	

* Distance travelled per day only includes vehicle passenger, vehicle passenger, bicycle, bus and taxi trip leg distances.

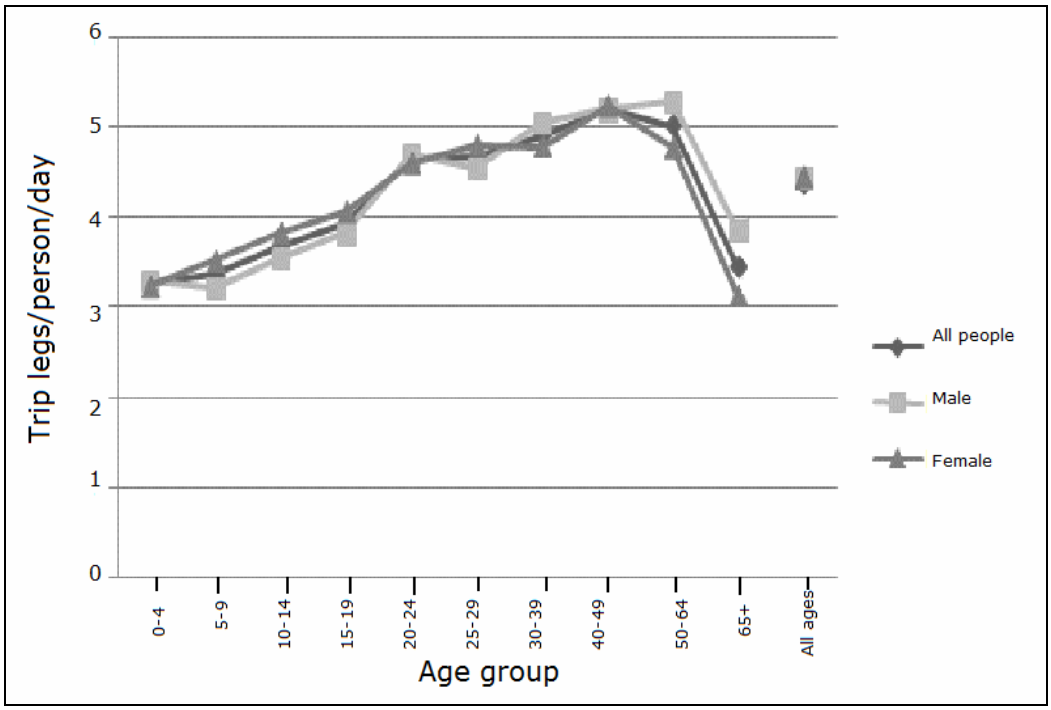

Figure 5.4 The number of trip legs / person / day, categorised by age group and gender.

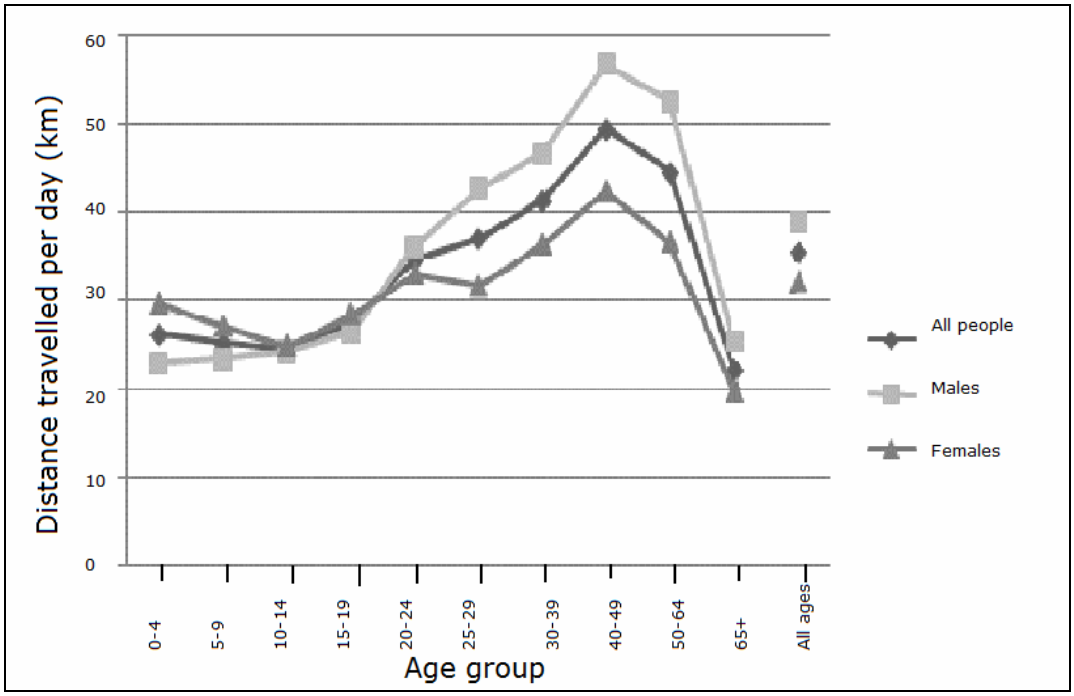

Figure 5.5 Distance travelled per person per day, categorised by age group and gender.

Analysis of the proportions of the mean amount of vehicle trip legs categorised by age and gender, as illustrated in Figure 5.6, shows that:

- On average, males make a higher proportion of their trip legs as vehicle drivers compared with females (61% as opposed to 47%). Linked to this, females make a higher proportion of their trip legs as a vehicle passenger compared with males (31% compared with 20%).
- The proportion of trip legs made as vehicle drivers increases with age to a peak of 83% among males in the 40–49 age group and 67% among females of the same age group. The peaks decline after this age group.
- The proportion of trip legs made as vehicle passengers decreases with age to a lowest proportion of 5% among males in the 40–49 age group and 16% among females in the 30–39 age group. The lowest trip leg proportion for all people as vehicle passengers occurs in the 40–49 age group.

It should be noted that the trip leg proportions of car drivers and passengers do not add to 100% as other modes make up the difference, and sometimes, vehicle drivers make trip legs without carrying passengers.

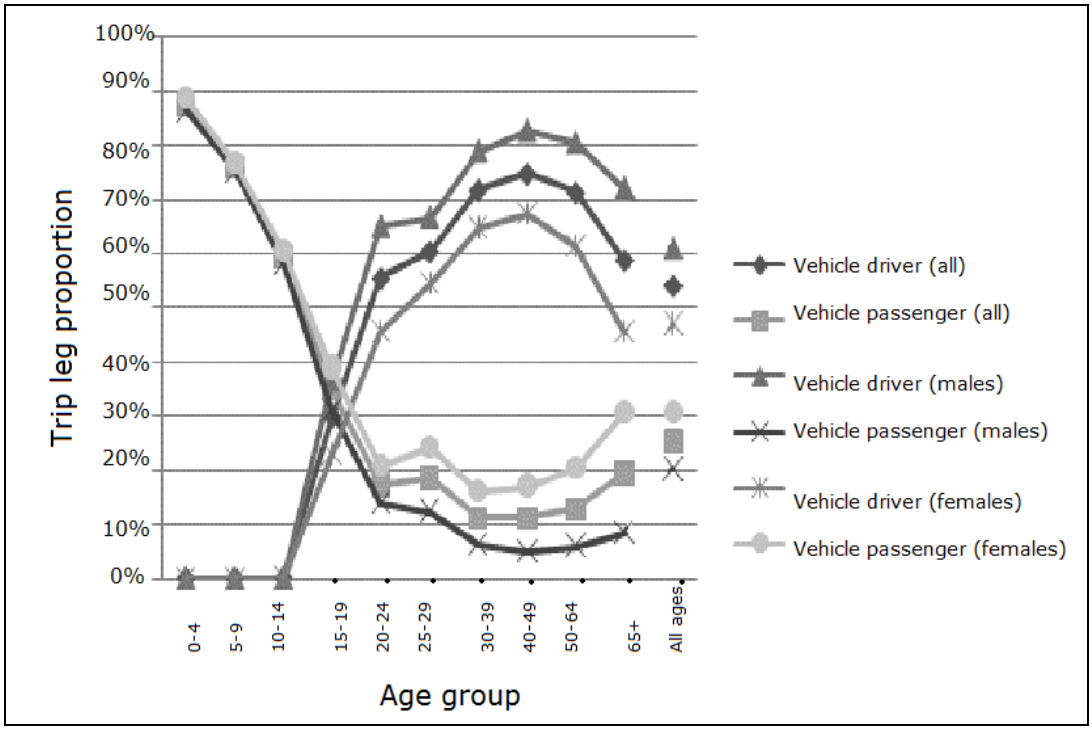

Figure 5.6 The proportion of the mean amount of vehicle trip legs, categorised by age and gender.

Figure 5.7 shows that with regards to walking trip legs:

- On average, females make higher proportion of their trip legs by walking compared with males (18% compared to 13%).
- The proportion of trip legs made by walking increases with age to a peak of 27% among females in the 15–19 age group and 24% among males in the 10–14age group. This trend declines after these age groups and then increases after the age of 40–49.

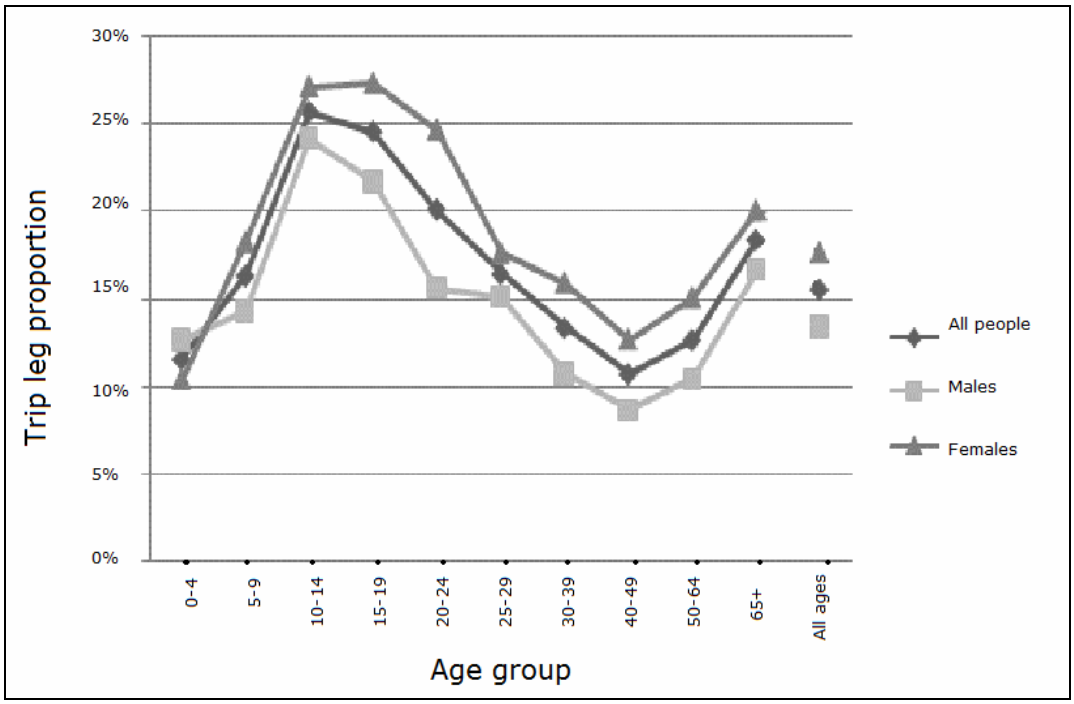

Figure 5.7 The proportion of walking trip legs, categorised by age and gender.

Figure 5.8 shows that with regards to cycling trip legs:

- On average, males make a higher proportion of their trip legs by cycling compared with females (2% compared to 1%).
- The proportion of trip legs made by cycling increases with age to a peak of 10% among males in the 10–14 age group and 4% among females in the same age group. This peak declines rapidly after these age groups and then fluctuates between 0.5% and 1.8% for both genders.

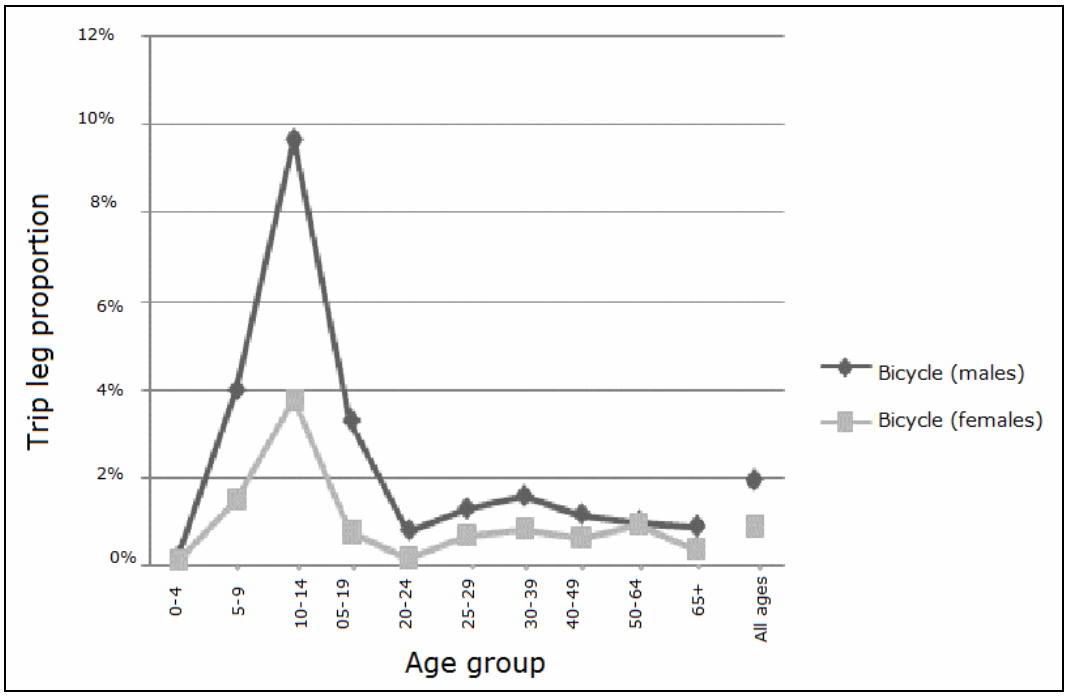

Figure 5.8 The proportion of cycling trip legs, categorised by age and gender.

Figure 5.9, which illustrates the proportion of trip legs made by bus, categorised by age and gender, shows that:

- On average, females make a higher proportion of their trip legs by bus (3%) compared with males (2%). This difference is minor, although it still shows that females are more likely to make a trip leg using the bus.
- The proportion of trip legs made by bus increases with age to a peak of around 8% among females in the 10–14 age group and 7% among males in the same age group. This declines rapidly after this age group (when the legal driving age is reached) and levels off below 2% after the 25–29 age group.

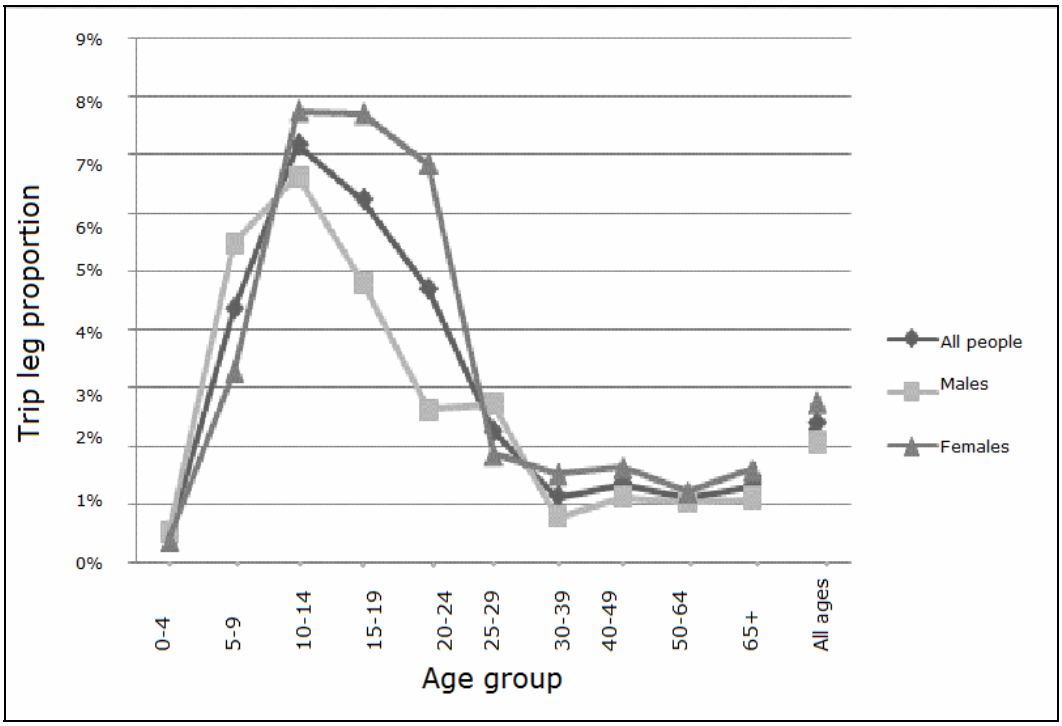

Figure 5.9 The proportion of public transport trip legs, categorised by age and gender.

5.4 Walking trip leg duration by age and gender

Walking trip leg duration/person/day, categorised by age and gender, is presented in Table 5.3 and illustrated in Figure 5.10. The surveys provide walking times but not walking distances so 'walking trip leg' distances are not recorded in this analysis.

The analysis of walking trip leg duration/person/day, categorised by age and gender, shows that:

- On average, females spend more time walking per day compared with males (9.2 minutes/person/day compared to 7.1 minutes/person/day).
- The walking trip leg duration /person/day increases with age to a peak of 17 minutes among females in the 15–19 age group and 11.8 minutes among males in the 10–14 age group. This trend declines after this age and then increases from the age of 50 onwards
- People aged 40–49 (males and females) walked for the shortest amount of time per person per day compared with other adult age groups (i.e. those over the legal driving age of 16).

Table 5.3 Walking trip leg duration / person / day, categorised by age and gender.

Age group	Unweighted sample size (people)	Walking duration / person / day (min)
All people		
0–4	885	4.5
5–9	905	6.0
10–14	942	12.1
15–19	846	13.9
20–24	730	10.6
25–29	671	8.4
30–39	1781	7.5
40–49	1873	6.1
50–64	2169	7.3
65+	1897	8.2
All	12 699	8.1
Males		
0–4	444	4.8
5–9	462	5.1
10–14	479	11.8
15–19	434	11.1
20–24	347	8.7
25–29	304	7.3
30–39	823	5.7
40–49	905	4.6
50–64	1059	6.3
65+	848	8.6
All	6105	7.1
Females		
0–4	441	4.2
5–9	443	6.9
10–14	463	12.5
15–19	412	17.0
20–24	383	12.5
25–29	367	9.5
30–39	958	9.1
40–49	968	7.6
50–64	1110	8.3
65+	1049	8.0
All	6594	9.2

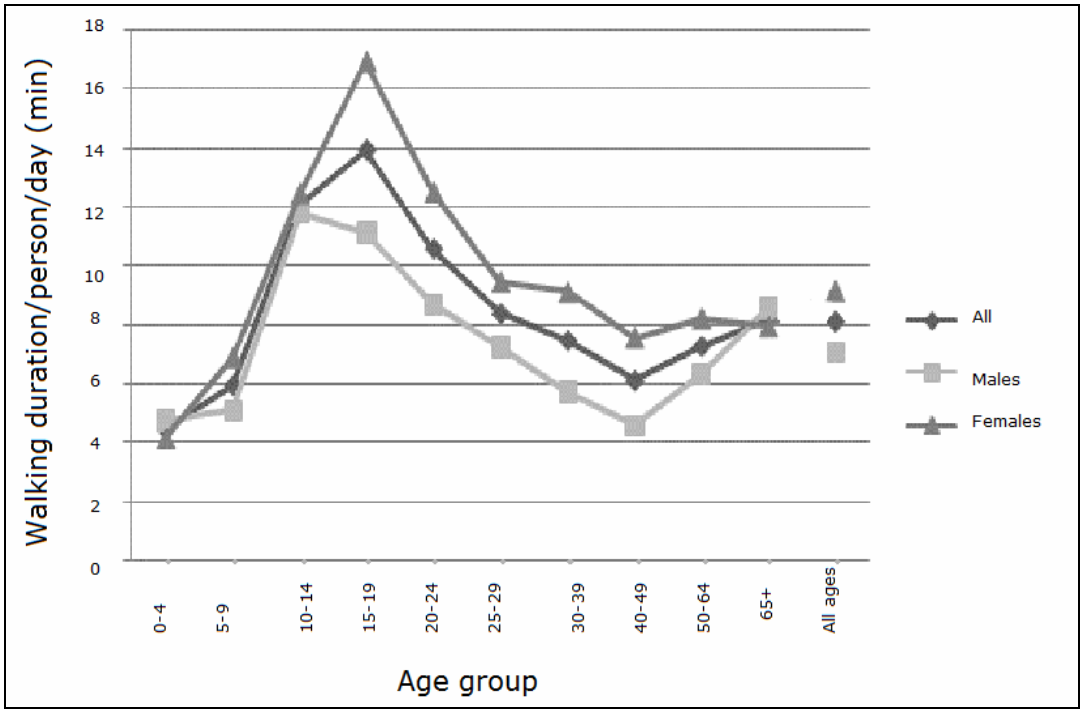

Figure 5.9 Walking trip leg duration / person / day, categorised by age and gender.

5.5 Comparing the proportion of trip legs by modes on weekday and weekends

The proportions of trip legs categorised by travel mode on weekdays and weekends are presented in Table 5.4 and illustrated in Figure 5.11. The trip legs that were undertaken from midnight Friday to midnight Sunday (i.e. 0000h Saturday to 2359h Sunday) were recorded as 'weekend' travel.

The analysis of weekend trip legs/person/day, categorised by modes of transport, shows that:

- The proportion of trip legs made as a vehicle driver is relatively higher on weekdays compared with weekends (56% compared to 49%).
- On the other hand, the proportion of trip legs /person/day made as a vehicle passenger is relatively higher on the weekends compared with weekdays (36% compared to 22%).
- The proportion of walking, cycling and bussing trip legs are relatively higher on weekdays compared with weekends.

Table 5.4 The proportion of trip legs, categorised by mode, on weekdays and weekends.

Mode	Proportion of trips	
	Weekdays	Weekends
Walk	17%	12%
Vehicle driver	56%	49%
Vehicle passenger	22%	36%
Bicycle	2%	1%
Bus	3%	1%
Taxi	0.3%	1%
Other	1%	1%
All modes	100%	100%
Number of trip legs (unweighted)	80 188	28 294

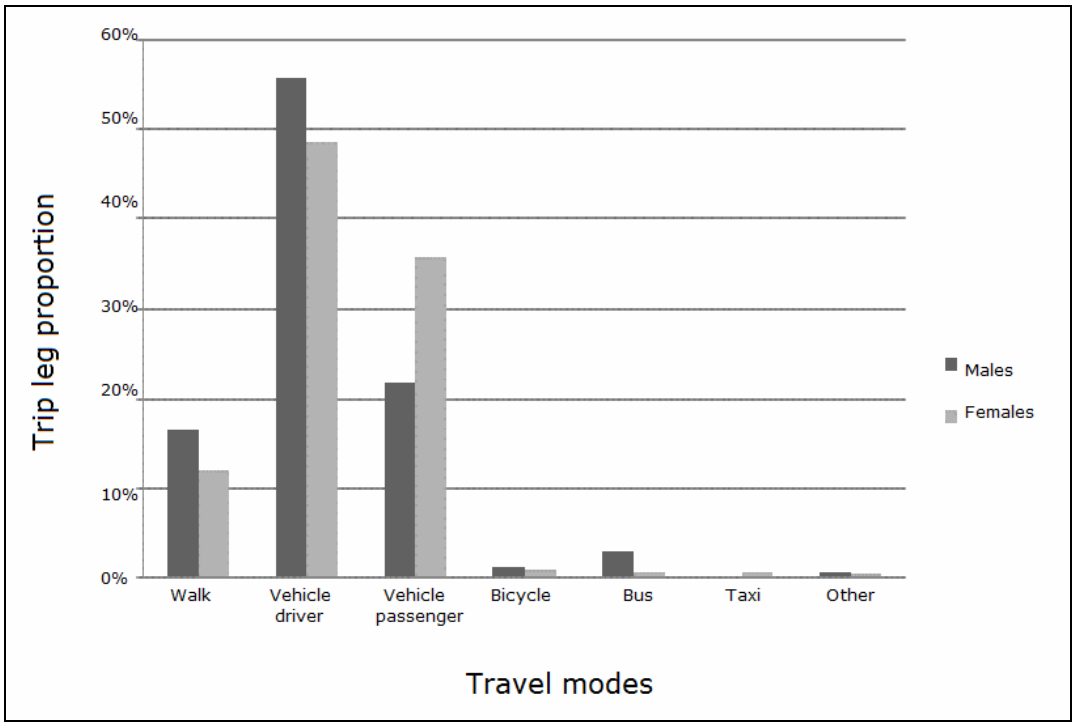

Figure 5.11 The proportion of trip legs by mode on weekdays and weekends.

5.6 Walking duration by purpose in MUAs

The 85th percentile, 15th percentile and mean walking duration by purpose in MUA for all trip leg arrivals and for home-based trip leg arrivals are presented in Table 5.5 and illustrated in Figure 5.12. Walking trip legs from all the trip leg arrivals include trip legs that may not be home-based, such as arrivals from 'work – main job', 'social/recreation' or 'medical/dental'. Home-based walking trip leg durations are calculated using the first trip leg that the individuals make at the start of the day leaving home. Those trip legs made by people who returned home at some point and then went out again have not been included in this analysis.

It is important to point out that respondents were prompted to include all walking trip legs of 100 m or more along a public road or footpath, or where a road was crossed. In practice, it is likely that very short trip legs might tend to be under-reported. Trip legs from a car park to work were eligible for the survey if they met these criteria. Interviewers were trained to probe for this information.

The analysis of walking trip leg durations, categorised by purpose for home-based arrivals in MUAs, shows that:

- Recreational trip legs have the highest mean walking duration. On average, an individual will walk 17 minutes for all recreational trip leg arrivals, and 18 minutes for home-based recreational arrivals.
- Trip legs made to 'change mode' have the lowest mean walking duration (8 minutes).
- The 'work (HB)' category has a higher walking trip leg duration (16 min) compared with trip leg purpose by 'work'. This is because trip leg purpose by 'work' includes other short walking distance trip legs such as walking from the bus stop or a stop to work. This therefore reduces the mean for 'work' walking trip leg duration.

Table 5.5 Walking trip leg duration by purpose in MUAs.

Trip leg purpose	Unweighted sample size (trip legs)	Walking trip leg duration (min)		
		15th %ile	Mean	85th %ile
Change mode	1518	2	8	10
Change mode (HB[a])	332	2	6	10
Work[b]	1209	2	9	15
Work (HB)	151	5	16	30
Shopping	1462	2	10	16
Shopping (HB)	283	5	12	20
Accompany someone else	528	2	11	20
Accompany someone else (HB)	146	5	12	21
Personal business/services	462	2	11	15
Personal business/services (HB) [c]	83	–	–	–
Social visits	1166	3	11	20
Social visits (HB)	144	3	16	30
Education	679	4	14	21
Education (HB)	352	5	16	25
Home	2862	4	15	25
Recreational	370	5	17	30
Recreational (HB)	339	5	18	30

a HB indicates a home-based arrival.

b 'work' includes trip legs for 'work – main job', 'work – other job' and 'work – employer's business'.

c Estimates for 'personal business and services (HB)' cannot be made because the number of trips legs sampled was less than 120.

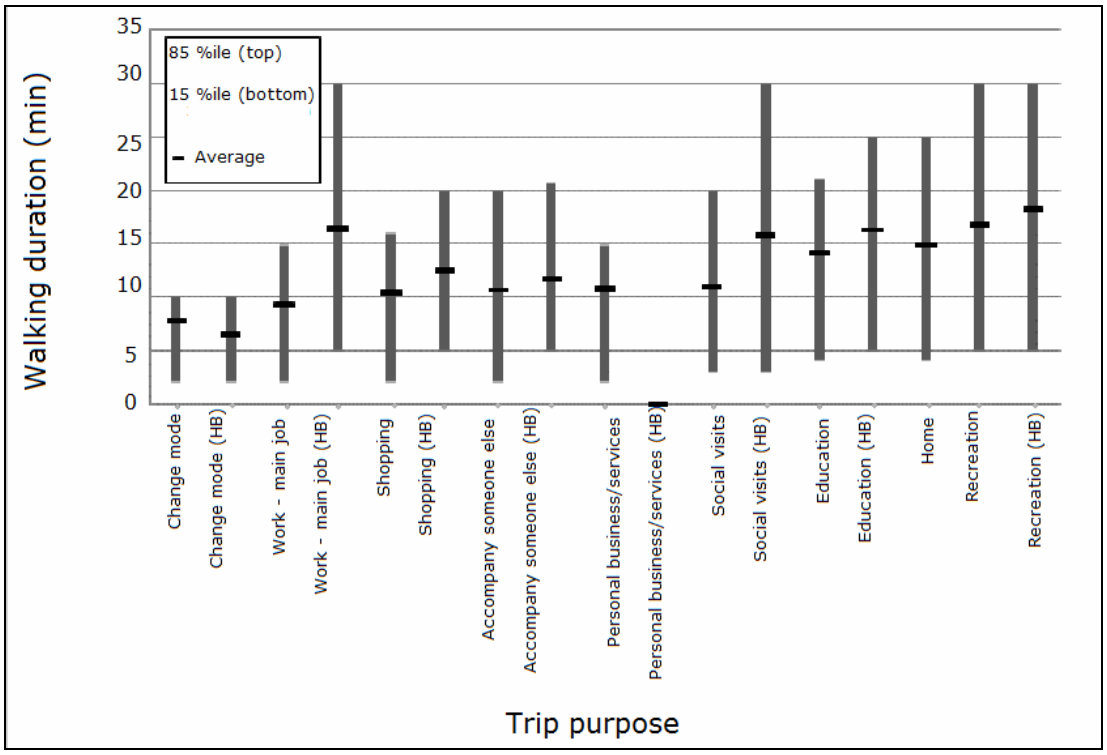

Figure 5.12 Walking trip leg duration by purpose in MUAs.*

* Estimates for 'personal business and services (HB)' cannot be made because the number of trips legs sampled was less than 120.

5.7 Cycle duration by purpose in MUAs

The 85th percentile, 15th percentile and mean cycling duration by purpose in MUAs for 'home' and 'work' trip leg arrivals are presented in Table 5.6. It is noted that cycling duration by other trip leg purposes apart from 'home' and 'work' cannot be made because the number of trip legs for those purposes was less than 120.

Table 5.6 shows that, on average, a person takes about 14 minutes to cycle to work in MUAs. The mean cycling duration arriving home from all origins is about 16 minutes.

Table 5.6 Cycling trip leg duration by purpose in MUAs.

Trip leg purpose	Unweighted sample size (trip legs)	Duration (min)		
		15th %ile	Mean	85th %ile
Home	386	5	16	25
Work*	263	4	14	23

* 'Work' includes trip legs for 'work – main job', 'work – other job' and 'work – employer's business'.

5.8 Summary

Table 5.7 shows the proportion of trip legs by mode of travel for the whole country. Some other key conclusions include:

- Individuals make approximately 80% of all trip legs per person per day as vehicle drivers and vehicle passengers. Nationally, these amount to an average of 3.5 trip legs per person per day.
- Individuals in the 40–49 age group make more trip legs as vehicle drivers per day than any other age group.
- The use of public transport rises steeply for males and females from 5–14 years, reaching over 7 % of all trip legs. Then males' public transport usage reduces rapidly, while females continue high use of public transport until the age of 25–29.
- Trip legs made as a vehicle driver continue to make up the highest proportion of personal trip legs among all the travel modes on both weekdays (56%) and weekends (49%).
- On average, females spend more time walking per day compared with males (9.2 minutes v. 7.1 minutes).
- On average, trip legs made for the purpose of recreation in MUAs with home-based trip leg arrivals have the highest walking duration of 18 minutes per trip leg.
- On average, a person takes about 14 minutes to cycle to work in a MUA.

Table 5.7 National proportions of trip legs by selected mode.

Mode description	Trip leg proportion
Walk	15.5%
Vehicle driver	54.1%
Vehicle passenger	25.5%
Bicycle	1.4%
Bus	2.4%
Other*	0.9%

* The 'other' category may include trip legs made by trains, ferries, planes, taxis and mobility scooters, as well as trips which were classified as 'other' on the survey forms (these may include travel by boat, horse, electric wheelchairs etc.).

6. Travel purpose

6.1 Introduction

Each trip leg has a trip leg purpose. The trip leg purpose definitions are described in Chapter 2.7.2 and they are contained in the 'TR14' database provided from the NZHTS. The trip leg purposes provide details of what activity is done at a trip leg destination. This section provides details of travel purposes for all modes, excluding walking. The analysis shows the mean trip leg distance and duration, categorised by different purposes. It also shows the proportion of trip legs per person by age group, gender and purpose. The proportion of trip legs, defined by purpose, on weekdays and weekends are also illustrated in this chapter.

6.2 Trip legs and total distance / person / day by purpose

The number of trip legs and total distance travelled per person per day by trip purpose are shown in Table 6.1. Only trip legs made by vehicle drivers, vehicle passengers, bicycle, bus and taxi are considered when considering distance. This analysis shows that:

- Using the trip leg definitions provided, the proportion of trip legs/person/day to home is the most prevalent (35%).
- Trip legs made for 'work – main job' or 'shopping' are the second and third most prevalent personal travel trip legs, accounting for 15% and 14%, respectively, of the trip legs made per day.
- On average, an individual travels 11.7 kilometres per day to home, which accounts for 37% of his/her total distance travelled per day.
- On the other hand, travel for 'work – main job' and 'recreation' account for the second and the third highest proportions of daily distance, at 16% and 14%, respectively.

Table 6.1 Number of trip legs and distance / person / day, categorised by trip purpose*.

Purpose	Trip legs / person / day	Trip legs / person / day (%)	Kilometres / person / day	Kilometres / person / day (%)
Home	1.4	35%	11.7	37%
Work – main job	0.6	15%	5.2	16%
Work – other job	0.02	0.5%	0.2	0.5%
Work – employer's business	0.1	2%	1.0	3%
Education	0.2	4%	0.8	2%
Shopping	0.5	14%	3.3	10%
Personal business/services	0.01	0%	0.0	0%
Medical/dental	0.2	6%	1.6	5%
Social visits	0.03	1%	0.2	1%
Recreational	0.5	12%	4.6	14%
Change mode	0.2	6%	2.6	8%
Accompany someone else	0.2	5%	0.8	3%
Total	3	100%	32.0	100%

* Unweighted sample size (people) = 12 698.

6.3 Mean distance and time by purpose

The mean trip leg distance and trip leg time, categorised by trip leg purpose, are shown in Table 6.2, and illustrated in Figures 6.1 and 6.2.

The analysis of the mean trip leg distance and trip leg time, categorised by trip leg purpose, shows that:

- 'Work – employer's business' has the highest trip leg distance (10.7 km), followed by 'recreation' (10.5 km) and 'social visits' (9.8 km).
- Recreational trip legs have the highest mean trip leg time (19.9 minutes), followed by 'work – employer's business' (19.2 minutes) and 'social visits' (16.4 minutes).
-

Table 6.2 Mean trip leg distances and trip leg time, categorised by trip leg purpose.

Trip leg purpose	Mean trip leg distance (km)	Mean trip leg time (min)
Home	8.5	15.6
Work – main job	9.0	15.5
Work – other job	7.6	14.2
Work – employer's business	10.7	19.2
Education	4.7	14.9
Shopping	6.1	12.4
Personal business/services	7.2	14.0
Medical/dental	6.5	13.8
Social visits	9.8	16.4
Recreational	10.5	19.9
Change mode	4.3	16.3
Accompany someone else	8.1	13.9
All purposes	8.1	15.3

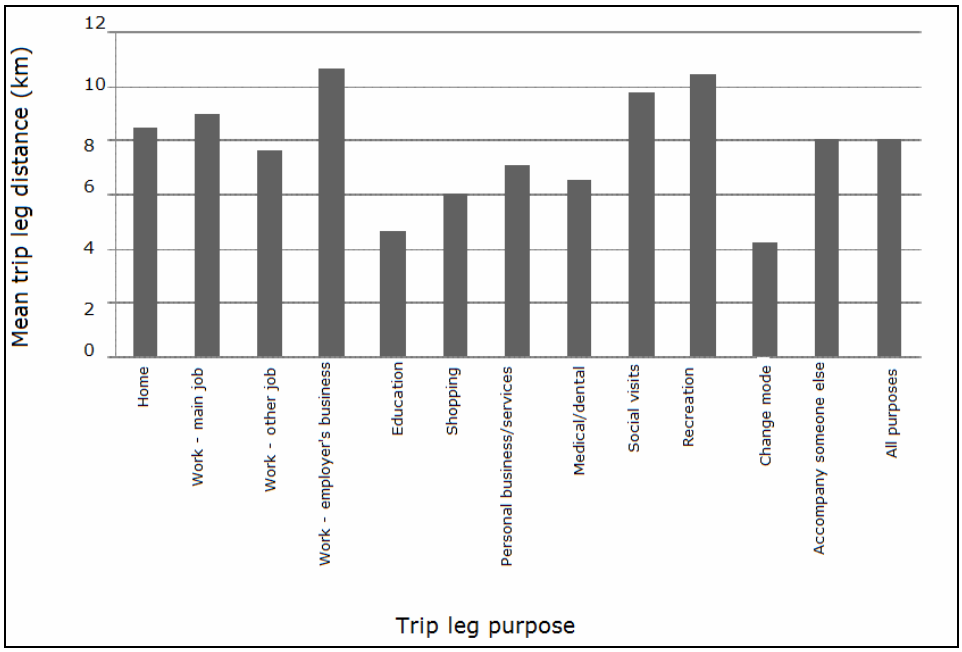

Figure 6.1 Mean trip leg distance, categorised by trip leg purpose.

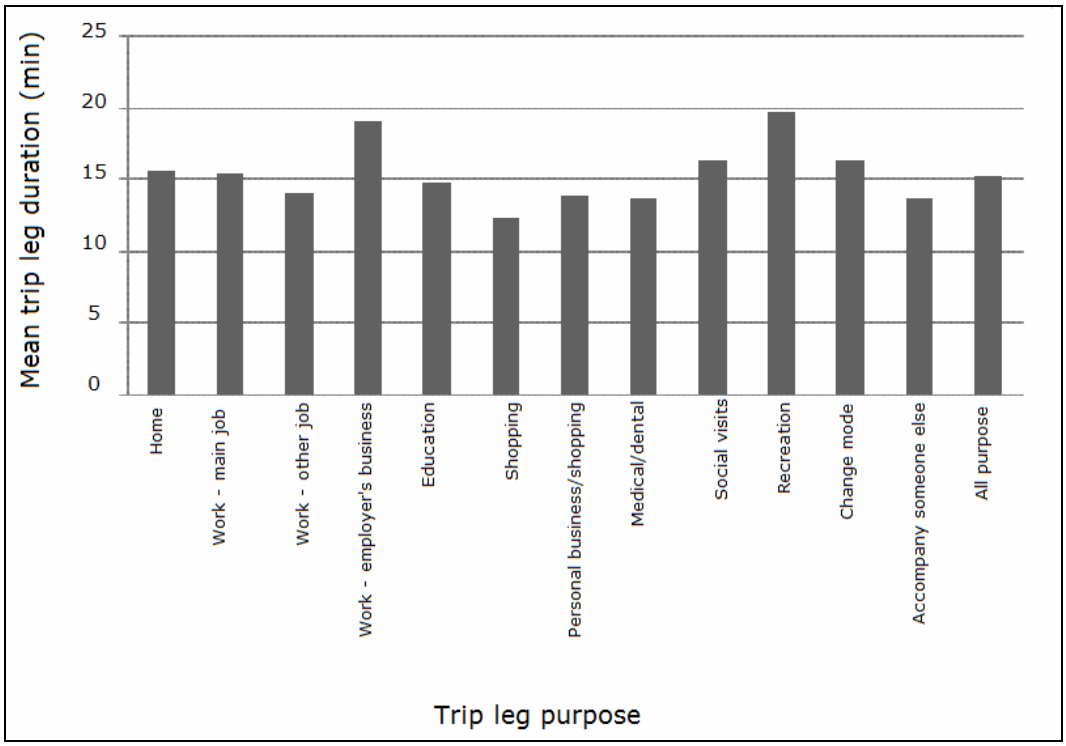

Figure 6.2 Mean trip leg duration, categorised by trip leg purpose.

6.4 Proportion of trip legs/person/day by age, gender and purpose

The proportions of trip legs/person/day, categorised by age, gender and trip leg purpose, are shown in Tables 6.3–6.5. Analysing these statistics shows the following:

- Overall, males make slightly more trip legs than females (4.4 trip legs/person/day v. 4.3). On average, males make 0.4 and 0.05 more trip legs/person/day for the purposes of 'work – main job' or 'work – employer's business', although females make 0.1 more shopping trip legs /person/day than males.
- Trip legs made to 'accompany someone else' make up the highest proportion of trip legs for those in the 0–4 age group, accounting for 43% of all trip legs.
- Education was the second most frequent trip leg purpose for those in the 10–14 age group, with a proportion of 16%.
- The relative importance of 'work – main job' trip legs increases with age. Among people aged 50–64, 20% of trip legs are for the purpose of 'work – main job'.
- The proportion of shopping trip legs also increases with age. Shopping trip legs account for the second highest proportion of trip legs for those in the 65+ age group.

Table 6.3 Proportions of trip legs/person/day, categorised by age and trip leg purpose for all people*.

Trip leg purpose	Age bracket											All trip legs (trip legs/ person/day)
	0–4	5–9	10–14	15–19	20–24	25–29	30–39	40–49	50–64	65+	All ages	
Home	35%	34%	35%	32%	29%	31%	31%	30%	30%	35%	31%	1.4
Work – main job	0%	0.1%	1%	6%	15%	17%	18%	20%	20%	4%	13%	0.6
Work – other job	0%	0.1%	0%	1%	1%	0%	0%	1%	1%	0%	0%	0.02
Work – employer's business	0%	0%	0%	1%	4%	2%	3%	3%	3%	0%	2%	0.1
Education	4%	17%	16%	12%	5%	2%	1%	1%	1%	0%	4%	0.2
Shopping	2%	4%	6%	11%	11%	13%	14%	13%	14%	20%	12%	0.5
Personal business/services	1%	1%	2%	3%	4%	5%	6%	6%	7%	9%	5%	0.2
Medical/dental	1%	0%	0%	1%	0%	1%	1%	1%	1%	2%	1%	0.03
Social visits	10%	10%	10%	14%	14%	12%	10%	9%	10%	13%	11%	0.5
Recreational	4%	7%	9%	6%	4%	5%	5%	5%	6%	8%	6%	0.2
Change mode	1%	4%	6%	7%	7%	6%	4%	4%	4%	4%	4%	0.2
Accompany someone else	43%	22%	14%	6%	6%	7%	8%	8%	4%	4%	10%	0.4
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	4.4
Unweighted sample size (people)	885	905	942	846	730	671	1781	1873	2169	1897	12 699	

* Where the number of trip legs in the sample was less than 120, the accuracy of the estimates may be unreliable.

Table 6.4 Proportions of trip legs/person/day, as categorised by age and trip leg purpose for males*.

Trip leg purpose	Age bracket											All trips (trip legs/ person/day)
	0–4	5–9	10–14	15–19	20–24	25–29	30–39	40–49	50–64	65+	All Ages	
Home	35%	35%	35%	33%	28%	29%	30%	29%	30%	36%	31%	1.4
Work – main job	0%	0%	2%	7%	19%	23%	25%	27%	25%	5%	17%	0.8
Work – other job	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%	0%	0.02
Work – employer's business	0%	0%	0%	1%	7%	2%	5%	4%	4%	1%	3%	0.1
Education	4%	16%	16%	13%	3%	3%	1%	0%	0%	0%	4%	0.2
Shopping	2%	3%	6%	9%	10%	10%	12%	10%	12%	18%	10%	0.5
Personal business/services	1%	1%	2%	3%	4%	4%	5%	5%	7%	10%	5%	0.2
Medical/dental	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	1%	0.03
Social visits	10%	10%	10%	15%	14%	12%	8%	8%	8%	11%	10%	0.4
Recreational	4%	7%	9%	6%	5%	5%	5%	5%	5%	8%	6%	0.3
Change mode	1%	5%	5%	7%	5%	5%	4%	4%	4%	3%	4%	0.2
Accompany someone else	42%	22%	15%	5%	5%	7%	5%	6%	4%	4%	8%	0.4
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	4.4
Unweighted sample size (people)	444	462	479	434	347	304	823	905	1059	848	6105	

* Where the number of trip legs in the sample was less than 120, the accuracy of the estimates may be unreliable.

Table 6.5 Proportions of trip legs/person/day, as categorised by age and trip leg purpose for females*.

Trip Leg Purpose												All trips (trip legs/ person/day)
	0–4	5–9	10–14	15–19	20–24	25–29	30–39	40–49	50–64	65+	All Ages	
Home	34%	34%	34%	33%	29%	32%	32%	31%	31%	33%	32%	1.4
Work – main job	0%	0%	1%	7%	11%	12%	11%	13%	14%	2%	9%	0.4
Work – other job	0%	0%	0%	0%	1%	0%	0%	1%	1%	0%	0%	0.02
Work – employers' business	0%	0%	0%	1%	0%	2%	2%	2%	2%	0%	1%	0.05
Education	3%	17%	16%	13%	7%	1%	2%	1%	1%	0%	4%	0.2
Shopping	2%	4%	7%	9%	13%	16%	15%	16%	18%	22%	14%	0.6
Personal business/services	0%	1%	2%	3%	4%	5%	7%	7%	8%	9%	6%	0.2
Medical/dental	1%	0%	0%	0%	1%	1%	1%	1%	1%	2%	1%	0.04
Social visits	10%	9%	10%	15%	15%	13%	11%	10%	12%	15%	12%	0.5
Recreational	4%	7%	9%	6%	3%	5%	5%	6%	6%	7%	6%	0.2
Change mode	1%	3%	7%	7%	10%	6%	4%	4%	4%	5%	5%	0.2
Accompany someone else	45%	23%	13%	5%	6%	7%	11%	10%	5%	5%	11%	0.5
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	4.3
Unweighted sample size (people)	441	443	463.	412	383	367	958	968	1110	1049	6594	

* Where the number of trip legs in the sample was less than 120, the accuracy of the estimates may be unreliable.

The proportions of trip legs/person/day categorised by different work purposes are illustrated in Figure 6.3. The figure shows that:

- On average, males make a higher proportion of 'work – main job' and 'work – employer's business' trip legs than females, showing proportions of 17% and 3%, compared with females (9% and 1%, respectively).
- The proportion of trip legs made for the purpose of 'work – main job' increases with age to a peak of 27% among males in the 40–49 age group and 14% among females in the 50–64 age group. The peaks then decline rapidly in line with the increase of those going into retirement beyond 64 years.

Figure 6.3 The proportion of trip legs/person/day, categorised by different work purposes.

The proportions of trip legs/person/day made for the purpose of shopping are illustrated in Figure 6.4.

The analysis of the proportion of trip legs/person/day made for the purpose of shopping shows that:

- On average, females have higher shopping trip leg proportions compared with males (14% compared to 10%).
- The shopping trip leg proportion increases with age to a peak of 18% among males in the 65+ age group and 22% among females in the same age group.

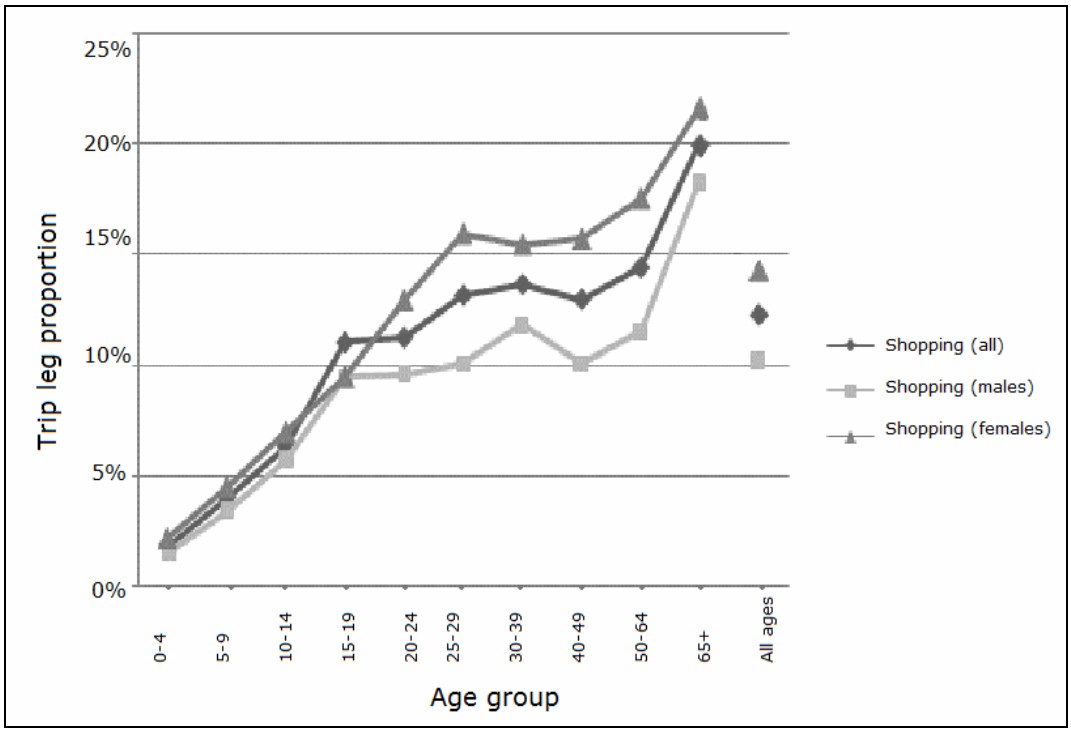

Figure 6.4 The proportion of shopping trip legs/person/day, categorised by gender.

The proportions of social visit trip legs/person/day are illustrated in Figure 6.5.

The analysis of the proportion of social visit trip legs/person/day shows that:

- On average, females have a higher proportion of 'social visit' trip legs compared with males (12% compared to 10%).
- The proportion of the number of trip legs for a 'social visit' increases with age to a peak of 16% among males and females in the 15–19 and 20–24 age groups. Both curves follow a similar pattern after the peaks, with the proportion of trip legs for both females and males declining, reaching minimum points of 10% and 8% in the 40-49 age group.

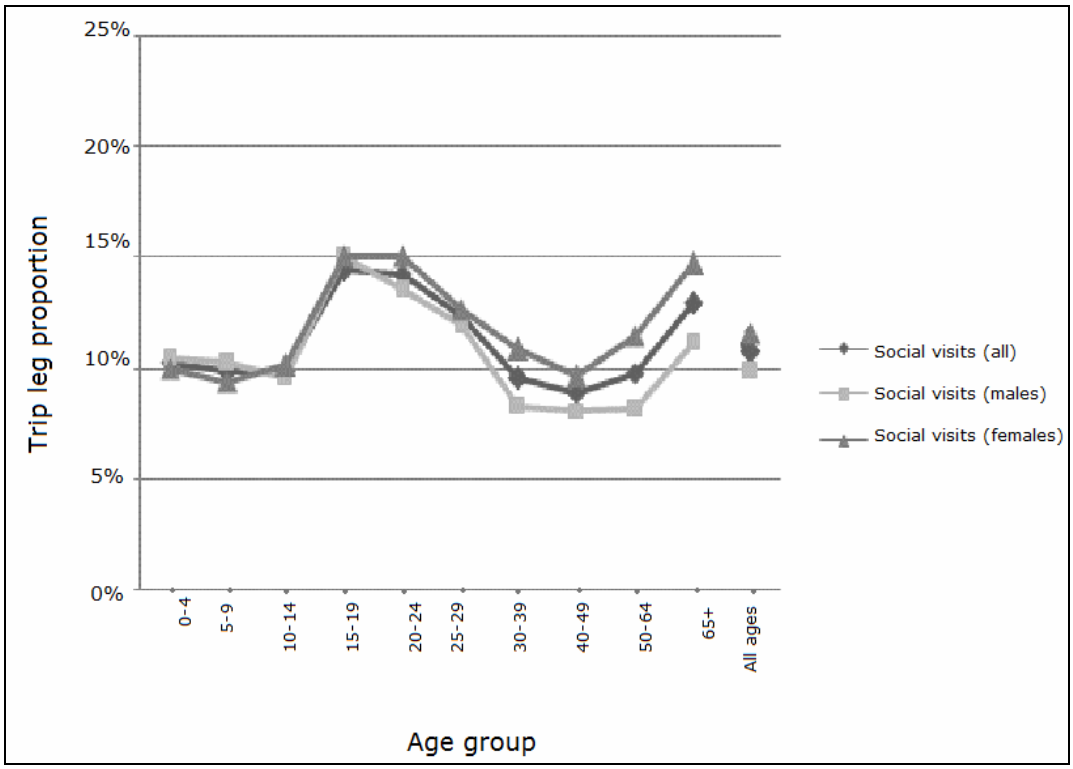

Figure 6.5 The proportion of social visit trip legs / person / day, categorised by gender.

The proportions of trip legs/person/day to accompany someone else are illustrated in Figure 6.6. This analysis shows that:

- On average, females make 2 % more trip legs to 'accompany someone else' than males.
- The trip leg proportion for trip legs made for the purpose of 'accompany[ing] someone else' for females declines rapidly with age but increases again to a peak of 12% in the 30–39 age group. The males' trip leg proportion curve follows a similar trend as the females from the 0–4 to 20–24 age groups before levelling off below 6%.

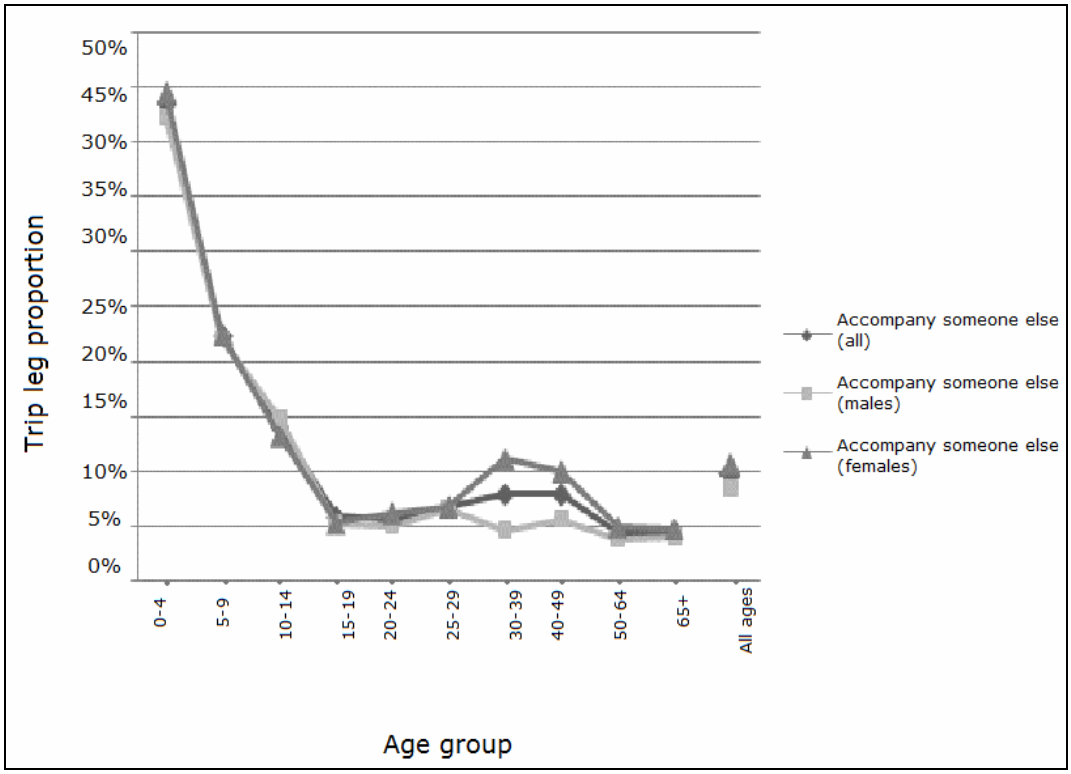

Figure 6.6 The proportion of 'accompany someone else' trip legs/person/day, categorised by gender.

The proportions of recreational trip legs /person/day are illustrated in Figure 6.7.

Analysis of this figure shows that:

- On average, both males and females make the same proportion of recreational trip legs, showing a 6% mean.
- The recreational trip proportions for both males and females increase with age to a peak of 9% and 10%, respectively, in the 10–14 age group. The peaks decline rapidly, reaching minimum points of 5% in the 25–29 age group for males and 4% in the 20–24 age group for females.
- Recreational trip legs are significant in the 65+ age group for both genders, achieving the fifth highest trip proportion of all trip purposes.

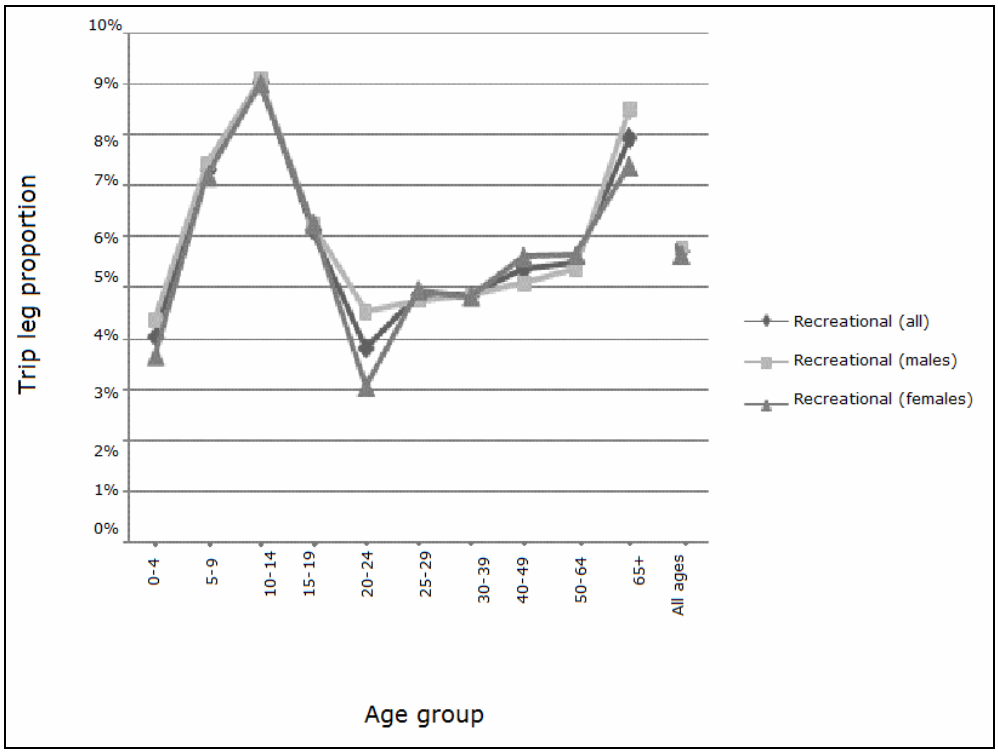

Figure 6.7 The proportion of recreational trip legs / person / day, categorised by gender.

6.5 Trip legs by purpose and day of the week

6.5.1 Proportion of weekday and weekend trip legs by selected purposes

The proportions of trip legs categorised by selected purposes on a weekday and weekend are presented in Table 6.6 and illustrated in Figure 6.8.

The analysis of the proportion of trip legs, categorised by selected purposes, shows that:

- Trip legs made for the purposes of 'work – main job' or 'shopping', or to 'accompany someone else' account for the second, third and fourth highest trip leg proportions on an average weekday. The trip legs made during the week that make up the highest proportion are those made for the purpose of going home (over 30%).
- 'Social visits' trip legs are the second most prevalent trip legs on the weekend, accounting for 17% of all the trip legs in the weekend.
- Shopping trip legs and trip legs made to accompany someone else have the third and the fourth highest trip leg proportions during the weekend, respectively.
- The trip leg proportion for 'work – main job' trip legs is substantially higher on a weekday compared with those for the same purpose on the weekend, showing a difference of 11%. The trip leg proportions of shopping and social visits are (16% less 11%) 5% and (17% less 9%) 8% higher during the weekend than on a weekday.

Table 6.6 The proportion of trip legs, categorised by trip leg purpose, on weekdays and weekends.

Description	Trip leg proportion (weekday)	Trip leg proportion (weekend)
Home	31%	34%
Work – main job	16%	5%
Work – other job	1%	0.3%
Work – employer's business	3%	1%
Education	5%	1%
Shopping	11%	16%
Personal business/services	5%	5%
Medical/dental	1%	0.2%
Social visits	9%	17%
Recreational	5%	9%
Change mode	5%	2%
Accompany someone else	9%	10%
Total	100%	100%
Total number of trip legs (unweighted)	79 927	28 211

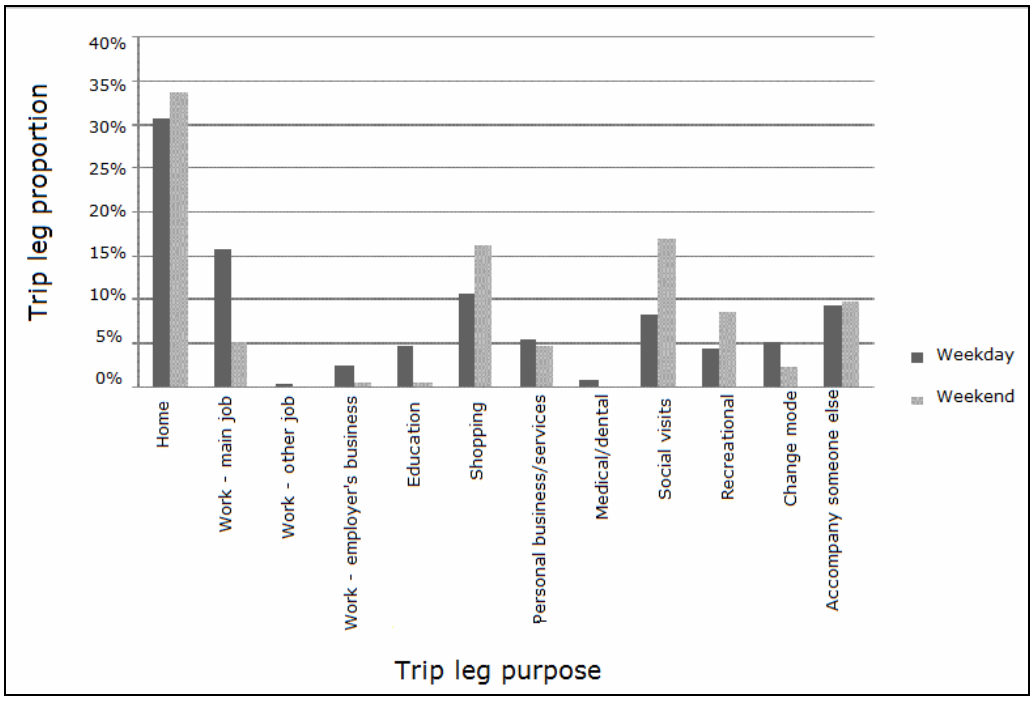

Figure 6.8 The proportion of trip legs, categorised by trip leg purpose on weekdays and weekends.

6.5.2 Trip leg duration by purpose – weekdays and weekends

The mean trip leg durations, defined by different purposes on weekdays and weekends, are presented in Table 6.7 and illustrated in Figure 6.9.

Points to be noted in the figure and table include:

- On average, trip legs for 'work - employer's business' trip legs have a relatively higher duration (19%) compared with other trip leg purposes on a weekday.
- On the weekend, recreational purposes have the highest trip leg duration (22 minutes) compared with trip legs made for other purposes.
- The highest increase in proportion from weekday to weekend mean trip leg duration was seen in trips made to 'accompany someone else' – an increase of four minutes. The highest drop in proportion from weekday to weekend mean duration (two minutes) was seen in 'work – employer's business' trip legs: 19 minutes during the week; 17 minutes at the weekend.

Table 6.7 Mean trip leg duration and trip leg sample size, categorised by trip leg purpose, on weekdays and weekends.

Description	Unweighted weekday trip legs	Average trip leg duration (min)	Unweighted weekend trip legs	Average trip leg duration (min)
Home	24 440	15	9324	17
Work – main job	12 464	16	1544	15
Work – other job	498	14	123	15
Work – employer's business	2153	19	209	17
Education	3509	15	136	17
Shopping	8882	12	4422	13
Personal business/services	4332	13	1210	16
Medical/dental*	838	14	58	–
Social visits	6903	16	4904	18
Recreational	4014	19	2481	22
Change mode	3999	16	760	17
Accompany someone else	7895	13	3040	17
Totals and averages	75 913	15	28 211	17

* Estimates for 'medical/dental' weekend trip leg duration cannot be made because the number of trips legs sampled was less than 120.

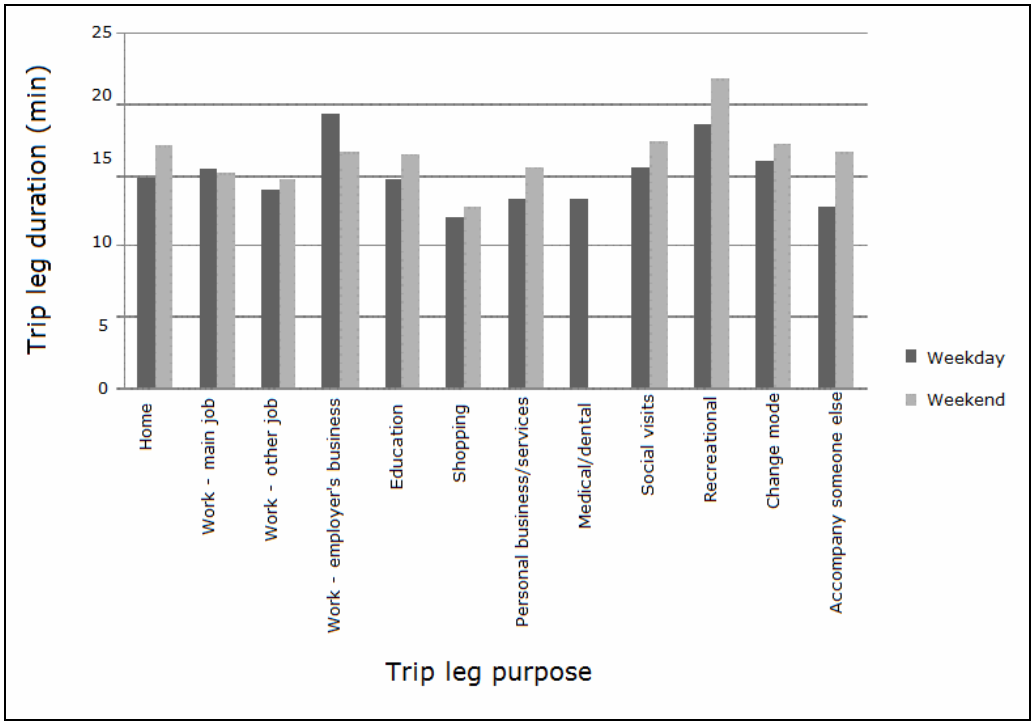

Figure 6.9 Mean trip leg duration, categorised by trip leg purpose, on weekdays and weekends.

6.6 Summary

- After trip legs to ‘home’, trip legs to ‘work – main job’ make up the second highest proportion of personal trip legs among all the selected trip purposes.
- ‘Work – main job’ and ‘shopping’ trip legs have the second and the third highest trip proportions per person for all age groups.
- ‘Work – employer’s business’ has the highest mean trip leg distance (10.7 km).
- Recreational trip legs have the highest mean trip leg time (19.9 minutes).
- Overall, males make more trip legs per person than females, and males make more work-related trip legs than females.
- Trip legs for the purpose of ‘work – main job’ and ‘shopping’, and to ‘accompany someone else’ accounted for the second, third and fourth highest trip proportions on a weekday.
- Recreational trip leg duration is relatively higher compared to other trip legs on both weekdays and weekends.

7. Travel by trip leg purpose and travel mode

7.1 Introduction

This chapter details individuals' travel, categorised by trip leg purpose and the mode of travel. It includes tables of trip legs/person/day and the distance travelled per person per day, both categorised by purpose and mode. A figure showing the proportion of trip legs, categorised by purpose and mode, is also included in this chapter.

7.2 Trip legs/person/day by purpose and mode

The number of unweighted trip legs and trip legs/person/day, categorised by purpose and mode, is shown in Tables 7.1 and 7.2, respectively.

From these tables, the following points can be noted:

- Individuals travel more trip legs as vehicle drivers for nearly all trip leg purposes apart from 'education', and to 'change mode' and 'accompany someone else'.
- Individuals travel more trip legs by walking compared with other modes to 'change mode'.
- Individuals travel more trip legs as vehicle passengers for 'education' and to 'accompany someone else'.

Table 7.2 The mean number of trip legs/person/day by mode, categorised by trip leg purpose.

Purpose	Mode							
	Walk	Vehicle driver	Vehicle passenger	Bicycle	Bus	Taxi	Other	Total
Home	0.2	0.8	0.4	0.02	0.02	0.007	0.004	1.4
Work – main job	0.1	0.5	0.04	0.01	0.008	0.001	0.003	0.6
Work – other job	0.002	0.02	0.002	0.0004	0.00004	0.0001	0.0001	0.02
Work – employer's business	0.01	0.1	0.005	0.001	0.0001	0.0005	0.001	0.1
Education	0.05	0.03	0.1	0.005	0.02	0.001	0.001	0.2
Shopping	0.1	0.3	0.1	0.003	0.004	0.001	0.001	0.5
Personal business/services	0.03	0.2	0.04	0.002	0.002	0.000	0.001	0.2
Medical/dental	0.004	0.02	0.01	0.0002	0.0002	0.0002	0.0002	0.03
Social visits	0.1	0.2	0.2	0.005	0.003	0.004	0.002	0.5
Recreational	0.1	0.1	0.1	0.008	0.003	0.001	0.002	0.2
Change mode	0.1	0.0	0.0	0.002	0.04	0.001	0.02	0.2
Accompany someone else	0.03	0.2	0.2	0.001	0.001	0.0002	0.002	0.4
Totals	0.7	2.4	1.1	0.1	0.1	0.02	0.03	4.4

7.3 Distance travelled / person / day by purpose and mode

The distances travelled per person per day, categorised by trip leg purpose and mode of transport, are shown in Table 7.3 as mean distances in kilometres.

Analysis of the data displayed in this table shows that:

- Individuals travel greater trip leg distances as vehicle drivers for most trip leg purposes. Only 'work – other job', 'education' and 'medical/dental' purposes, and to 'change mode' and 'accompany someone else' have mean travel distances less than 1 kilometre.
- Individuals travel greater trip leg distances as vehicle passengers for shopping, social visits and recreational purposes, and to accompany someone else.
- Individuals travel the greatest trip leg distances by bus to change mode.

Table 7.3 Mean distance travelled / person / day (in kilometres), categorised by trip leg purpose and mode of transport.

Purpose	Mode					
	Vehicle driver	Vehicle passenger	Bicycle	Bus	Taxi	Total
Home	7.0	4.4	0.1	0.2	0.05	11.7
Work – main job	4.7	0.4	0.03	0.1	0.01	5.2
Work – other job	0.1	0.03	0.001	0.0001	0.001	0.2
Work – employer's business	0.9	0.1	0.001	0.001	0.004	1.0
Education	0.2	0.3	0.01	0.3	0.01	0.8
Shopping	2.1	1.1	0.005	0.02	0.005	3.3
Personal business/services	1.2	0.4	0.003	0.02	0.001	1.6
Medical/dental	0.2	0.1	0.0004	0.0004	0.001	0.2
Social visits	2.4	2.0	0.01	0.1	0.03	4.6
Recreational	1.1	1.3	0.03	0.1	0.01	2.6
Change mode	0.3	0.2	0.003	0.4	0.01	0.8
Accompany someone else	1.2	2.2	0.002	0.05	0.0004	3.4

7.4 Trip leg proportion by purpose and mode

Trip leg proportions, categorised by trip leg purpose and mode of transport, are presented in Table 7.4 and illustrated in Figure 7.1.

Looking at the figure and the table, we can see the following:

- Trip legs made as a 'vehicle driver' make up the highest proportion of trip legs travelled for working purposes. Shopping, personal business/services, social visit and medical/dental trip purposes show a similar pattern.
- Trip legs made as a 'vehicle passenger' make up the highest proportion of trip legs made for 'education' and to 'accompany someone else', with proportions of 39% and 54%, respectively.
- Walking is the dominant mode of transport for trip legs made to 'change mode' (42% of all 'change mode' trip legs).
- Buses were the most frequently used mode of public transport, being the fourth highest mode for education and the second highest for 'change mode' trip legs.

Table 7.4 Trip leg proportions categorised by trip leg purpose and mode of transport*.

Purpose	Mode							
	Walk	Vehicle driver	Vehicle passenger	Bicycle	Bus	Taxi	Other	Total
Home	14%	56%	27%	2%	1%	1%	0.3%	100%
Work – main job	11%	78%	7%	2%	1%	0.2%	0.5%	100%
Work – other job	9%	77%	10%	2%	0.2%	1%	0..4%	100%
Work – employer's business	6%	87%	5%	1%	0.2%	0.5%	1%	100%
Education	30%	15%	39%	3%	12%	0.5%	0.5%	100%
Shopping	16%	61%	22%	1%	1%	0.2%	0.2%	100%
Personal business/services	14%	69%	15%	1%	1%	0.05%	0.03%	100%
Medical/dental	11%	62%	25%	1%	0.4%	1%	1%	100%
Social visits	15%	49%	33%	1%	1%	1%	1%	100%
Recreational	27%	38%	30%	3%	1%	0.3%	1%	100%
Change mode	42%	17%	9%	1%	22%	0.5%	8%	100%
Accompany someone else	7%	38%	54%	0.3%	0.3%	0.1%	1%	100%

* Where the number of unweighted trip legs in the sample was less than 120, the accuracy of the estimates may be unreliable.

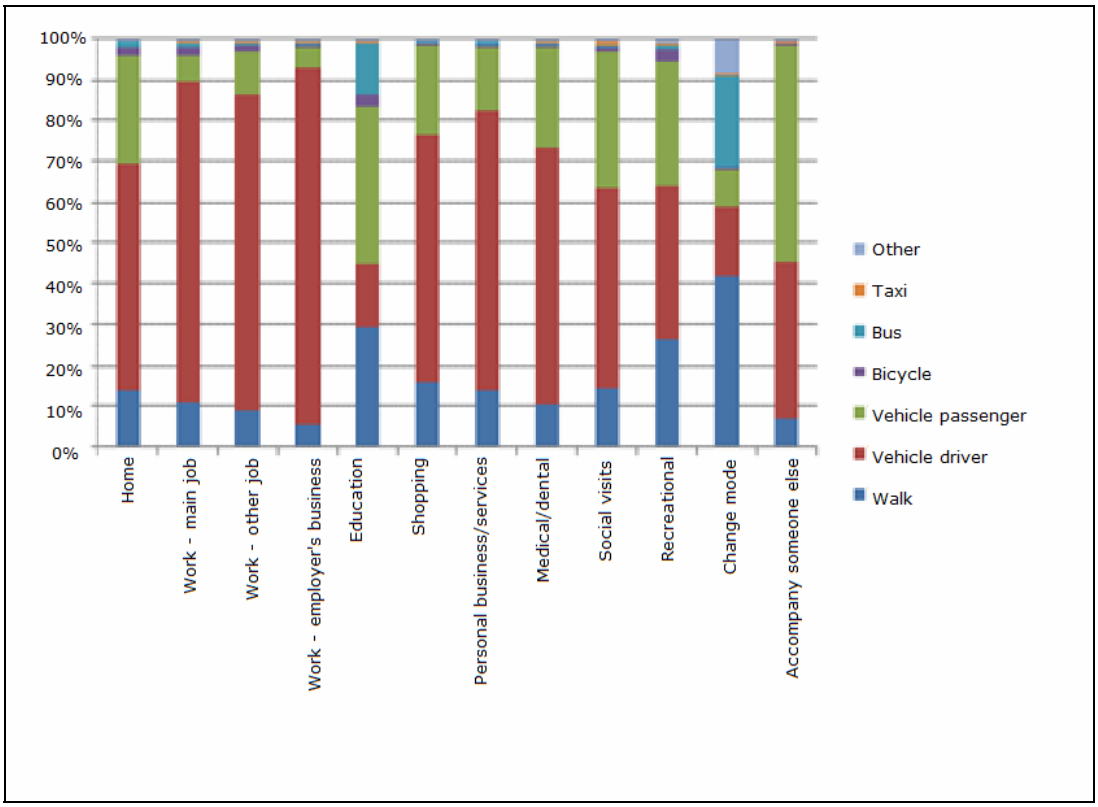

Figure 7.1 Trip leg proportions, categorised by trip leg purpose and mode of transport.

7.5 Summary

This chapter has considered how New Zealanders travel, by trip leg purpose and mode of transport. Highlights from this section include:

- Individuals travel more trip legs and trip leg distance as vehicle drivers for nearly all purposes apart from 'education', and to 'change mode' and to 'accompany someone else'.
- For all working purposes, trip legs made as a 'vehicle driver' (56%) make up the highest proportion. Shopping, personal business/services, social visits and medical/dental trip legs purposes show a similar pattern.
- The purposes which have the highest proportion of trips made as a vehicle passenger are 'education' (39%), 'social visits' (33%) and recreation (30%).
- The purposes that showed the highest proportion of individuals walking were 'education' (30%), followed by 'shopping' (16%).
- The purposes that showed the highest proportion of bus use were 'change mode' (22%) and 'education' (12%).
- Recreation and education show the greatest proportion of bicycle use (3% each), followed by work trips (2%).
- Taxis are a minor contributor for trips to 'work' (1%), and for 'medical/dental' (1%) and social (1%) purposes.

8. Social inclusion and accessibility

8.1 Introduction

This chapter provides information regarding how vehicle availability and different income categories affected households' and individuals' travel profiles, and includes tables and figures showing:

- variations in travel time, distance and trip legs according to car availability;
- variations in travel time, distance and trip legs according to the number of people in a household; and
- variations in travel mode and distance according to personal income bracket.

8.2 Variation in travel by household car availability

Table 8.1 and Figure 8.1 show how travel patterns differ according to household car availability. Trip legs, distance and time per household per day are indexed to show the relative difference of variations in household car availability. For this index, a reading of 100 indicates the average, which is equivalent to 15 trips per household, 121 km per household and 227 minutes per household.

Analysing the variations in travel categorised by household car availability shows that:

- Households with more than three cars generate more trip legs than households with one car or no cars.
- On average, households with more than three cars also travelled greater distances and spent more time travelling than those with one or no cars.

Table 8.1 Variations in travel by household car availability.

Number of cars in household	Unweighted sample size (households)	Trips/ household/ day	Distance/ household/ day (km)	Travel time/ household/ day (min)
No Car	360	6	57	102
1 Car	1818	10	80	153
2 Cars	1783	17	141	262
3+ Cars	848	24	202	382
Totals and means	4809	15*	121*	227*

* These values were used to calculate the 100 index for Figure 8.1.

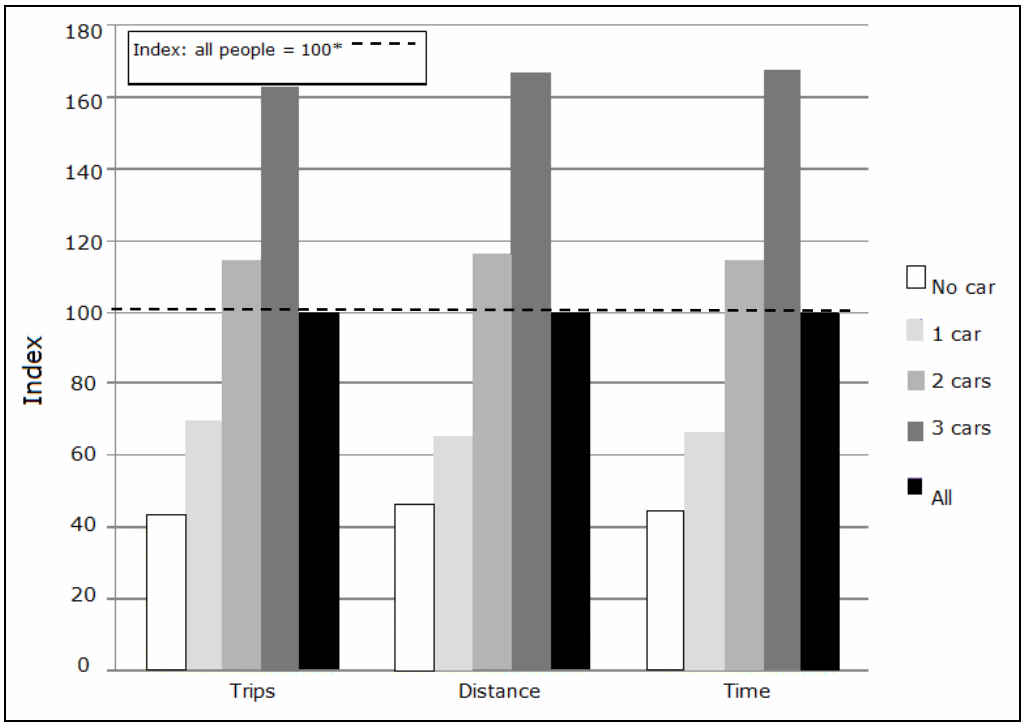

Figure 8.1 Mean variations in travel categorised by household car availability.

* Index 100 = 15 trip legs/household
= 121 km/household
= 227minutes/household
(as set out in Table 8.2)

8.3 Variation in travel by household size

Variation in travel behaviour, categorised by number of people in a household, is shown in Table 8.2. Trip legs, distance and time travelled per household per day are illustrated in Figure 8.2, Figure 8.3 and Figure 8.4, respectively. The table shows that:

- Trip legs per household per day and travel time per household per day increase with the number of people in a household.
- The number of trip legs (6), the distance (50 km) and travel time (90 minutes) per person per day in a household is pretty much constant until the household size reaches 6+ people.
- Households with five people travel the greatest distance: 244 km per day.
- Trip legs and distances travelled increase rapidly with the number of people in a household.

Table 8.2 Variations in travel by number of people in a household.

No. of people in household	Unweighted sample size (households)	Trip legs / household / day	Distance / household / day (km)	Travel time / household / day (min)
1	1169	6	47	91
2	1809	12	99	188
3	749	18	147	282
4	687	25	200	376
5	272	28	244	421
6+	124	29	230	426
All	4810	15	121	227

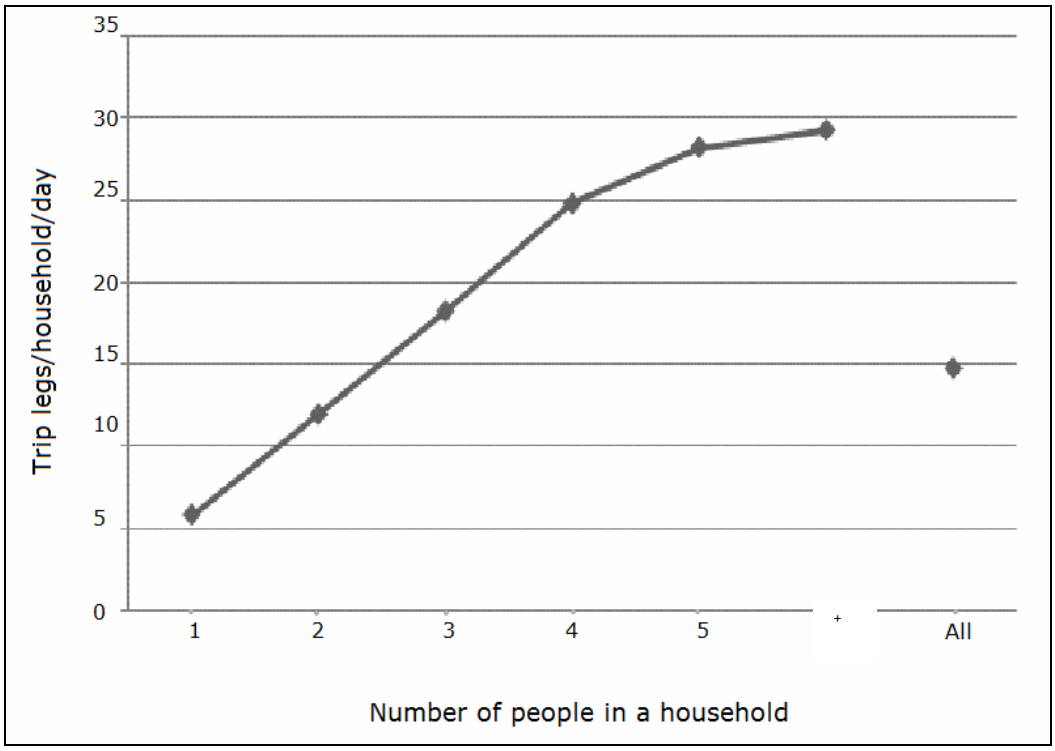

Figure 8.2 Trip legs per household per day, categorised by number of people in the household.

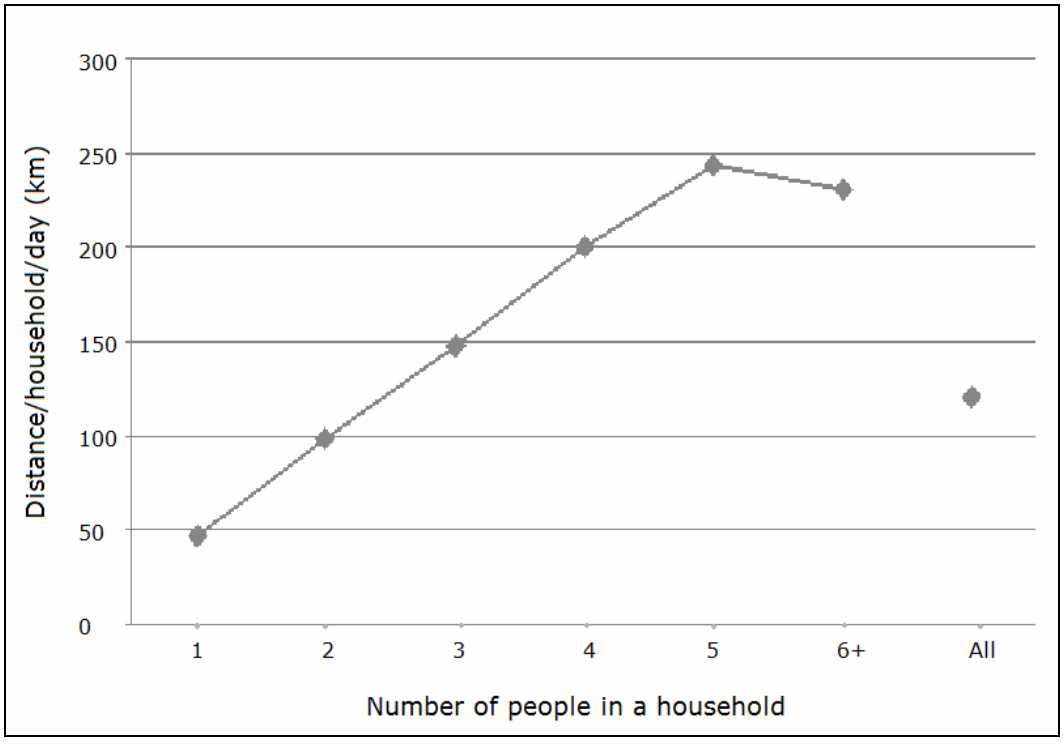

Figure 8.3 Distance per household per day, categorised by number of people in the household.

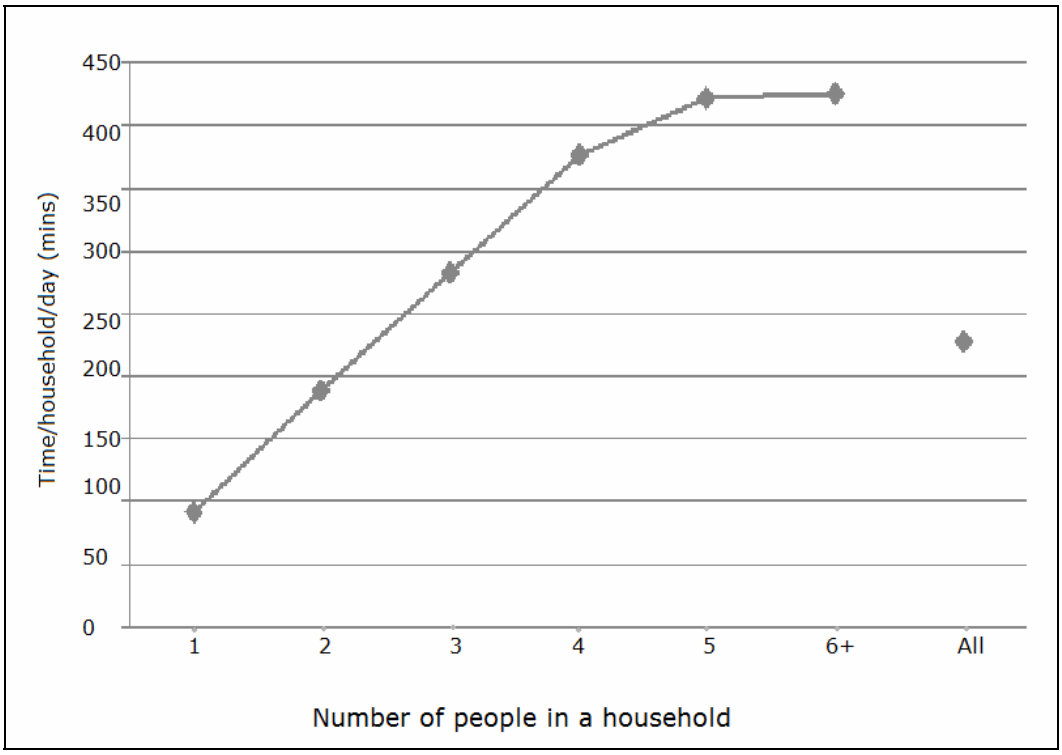

Figure 8.4 Travel time per household per day, categorised by number of people in a household.

8.4 Trip legs/person/day by mode and personal income

This section considers the influence of personal income on travel patterns. Table 8.3 shows the (unweighted) number of trip legs/person/day, while the mean distances travelled per person per day are shown in Table 8.4. Trip legs/person/day according to personal income are presented in graph form as follows:

- Figure 8.5 shows all modes combined,
- Figure 8.6 shows vehicle trip legs (driver and passenger),
- Figure 8.7 shows walking trip legs,
- Figure 8.8 shows cycling trip legs, and
- Figure 8.9 shows bus trip legs.

The incomes are those provided by the individuals surveyed. Total household incomes have not been derived in this analysis. Given that only ages 16+ were asked their personal income, the analysis is based on ages 16+ only.

The analysis of the numbers of trip legs/person/day, categorised by mode of travel and personal income bracket, shows that:

- The numbers of trip legs/person/day increase slightly with personal income. (Figure 8.5).
- The number of trip legs/person/day made as vehicle drivers increase with increasing personal income. The number of trip legs made as vehicle passenger decrease as personal income rises (Figure 8.6).

- Individuals who have a personal income under $10,000 make more walking trip legs per day than those in the other personal income ranges. The number of walking trip legs made per person decreases after the 'under $10,000' category and reach the minimum point of 0.55 trip legs per person in the '$20,001–$30,000' personal income bracket (Figure 8.7).
- On the other hand, those who earn $20,001–$30,000 per annum make the highest amount of cycling trip legs (0.08) per day (Figure 8.8).
- Individuals earning under $10,000 make more trip legs by bus than those in other personal income brackets. The minimum number of bus trip legs/person/day occurs within the '$15,001–$20,000' personal income bracket.

Table 8.3 Mean number of trip legs/person/day, categorised by travel mode and personal income bracket.

Income bracket	Trip legs/person/day								
	Mode								
	Walk	Vehicle driver	Vehicle passenger	Bicycle	Bus	Taxi	Other	All modes (total)	Unweighted sample size (people)
No income	0.89	1.63	1.00	0.03	0.16	0.02	0.03	3.76	660
Under $10,000	1.01	2.10	0.94	0.05	0.17	0.02	0.03	4.32	1011
$10,001–$15,000	0.70	2.26	0.72	0.04	0.08	0.02	0.03	3.86	1346
$15,001–$20,000	0.65	2.69	0.92	0.03	0.05	0.02	0.03	4.40	1064
$20,001–$30,000	0.55	3.50	0.75	0.08	0.07	0.03	0.04	5.01	1301
$30,001–$40,000	0.61	3.70	0.60	0.05	0.07	0.02	0.03	5.08	1262
$40,001–$50,000	0.63	3.90	0.48	0.04	0.09	0.01	0.05	5.21	894
$50,001–$70,000	0.66	4.23	0.42	0.05	0.06	0.02	0.06	5.48	785
$70,001–$100,000	0.77	4.34	0.47	0.06	0.09	0.04	0.07	5.83	335
$100,000+	0.87	4.81	0.48	0.03	0.04	0.04	0.05	6.32	234

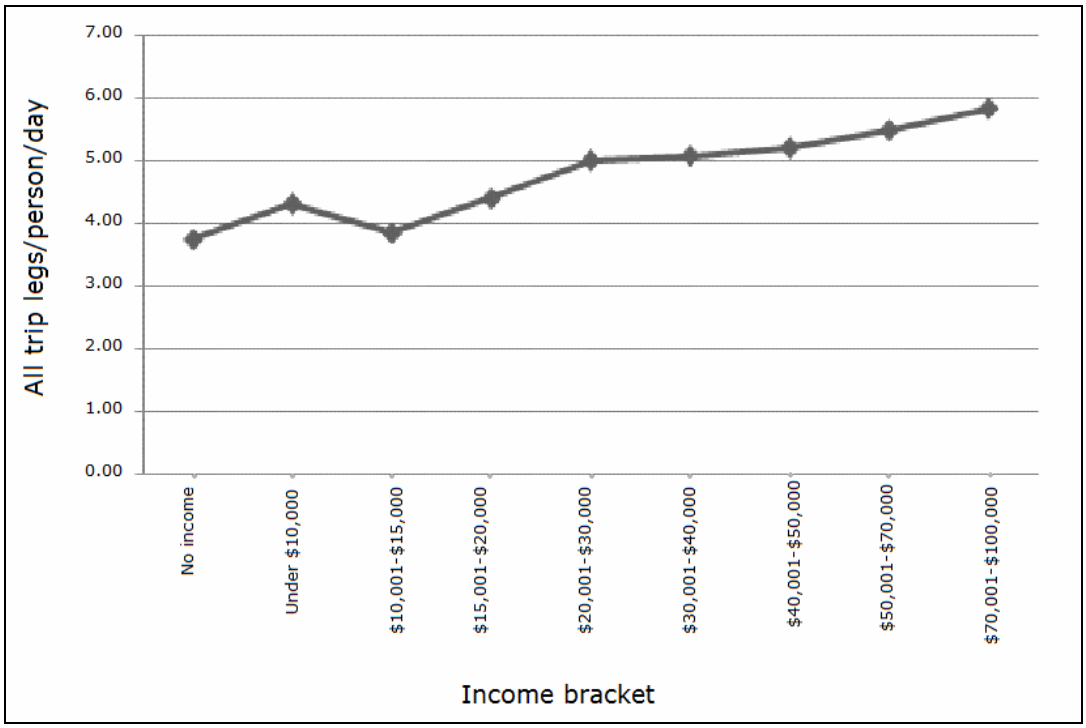

Figure 8.5 Mean number of trip legs / person / day, categorised by personal income bracket.

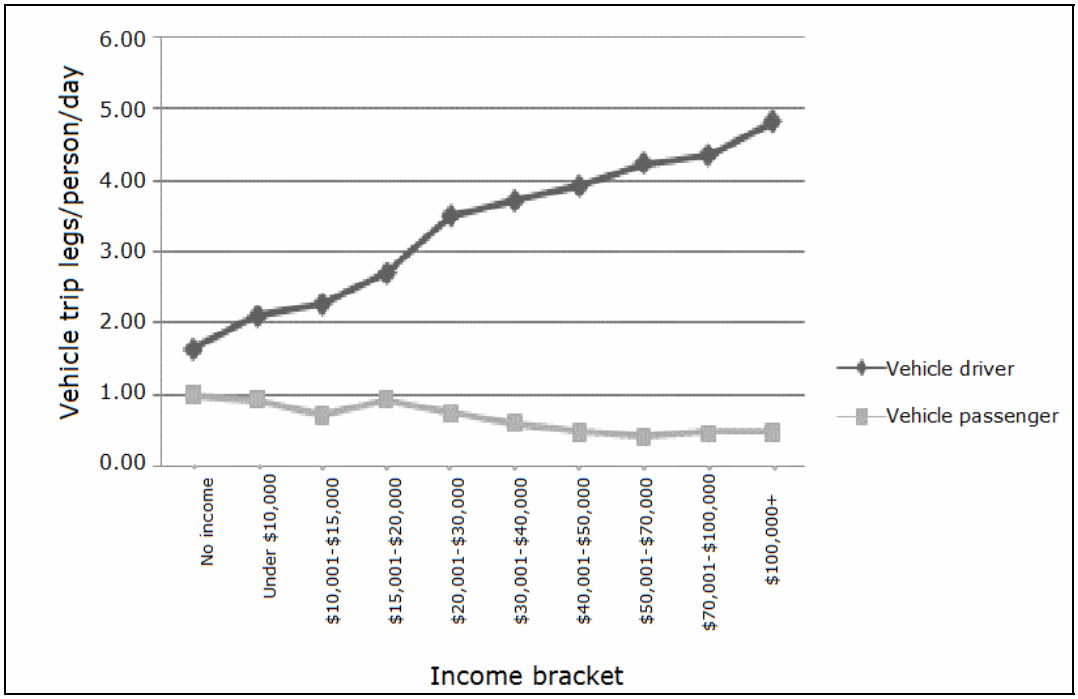

Figure 8.6 Mean number of vehicle driver and passenger trip legs / person / day, categorised by personal income bracket.

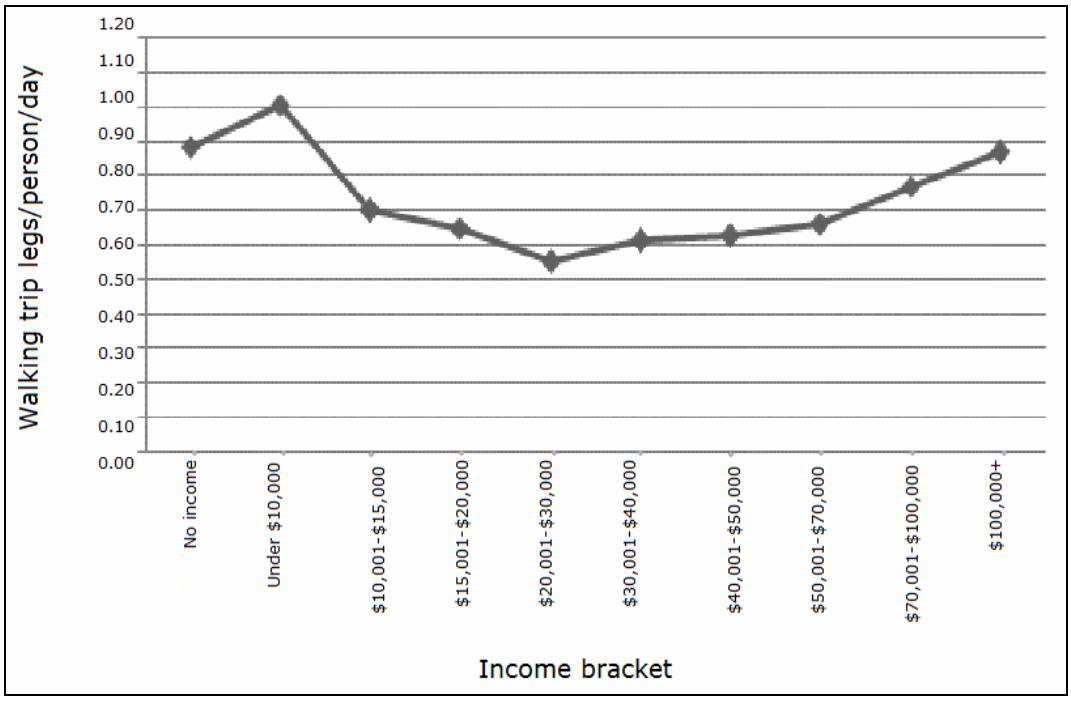

Figure 8.7 Mean number of walking trip legs / person / day, categorised by personal income bracket.

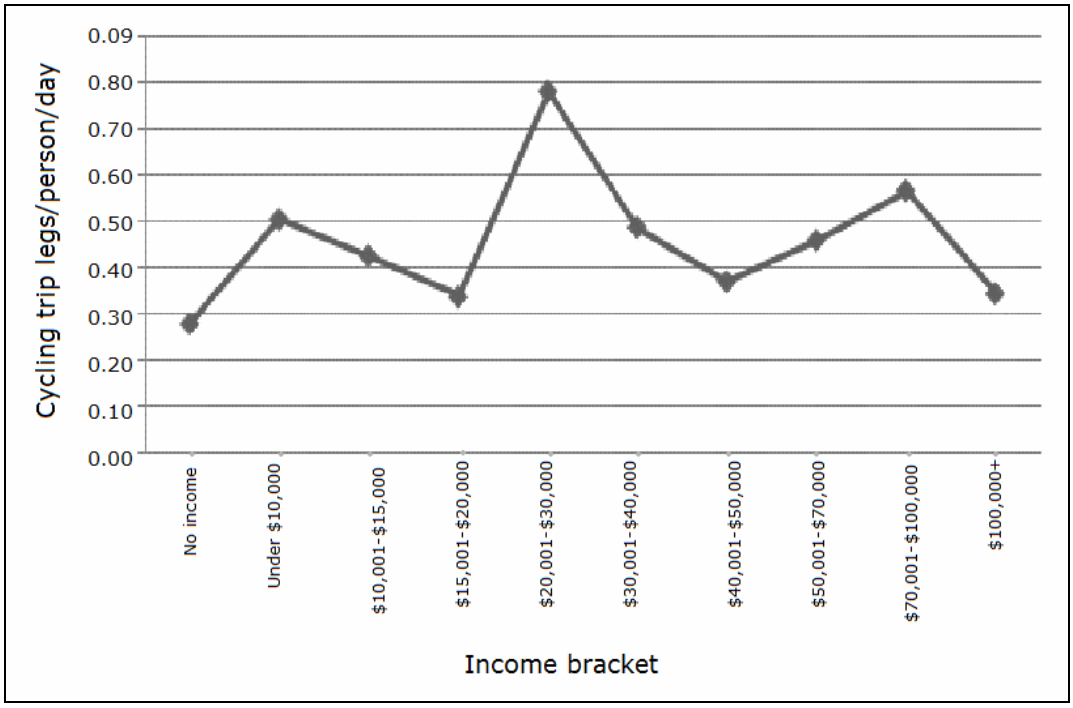

Figure 8.8 Mean number of cycling trip legs / person / day, categorised by personal income bracket.

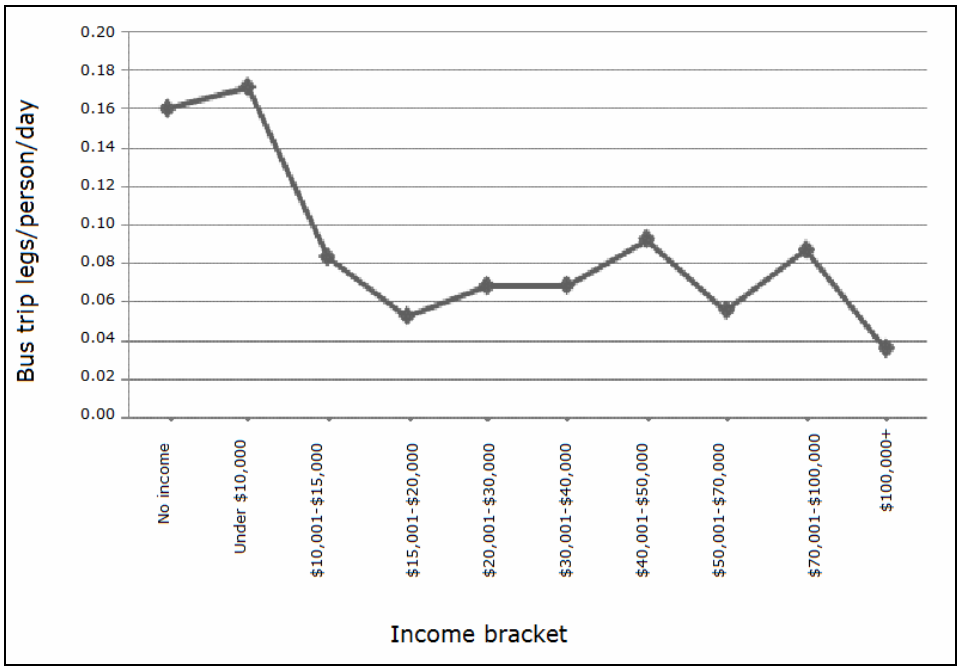

Figure 8.9 Mean number of bus trip legs / person / day, categorised by personal income bracket.

8.5 Distance travelled by mode and personal income

The distances travelled per person per day, categorised by travel mode and personal income bracket, are shown in Table 8.4.

The analysis of the distance travelled per person per day, categorised by mode of transport and personal income bracket shows that:

- Generally, the distance travelled per person per day increases with personal income. Considering all modes of travel, on average, individuals who earn more than $100,000 per annum travel twice the distance compared with those who fall into the $10,001–$15,000 personal income bracket.
- For vehicle drivers, on average, individuals who earn more than $100,000 per annum travel almost four times the distance compared with those who fall into the 'under $10,000' personal income bracket.
- Individuals who earn $70,001–$100,000 per day cycle more distance than those in other personal income brackets, travelling, on average, 0.8 km per day.
- Individuals who earn less than $10,000 per annum travel more distance by bus than those in the other personal income brackets, travelling 3.8 km per day.

Table 8.4 Mean distance travelled / person / day, categorised by mode of transport.

Income bracket	Trip legs / person / day						
	Mode						
	Vehicle driver	Vehicle passenger	Bicycle	Bus	Taxi	All modes (total)	Unweighted sample size (people)
No income	12.7	8.0	0.1	0.7	0.1	21.5	660
Under $10,000	29.9	23.4	0.4	3.8	0.2	57.7	1011
$10,001–$15,000	36.2	18.1	0.3	2.5	1.1	58.1	1346
$15,001–$20,000	43.2	24.2	0.3	1.1	0.3	69.1	1064
$20,001–$30,000	55.0	19.9	0.4	1.6	0.2	77.1	1301
$30,001–$40,000	75.6	21.6	0.4	1.8	0.2	99.7	1262
$40,001–$50,000	83.2	17.9	0.4	1.2	0.2	102.9	894
$50,001–$70,000	99.4	15.0	0.6	1.4	0.4	116.8	785
$70,001–$100,000	94.9	13.7	0.8	1.5	0.5	111.5	335
$100,000+	101.6	14.9	0.5	0.6	0.8	118.5	234

8.6 Summary

- Trip legs, distance and time travelled per day per household increase with car availability.
- Trip legs and travel time per household per day increase with the number of people in a household. Households with five people travel the greatest distance: 244 km per day.
- Generally, the number of trip legs made and the distance travelled per person per day also increase with personal income. Individuals who fall into the 'no income' category made fewer trip legs than those with other personal income ranges.
- The number of trip legs made per person as a vehicle driver increased relative to personal income level. On the other hand, the number of trip legs made per person as a vehicle passenger decreased with rising personal income.

9. Travel by time of day

9.1 Introduction

This chapter provides information on personal travel patterns categorised by time of day, day of the week and travel purpose. The tables and figures show the total trip legs for all modes together.

9.2 Proportion of home-based daily departures by purpose and time of day

The proportions of home-based daily trip leg departures (i.e. the time that individuals first leave home at the 'start' of a day), categorised by selected purposes and the time of day, are illustrated in Figures 9.1 to 9.8. Table 9.1 shows the morning and evening peak departure times from home for different purposes on weekdays and weekends. These proportions of daily flow shown in the graphs are reported for the end of the hour shown (e.g. all trip legs made from 1301h to 1400h would be classified as '14'). The estimates in this chapter have not been made where the total number of unweighted trip legs, categorised by purpose, are less than 120. The total number of unweighted trip legs for all modes together are categorised by trip leg purposes and day of the week, and are given in detail in Appendix D.

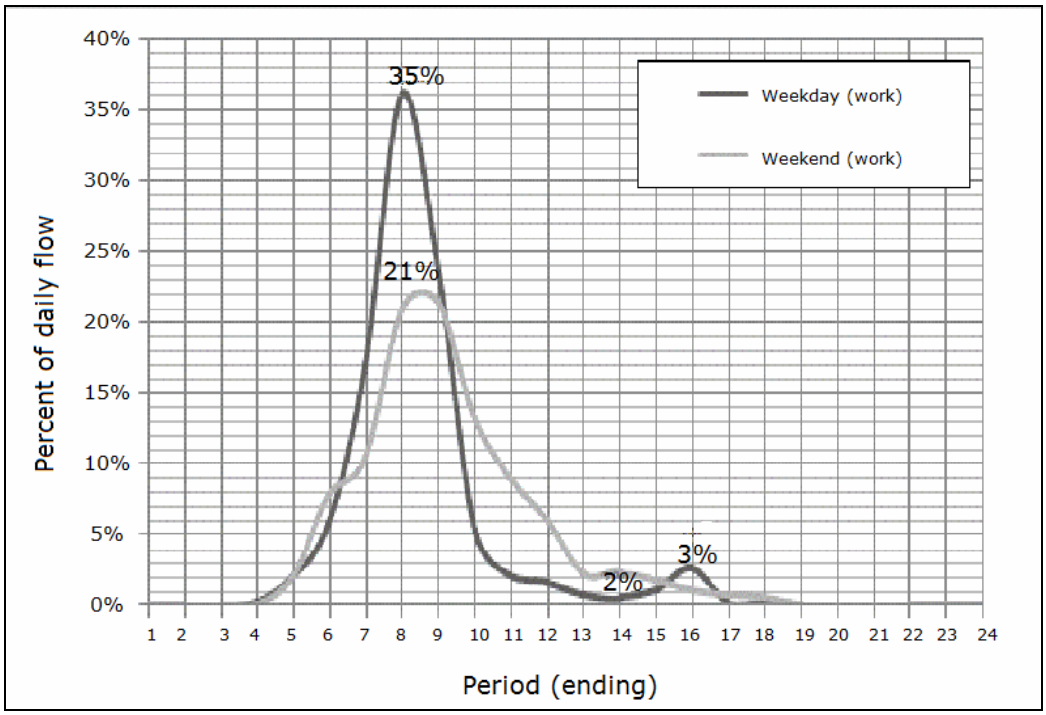

Figure 9.1 Departure time from home for work (main job and other job) as a proportion of daily flow on weekdays and weekends.

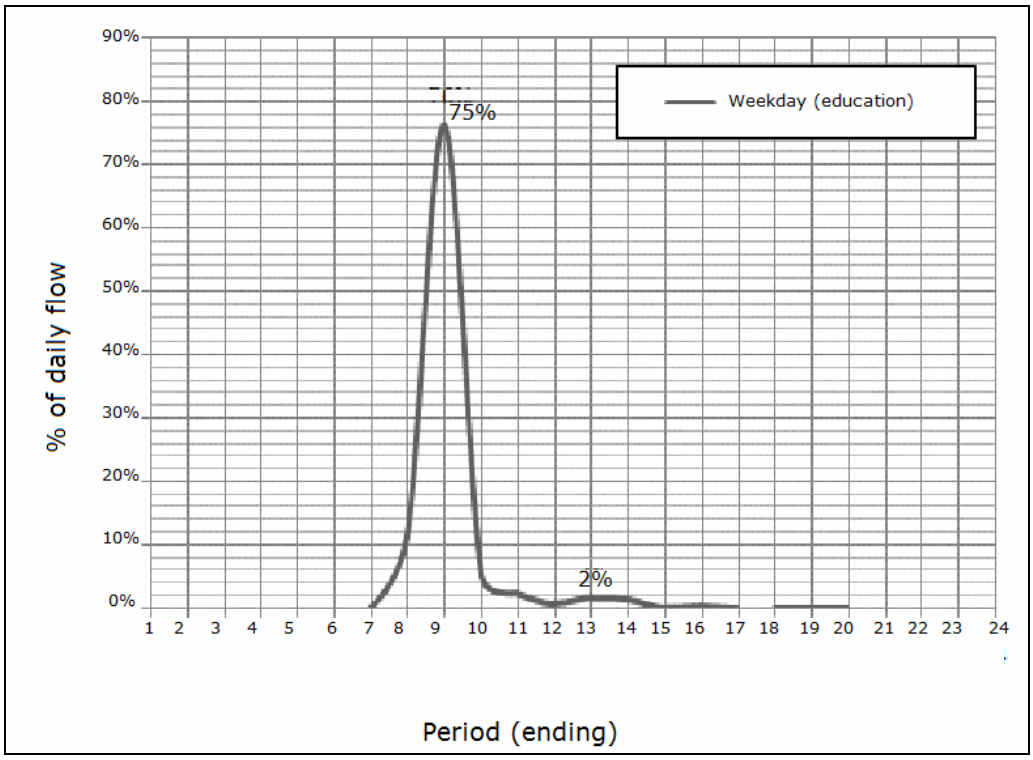

Figure 9.2 Departure time from home for education as a proportion of daily flow on weekdays.

Note: Estimates for weekend education cannot be made because the total number of trip legs samples was less than 120 (see Appendix D).

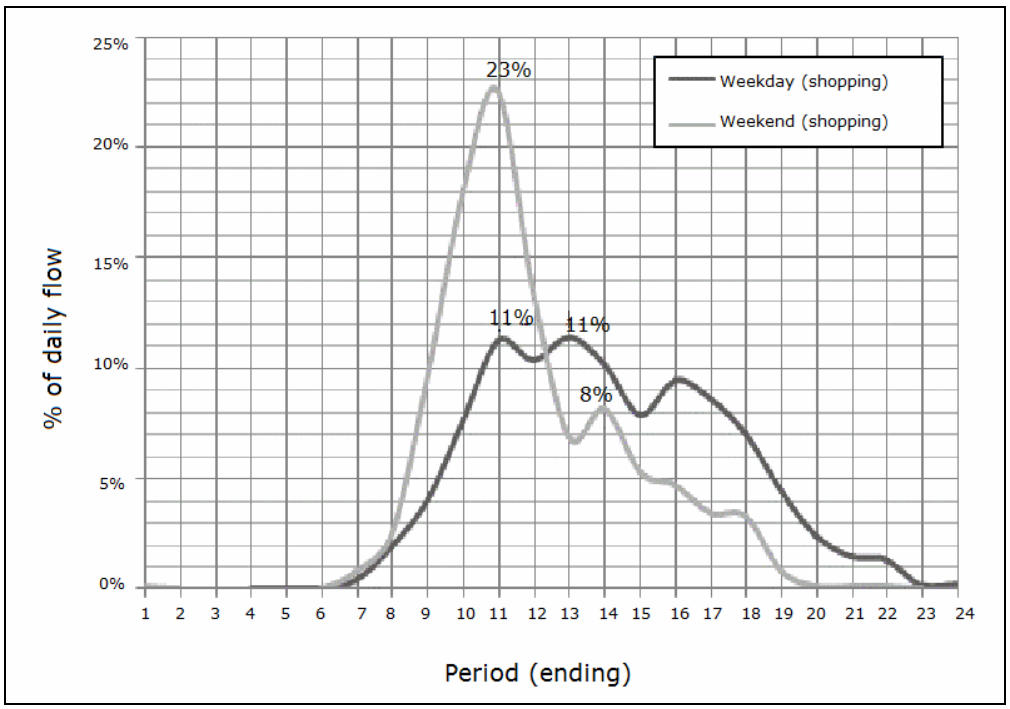

Figure 9.3 Departure times from home for shopping trips as a proportion of daily flow on weekdays and weekends.

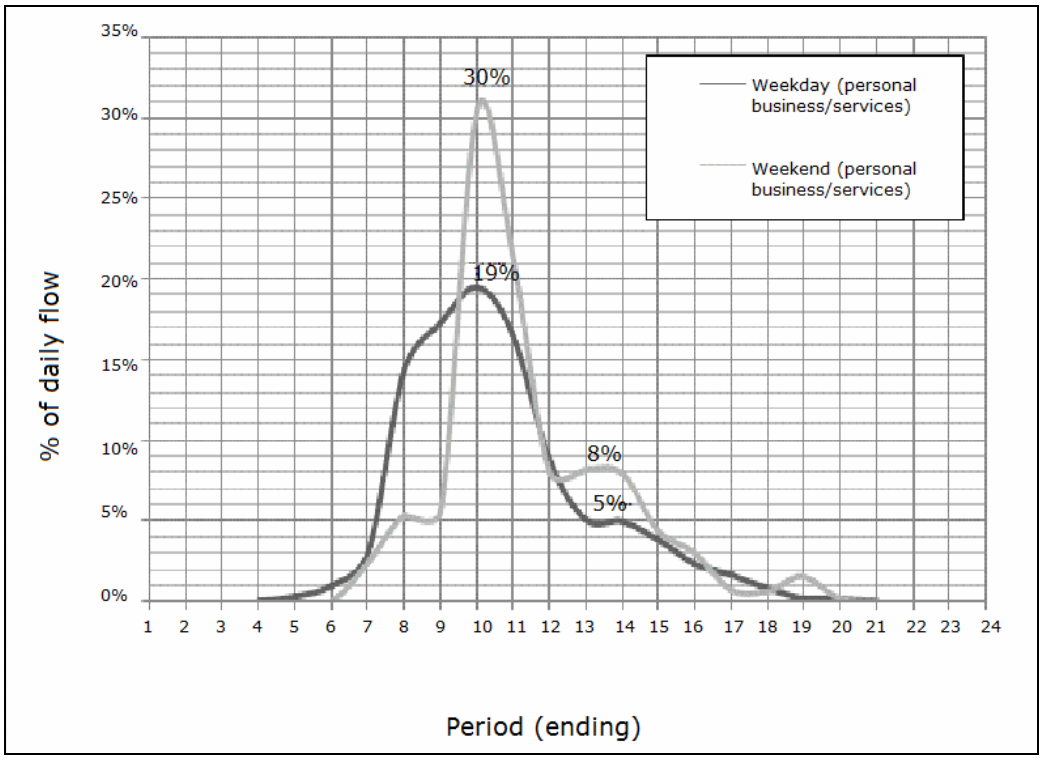

Figure 9.4 Departure time from home for 'personal business/services' trip legs as a proportion of daily flow on weekdays on weekends.

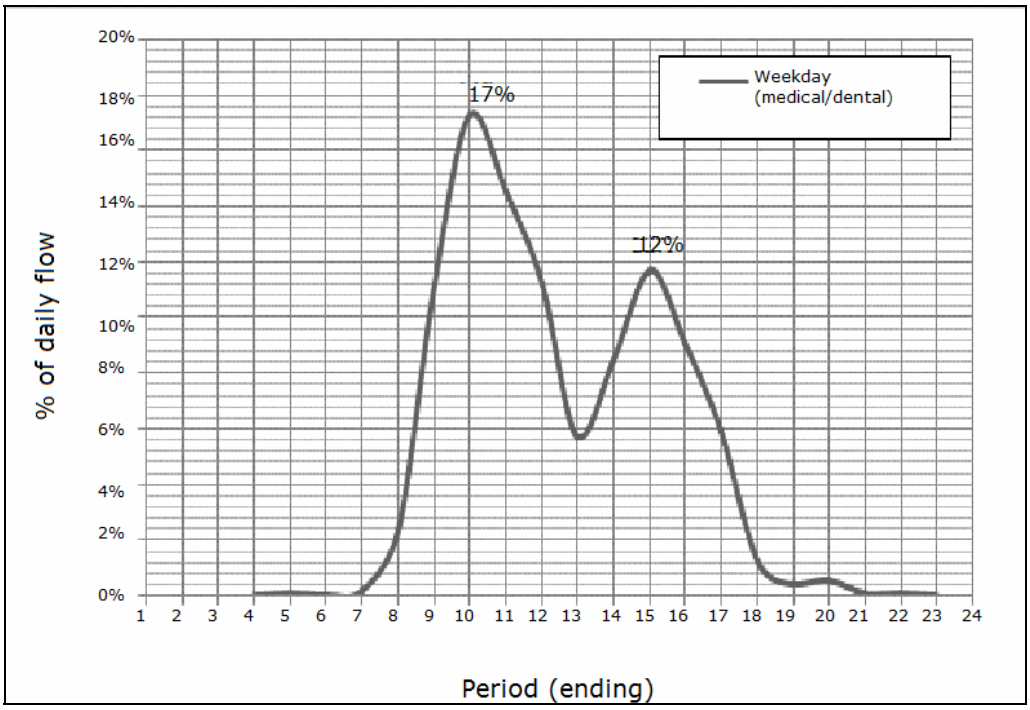

Figure 9.5 Departure time from home for 'medical/dental' trip legs as a proportion of daily flow on weekdays.

Note: Estimates for weekend 'medical/dental' trip legs are not included because the total number samples was less than 120 (see Appendix D).

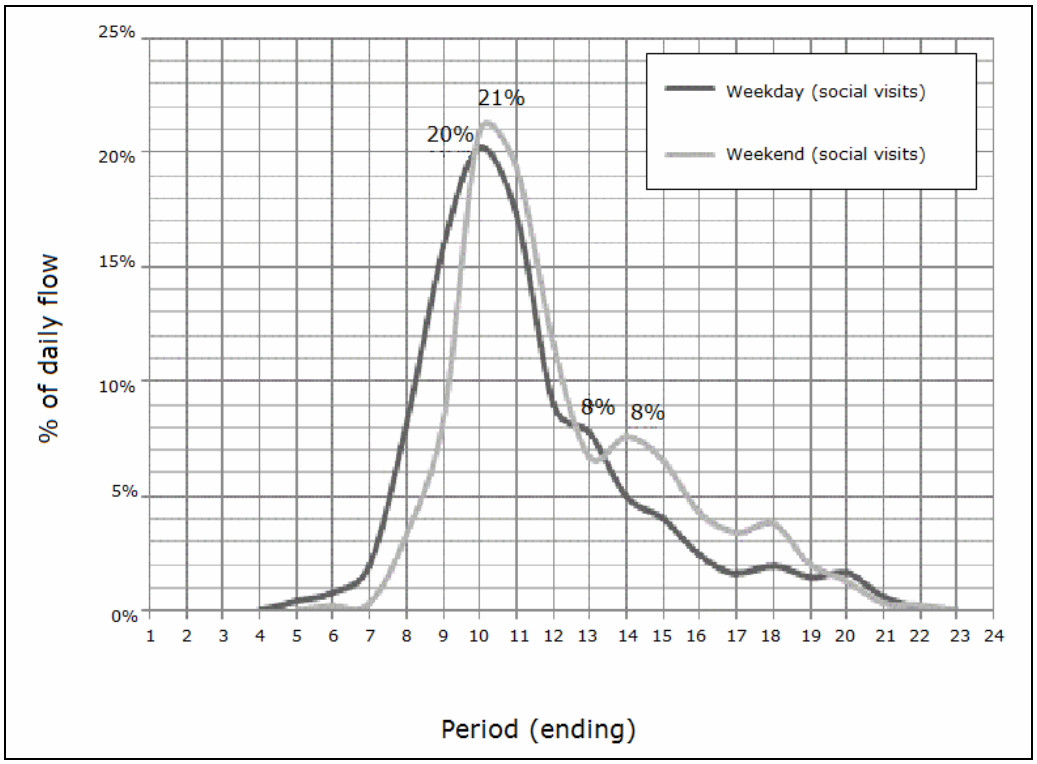

Figure 9.6 Departure time from home for social visits as a proportion of daily flow for weekends and weekdays.

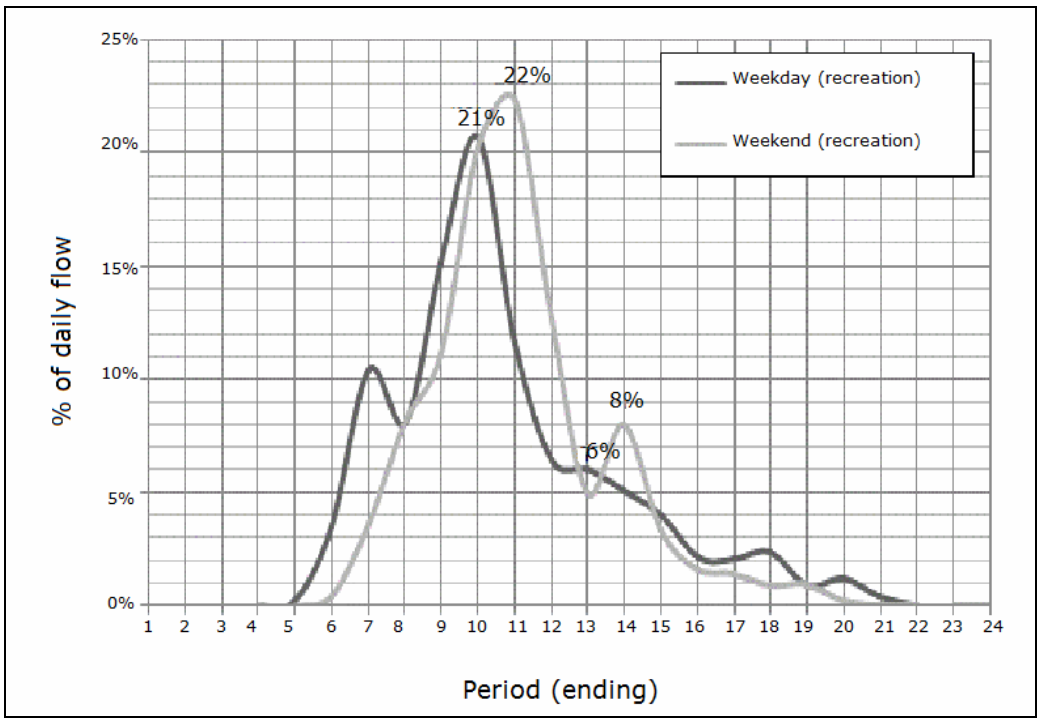

Figure 9.7 Departure time from home for recreation as a proportion of daily flow for weekends and weekdays.

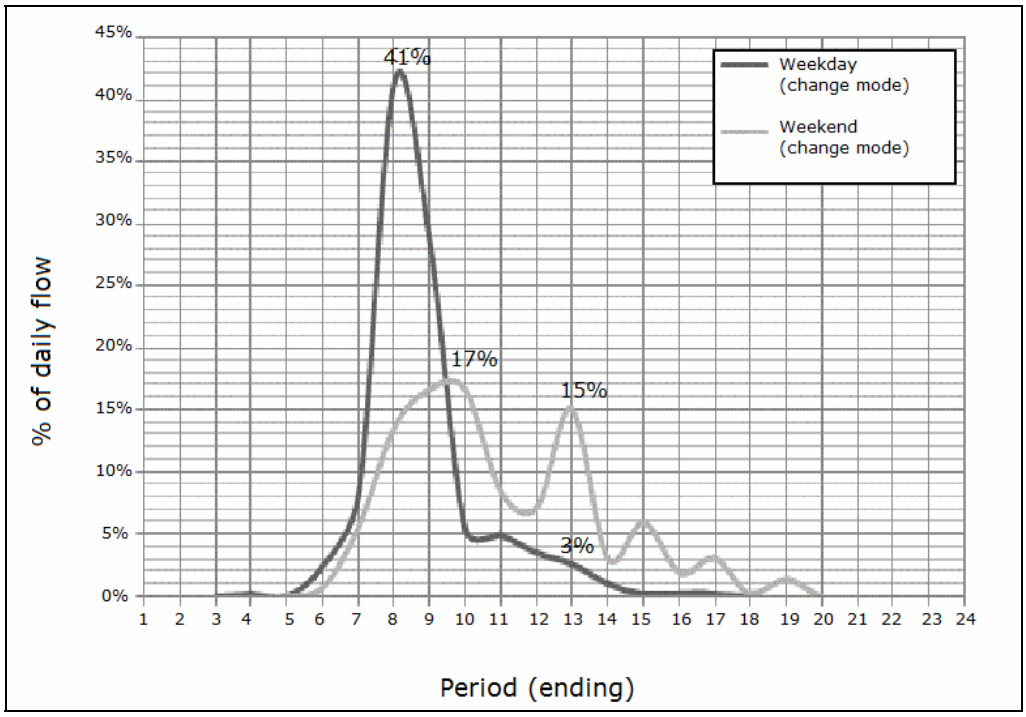

Figure 9.8 Departure times from home to change mode as a proportion of daily flow on weekdays and weekends.

Table 9.1 Morning and evening peak times for leaving home for different purposes on weekdays and weekends.

Trip purpose	Weekday				Weekend			
	a.m. peak period	a.m. peak %	p.m. peak period	p.m. peak %	a.m. peak period	a.m. peak %	p.m. peak period	p.m. peak %
Work[a]	07–08	36%	15–16	3%	08–09	21%	13-14	2%
Education[b]	08–09	76%	12–13	2%	–	–	–	–
Shopping	10–11	11%	12–13	11%	10–11	23%	13–14	8%
Personal business/services	09–10	19%	13–14	5%	09–10	30%	12–14	8%
Medical/dental	09–10	17%	14–15	12%	–	–	–	–
Social visits	09–10	20%	12–13	8%	09–10	21%	13–14	8%
Recreational	09–10	21%	13–14	5%	10–11	22%	13–14	8%
Change mode	07–08	41%	12–13	3%	08–10	17%	12–13	15%

Notes:
a 'Work' trip leg purposes includes 'work – main job' and 'work – other job'.
b Estimates could not be made in categories where the number of trip legs sampled was less than 120.

In summary, these home-based departures reflect the four major home-based departures in the weekdays and weekends. These occur on the weekday at approximately hourly intervals between 0800h and 1100h. The patterns relate to trips on weekdays to:

- work (with a peak up to 0800h),
- education (with a peak up to 0900h),
- personal business/services (with a peak up to 1000h), and
- shopping (with a peak up to 1100h).

9.3 Proportion of daily arrivals purpose and time of day

The proportions of daily trip leg arrivals, categorised by selected purpose and time of day, are illustrated in Figures 9.9 to 9.19. The daily morning and evening peaks and proportions for the selected purposes are summarised in Table 9.2. In these figures, the proportions are reported for the end of the hour shown (e.g. all times from 0801h to 0900h are classed as '9'). The analysis looks at when individuals arrive after setting out from home, considering all modes and purposes (home-based arrivals).

It is important to point out that estimates in this section cannot be made where the number of unweighted trip legs, categorised by trip leg purpose, are less than 120. The total number of unweighted trip legs, categorised by trip leg purposes and day of the week for all modes, are shown in detail in Appendix D.

In general, compared with arrivals and departures that are home-based or for education, the other trip leg purposes are spread more evenly throughout the day, resulting in typical peak hours varying between 10% and 18% for different trip purposes.

Table 9.2 Morning and evening peak arrival times on weekdays and weekends, categorised by purpose.

Trip leg purpose*	Weekday				Weekend			
	a.m. peak period	a.m. peak %	p.m. peak period	p.m. peak %	p.m. peak period	p.m. peak %	p.m. peak period	p.m. peak %
Home	10–11	6%	14–15; 16–17	15%	10–11	8%	16–17	11%
Work – main job	07–08	19%	12–13	8%	07–08	13%	13–14	7%
Work – other job	07–08	15%	15–16	9%	07–08	17%	15–16	9%
Work – employer's business	08–09	14%	13–14	10%	06–07; 09–10	12%	12–13	8%
Education	07–08	64%	11–12	5%	07–08	26%	11–12	8%
Shopping	09–11	11%	12–13	10%	09-10	14%	14–15	10%
Personal business/ services	08–09	11%	14–15	11%	09–10	14%	12–13	9%
Medical/ dental	09–10	18%	13–14	12%	–	–	–	–
Social visits	10–11	7%	16–17	10%	10–11	10%	17–18	9%
Recreational	08–09	7%	15-17	10%	09–10	12%	12–13	11%
Change mode	07–08	15%	14–15	13%	10–11	10%	12–13	12%

* Estimates could not be made in categories where the number of trip legs surveyed was less than 120.

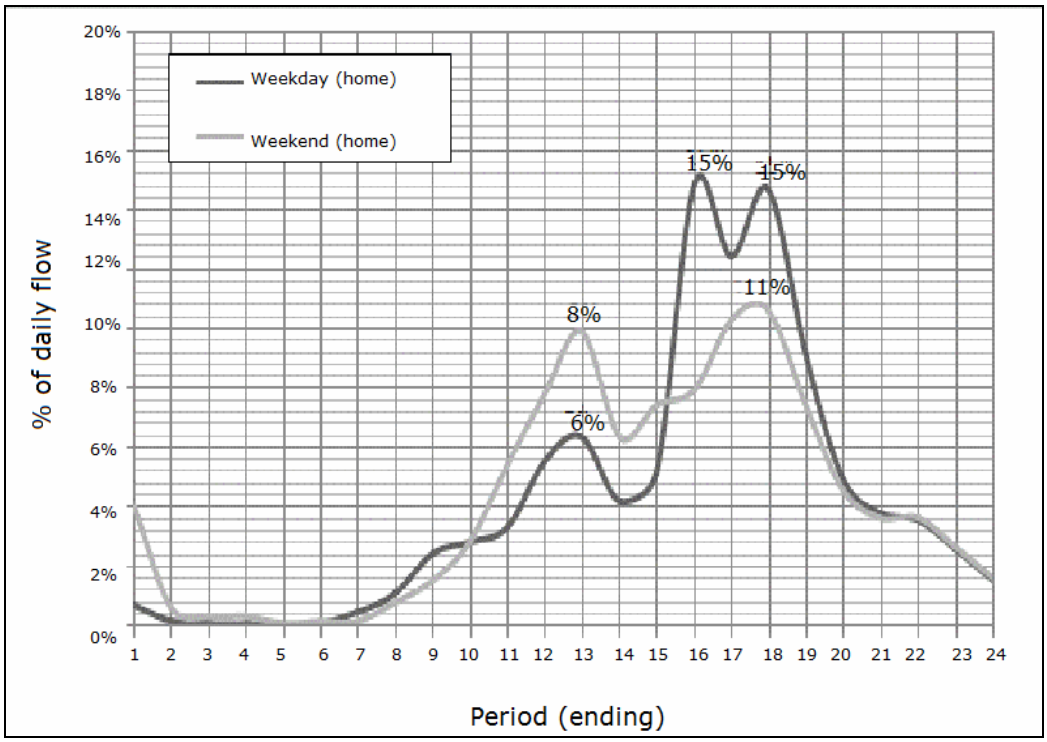

Figure 9.9 Proportion of daily trip leg arrivals at home from all origins by time of day.

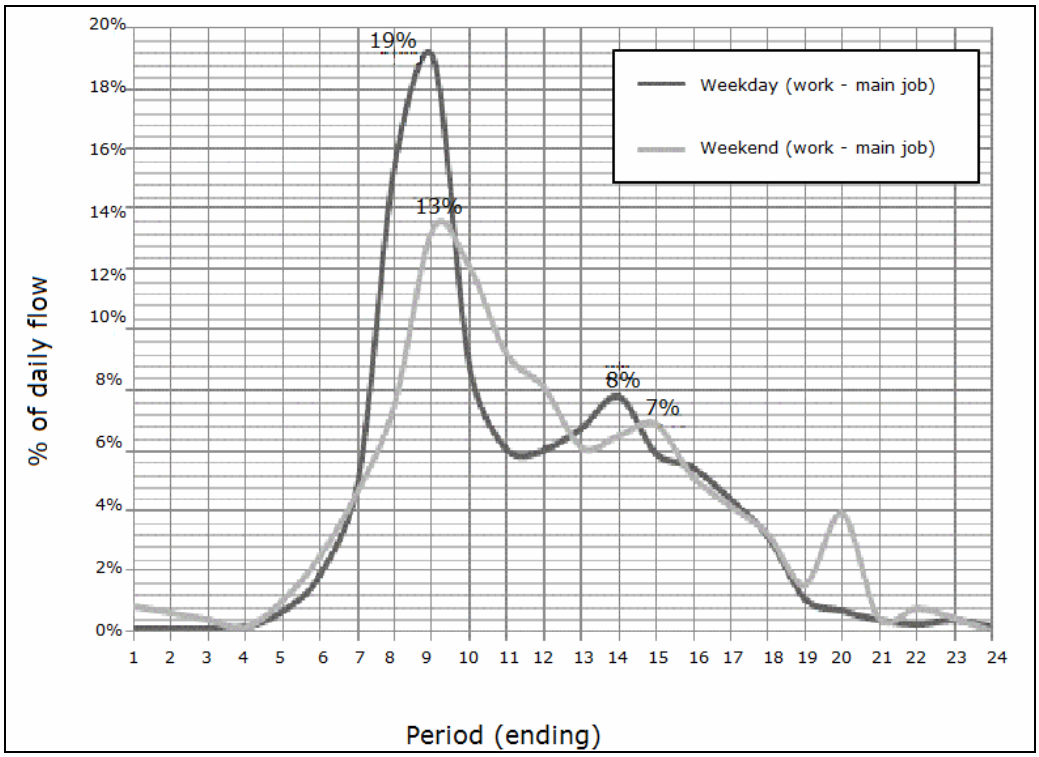

Figure 9.10 Proportion of daily trip leg arrivals at 'work – main job' by time of day.

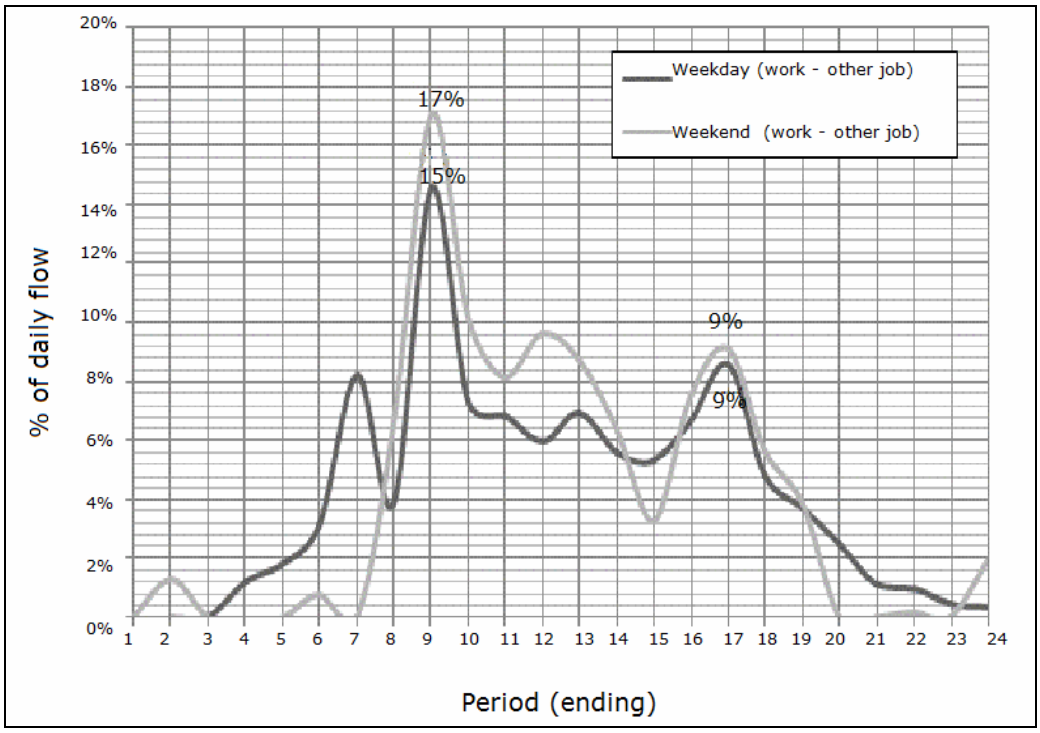

Figure 9.11 Proportions of daily trip leg arrivals at 'work – other job' by time of day.

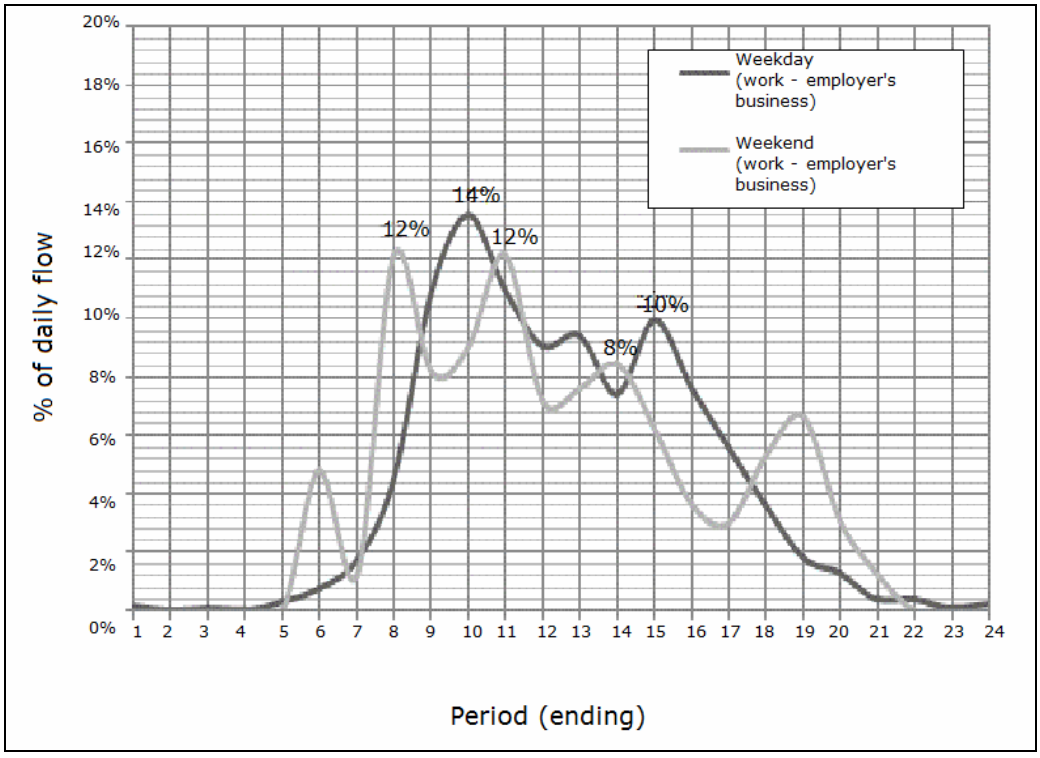

Figure 9.12 Proportions of daily trip leg arrivals at 'work– employer's business' by time of day.

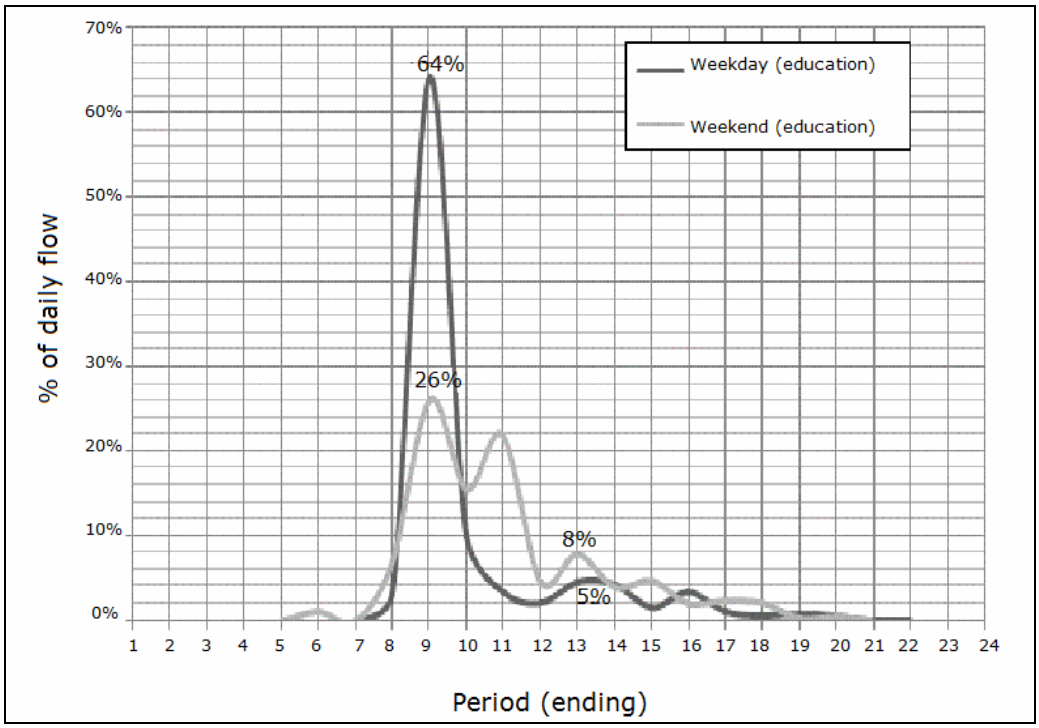

Figure 9.13 Proportions of daily trip leg arrivals for education by time of day.

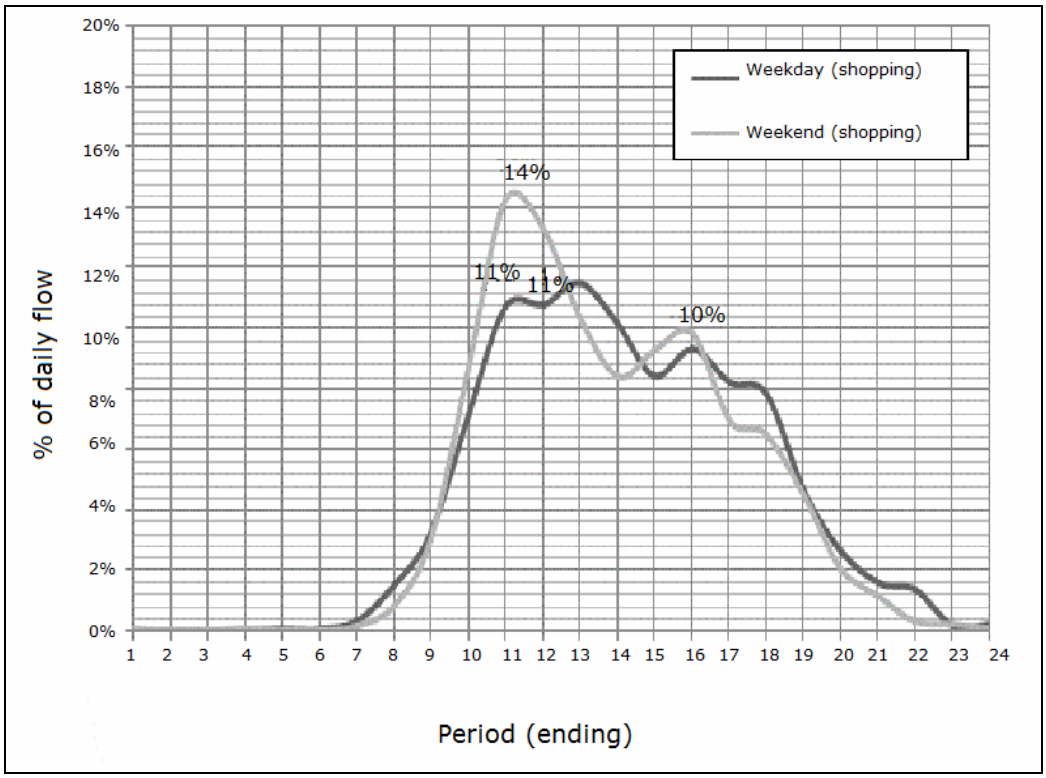

Figure 9.14 Proportions of daily trip leg arrivals for shopping by time of day.

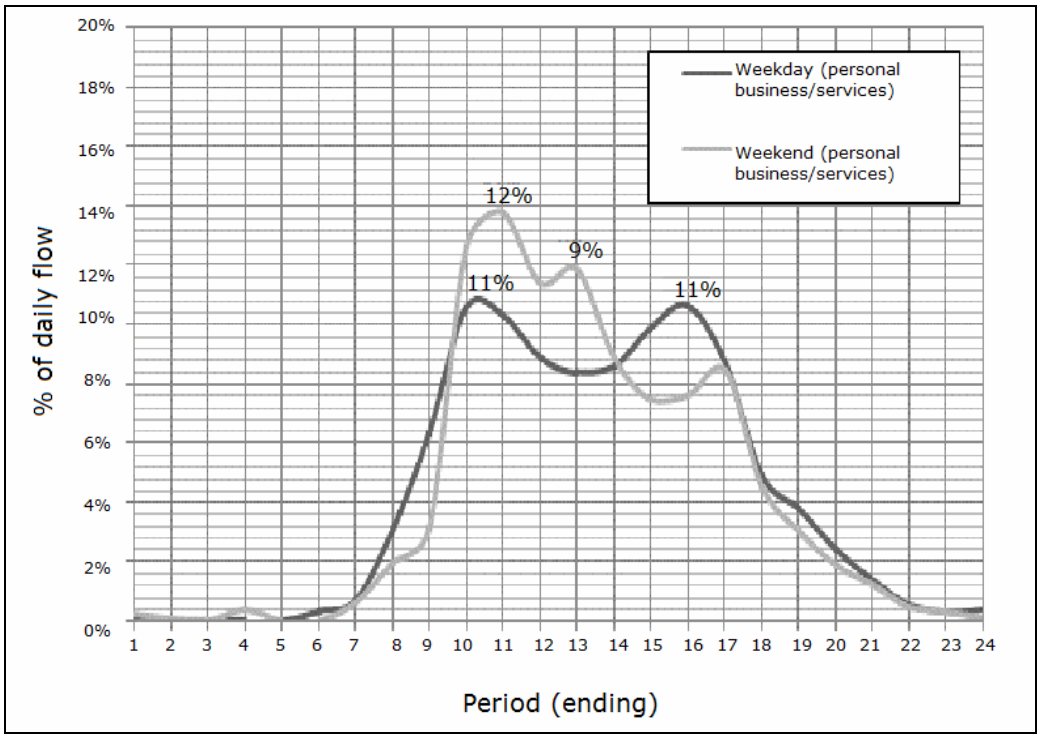

Figure 9.15 Proportions of daily trip leg arrivals for 'personal business/services' by time of day.

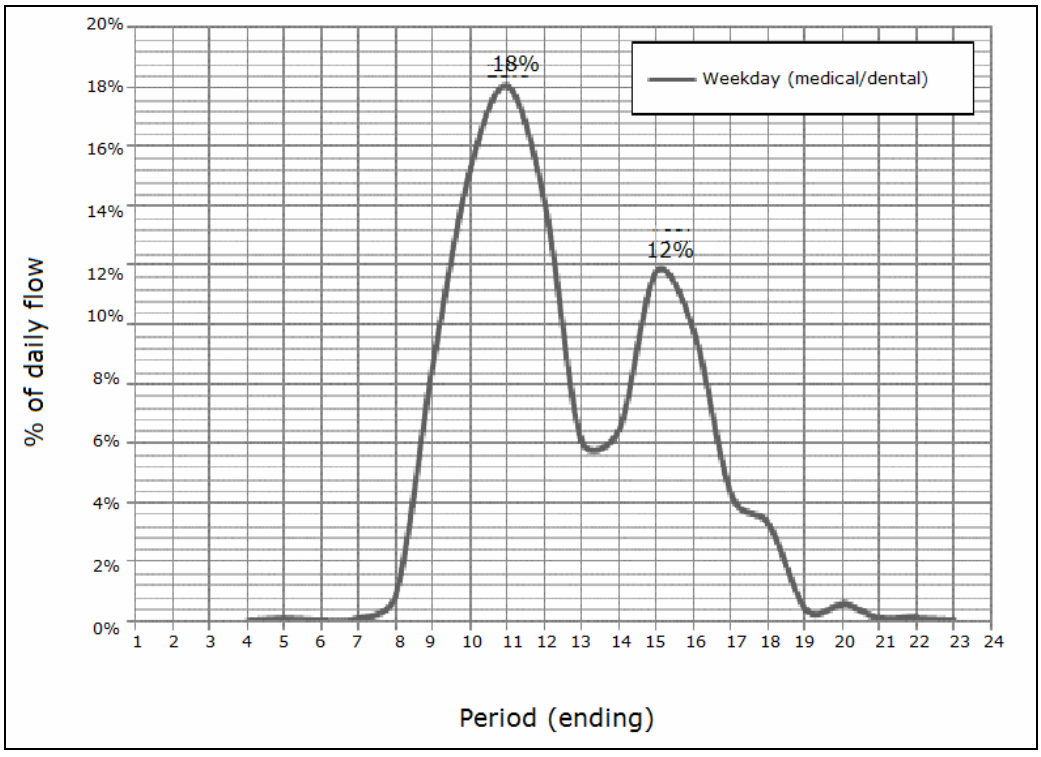

Figure 9.16 Proportions of daily arrivals for 'medical/dental' trip legs by time of day*.

* Estimates for weekend 'medical/dental' trip legs cannot be made because the total number of trip legs sampled was less than 120 (see Appendix D).

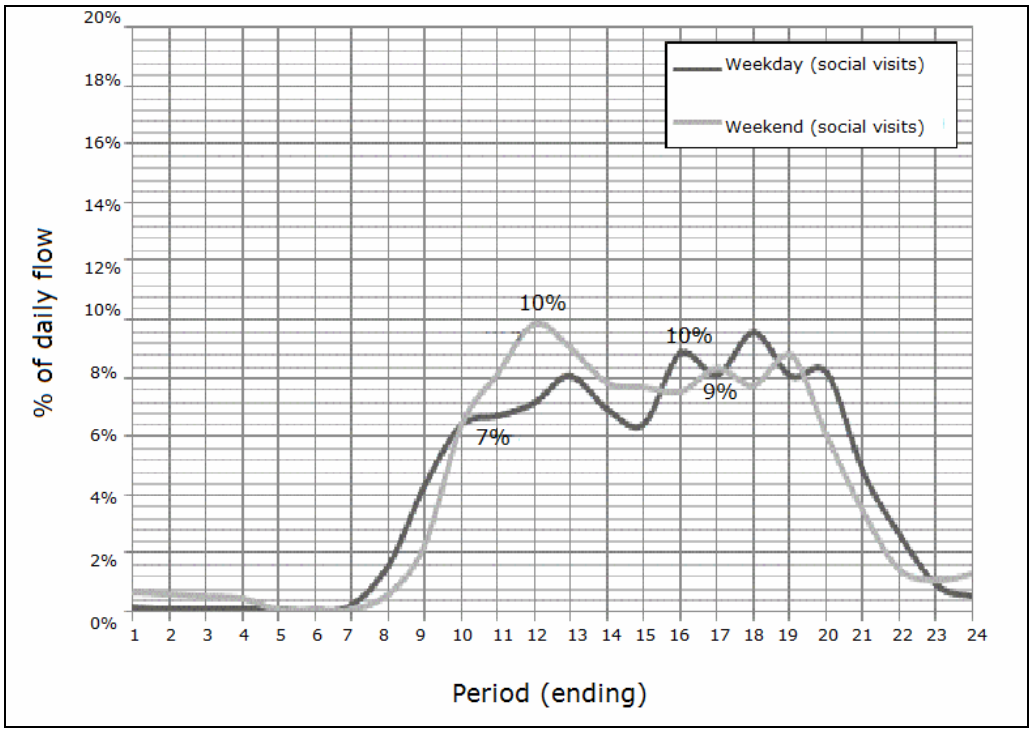

Figure 9.17 Proportions of daily trip leg arrivals for 'social visits' by time of day.

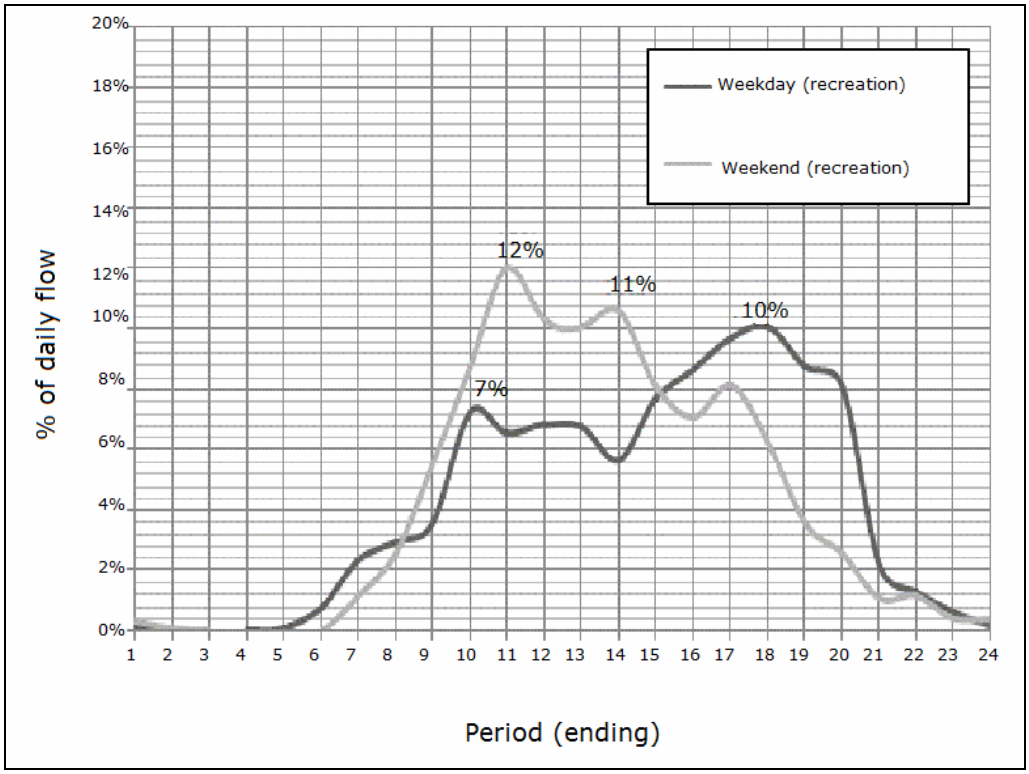

Figure 9.18 Proportions of daily arrivals for 'recreational' trip legs by time of day.

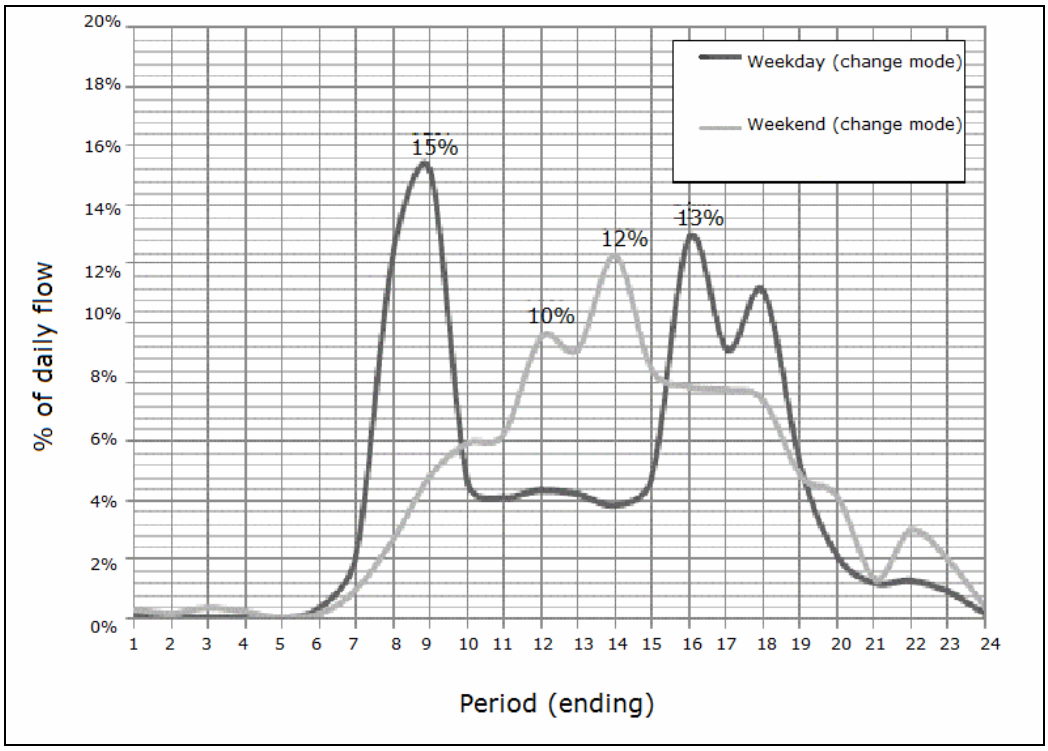

Figure 9.19 Proportions of daily trip leg arrivals to 'change mode' by time of day.

9.4 Proportion of weekday and weekend arrivals for all purposes by time of day in MUAs

The proportion of total weekday and weekend trip leg arrivals using motorised modes by time of day for all purposes and for all destinations in MUAs is illustrated in Figure 9.20. The graph reflects traffic patterns occurring throughout a typical weekday and weekend. The numbers of unweighted weekday and weekend trip leg arrivals using motorised modes, by time of the day, are given in Appendix D. The unweighted samples on weekdays (37 983) and weekends (15 711) are large. The introduction of the weekend surveys is an important development of the NZHTS questionnaire design compared with previous surveys.

The analysis of the proportions of total weekday and weekend trip leg arrivals, categorised by time of day in MUAs, shows that:

- Three peak hours are typical: the morning peak (approximately 0800h) is highest. The first afternoon peak occurs at approximately 1500h and the second afternoon peak occurs at approximately 1700h.
- The weekend peaks are not quite as great as the weekday peaks, and the highest occur at 1100h and 1200h.

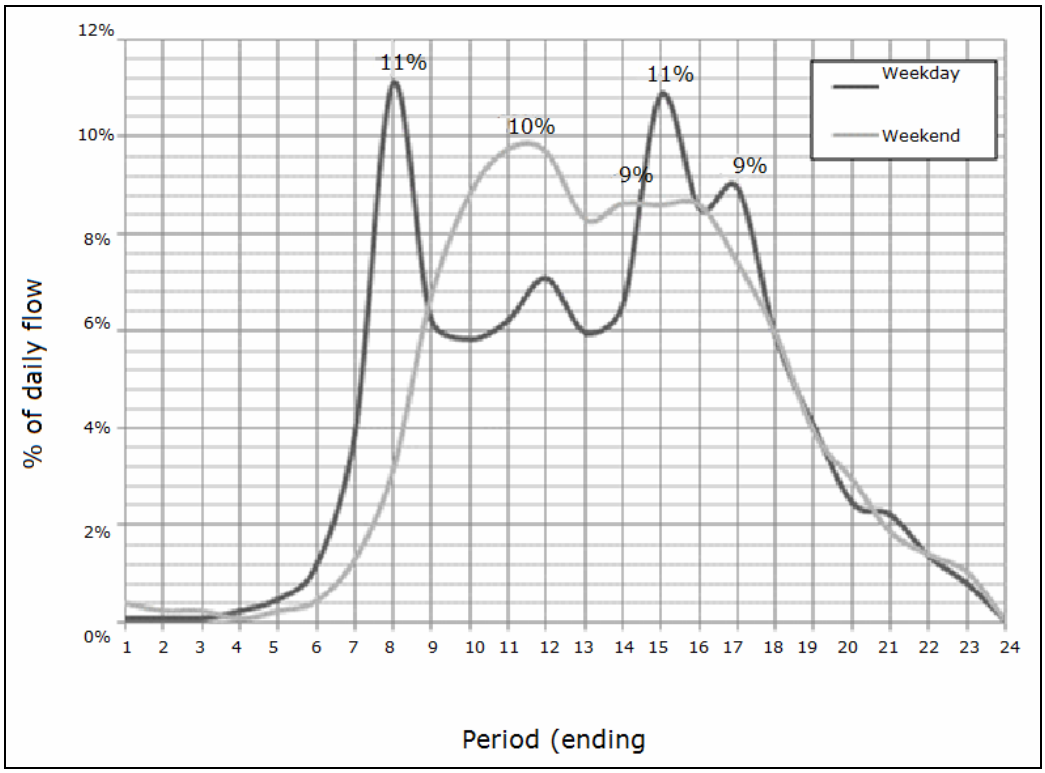

Figure 9.20 Total weekday and weekend arrival timess for motorised modes of transport as a proportion of daily flow.

9.5 Summary

This chapter has brought together all the modes and sorted them by purpose, by departure time and arrival time. The typical daily variations and peak hours (and the off-peaks), which might be used for design and policy formulation, are illustrated in Figures 9.1 to 9.20.

Departures from home are analysed in Section 9.2, and the graphs and tables illustrate how they are distributed for the defined trip leg purposes according to time of day. Both the typical weekday and weekend are included on all the graphs.

The departures from home in the 0800h–0900 hperiod are, of course, dominated by the trip legs to work and the trip legs to education providers (school or university). However, a range of shopping, recreation, social and other trip legs are also undertaken on an ongoing basis throughout the day. The unweighted number of trip legs surveyed that were used to derive these graphs are set out in Appendix D. The analysis of departures has not included non-home based trips i.e. all these graphs have trip legs starting from home. The data used in this analysis includes the travel surveyed in all three area types (MUAs, SUAs and RAs).

In Section 9.3, the arrival patterns at the destinations are analysed. This covers all trip leg purposes, including those from home to other destinations, along with the arrivals at an activity from all other origins. Again, the unweighted trip legs contributing to these graphs and tables are included in Appendix D.

Shopping, personal business/services, medical/dental, social and recreation trips tend to peak between 1100h and 1200h, and again at 1600h. However, recreation also has another peak after work between 1700h and 1800h. This information gives a clear indication as to the times when more detailed traffic surveys, and pedestrian and vehicle counts might be undertaken to study these trip leg purposes.

To give an understanding of overall daily travel patterns, an analysis of the movement in the MUAs alone is provided in Section 9.4. The analysis considers arrivals using motorised transport for all trip purposes at all destinations for typical weekdays and at weekends (Figure 9.20). On weekdays, two arrival times dominate: 0700–0800h and also 1400–1500h. These each represent 11 % of all trip legs by all modes during the day. In the weekend, a slightly lower peak of 10% between 1100h and 1200h is typical, with the afternoon maintaining a steady 9% through to 1600h before it declines.

10. Summary and recommendations

10.1 Summary

This report was commissioned as part of a National Travel Profile research project to analyse and make a 'Description of Daily Travel Patterns' from the continuing NZHTS 2003 to 2006. It was designed to provide a summarised description of New Zealand travel profiles on a national basis. It originated from a desire to provide a readily available information source which was convenient to researchers and transportation planners. It also provides an initial step toward later research as a basis for further analysis of the NZHTS data to describe trends and travel variables suited to the future prediction of travel. It is presented through tables, graphs and diagrams in a concise form to meet the information needs of a wide range of persons and institutions who are involved in transportation policy and planning issues.

The range of tables and graphs included cover comparisons of:

- personal travel,
- travel mode,
- travel purpose,
- social inclusion and accessibility, and
- travel by time of day.

The data has been sorted according to MUAs, SUAs and RAs.

The trip purposes, mode definitions and local government population groupings used here are those defined in the Ministry of Transport's NZHTS. The 2003–2006 dataset used here has not provided a basis for assessing trend analysis, or regional or more detailed comparison of urban settlements of different sizes. Such trends and inter-regional comparisons will, however, be capable of analysis when the fourth year (2007) of NZHTS surveys are included in the continuing dataset.

This report meets the research objectives of describing, on a national basis, the daily travel profile derived from the NZHTS.

10.2 Some ongoing matters

During this research, several issues emerged, some of which require further intensive investigation as research projects. This way, greater use could be made of the NZHTS datasets in the future. Other matters would also benefit from further analysis of the existing datasets. These would integrate the current research with a range of other related research projects.

Three aspects warranting more analysis and research, and which also receive priority in the recommendations which follow, are:

- As already mentioned, this present project and report is limited by not having a five-year dataset. When the 2007 NZHTS surveys are added, this will enable regional and city-based analyses and comparisons of travel trends over the five year period to be undertaken.
- The present three groupings (MUA, SUA, RA) are defined by local government boundaries which, in some cases, do not reflect transportation catchments and the differences of travel generated by urban and rural settlement patterns. In some metropolitan urban regions, e.g. Auckland and Wellington, the present groupings will, after the 2007 surveys are added, enable comparative analysis. But in others, such as Canterbury, Nelson and the Bay of Plenty, the data should be disaggregated and regrouped, allowing valid comparison of MUA and RA household travel patterns.

  The conclusion of this research project is that such re-sorting of the dataset would bring a better understanding of the variations in travel patterns. It would also improve the prospect of being able to develop transportation models for trip calculation and prediction purposes from the NZHTS surveys. This would have significant benefits to those practitioners wishing to take advantage of the NZHTS data when developing transportation policy, planning and Regional Land Transport Strategies.
- The trip legs used in the NZHTS survey database are related to trip purposes with only some of the land uses defined at each end (e.g. home, shops and education are defined, but industries and offices are not). Progress is being made in other research that links the ‘trip chains’ and ‘tours’. However, for transportation planning purposes, this will also need to be extended to include definitions of the land uses at each end of the significant trip chains so the information can be used in future spatial land-use/transportation modelling.

Further work reconciling these two aspects, some of which is in hand in other research projects, would give the NZHTS greater usefulness in developing models for Regional Land Transport Strategies and transportation assessments necessary for the spatial planning associated with urban development strategies and district plan.

The NZHTS datasets contain a wealth of information and many additional analyses might have been undertaken in this research using the present NZHTS dataset. In this group,

other matters are identified here where, if time had permitted, additional analysis could have been undertaken:

- **Vehicle trip types:** Research should extend the analysis of the existing NZHTS data file to identify the proportion of trip legs or trip chains falling within the traffic engineering definitions of primary trips, bypass trips and diverted trips for different purposes. The research outcome would enable practitioners making development transportation assessments to identify these component parts and the transport effects caused by various types of development at different locations along a trip chain. This would then enable an assessment of whether the visits are newly generated trips, or whether they are diversions of existing trips or the primary destination of a particular trip.
- **Active mode trips:** Extending the analysis of the distance, time, locations and land uses visited by active modes (pedestrians and cyclists) would provide more detail and possible models to explain travel by these modes. This analysis might also identify walking/cycling thresholds on different street classes in different sizes of settlement to assist in future planning for sustainable transportation. This is complementary to the approved NZTA project Accessibility Research (LTR 50/07).
- **Personal vehicle availability:** Research should extend the household information analysis to discover each individual's use of household cars. This would involve merging the vehicle use and the vehicle database in the existing dataset to assess the trips, distance and time per person per year related to households having no car, one car, or two or more cars. It would also yield information on the frequency of vehicle driver and passenger trips in each of the household's cars.

It is also observed that some of the information derived from this project as well as from the further analysis outlined above has immediate application to other research already commissioned by NZTA.

This present project was proposed as a preliminary study. This was seen as leading to further analysis and grouping of variables for predicting future transportation planning. The matters referred above are relevant to testing variables for travel prediction and development of spatial planning policies at regional and district levels. Such regional and district planning will derive additional benefits from the results of the NZHTS when these are in a suitable form for assisting transportation planning, both at regional and district levels.

10.3 Recommendations

10.3.1 Recommendations to NZTA

- This report should be published and made available to practitioners working in the transportation field as a national summary of travel profiles 2003–2006 derived from the NZHST.
- Arising from the conclusions now available, including the addition of the fourth year (2003–2007) of the NZHTS survey, a further report should be prepared to identify trends in these travel profiles over time, and to ascertain the regional comparisons for the three MUAs, the SUAs and the RAs identifying travel patterns for communities of different sizes.
- The next stage in this research should be to investigate the variables obtained in the NZHTS. This would improve the definition of household characteristics, but it would also identify trip chains or tours which contribute to making up trip purposes between significant and defined land uses at the origin and destination of journeys. This would allow researchers and planners to:
  - assess how well the factors surveyed in the NZHTS act as predictive variables in forecasting future travel patterns of trip generation and trip attractions;
  - investigate variables used in the household characteristics surveyed in the NZHTS to determine if they can be used to define 'household categories' suited for use in future travel prediction;
  - compare the NZHTS household survey results with the Regional Council household surveys undertaken in Auckland, Wellington and Christchurch, and compare the NZHTS travel characteristics and surveyed variables with the predictive variables which have been selected in these complementary regional studies; and
  - establish the degree of contrast between rural areas, urban settlements of varying sizes, major cities and the three metropolitan areas so as to provide descriptions of the differences. This information can then be applied to the Regional Long-Term Strategy in the different local government regions.

10.3.2 Recommendations to the MoT

- When the next phase of reporting the NZHTS is completed, a report covering the 2003–2007 surveys (similar to that presented here) should be prepared, including travel trends over that period, and comparisons between metropolitan areas, other urban areas and rural settlements.
- Questions should be added to the survey that cover the personal situation and reasons (e.g. convenience, safety, economy, temporary situation etc.) for individuals selecting to travel 'to work' or 'to shop' by their selected mode. If, because of the length of the present survey, this cannot be included in the present NZHTS then some other national research, based on household surveys, is desirable to cover the reasons for choice of mode being made by individuals in different communities.

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Appendix A: NZHTS interviewer household response – form 1

This appendix contains a facsimile of the household survey form used by investigators to collect the household information used in the NZHTS.

NEW ZEALAND TRAVEL SURVEY

IN CONFIDENCE

Form 1 Household Form

Workload number

Travel dates: Day 1

Day 2

Scheduled interviewer no:

Actual interviewer no:

Summary of calls made to household

	Before Travel		After Travel	
	Date	Time	Date	Time
1				
2				
3				
4				
5				
6				
7				
8				

Appointments for interview

Observe

Home structure type

Separate house	1	
2 flats or houses joined together	2	
3 or more flats or houses joined together	3	
Flat or house attached to a business or shop	4	
Retirement village	5	
Bach, crib or hut (not a work camp)	6	
Caravan, cabin or tent	7	
Non private dwelling (hostel, motel etc)	8	Do not survey

Security entry system

No system	0	
Residence with locked gates	1	
Apartment block with entry phone	2	
Gated community	3	
Retirement village with security entry	4	
Other (specify) _____	9	

_____

Comments

Good morning, I'm _____ from Opus International Consultants.
This is my identification card. The Ministry of Transport has sent you a letter saying I'd be calling.

1. Could you please tell me who usually lives here, including any visitors staying. Starting with you...
In survey if in New Zealand on at least one travel day
and permanently live at this address
or guest staying until interview day.

Only fill in g + h if using paper Person Form

Person Number	(a) First name/ identifier	(b) Relationship to person 1	(c) Gender	(d) What is your/ _____'s date of birth? If reluctant ask (e)			(e) Do you mind telling me how old you are [roughly?]		(f) In survey? In 1 = HH member 2 = Visitor (surveyed) Out: 3 = Visitor (gone by interview day) 4 = Out of NZ on both travel days	(g) Post – travel interview completed? 1 = Yes 2 = No 3 = Partial	(h) Reason not completed 1 = Refused 2 = Non-contact 3 = Language difficulties 4 = Death/illness in HH
			M/F	Day	Month	Year	Age	Tick if guess			
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

Observe

2. Household type

Person living alone	1	☐
Married/de facto couple only	2	☐
Other adults only	3	☐
Family (including extended) with children	4	☐
Family with adults only	5	☐
Single adult with other adult only	6	☐
Single adult living with children	7	☐
Other (specify) _____	8	☐

3. How many bicycles in working order are kept at this household?
(Include children's bicycles but not tricycles)

Number of bicycles ☐

4a. Could you give me a list of all vehicles used by your household and usually parked here overnight, whether private or company-owned?

Nil vehicles in household (Go to 4b) ☐

(a) Vehicle Number	(b) Make	(c) Model	(d) Year	(e) Body type 1 = Car/SW 2 = Van/Ute/Panel Van 3 = 4WD type 4 = Truck 5 = Taxi 6 = Motorbike 7 = Other (specify) Num	Write in # value	(f) Engine size/ CCs	(g) Fuel 1 = Petrol 2 = Diesel 3 = LPG/CNG 4 = Dual fuel 5 = Electric 6 = Other (specify) Num	Write in # value	(h) Who owns the vehicle? 1 = HH member 2 = Company owned or leased 3 = Rental 4 = Other (specify) Num	Write in # value
1										
2										
3										
4										
5										
6										
If using paper Person Form, record non-household vehicle details below										
A										
B										
C										

4b. Prompt: Does this include all vehicles used on the road – trucks, vans, motor bikes, tractors...? ☐

5. Appointments

a. Each household in the survey has been assigned two travel days.
Your household's days are _____ and _____.

b. Are you/is anyone in the household likely to make more than 10 trips on either of those days?
Leave extra memory joggers as required.

c. Make appointments for all post-travel interviews. Record on front page.

d. If the need arises, may we phone you? Yes ☐ Phone number _____
No ☐

Response report – pre-contact		
		Tick
Full response of all 'in survey' people	1	☐
Sample loss:		
All persons in household 'out of survey'	2	☐
Vacant dwelling	3	☐
Dwelling under construction	4	☐
Non-dwelling/Vacant lot	5	☐
Derelict dwelling	6	☐
Dwelling demolished	7	☐
Hotel/motel/rest home or other institution	8	☐

No pre-contact:		*Tick*
No contact with household	9	☐
Refused pre-contact	10	☐
No pre-contact (full non-response) due to		
Language problems	11	☐
Death/illness in household	12	☐

Response report – post-travel interview	*Number*
Number of 'in survey' people in household	
Number post-travel interviews completed	

Comments

Refusal report

Appendix B: NZHTS personal questionnaire – form 2

This appendix contains a facsimile of the personal survey form used by investigators to collect the personal information used in the NZHTS.

Ministry of Transport
TE MANATŪ WAKA

NEW ZEALAND TRAVEL SURVEY

FORM 2 — PERSON FORM

Interview Date_____

--- In Confidence ---

Sample No. ☐☐☐☐☐☐☐☐

Person No. ☐

Person name _____

Person ☐ 1 (Go to Q1)

Proxy ☐ 2 Reason for proxy:

Child 0–9 ☐ Speech ☐

Language difficulties ☐ Insufficient comprehension ☐

Hearing ☐ Long-term illness ☐

INTRODUCTION

I have a few questions before we discuss your/_____'s travel details. Please keep your memory jogger, and use it when we get to the travel questions, to help you recall your trips. Here are some show cards I'll refer to as we go.

1. Looking at card A, please could you tell me which of these activities apply to you/_____ at the moment. *(Show card A)*

Not yet at school ..... ☐ 1
Student – Full-time..... ☐ 2
– Part-time ..... ☐ 3
Work – Full-time..... ☐ 4
– Part-time ..... ☐ 5
– Casual..... ☐ 6
Looking for work/unemployed..... ☐ 7
Looking after home and family..... ☐ 8
Retired ..... ☐ 9
Other beneficiary..... ☐ A
Other *(specify)*_____
_____ ☐ B

2. *SEQUENCE GUIDE:* • *If student (Codes 2 or 3 in Q. 1), go to Q. 3.*
• *Otherwise go to Q. 4.*

3. What school or educational institution do you/does _____ attend?

Name _____
Street No. ☐☐☐
Street _____
Suburb _____
Town/City _____

FORM 2 – VERSION D – Feb 06

4. *SEQUENCE GUIDE: • If worker (Codes 4, 5 or 6 in Q. 1), go to Q. 5.*
• Otherwise go to Q. 10.

5. Do you have more than one paid job?
Yes ☐ 1
No *(Go to Q.7)* ☐ 2

6. I would now like to ask you about the job in which you usually work the most hours.

7. What kind of work do you do (in your main job)?
_____
_____ ☐

8. Now looking at card B, (in your main job) do you work
For an employer for wages or salary? ☐ 1
In your own business
With employees? ☐ 2
Without employees? ☐ 3
Without pay in a family business? ☐ 4
Other ☐ 5

9. And could I have the exact address where you work (in this job)?
Identification _____
Street No. ☐☐☐
Street _____
Suburb _____
Town/City _____
OR Home ☐ 001
OR No fixed place of work ☐ 999

FORM 2 – [illegible]

TRAVEL DAY 1

SECTION B: TRAVEL DAY 1 — *First Travel Date* | | | | | | | |

10. Now I'd like to ask you about your/_____'s travel from 4 o'clock *(First Day)* morning till 4 o'clock *(Second Day)* morning.
By travel I mean, for example, walking to a friend's place, catching a bus ... or anytime you/_____ left the house, say to buy a newspaper.

11. Do you have your/ _____'s memory jogger handy?
- Yes ..... ☐ 1
- No ..... ☐ 2

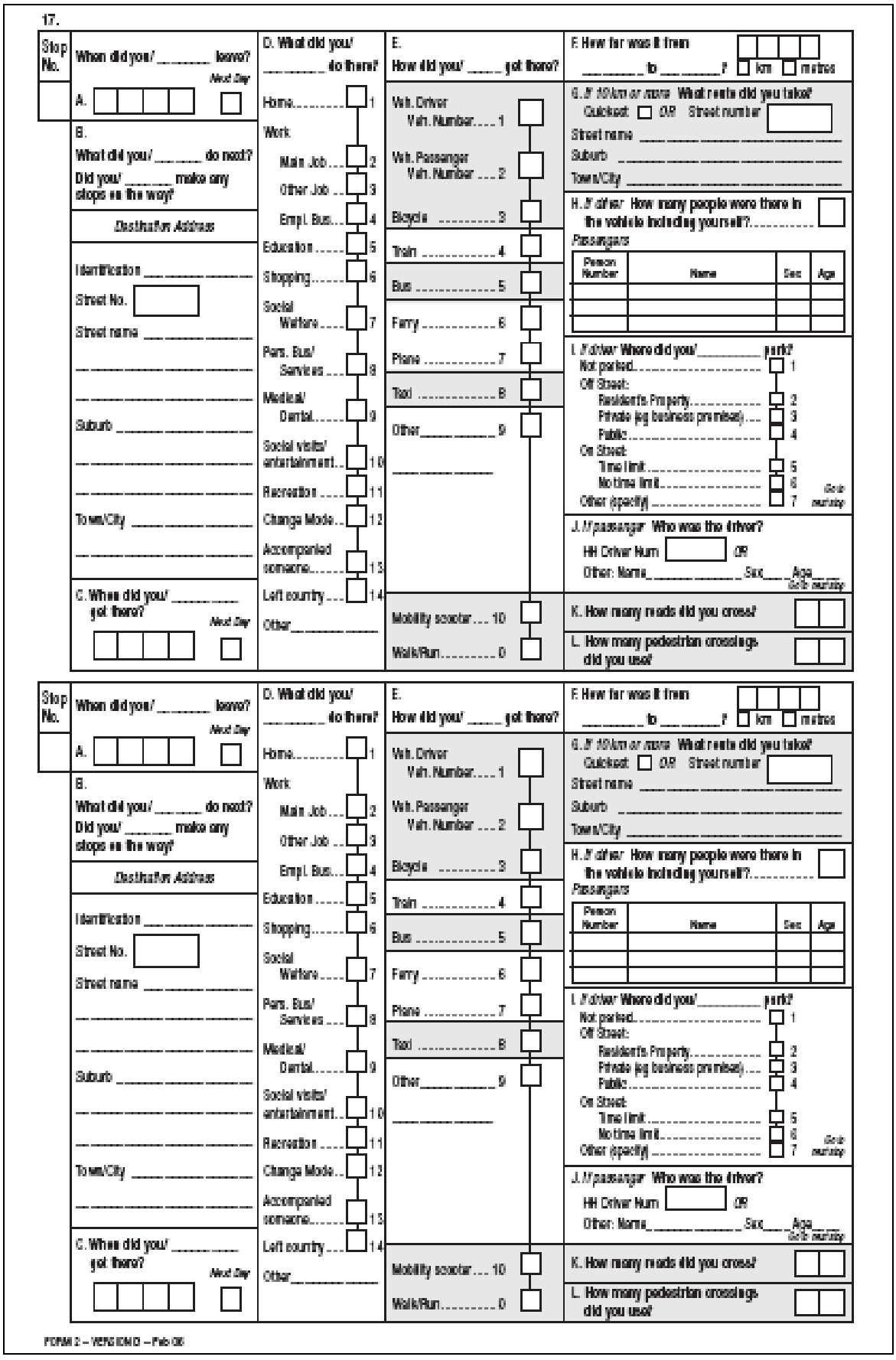
12. Did you/ _____ go *anywhere* at all on *(First Day)*?
Remember this includes even walking down the street to buy some milk or bread...
- Yes ..... ☐ 1
- No ..... ☐ 2

14. Where did you/ _____ start the day on *(First Day)*?
- Home *(Go to Q. 16)* ..... ☐ 1
- Work – Main Job *(Go to Q. 16)* ..... ☐ 2
- Work – Other Job ..... ☐ 3
- Social/Recreation ..... ☐ 4
- Hospital/Medical ..... ☐ 5
- Other _____ ☐ 6

15. And could I have the address?
- Identification _____
- Street No. ☐
- Street _____
- Suburb _____
- Town/City _____

16. *SEQUENCE GUIDE:*
- *If traveller (Code 1 in Q. 12), go to Q. 17.*
- *If non-traveller (Code 2 in Q. 12), go to Q. 16.*

FORM 2 – VERSION 0 – Feb 00


17.
Stop No.
When did you/ _____ leave?
Next Day
A.
B.
What did you/ _____ do next?
Did you/ _____ make any stops on the way?
Destination Address
Identification
Street No.
Street name
Suburb
Town/City
C. When did you/ _____ get there?
Next Day
D. What did you/ _____ do there?
Home 1
Work:
Main Job 2
Other Job 3
Empl. Bus 4
Education 5
Shopping 6
Social Welfare 7
Pers. Bus/ Services 8
Medical/ Dental 9
Social visits/ entertainment 10
Recreation 11
Change Mode 12
Accompanied someone 13
Left country 14
Other
E.
How did you/ _____ get there?
Veh. Driver Veh. Number 1
Veh. Passenger Veh. Number 2
Bicycle 3
Train 4
Bus 5
Ferry 6
Plane 7
Taxi 8
Other 9
Mobility scooter 10
Walk/Run 0
F. How far was it from _____ to _____? km miles
G. If 10 km or more What route did you take?
Quickest OR Street number
Street name
Suburb
Town/City
H. If other How many people were there in the vehicle including yourself?
Passengers
Person Number
Name
Sex
Age
I. If driver Where did you/ _____ park?
Not parked 1
Off Street:
Resident's Property 2
Private (eg business premises) 3
Public 4
On Street:
Time limit 5
No time limit 6
Other (specify) 7
Go to next stop
J. If passenger Who was the driver?
HH Driver Num OR
Other: Name Sex Age
Go to next stop
K. How many roads did you cross?
L. How many pedestrian crossings did you use?
FORM 2 – VERSION 0 – Feb 08

TRAVEL DAY 2

SECTION C: TRAVEL DAY 2 — *Second Travel Date* ☐☐☐☐☐☐

18. Now I'd like to ask you about your/_____'s travel from 4 o'clock *(Second Day)* morning till 4 o'clock *(Next Day)* morning.

19. Do you have a memory jogger for this day?
- Yes ..... ☐ 1
- No ..... ☐ 2

20. Did you/ _____ go anywhere at all on *(Second Day)*? Remember this includes even walking down the street to buy some milk or bread ...
- Yes ..... ☐ 1
- No ..... ☐ 2

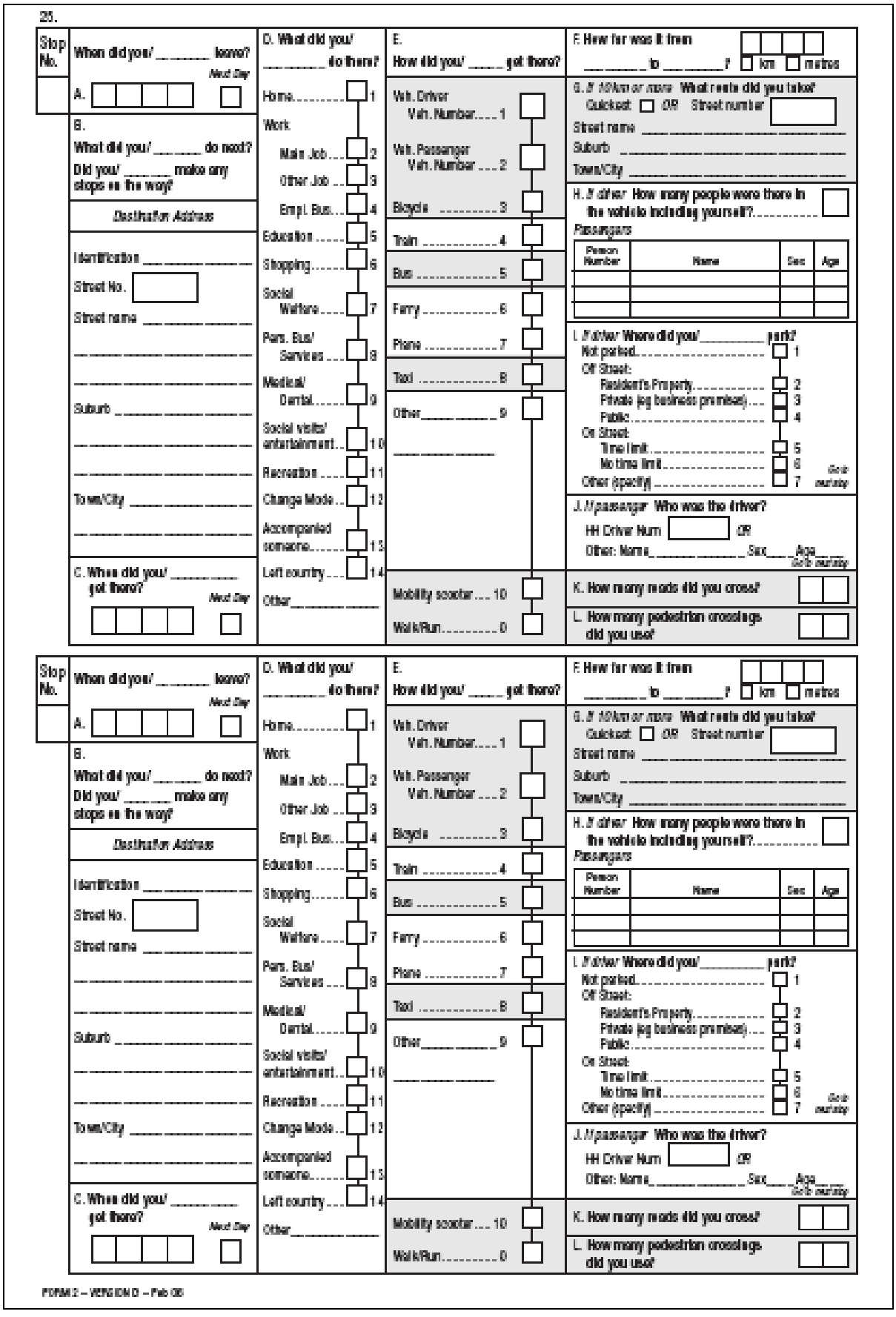
22. Where did you/ _____ start the day on *(Second Day)*?
- Home *(Go to Q. 24)* ..... ☐ 1
- Work – Main Job *(Go to Q. 24)* ..... ☐ 2
- Work – Other Job ..... ☐ 3
- Social/Recreation ..... ☐ 4
- Hospital/Medical ..... ☐ 5
- Other ..... ☐ 6

23. And could I have the address?

Identification _____
Street No. ☐☐☐
Street _____
Suburb _____
Town/City _____

24. *SEQUENCE GUIDE:*
- *If traveller (Code 1 in Q. 20), go to Q. 25.*
- *If non-traveller (Code 2 in Q. 20), go to Q. 26.*

FORM 2 – VERSION D – Feb 00


25.
Stop No.
A. When did you/ _____ leave? Next Day
B. What did you/ _____ do next? Did you/ _____ make any stops on the way?
Destination Address
Identification
Street No.
Street name
Suburb
Town/City
C. When did you/ _____ get there? Next Day
D. What did you/ _____ do there?
Home 1
Work
Main Job 2
Other Job 3
Empl. Bus. 4
Education 5
Shopping 6
Social Welfare 7
Pers. Bus/ Services 8
Medical/ Dental 9
Social visits/ entertainment 10
Recreation 11
Change Mode 12
Accompanied someone 13
Left country 14
Other
E. How did you/ _____ get there?
Veh. Driver Veh. Number 1
Veh. Passenger Veh. Number 2
Bicycle 3
Train 4
Bus 5
Ferry 6
Plane 7
Taxi 8
Other 9
Mobility scooter 10
Walk/Run 0
F. How far was it from _____ to _____? km metres
G. If 10Km or more What route did you take? Quickest OR Street number
Street name
Suburb
Town/City
H. If other How many people were there in the vehicle including yourself?
Passengers
Person Number
Name
Sex
Age
I. If driver Where did you/ _____ park?
Not parked 1
Off Street:
Resident's Property 2
Private (eg business premises) 3
Public 4
On Street:
Time limit 5
No time limit 6
Other (specify) 7
Go to next stop
J. If passenger Who was the driver?
HH Driver Num OR
Other: Name Sex Age
Go to next stop
K. How many roads did you cross?
L. How many pedestrian crossings did you use?
Stop No.
A. When did you/ _____ leave? Next Day
B. What did you/ _____ do next? Did you/ _____ make any stops on the way?
Destination Address
Identification
Street No.
Street name
Suburb
Town/City
C. When did you/ _____ get there? Next Day
D. What did you/ _____ do there?
Home 1
Work
Main Job 2
Other Job 3
Empl. Bus. 4
Education 5
Shopping 6
Social Welfare 7
Pers. Bus/ Services 8
Medical/ Dental 9
Social visits/ entertainment 10
Recreation 11
Change Mode 12
Accompanied someone 13
Left country 14
Other
E. How did you/ _____ get there?
Veh. Driver Veh. Number 1
Veh. Passenger Veh. Number 2
Bicycle 3
Train 4
Bus 5
Ferry 6
Plane 7
Taxi 8
Other 9
Mobility scooter 10
Walk/Run 0
F. How far was it from _____ to _____? km metres
G. If 10Km or more What route did you take? Quickest OR Street number
Street name
Suburb
Town/City
H. If other How many people were there in the vehicle including yourself?
Passengers
Person Number
Name
Sex
Age
I. If driver Where did you/ _____ park?
Not parked 1
Off Street:
Resident's Property 2
Private (eg business premises) 3
Public 4
On Street:
Time limit 5
No time limit 6
Other (specify) 7
Go to next stop
J. If passenger Who was the driver?
HH Driver Num OR
Other: Name Sex Age
Go to next stop
K. How many roads did you cross?
L. How many pedestrian crossings did you use?
FORM 2 – VERSION 0 – Feb 05

SEQUENCE GUIDE: • *If 15 years or older go to Q. 26.*
• *Otherwise go to Q. 32.*

ALCOHOL

26. Thinking about the day before your first travel day, that is_____. Did you drink any alcohol at all after 6 pm on this day? This includes at home, while visiting, or anywhere else, like work, a club, pub or cafe.
Yes ☐ 1
No ☐ 2

27. And did you drink any alcohol at all on *(First Travel Day)*? Anywhere at all?
Yes ☐ 1
No ☐ 2

28. Did you drink any alcohol at all on *(Second Travel Day)*? Anywhere at all?
Yes ☐ 1
No ☐ 2

29. *SEQUENCE GUIDE:* • *If yes to Q26, go to Q. 26a.*
• *Otherwise go to box 30.*

So, thinking about *(Day before First Travel Day _____)* again,

26a. Between when and when did you have these drinks? *Prompt:* Any other times (at home?) *(Record all times)*	26b. And from card C, where-abouts did you have this drink/these drinks? *(Show card C)*	26c. Now turn the page to the photos. From these photos, how many of each of these did you have? *(Show photos)* No.	Type
☐☐☐☐ Start Next day ☐ ☐☐☐☐ Finish Next day ☐ *(24 hour clock) hh:mm*	Code ☐ *OR* Some-where else ☐ 10 _____		
☐☐☐☐ Start Next day ☐ ☐☐☐☐ Finish Next day ☐	Code ☐ *OR* Some-where else ☐ 10 _____		
☐☐☐☐ Start Next day ☐ ☐☐☐☐ Finish Next day ☐	Code ☐ *OR* Some-where else ☐ 10 _____		

26d. *(Check back with respondent to clarify, specifying amounts.)*
So let me check I've got that right, that was... *(read back answers, eg 2 glasses of sherry and 4 cans of beer)*

30. *SEQUENCE GUIDE:* • *If drank on TD 1 (Yes to Q. 27), go to Q. 27a.*
• *Otherwise go to box 31.*

FORM 2 – VERSION 0 – Feb 08

27a. And thinking now about *(First Travel Day)*, between when and when did you have the drinks? *Prompt* Any other times (at home?) *(Record all times)*

27b. And from card C, whereabouts did you have this drink/these drinks? *(Show card C)*

27c. From these photos, how many of each of these did you have? *(Show photos)*

				No.	Type
Start ☐☐☐☐	Next day ☐	Code ☐☐		☐☐	☐☐
Finish ☐☐☐☐	Next day ☐	*OR* Somewhere else ☐☐	10	☐☐	☐☐
(24 hour clock) hh:mm				☐☐	☐☐
Start ☐☐☐☐	Next day ☐	Code ☐☐		☐☐	☐☐
Finish ☐☐☐☐	Next day ☐	*OR* Somewhere else ☐☐	10	☐☐	☐☐
				☐☐	☐☐
Start ☐☐☐☐	Next day ☐	Code ☐☐		☐☐	☐☐
Finish ☐☐☐☐	Next day ☐	*OR* Somewhere else ☐☐	10	☐☐	☐☐
				☐☐	☐☐

27d. *(Check back with respondent to clarify, specifying amounts.)*
So let me check I've got that right, that was... *(read back answers, eg 2 glasses of sherry and 4 cans of beer)*

31. *SEQUENCE GUIDE:* • *If drank on TD 2 (Yes to Q. 26), go to Q. 28a*
• *Otherwise go to Q.32.*

28a. And on *(Second Travel Day)*, between when and when did you have the drinks? *Prompt:* Any other times (at home?)

28b. And from card C, whereabouts did you have this drink/these drinks? *(Show card C)*

28c. From these photos, how many of each of these did you have? *(Show photos)*

(Record all times)

				No.	Type
Start ☐☐☐☐	Next day ☐	Code ☐☐		☐☐	☐☐
Finish ☐☐☐☐	Next day ☐	*OR* Somewhere else ☐☐	10	☐☐	☐☐
(24 hour clock) hh:mm				☐☐	☐☐
Start ☐☐☐☐	Next day ☐	Code ☐☐		☐☐	☐☐
Finish ☐☐☐☐	Next day ☐	*OR* Somewhere else ☐☐	10	☐☐	☐☐
				☐☐	☐☐
Start ☐☐☐☐	Next day ☐	Code ☐☐		☐☐	☐☐
Finish ☐☐☐☐	Next day ☐	*OR* Somewhere else ☐☐	10	☐☐	☐☐
				☐☐	☐☐

28d. *(Check back with respondent to clarify, specifying amounts.)*
So let me check I've got that right, that was ... *(read back answers, eg 2 glasses of sherry and 4 cans of beer)*

ACCIDENTS

32. Thinking back over the last 12 months, that is to *(this date)* last year ... Have you/has _____ been involved in a road accident?

And by accident I mean, if you/they were driving or a passenger in a motorbike, truck, bus, or car, or riding a bike, or walking, and someone was hurt or a vehicle had to be towed – even if it was not reported. Anything you can think of?

Yes ..... ☐ 1
No *(Go to Q.34)* ..... ☐ 2

FORM 2 – VERSION D – Feb 00

33. How many accidents have you/they had since _____ ? ☐

34. Now thinking back to the 12 months before that, between *(this time last year)* and *(this time the year before)*. Were you/they involved in an accident of any kind during that time?

Prompt: Remember to include any which may have happened when you/they were driving, or a passenger, or on a bike or walking, and someone was hurt or a vehicle had to be towed.

Yes ..... ☐ 1
No *(Go to Q.36)*..... ☐ 2

35. How many accidents did you/they have in that 12 month period? ☐

36. *SEQUENCE GUIDE:* • *If accidents, (code 1 in Q. 32 or 34), go to Q. 37.*
• *If no accidents, (code 2 in Q. 32 or 34), go to Q. 78.*

37. Thinking back to this accident (the last time you/they had an accident), when did it happen?

What date was it? ☐☐☐☐☐☐☐☐ (D D M M Y Y Y Y)

Don't know = – –

Which day of the week?

Monday ..... ☐ 1
Tuesday ..... ☐ 2
Wednesday ..... ☐ 3
Thursday ..... ☐ 4
Friday ..... ☐ 5
Saturday ..... ☐ 6
Sunday ..... ☐ 7
Weekday ..... ☐ 8
Weekend ..... ☐ 9
Don't Know ..... ☐ A

38. What time of day was it? *Exact* ☐☐☐☐ (H H M M)

or between ☐☐☐☐ (H H M M) *and* ☐☐☐☐ (H H M M)

39. Where did it happen – in which suburb or town, or on what highway did it happen?

Identification _____
Street No. ☐
Street _____
Suburb/Town or City _____

41. Did anyone have to go to hospital – you or anyone else?

Yes ..... ☐ 1
No *(Go to Q.43)*..... ☐ 2

42. Did you/_____ spend any nights in hospital?

Yes ..... ☐ 1
No ..... ☐ 2

FORM 2 – VERSION D – Feb 05

43. Did anyone receive any injuries at all?
- Yes ☐ 1
- No *(Go to Q.46)* ☐ 2

45. Were you/was _____ personally injured?
- Yes ☐ 1
- No ☐ 2

46. In this accident, were you/they…
- The driver of a motor vehicle ☐ 1
- A passenger in a motor vehicle ☐ 2
- Walking *(Go to Q. 49)* ☐ 3
- Riding a bicycle, or *(Go to Q. 49)* ☐ 4
- Other, eg skateboard, horse, mobility scooter *(Go to Q. 49)* ☐ 5

48. Which vehicle were you in?
(Prompt if necessary) Was it one of your current household vehicles or a different one?
Vehicle number ☐
(If non HH vehicle, add to HH form Q. 4)

49. Altogether, … were involved? *(Write in number)*
- How many cars ☐ A
- How many vans ☐ B
- How many trucks ☐ C
- How many motorbikes ☐ D
- How many 4-wheel drive vehicles ☐ E
- How many bicycles ☐ F
- How many pedestrians ☐ G
- How many other objects, like trees or poles .. ☐ H

(specify) _____

50. *SEQUENCE GUIDE:*
- *If the accident involved at least one motorised vehicle (A-E), go to Q. 52.*
- *Otherwise go to Q. 53.*

52. How would you describe the accident?
- One vehicle hitting a parked vehicle/s only ☐ 1
- One vehicle hitting the back of another (not parked) ☐ 2
- A head-on collision ☐ 3
- Vehicles hitting each other at an angle ☐ 4
- Hitting an object of some sort ☐ 5
- One vehicle hitting a pedestrian or cyclist ☐ 7
- Something else? *(specify)*_____ ☐ 8

53. In what speed zone did the accident happen?
- 70 km/h or less ☐ 1
- Over 70 km/h ☐ 2
- Car park/driveway ☐ 3

FORM 2 – VERSION D – Feb 00

54. Was the accident reported to the police, at any time?

Yes 1
No 2
Don't know 3

56. *SEQUENCE GUIDE:* • *If more accidents in last 2 years, go to Q. 57.*
• *If no more accidents, go to Q. 78.*

57. Thinking back to this accident (the last time you/they had an accident), when did it happen?

What date was it? ☐☐☐☐☐☐☐☐
D D M M Y Y Y Y

Don't know = – –

Which day of the week?

Monday 1
Tuesday 2
Wednesday 3
Thursday 4
Friday 5
Saturday 6
Sunday 7
Weekday 8
Weekend 9
Don't Know ..... A

58. What time of day was it? *Exact* ☐☐☐☐
H H M M

or between ☐☐☐☐ *and* ☐☐☐☐
H H M M H H M M

59. Where did it happen – in which suburb or town, or on what highway did it happen?

Identification _____
Street No. ☐☐☐
Street _____
Suburb/town or city _____

61. Did anyone have to go to hospital – you or anyone else?

Yes 1
No *(Go to Q.63)* 2

62. Did you/_____ spend any nights in hospital?

Yes 1
No 2

63. Did anyone receive any injuries at all?

Yes 1
No *(Go to Q.66)* 2

65. Were you/was _____ personally injured?

Yes 1
No 2

FORM 2 – VERSION 0 – Feb 05

66. In this accident, were you/they... The driver of a motor vehicle ☐ 1
A passenger in a motor vehicle ☐ 2
Walking *(Go to Q. 69)* ☐ 3
Riding a bicycle, or *(Go to Q. 69)* ☐ 4
Other, eg skateboard, horse, mobility scooter *(Go to Q. 69)* ☐ 5

68. Which vehicle were you in?
(Prompt if necessary) Was it one of your current household vehicles or a different one?
Vehicle number ☐
(If non HH vehicle, add to HH form Q. 4)

69. Altogether ... were involved? *(Write in number)*
How many cars ☐ A
How many vans ☐ B
How many trucks ☐ C
How many motorbikes ☐ D
How many 4-wheel drive vehicles ☐ E
How many bicycles ☐ F
How many pedestrians ☐ G
How many other objects, like trees or poles .. ☐ H
(specify) _____

70. *SEQUENCE GUIDE:*
- *If the accident involved at least one motorised vehicle (A-E), go to Q. 72.*
- *Otherwise go to Q. 73.*

72. How would you describe the accident?
One vehicle hitting a parked vehicle/s only ☐ 1
One vehicle hitting the back of another (not parked) ☐ 2
A head-on collision ☐ 3
Vehicles hitting each other at an angle ☐ 4
Hitting an object of some sort ☐ 5
One vehicle hitting a pedestrian or cyclist ☐ 7
Something else? *(specify)* _____ ☐ 6

73. In what speed zone did the accident happen?
70 km/h or less ☐ 1
Over 70 km/h ☐ 2
Car park/driveway ☐ 3

74. Was the accident reported to the police, at any time?
Yes ☐ 1
No ☐ 2
Don't know ☐ 3

76. *SEQUENCE GUIDE:*
- *If more accidents in last 2 years, fill in extra form.*
- *If no more accidents, go to Q. 78.*

FORM 2 – VERSION 0 – Feb 00

BICYCLING

78. In the last 12 months, that is since _____ last year, have you ridden a bicycle at all?
- Yes 1
- No *(Go to Q.79a)* 2

79. Thinking about just the last four weeks, how often have you ridden a bike? *(Show card D)*
- Not at all this month ..... A
- On 1–4 days this month ..... B
- On 5–9 days this month C
- On 10–19 days this month ..... D
- On 20 days or more this month ..... E

79a. *SEQUENCE GUIDE:* • *If UNDER 15 YEARS, go to Q. 84.*
• *Otherwise go to Q. 80.*

KILOMETRES DRIVEN

80. Looking at the broad categories on card E: In your life so far, could you estimate how many kilometres you have done as the driver of any motor vehicle – a car, motorbike, truck or any other vehicle? *(Show card E)* *(Read if questioned: Anywhere in the world).*
- Never Driven *(Go to Q. 83)* ..... A
- Less than 2,000 km ..... B
- 2,001–20,000 km C
- 20,001–200,000 km ..... D
- More than 200,000 km ..... E
- Don't know ..... F

81. Now looking at card F. In the last 12 months, that is since _____ last year, how many kilometres have you driven: *(Read if questioned: Anywhere in the world).*

		Category		
	In a car or a van as a driver ..... *(Show card F)*	☐	*OR* Don't know	☐ 2
And on card G:	On a motorbike as a rider ..... *(Show card G)*	☐	*OR* Don't know	☐ 2

82. Do you currently hold a licence to drive …

A car	Yes ☐ 1 →	Is it full	☐ 1	How long have you had a car licence? *Read if questioned: How long have you been licensed to drive in any country?*	
	No ☐ 2	restricted	☐ 2	☐☐ years ☐☐ mths *(If less than 5 years)*	
		or learner's	☐ 3	*(Do not read:* Disqualified ☐ 1*)*	
A motorbike	Yes ☐ 1 →	Is it full	☐ 1	How long have you had a motorbike licence?	
	No ☐ 2	restricted	☐ 2	☐☐ years ☐☐ mths *(If less than 5 years)*	
		or learner's	☐ 3		
A truck	Yes ☐ 1 →	Is it full	☐ 1	How long have you had a truck licence?	
	No ☐ 2	restricted	☐ 2	☐☐ years ☐☐ mths *(If less than 5 years)*	
		or learner's	☐ 3		

FORM 2 – VERSION 0 – Feb 06

DEMOGRAPHIC INFORMATION

83. *(If 16 years or older)* Do you have a husband/wife or partner who you live with?
- Yes ☐ 1
- No ☐ 2
- Object to state ☐ 3

84. *(All ages)* Looking at card H, which of these ethnic groups do you belong to?

(Show card H)

Code: ..... ☐☐☐
- Other *(specify)* _____ ☐ 12
- Object to state ..... ☐ 13

SEQUENCE GUIDE: • *If UNDER 16 YEARS, go to Q. 85a.*
• *Otherwise go to Q. 85.*

85. *(If 16 years or older)* And from card J, which of these categories best represents your personal income before tax?

(Show card J)

Code: ..... ☐☐
- Don't know ..... ☐ X
- Object to state ..... ☐ Z

85a. END OF INTERVIEW. THANK RESPONDENT.

86. Post travel interview completed?
- Yes ☐ 1
- No ☐ 2 } *Go to Q. 87*
- Partial ☐ 3 } *Go to Q. 87*

87. Reason not completed
- Refusal ☐ 1
- Non-contact ☐ 2
- Language problems ☐ 3
- Death/illness/disability ☐ 4

COMMENTS

FORM 2 – VERSION 0 – Feb 08

Appendix C: Household and personal data coding form

These tables show the coding used for creating the graphs shown in this report, along with the definitions and possible answers to each of the survey questions.

Table C1 Coding and definitions used for household data as part of the NZHTS.

Variable name	Data type	Description	Question no.
samno	N	Sample number	
hhwload	N	Workload number	
hhdate1	N	First travel day	
hhdate2	N	Second travel day	
Hhdaywk1	N	Day of week of first travel day (Sunday=1)	
Hhdaywk2	N	Day of week of second travel day (Sunday=1)	
Hhintvr	N	Scheduled interviewer number	
actintvr	N	Actual interviewer number	
Hhphone	A1	phone connected	OBSOLETE
Hhstruc	N	Home structure type: 1 = Separate house 2 = Two flats or houses joined together 3 = Three or more flats or houses joined together 4 = Flat or house attached to a business or shop 5 = Retirement village 6 = Bach, crib or hut (not a work camp) 7 = Caravan, cabin or tent 8 = Non private dwelling	
hhsecure	N	Security in place: 0 = No system 1 = Residence with locked gates 2 = Apartment block with entry phone 3 = Gated community 4 = Retirement village with security entry 9 = Other	
hhsecureother	A20	Other security entry system	
hhnumcyc	N	Number of bicycles	3
hhnilveh	A1	Nil vehicles in household	4a
Hhtype	N	Household type 1 = Person living alone 2 = Married/de facto couple only 3 = Other adults only 4 = Family (including extended) with children 5 = Family with adults only 6 = Single adult with other adult only 7 = Single adult living with children 8 = Other	2
hhtypeother	A50	Other household type	2
hhrespstat	N	Response status: 1 = Full response of all eligible people 2 = All person in household 'out of survey' 3 = Vacant dwelling 4 = Dwelling under construction 5 = Non-dwelling/vacant lot 6 = Derelict dwelling 7 = Dwelling demolished 8 = Hotel/motel/rest home 9 = No contact with household 10 = Refused pre-contact interview 11 = Language problems 12 = Death/illness in household 13 = should be empty. Previously referred to post-travel interviews incomplete, but has been split into 14 and 15 14 = Partial – pre-contact only (no post-travel interviews completed) 15 = Partial – one or more post-travel interviews completed.	RR

Table C1 cont. Coding and definitions used for household data as part of the NZHTS.

Variable name	Data type	Description	Question number
comments2	255	Interviewer comments	RR
Refusal_report	255	Refusal report	RR
Hhaunit	N	Area unit	OBSOLETE
homeaddn	N	Home address number	
Hhnc	N	Number post-travel interviews completed	RR
Hhnhh	N	Number of eligible people in household (i.e. in NZ on travel days AND normally resident OR visitors who will be there on travel days).	RR
Hhnormal_residents	N	Number of people normally resident in household (excludes visitors but includes people out of NZ on travel days).	NEW LJP
Hhnotes	A2000+	General purpose notes	
area2	A5	**Missing if hhweight is missing** CENTR = Central Auckland MUA = Main Urban Area NORTH = Northern Auckland SOUTH = Southern Auckland WESTE = Western Auckland rural = Rural This is the variable for stratum2	
Areatype	A5	**Missing if hhweight is missing** 'Urban' = Main urban areas 'Rural' = Rural areas and secondary and minor urban areas ****NB the previous definition of this was wrong! Secondary urban areas are NOT included within the 'Urban' definition.***** Preferable to use AREATYPE2.	
Areatype2	A5	'MUA' = Main urban areas (pop 30 000 or more) 'SUA' = Secondary urban area (pop 10 000–29 999) 'Rural' = Rural areas and rural centres (pop<1000)	
Region	A18	Local government region: AUCKLAND BAY OF PLENTY CANTERBURY GISBORNE HAWKES BAY MANAWATU/WANGANUI NELSON/MARLBOROUG/TASMAN NORTHLAND OTAGO SOUTHLAND TARANAKI WAIKATO WELLINGTON WEST COAST	
Meshid	N	int(samno/1000)	
hhweight	N	Household weight	
Hhnumhv	N	Number of household vehicles (usually parked overnight)	HH4a
HHnumothv	N	Number of non-household vehicles used by this household	HH4a & TR(E1 & E2)
Hhweight	N	Household weight (weighted to national annual total households)	
Hh4avgwgt		Household weight/4, gives estimates per year when using four-year dataset.	

Table C2 Coding and definitions used for person data as part of the NZHTS.

Variable name	Data type	Description	Question number
samno	N	Sample number	
person	N	Person number	HH1
pename	A20	First name/identifier	HH1(a), RR(a)
perelat	A3	Relationship to head of household: A = Aunt BDR = Boarder BOY = Boyfriend BRL = Brother-in-law BRO = Brother COD = Cousin's daughter COS = Cousin's son COU = Cousin COW = Cousin's wife D = Daughter DL = Daughter-in-law F = Father FL = Father-in-law FLT = Flatmate FR = Friend GRD = Granddaughter GRF = Grandfather GRL = Girlfriend GRM = Grandmother GRS = Grandson H = Self HUS = Husband M = Mother ML = Mother-in-law NCE = Niece NPH = Nephew PTR = Partner S = Son SA = Step-aunt SBR = Stepbrother SD = Stepdaughter SF = Stepfather SIL = Sister-in-law SIS = Sister SL = Son-in-law SM = Stepmother SS = Stepson SSI = Stepsister SU = Step-uncle U = Uncle UNK = Unknown VIS = Visitor/guest W = Wife	HH1(b)
sex	A1	Person's sex	HH1I
age	N	Age computed from date of birth or estimated	HH1(e)
estage	A1	Age was estimated	HH1(e)
peinout	N	In survey: 1 = HH member 2 = Visitor (surveyed) 3 = Visitor (gone) 4 = Out of NZ	HH1(f), RR(f)
Hh_member	A1	Distinguishes between people listed on pink form as household members, (including visitors or out of NZ), and those outside household who appear in the trips database as drivers or non-household passengers. HH_member is No for non-household drivers and passengers; otherwise it is Yes, which means it is Yes for visitors and out of NZ. To exclude them all, use both hh_member and peinout.	

Table C2 cont. Coding and definitions used for person data as part of the NZHTS.

Variable name	Data type	Description	Question number
perespstat	N	Response status: 1 = Yes – completed 2 = No – not completed 3 = Partially completed	86, RR(g)
peproxy	N	Person/proxy	
peemp01	A1	Not yet at school (Y/N)	1
peemp02	A1	Student full time (Y/N)	1
peemp03	A1	Student part time (Y/N)	1
peemp04	A1	Work full time (Y/N)	1
peemp05	A1	Work part time (Y/N)	1
peemp06	A1	Work casual (Y/N)	1
peemp07	A1	Looking for work (Y/N)	1
peemp08	A1	Keeping house (Y/N)	1
peemp09	A1	Retired/aged pensioner (Y/N)	1
peemp10	A1	Other beneficiary (Y/N)	1
peemp11	A1	Other (Y/N)	1
peempother	A20	Other description	1
Pesaddn	N	School address number	3
Pejobs	A1	More than one job	5
Peoccup	A100	Occupation	7
peoccupcode	A5	Occupation code	
Peemplo	N	Employee status: 1 = For an employer for wages or salary 2 = In your own business with employees 3 = In your own business without employees 4 = Without pay in a family business 5 = Other	8
Pewaddn	N	Work address number	9
pe1mjog	A1	Travel Day 1 memory jogger	11
pe1anyw	A1	Travel Day 1 went anywhere	12
pe1strt	N	Travel Day 1 start of day location: 1 = Home 2 = Work – main job 3 = Work – other job 4 = Social/recreation 5 = Hospital/medical 6 = Other	14
pe1addn	N	Travel Day 1 start of day address number	15
pe1numstops	N	Travel Day 1 number of stops Sometimes 1 more or less than actual trips and has 0 instead of missing. Use tripcnt1.	
Tripcnt1	N	Travel Day 1 number of stops as counted from trip dataset	
pe2mjog	A1	Travel Day 2 memory jogger	19
pe2anyw	A1	Travel Day 2 went anywhere	20
pe2strt	N	Travel Day 2 start of day location: 1 = Home 2 = Work – main job 3 = Work – other job 4 = Social/recreation 5 = Hospital/medical 6 = Other	22
pe2addn	N	Travel Day 2 start of day address number	23
pe2numstops	N	Travel Day 2 number of stops Sometimes 1 more or less than actual trips and has 0 instead of missing. Use tripcnt2.	
Tripcnt2	N	Travel Day 2 number of stops as counted from trip dataset	
pe0alco	A1	Alcohol used – day before travel Day 1	26
pe1alco	A1	Alcohol used – travel Day 1	27
pe2alco	A1	Alcohol used – travel Day 2	30
peanyax1	A1	Any accidents in last year	32

Table C2 cont. Coding and definitions used for personal data as part of the NZHTS.

Variable name	Data type	Description	Question number
peaccn1	N	Accidents – number in last year	33
peanyax2	A1	Any accidents in previous year	34
peaccn2	N	Accidents – number in previous year	35
Peanycyc	A1	Cycled in last year? **NB: in years 1–4: this defaults to No – to find actual number of Nos use 'no answer to pefreqcyc'**	78
Pefreqcyc	N	How often bicycle ridden in last four weeks: 1 = Not at all this month 2 = On 1–4 days 3 = On 5–9 days 4 = On 10–19 days 5 = On 20 days or more	79
Peexp	N	Lifetime driving experience: 1 = Never driven 2 = Less than 2000 km 3 = 2001–20 000 km 4 = 20 001–200 000 km 5 = More than 200 000 km 6 = Don't know	80
pekmcar	N	km driven in car last year: 1 = 0–99 km 2 = 100–1999 km 3 = 2000–4999 km 4 = 5000–9999 km 5 = 10 000–14 999 km 6 = 15 000–19 999 km 7 = 20 000–29 999 km 8 = 30 000–49 999 km 9 = 50 000–99 999 km 10 = 100 000+ km 11= Don't know	81
pekmmc	N	km driven on motorbike last year: 1 = 0–99 km 2 = 100–999 km 3 = 1000–1,999 km 4 = 2000–2999 km 5 = 3000–4999 km 6 = 5000–9999 km 7 = 10 000= km	81
peclicn	A1	Car licence held	82
pectype	N	Car licence type: 1 = Full 2 = Restricted 3 = Learner	82
pecyear	N	Car licence number of years held	82
pecmonth	N	Car licence number of months held	82
peblicn	A1	Motorbike licence held	82
pebtype	N	Motorbike licence type: 1 = Full 2 = Restricted 3 = Learner	82
pebyear	N	Motorbike licence number of years held	82
pebmonth	N	Motorbike licence number of months held	82
petlicn	A1	Truck licence held	82
pettype	N	Truck licence type: 1 = Full 2 = Restricted 3 = Learner	82
petyear	N	Truck licence number of years held	82
petmonth	N	Truck licence number of months held	82

Table C2 cont. Coding and definitions used for personal data as part of the NZHTS.

Variable name	Data type	Description	Question number
peracat01	A1	Racial category: NZ European	84
peracat02	A1	Racial category: NZ Maori	84
peracat03	A1	Racial category: Other European descent	84
peracat04	A1	Racial category: Samoan	84
peracat05	A1	Racial category: Cook Island Maori	84
peracat06	A1	Racial category: Tongan	84
peracat07	A1	Racial category: Niuean	84
peracat08	A1	Racial category: Other Pacific	84
peracat09	A1	Racial category: Chinese	84
peracat10	A1	Racial category: Indian/Pakistani	84
peracat11	A1	Racial category: Other Southeast Asian	84
peracat12	A1	Racial category: Other	84
peracat13	A1	Racial category: object to stating	84
peracatother	A30	Racial category: other description	84
peincome	A1	Personal income category: L = No income M = Under $10,000 N = $10,001–$15,000 P = $15,001–$20,000 R = $20,001–$30,000 S = $30,001–$40,000 T = $40,001–$50,000 U = $50,001–$70,000 W = $70,001–$100,000 Q = $100,000+ X = Don't know Z = Object to stating	85
proxyreason	N	Reason for proxy: 1 = Child under ten 2 = Language difficulties 3 = Hearing impaired 4 = Speech impaired 5 = Insufficient comprehension 6 = Long-term illness	
licdisq	A1	Driver's licence disqualified	82
pelivewith	A1	Lives with husband/wife/partner	83
agegp	N	Age group of non-household member: 1 = 0–9 2 = 10–14 3 = 15–19 4 = 20–24 5 = 25–29 6 = 30–79 7 = 80+	
notcompletedreason	N	Reason forms not completed: 1 = Refusal 2 = Non-contact 3 = Language problems 4 = Death/illness/disability	87, RR(h)
Pe1home	A1	Travel Day 1 did NOT end at home	17
pe2home	A1	Travel Day 2 did NOT end at home	25
peIntEditTime	N	Time interviewer spent editing	
peOtherEditTime	N	Time others spent editing	
pequality	A1	Interviewer estimate of data quality: E = Excellent A = Adequate D = Dubious	88, RR(j)
peweight	N	Person weight	
Pe4avgwgt	N	Person weight/4, gives estimates per year when using four-year dataset.	
hhdate1	N	First travel day	
hhdate2	N	Second travel day	
Hhdaywk1	N	Day of week of first travel day (Sunday=1)	
Hhdaywk2	N	Day of week of second travel day (Sunday=1)	

Table C3 Coding and definitions used for trip data as part of the NZHTS.

Variable name	Data type	Description	Question number
Year	N	Survey year number: 1 = 2002/03 2 = 2003/04 3 = 2004/05 4 = 2005/06	
Samno	N	Sample number	
Person	N	Person number	
Yearnm	N	Survey year name (in format 200203, 200304 etc.)	
hhdate1	N	First travel day	
hhdate2	N	Second travel day	
Hhdaywk1	N	Day of week of first travel day (Sunday=1)	
Hhdaywk2	N	Day of week of second travel day (Sunday=1)	
Daywk	N	Day of week of the travel day this trip takes place on (Sunday=1). Based on hhdaywk1 and hhdaywk2.	
Tripday	N	Trip day	
Tripno	N	Trip number	
Trleave	N	Departure time	17A, 25A
trleaveh	N	Departure time in hours with decimal (+24 if next day)	A
trleavetm	Sastime	Departure time, SAS time format	A
Trleavenextday	A1	Departure time is next day (after midnight and before 0400)	A
Traddno	N	Destination address number	B
Trarriv	N	Arrival time	C
Trarrivtm	SAStime	Departure time, SAS time format	C
Trarrivh	N	Departure in hours with decimal (+24.00 if next day)	C
Trnextday	A1	Arrival time is next day	C
Duration	N	Duration of trip (hours)	
Durmin	N	Duration (minutes)	
Tractiv	N	Activity – what done there: 1 = Home 2 = Work – main job 3 = Work – other job 4 = Work – employer's business 5 = Education 6 = Shopping 7 = Social welfare 8 = Personal business/services 9 = Medical/dental 10 = Social visits 11 = Recreational 12 = Change mode 13 = Accompany someone else 14 = Left country 15 = Other	D
Purpose	N	Overall journey purpose, where a journey is a series of trips with purpose = change mode. Same codes as tractiv.	
Vehicle	A1	Vehicle number	E
Trmode	N	Travel mode: 1 = Vehicle driver 2 = Vehicle passenger 3 = Bicycle 4 = Train 5 = Bus 6 = Ferry 7 = Plane 8 = Taxi 9 = Other 10 = Mobility Scooter 0 = Walk	E

Table C3 cont. Coding and definitions used for personal data as part of the NZHTS.

Variable name	Data type	Description	Question number
trmodeother	A15	Travel mode other	E
trquickest	A1	Quickest route taken	G
trmidaddno	N	Route taken address no	G
Trdistn	N	Reported distance in km	F
Trpeopl	N	Number of people in vehicle	H
Trwpark	N	Where parked: 1 = Not parked 2 = Off street – resident's property 3 = Off street – private 4 = Off street – public 5 = On street – time limit 6 = On street – no time limit 7 = Other	I
trwparkother	A20	Where parked other	I
Trroads	N	Number of roads crossed	K
Trpedes	N	Number of pedestrian crossings used	L
startaddno	N	Start address number	
tractivother	A30	Activity other	D
CalculatedDistance	N	Critchlow's calculated distance	
calcdist	N	Same as CalculatedDistance but easier to type	
BestDist	N	Best available distance - Calculated dist if credible, or else estimated dist	
distused	A7	Indicates which distance estimate used for analysis: Geodist = CalculatedDistance Estdist = Respondent estimated distance (trdistn) Neither = both distance sources failed criteria, bestdist and duration set to missing. BadGeo = should not arise – means do not use calculated distance but no alternative explored.	
Trip_comments	A1	Method of calculation for the trip: Q = Quickest route W = Waypoint used X = Waypoint provided but not used N = Trip not generated	
Vyear	N	Year of manufacture	HH4a(d)
Vtype	N	Body type: 1 = Car/stationwagon 2 = Van/ute/passenger van 3 = 4-wheel drive 4 = Truck 5 = Taxi 6 = Motorbike 7 = Other	HH4a(e)
Vcc	N	Engine capacity	HH4a(f)
Vowner	N	Vehicle owner: 1 = Member of household 2 = Company owned/leased 3 = Rental 4 = Other	HH4a(h)
Vfuel	N	Vehicle fuel: 1 = Petrol 2 = Diesel 3 = LPG/CNG 4 = Dual fuel 5 = Electric 6 = Other	HH4a(g)

Table C3 cont. Coding and definitions used for personal data as part of the NZHTS.

Variable name	Data type	Description	Question number
area2	A5	**Missing if hhweight is missing** CENTR = Central Auckland MUA = Main Urban Area NORTH = Northern Auckland SOUTH = Southern Auckland WESTE = Western Auckland rural = Rural This is the variable for stratum2	
Areatype	A5	**Missing if hhweight is missing** 'Urban' = Main urban areas 'Rural' = Rural areas and secondary and minor urban areas ****NB the previous definition of this was wrong! Secondary urban areas are NOT included within the 'Urban' definition.***** Preferable to use AREATYPE2.	
Areatype2	A5	'MUA' = Main urban areas (pop 30 000 or more) 'SUA' = Secondary urban area (pop 10 000–29 999) 'Rural' = Rural areas and rural centres (pop<1000)	

Appendix D: Table of unweighted trip legs by time of day

D1 Home-based departures by purpose and time of day: unweighted sample size.

Table D1 Departure times from home for work trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures (trip legs)	
00	1	1
01	0	0
02	0	0
03	11	1
04	98	17
05	274	47
06	699	67
07	1601	117
08	993	150
09	266	88
10	99	59
11	58	32
12	31	21
13	32	11
14	56	15
15	33	7
16	15	6
17	14	2
18	2	0
19	3	0
20	1	0
21	2	0
22	0	1
23	0	0
Total	4289	642

Table D2 Departure times from home for education trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	0
01	0	0
02	0	0
03	0	0
04	1	0
05	0	3
06	3	0
07	203	6
08	1690	26
09	94	17
10	34	6
11	11	2
12	25	6
13	10	3
14	6	1
15	4	1
16	0	0
17	1	0
18	2	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
Total	2084	71

Table D3 Departure times from home for shopping trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	1
01	0	0
02	0	0
03	0	0
04	1	0
05	2	0
06	14	12
07	29	42
08	56	93
09	52	212
10	58	242
11	56	163
12	57	94
13	59	99
14	54	74
15	57	53
16	56	42
17	49	36
18	35	11
19	29	3
20	22	2
21	14	1
22	7	0
23	6	0
Total	713	1180

Table D4 Departure times from home for 'personal business/services' trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	0
01	0	0
02	0	0
03	0	0
04	2	0
05	11	0
06	35	11
07	108	26
08	185	30
09	193	129
10	146	91
11	92	30
12	58	28
13	59	30
14	39	19
15	32	13
16	20	5
17	10	7
18	3	3
19	1	1
20	0	0
21	0	0
22	0	0
23	0	0
Total	994	423

Table D5 Departure times from home for medical/dental trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	0
01	0	0
02	0	0
03	0	0
04	1	0
05	0	0
06	2	0
07	21	1
08	69	3
09	137	7
10	116	4
11	102	3
12	43	1
13	73	0
14	84	2
15	83	0
16	42	0
17	12	0
18	4	0
19	4	0
20	1	0
21	1	0
22	0	0
23	0	0
Total	795	21

Table D6 Departure times from home for 'social visits' trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	0
01	0	0
02	0	0
03	0	0
04	2	0
05	5	7
06	20	6
07	78	31
08	171	110
09	202	211
10	206	175
11	99	127
12	82	82
13	64	83
14	50	64
15	25	57
16	24	31
17	22	31
18	17	19
19	23	14
20	7	2
21	2	3
22	0	0
23	0	0
Total	1099	1053

Table D7 Departure times from home for recreational trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	0
01	0	0
02	0	0
03	0	0
04	2	0
05	35	4
06	104	23
07	84	51
08	141	102
09	162	142
10	107	124
11	59	113
12	47	54
13	46	58
14	30	43
15	26	21
16	19	14
17	18	10
18	13	11
19	15	3
20	2	1
21	0	0
22	0	0
23	0	1
Total	910	775

Table D8 Departure times from home for 'change mode' trips on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of departures	
00	0	0
01	0	0
02	0	0
03	2	0
04	2	0
05	21	1
06	84	5
07	328	13
08	272	23
09	55	23
10	49	15
11	23	13
12	20	20
13	16	6
14	6	8
15	4	3
16	3	5
17	1	1
18	1	1
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
Total	887	137

D2 Daily trip leg arrivals by purpose and time of day: unweighted sample size

Table D9 Arrival time at home on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	82	108
01	47	53
02	18	37
03	17	41
04	10	6
05	26	14
06	109	18
07	274	82
08	627	156
09	732	280
10	877	528
11	1316	777
12	1730	876
13	1131	633
14	1312	736
15	3768	824
16	2948	965
17	3566	1019
18	2057	658
19	1130	417
20	897	367
21	866	292
22	572	261
23	328	176
Total	24 440	9324

Table D10 Arrival time at work (main job) on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	5	13
01	9	10
02	15	6
03	15	3
04	96	19
05	248	41
06	608	72
07	1827	115
08	2350	211
09	1198	200
10	777	147
11	710	102
12	861	98
13	1029	95
14	812	119
15	649	73
16	529	70
17	348	55
18	141	26
19	88	44
20	43	11
21	31	7
22	52	6
23	23	1
Total	12 464	1544

Table D11 Arrival time at work (other job) on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	0	0
01	0	2
02	1	0
03	12	0
04	20	0
05	16	1
06	27	0
07	22	10
08	69	14
09	53	15
10	34	8
11	30	14
12	27	10
13	29	8
14	28	7
15	38	8
16	26	13
17	20	5
18	19	4
19	11	0
20	5	0
21	5	1
22	3	0
23	3	3
Total	498	123

Table D12 Arrival time at work (employer's business) on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	3	0
01	0	0
02	2	0
03	2	0
04	7	0
05	17	4
06	43	3
07	128	15
08	249	19
09	282	25
10	205	21
11	194	20
12	178	17
13	162	15
14	199	15
15	173	9
16	113	11
17	88	12
18	46	11
19	33	8
20	9	4
21	9	0
22	3	0
23	8	0
Total	2153	209

Table D13 Arrival time at education on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	0	0
01	0	0
02	0	0
03	0	0
04	0	0
05	0	3
06	2	0
07	104	7
08	2452	37
09	301	22
10	94	15
11	57	5
12	122	14
13	118	9
14	61	10
15	97	5
16	28	5
17	20	2
18	26	1
19	25	1
20	2	0
21	0	0
22	0	0
23	0	0
Total	3509	136

Table D14 Arrival time at shopping on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	0	4
01	1	1
02	0	1
03	0	5
04	5	2
05	4	0
06	28	9
07	126	47
08	308	112
09	630	335
10	985	606
11	1017	579
12	979	497
13	907	411
14	763	456
15	845	391
16	745	293
17	684	261
18	403	207
19	239	100
20	116	66
21	76	20
22	9	13
23	12	6
Total	8882	4422

Table D15 Arrival time at personal business/services on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	1	3
01	1	2
02	0	1
03	1	2
04	0	0
05	13	0
06	38	17
07	108	24
08	307	46
09	439	160
10	438	181
11	403	138
12	375	113
13	395	114
14	443	98
15	463	89
16	345	80
17	237	47
18	126	39
19	97	25
20	48	17
21	30	9
22	14	4
23	10	1
Total	4332	1210

Table D16 Arrival time for 'medical/dental' trip legs on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	0	0
01	0	1
02	0	0
03	0	0
04	1	0
05	0	0
06	1	0
07	9	0
08	67	2
09	123	12
10	135	14
11	128	12
12	53	2
13	64	2
14	92	5
15	90	1
16	44	3
17	20	1
18	4	0
19	5	2
20	1	0
21	1	0
22	0	1
23	0	0
Total	838	58

Table D17 Arrival time for social visits on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	16	37
01	2	35
02	4	22
03	5	18
04	3	3
05	5	7
06	17	7
07	95	29
08	267	135
09	427	289
10	491	397
11	503	448
12	597	476
13	503	421
14	449	365
15	658	414
16	553	385
17	637	367
18	558	395
19	563	293
20	296	167
21	160	75
22	59	61
23	35	58
Total	6903	4904

Table D18 Arrival time at recreation on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	6	11
01	0	2
02	0	0
03	0	0
04	2	0
05	34	0
06	102	21
07	128	54
08	151	150
09	283	210
10	270	242
11	265	240
12	291	246
13	253	259
14	276	242
15	364	221
16	389	199
17	377	150
18	347	90
19	307	62
20	85	41
21	48	22
22	28	11
23	8	8
Total	4014	2481

Table D19 Arrival time to change mode on weekends and weekdays (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
00	2	3
01	1	2
02	0	5
03	2	3
04	0	0
05	15	2
06	95	3
07	463	15
08	573	34
09	184	41
10	183	60
11	197	73
12	200	75
13	194	78
14	214	69
15	519	59
16	361	63
17	398	59
18	203	40
19	73	31
20	48	8
21	39	20
22	27	13
23	8	4
Total	3999	760

D3 Arrival times for motorised modes in MUAs (all purposes) on weekends and weekdays.

Table D20 Arrival times for motorised trip legs in MUAs on weekdays and weekends (unweighted sample size).

Period (start)	Weekday unweighted sample size	Weekend unweighted sample size
	No. of arrivals	
0	70	86
1	31	59
2	25	34
3	34	32
4	92	16
5	213	38
6	492	74
7	1629	212
8	4030	494
9	2480	1019
10	2279	1356
11	2408	1454
12	2748	1472
13	2318	1245
14	2546	1286
15	3867	1294
16	3189	1273
17	3429	1129
18	2197	892
19	1465	591
20	881	426
21	796	274
22	485	204
23	279	151
Total	37 983	15 111

Appendix E Glossary and abbreviations

Active modes	Walking and cycling.
Average day	Based on the average over Monday to Sunday. To calculate the total annual estimates, figures for an average day are multiplied by 365.
LTNZ	Land Transport New Zealand
MoT	Ministry of Transport New Zealand
Motorised trip legs	Trip legs as vehicle drivers or passengers only.
MUA	Major Urban Areas. Areas with a population of at least 30 000.
NSW	New South Wales
NTHS	National Household Travel Survey (United States)
NZHTS	New Zealand Household Travel Survey. This has been commissioned by the MoT.
Private mode	Includes vehicle driver, vehicle passenger, bicycle and walking.
Public mode	Includes train, bus, ferry, plane and taxi.
RA	Rural Areas. Areas with a population less than 10,000 and all other rural areas.
SUA	Secondary Urban Areas. Areas with a population between 10 000 and 30 000.
Travel	Includes all on-road travel by any mode; any walk which involves crossing a road or walking for 100 metres or more along a public footpath or road; cycling on a public road or footpath; some air and sea travel. Excludes off-road activities such as tramping, mountain biking, walking around the mall or around the farm.
Trip chains	A connected series of trip legs. For example, a journey from work to home but where the individual stops 200 m from home to buy bread would be considered a single trip chain but two trip legs.
Trip leg distance	For road-based trip legs, distances are calculated by measuring the distance from the start address along the roads to the finish address. If an unusual route was used, the interviewer records an intermediate point to indicate the route; otherwise, the journey is assumed to follow the quickest available route.
Trip leg duration	The time between the reported departure time in minutes of a trip leg and the reported arrival time.
Trip leg purpose	The activity that is done at a trip leg destination.
Trip leg	A section of travel by a single mode with no stops.
Weekday travel	Average amount of travel over Monday to Friday. Using the 24 hour clock, it is 0000h Monday to 2359h Friday (i.e. midnight Sunday to midnight Friday).
Weekend travel	Average amount of travel undertaken over Saturdays and Sundays. Using the 24 hour clock, it is 0000h Saturday to 2359h Sunday (i.e. midnight Friday to midnight Sunday).

National Travel Profiles Part A: Description of Daily Travel Patterns

NZ Transport Agency
Research Report 353