travel survey
report

increasing our understanding of
New Zealanders' travel behaviour

1997/1998

Foreword

The NZ Travel Survey was a project initiated and funded by the New Zealand Road Safety Trust. Its aim was to update information on road crash and injury risk to allow accurate targeting of road safety strategy and initiatives. Approximately 14,000 people were interviewed from 7,000 randomly sampled households over the period of a year between June 1997 and July 1998 and during April and May 1999 (some Auckland households only).

This report provides a detailed description of the survey methodology together with tables of survey results including changes over the eight intervening years since the last travel survey of 1989/90 - a project that employed comparable survey methods. A separate booklet, *Travel Survey Highlights,* presents a selection of Travel Survey results suitable for use by schools, universities and the general public. In contrast to that publication, this report has considerably more detail. The extensive tables and graphs provide highly valuable information for road safety professionals as well as for those involved in transportation planning.

The following statistics are examples of what can be found in the tables and graphs in this document:

- *People are more mobile*.
  During the eight years from 1989/90 to 1997/98 driving has increased by 35%; passenger travel by 14%; bus travel by 16%; time walking by 7%; however, cycling has decreased by 19%.

- *People are very dependent on cars for mobility.*
  55% of all road travel was by car drivers (including van/ute) and 35% by car passengers.

- *Driving is safer.*
  Where risk is expressed as the number of crash involvements per distance driven, the risk for car drivers of being involved in an injury crash has fallen by 38% between 1989/90 and 1997/98, as has the risk of involvement in a fatal crash. The largest improvements in risk have been for the young and the old.

- *There are fewer older cars (including vans and utes) used by households.*
  In 1989/90, of all cars used by households, 15% were 15-19 years old and 19% were at least 20 years old. The respective figures for 1997/98 are 13% and 17%. However, there are proportionately more "middle-aged" cars and hence the average age of cars has increased by almost a year.

- *Cars (including vans and utes) used by households are now more powerful.*
  In 1997/98, 59% of household cars were over 1600cc. The corresponding figure in 1989/90 was only 47%.

- *There are significant differences between ethnic and gender groups in terms of percentages of people who are active drivers.*
  Of driving-age males identifying themselves as Pakeha or of European origin, an estimated 92% were active drivers, compared to 84% of Maori and 72% of Pacific descent. The corresponding figures for driving-age females are 85% for Pakeha/Europeans, 64% for Maori and only 53% for Pacific women.

- *There are significant differences between ethnic groups in terms of injury crash risk.*
  Compared to Pakeha/Europeans, the risks of being hospitalised as a result of a crash per distance driven was more than *three times* as high for Maori drivers and only slightly less than three times for Pacific drivers.

- *Trips made at high drinking times of the week (10pm to 4am each night, plus 4am-6am on Fridays to Sundays) are more than ten times as likely to be made by drivers under the influence of alcohol than trips generally.*
  As details of alcohol consumed by drivers were also recorded by the travel survey, it could be estimated that 0.25% of *all* trips made by male drivers and 0.08% by female drivers (at any time of day or night) were made while the driver was over the legal alcohol limit. During the high drinking times mentioned above, the proportion increases to 2.7% and 0.9% for males and females respectively.

Firstly, thanks are due to the 14,000 respondents who freely gave their time to describe their own travel behaviour in considerable detail. I would also like to acknowledge the work of the LTSA Research and Statistics team led by Bill Frith, in particular the work of Lynley Povey and Mike Keall. This team designed and managed the survey and compiled this report as well as the *Travel Survey Highlights* booklet from their analyses of the data. Along with their survey team, I would also like to thank Elizabeth Ampt and Sue Riddle of Ampt Applied Research, who carried out the survey, Critchlow Associates who undertook the geocoding of trips, and Alan Wyllie who provided valuable advice regarding the measurement of alcohol consumption.

I trust you find this *New Zealand Travel Survey Report* informative and useful.

Reg Barrett
Director of Land Transport Safety Authority

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INTRODUCTION

Survey description

Purpose

The New Zealand Travel Survey provides data to assist in the development of policy and evaluation of programmes relating to road use and road safety. When combined with existing crash data, crash risks for different groups of road users (including drivers, passengers, pedestrians and pedal cyclists) can be estimated. To enable valid estimation of changes in risk and travel occurring over time, comparable survey methods were used to the previous national travel survey of 1989/90.

As travel behaviour has been shown to be strongly related to people's availability and willingness to be surveyed, personal interviews were used to gather travel data. This survey method generates the highest rate of co-operation and the most complete recording of complex travel behaviour.

Procedure

An initial letter was sent from the Road Safety Trust to the households selected for interview. Included with this was a pamphlet briefly describing the aims and content of the survey. Next, the interviewer called at the address to gather household information, explain the purpose of the survey, tell the household which were their "travel days" (two consecutive days for which the household was to record all travel), and leave a memory-jogger for the respondents to use for recording travel. Finally, as soon as possible after the travel days, the interviewer returned to conduct the interviews.

Questionnaire

As one of the objects of the survey was to compare 1997/98 travel with 1989/90 travel (estimated by the previous travel survey), essentially the same questionnaire was used as in the 1989/90 survey. There was the further advantage of using a survey instrument that had been extremely well tested and had performed well in the field previously. Minor changes were made to update wording and response categories. Major changes were made to the questions on alcohol consumption so that estimates could be made of actual quantities drunk. These were made with the assistance of Alan Wyllie, Assistant Director of the Alcohol and Public Health Research Unit, Auckland University.

All responses were treated as confidential and the computerised data file contained no information that could identify individual households or respondents.

Data gathered

There were two questionnaires used: one to gather information about the household and another for individual travel, demographics, alcohol usage, etc. In addition, the interviewers had show cards for coding occupation, driving experience, ethnicity, income, drinking venue and types and quantities of alcohol consumed. The questionnaires and show cards can be found in Appendix G.

The following data were gathered (or were derived from responses):

Household:

Local Government Region of respondent's residence, urbanisation of respondent's residence, household structure, relationship of people in the household, number of people, number and type of household vehicles (car, motorcycle, van etc.), vehicle make and model, vehicle age, engine capacity and ownership, and response status of household.

Person:

For each person in the sampled household - relationship to nominal "head" of household, gender, age, employment, income, driving experience, number of road crashes, number of trips, ethnicity, whether they drank alcohol on travel days, and location of workplace/school.

Trip:

For each trip made by sampled people on the travel days - trip purpose, mode (as driver/passenger/pedestrian/cyclist etc), date, time, origin and destination grid references, numbers of people in the vehicle, and which household vehicle was used (linked to information on vehicle make and model, vehicle age, engine capacity, ownership). For walking trips no distance estimates were recorded because people generally find these difficult to estimate accurately and the digitised distance calculation designed for road travel was not well suited to pedestrian travel. Duration of the walking trip and the number of roads crossed were recorded instead.

Alcohol drinking sessions:

For each person – times, locations and types and amounts of alcohol consumed.

Traffic crashes:

For each person - crash involvement over the last two years, location of crashes, and type of crash.

Piloting and testing

A pre-pilot or "skirmish" plus a larger scale pilot were used to test and refine the survey forms (particularly the questionnaires) and procedures. A skirmish was run very early in the project to test the wording of the questionnaires, using a small sample of households, including the extremes in socio-economic levels. The results of the skirmish led to minor changes in question wording. The pilot test was essentially a dress-rehearsal of the main survey, used to test the interviewing procedures, the adequacy of the training, the field work, and validation interviews as well as to examine the response rates.

Interviewers' training and supervision

All interviewers underwent a three-day training session after completing an extensive home study exercise. This was necessary as the travel behaviour being recorded was relatively complex and the interviewers needed to be well-acquainted with the 60-page interviewers' manual. They were personally supervised once during the training (which involved carrying out actual Travel Survey interviews), once during their first week of interviewing and once (at random) after that. Checks were also made of 10% of each interviewer's questionnaires that the surveyed household had actually been visited by the interviewer and that each respondent had in fact been interviewed personally, and one or two items of data were also

checked. A supervisor also visited three households from each interviewer's workload and checked data from the questionnaire with the residents.

Sample design

Stratification

The sample strata and substrata were geographically based using Statistics NZ definitions for the 1991 Census of Population and Dwellings[1]: the strata were the 14 Local Government Regions, further stratified into Main Urban Areas (at least 30,000 population), Secondary Urban Areas (population between 10,000 and 30,000) and rural (including Minor Urban Areas with population less than 10,000 and all other rural areas).

The sample sizes per Local Government Region were proportional to 1991 Census populations except for the following:

- Less than proportional: Auckland (69% of proportional), Canterbury (83%), Wellington (92%);

- More than proportional: Hawkes Bay, Nelson-Marlborough, Northland, Southland, Taranaki, Gisborne and the West Coast Regions.

These departures from proportional sampling were necessary to ensure a minimum sample size per Region (so the smaller Regions were allocated some of the sample size of the larger Regions). All the Major Urban Areas (population greater than 50,000) and Local Government Regions were surveyed throughout the entire year, so estimates could be made of annual travel for these cities and Regions. Some parts of Auckland were surveyed during the months of April and May 1999 to replace unreliable data collected during the previous year.

Sample frame and sampling method

Survey costs were minimised (while maximising the utility of the data collected) by constructing the survey so that interviewers did not need to travel long distances between households. Meshblocks (geographical units varying in size from a city block in urban areas to extensive tracts of land in rural areas) were used as the first stage sampling units and were sampled independently within the strata. The sampling frame for meshblocks consisted of the 1991 Census list of meshblocks. The meshblocks were sampled with probability proportional to size without replacement[2] where size was defined as 1991 Census population. To compile an up-to-date sampling frame of households within the sampled meshblocks, these meshblocks were visited and all dwellings were listed together with street addresses.

Meshblocks were surveyed in random order within Regions. In urban areas, one in eight households from sampled meshblocks was sampled. A higher proportion (one in seven) of households within most rural meshblocks was sampled to ensure that an adequate sample of rural households would be available for comparing rural with urban travel. As high travelling costs were associated with the more distant rural areas, such areas were sampled with a lower sampling fraction of one in eight households. A systematic sample of households was taken by randomising a list of all households within sampled meshblocks and sampling every

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[1] 1996 Census data were not available at the time that the sample was selected, although these data were able to be used during the weighting of the survey data to produce national and sub-national estimates.

[2] The probability proportional to size sampling method used, due to Sunter (1977), is described in Särndal et al (1992: p94).

seventh or eighth household from this list. Although this procedure can lead to a slightly variable sample size per meshblock, the households within the next meshblock were systematically sampled as though the list were continuous (so, for example, very close to one eighth of all households were sampled in urban areas). This method of sampling is almost identical with simple random sampling without replacement. Introductory letters were sent to a computer-generated list of households prior to the interviews of household members. Sampled households and household members from whom responses could not be obtained were not replaced by other respondents, but were imputed for using data obtained from other similar respondents (see below).

Allocation of travel days

The households selected according to the sampling scheme were each allocated two consecutive travel days (i.e. days about which the household members should report their travel). The travel days were allocated to the sample of households in a fashion that maintained a wide geographical spread (of areas being surveyed) at any given time of the year but was compatible with a restricted number of survey interviewers, each surveying at a rate of approximately three households per day. An even spread by day-of-week was maintained by systematic allocation of travel days.

Coverage

The sampling frame consisted of all New Zealand households, excluding some sparsely populated remote areas in Westland, East Coast of the North Island, Southland and Northland. Holiday homes were not included in the sampling frame to avoid higher sampling probabilities (leading to biased estimates) for people who own more than one house. Guests at hotels and motels were not surveyed as it was assumed that this group of people had a chance of being sampled at their home residence. There were also considered to be difficulties in gaining access to these people for interviews, particularly as the survey method required more than one visit (see above) and was not compatible with short stays at motels/hotels. Inmates of prisons and patients of hospitals were also not surveyed. However, staff residences of hotels, motels, prisons and hospitals were included in the sampling frame. Bias due to non-response was minimised by requiring a minimum of four attempts (made at different times of the day) to contact people who were not at home. Nevertheless, the failure to make contact with respondents who are not at home together with the exclusion of visitors and people staying at hotels/ motels (some research indicates that these people tend to travel more than the average), means that the estimates of distance travelled derived from this household survey may slightly under-estimate the total travel in New Zealand. However, this can be estimated from other sources.

There will also be some underestimation of travel by professional drivers (and hence by vehicles such as taxis and trucks). This is due to a combination of the household-based sampling that excluded accommodation used by long-distance drivers, and the likelihood that professional drivers would refuse to participate because of the demands of providing all trip details.

Estimation of distance

The estimation of distance travelled is central to the calculation of exposure to crash risk, and hence the key variable of this survey. For all their recorded trips, respondents were asked to provide addresses of the origin and destination of each leg of the trip in a format that could be used in the automated calculation of trip distances. Critchlow Associates were contracted to generate automated map co-ordinates for each address and then to calculate distance based

on the shortest (in terms of travelling time) route between the origin and destination addresses. Some approximations needed to be used when a street number was not valid (the closest valid address was used) or did not exist (the mid-point of the street was used). Where a route was used that deviated from the shortest route (eg a scenic drive), the interviewers recorded an intermediate address along the route taken to show that a longer route was taken. A number of addresses that could not be automatically digitised (ie encoded as map co-ordinates) were digitised manually by referring to street maps. Where there was insufficient detail or errors in the recording of the address, the respondent's own estimate of the trip distance (which was recorded for all non-pedestrian trips) was used as the best distance measure. For pedestrians, the most commonly used exposure measures are time spent walking and number of roads crossed, both of which were recorded. Distance walked was not considered to be able to be calculated using the same algorithm as for driving or cycling, hence there was no distance measure calculated for pedestrian trips.

Estimation of means and totals

Since the sample was not a simple random sample of the population, a simple mean or total of the sample observations was not appropriate for estimating population means and totals. Weighted means and totals were used, where the weights were approximately equal to the reciprocals of the probability of selection of the respondents. Weights were also used to reduce the inevitable bias due to non-response. The sampling weights, non-response imputation and post-stratification weights are described in more detail in Appendix A.

Estimation of sampling errors

Sampling errors were calculated using the random group method. This consisted of dividing the sample into random groups (maintaining the sample structure in each group) and calculating estimates based on each resulting sub-sample. The sampling error was estimated from the variability between these random group estimates. Further details can be found in Appendix A.

Crash and injury data

A number of tables in this report combine travel information with information about motor vehicle crashes. This is extracted from the Land Transport Safety Authority's database of coded information derived from Traffic Crash Reports.

When an injury crash is reported, it is usually attended by a police officer. The reporting officer's primary duties are to prevent further injury and to help those injured. The next duty is a legal one, to ascertain whether anyone involved in the crash has committed an offence. After dealing with these other duties, the officer completes a Traffic Crash Report. The Traffic Crash Report is examined and coded by traffic engineers and by administrative staff of the LTSA. This coded information is loaded on to a computer, edited and checked. Further details can be found in the annual summary of crash statistics, "Motor Accidents in New Zealand" (eg LTSA, 1999).

Hospitalisation data are used for tables of cyclist injuries in non-motor vehicle crashes and of risks for different ethnic groups. These refer to the number of people admitted to hospital as a result of a crash and are supplied by the New Zealand Health Information Service.

Key statistics

*Sample
size*

Occupied permanent dwellings	7 164
Full response from all household members	74.9%
Response from one or more members	79.0%
Number of people responding	14 250

Annual national travel by mode of travel	**Million trips**	**100 million km travelled**
Vehicle driver	3 093.0	273.2
Passenger	1 618.2	164.6
Bicycle	111.4	2.9
Bus	134.8	17.9
Taxi	27.8	1.5
Pedestrian	1 151.1	(not calculated)

Annual national driving trips by age	**Age group**	**Million trips**	**100 million km travelled**
	15-19	144.2	10.1
	20-24	262.8	24.5
	25-29	313.5	30.9
	30-34	359.9	31.5
	35-39	456.7	41.1
	40-44	384.4	34.4
	45-49	336.4	31.4
	50-54	247.5	22.7
	55-59	173.6	15.0
	60-64	127.4	10.6
	65-69	105.5	8.9
	70-74	80.8	5.5
	75-79	58.6	3.3
	80+	23.8	1.1

HOUSEHOLDS IN THE SURVEY

Analysis of household responses 1997/98[3]

In total, 8079 addresses were surveyed. 915 (11%) of these addresses were not permanently occupied dwellings. Full responses were obtained from 5367 (74.9%) of the 7164 permanently occupied dwellings.

Table HH1: Households sampled

Response	Addresses in sample	% of all addresses	% of eligible households
Full response	5367	66.4%	74.9%
Partial response (see note)	296	3.7%	4.1%
Non-response	1501	18.6%	21.0%
Total eligible households	7164	88.7%	100.0%
Sample loss (eg non-dwelling, dwelling under construction, demolished, derelict or vacant)	915	11.3%	
Total households in survey	8079	100.0%	

Note: 'Partial response' refers to households in which some post-travel interviews were completed but in which one or more members refused or was unable to participate. (Households for which only the pre-travel interview was completed are classed as non-response).

Table HH2: Reasons for partial response or non-response

Reason for partial response or non-response	Number of households	Percentage of eligible households
Unable to contact dwelling occupants	678	9.5%
Part non-contact with dwelling occupants (see note)	108	1.5%
Language problems	29	0.4%
Death/ illness in household	85	1.2%
Full refusal of household	709	9.9%
Part refusal (see note)	188	2.6%
Total	1797	25.1%

Note: 'Part non-contact' and 'Part refusal' refer to households in which some post-travel interviews were completed but in which one or more members refused or was unable to be contacted. (Households for which only the pre-travel interview was completed are classed as 'full refusal' or 'unable to contact dwelling occupants' as appropriate).

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[3] Details of response rates for the 1989/90 survey may be found in Appendix E.

Table HH3: Sample sizes and response rates by Local Government Region

Local Government Region	Eligible households	Response rate (see note)
Northland	326	94%
Auckland	1273	67%
Waikato	734	78%
Bay of Plenty	462	71%
Gisborne	253	67%
Hawke's Bay	323	81%
Taranaki	380	85%
Manawatu/ Wanganui	454	82%
Wellington	820	64%
Nelson/ Marlborough	369	73%
West Coast	204	73%
Canterbury	827	78%
Otago	403	73%
Southland	336	84%
Total	7164	75%

Table HH4: Response rates for major household types and dwelling structures

Household type	Dwelling structure						All dwellings (including unspecified)	
	Separate house		2 flats/ houses joined together		3 or more flats together			
	Sample size	Resp rate	Sample size	Resp rate (%)	Sample size	Resp rate (%)	Sample size	Resp rate (%)
Person living alone	803	89%	148	90%	135	78%	1100	87%
Married/ de facto couple only	1444	91%	70	80%	42	74%	1576	90%
Single adults only	203	71%	23	77%	20	56%	247	70%
Family (including extended) with children	1630	83%	29	69%	17	59%	1703	83%
Family with adults only	277	84%	8	67%	6	75%	293	83%
Single adult living with children	282	88%	20	87%	18	82%	325	87%
All types (including unspec.)	4754	77%	303	72%	240	64%	5367	75%

Note: 'Response rate', as in tables HH3 and HH4 above, is the percentage of eligible households from which all members provided travel information.

PEOPLE IN THE SURVEY

Survey Respondents

Table PE1: Age group and gender of survey respondents

Age group	Male	Female	Total
0-4	567	586	1153
5-9	714	620	1334
10-14	621	530	1151
15-19	410	422	832
20-24	353	431	784
25-29	391	502	893
30-34	473	562	1035
35-39	546	657	1203
40-44	470	553	1023
45-49	482	523	1005
50-54	403	458	861
55-59	365	355	720
60-64	272	291	563
65-69	269	296	565
70-74	207	258	465
75-79	147	205	352
80+	129	176	305
Unknown	3	3	6
Total	6822	7428	14250

15 - 19 year olds

Age group	Male	Female	Total
15	88	91	179
16	95	92	187
17	96	80	176
18	59	77	136
19	72	82	154

Table PE2: Employment status of survey respondents

Status (one or more may apply to any individual - see Note)	Respondents with this status
Not yet at school	1130
Student - full time	3330
Student - part time	231
Work - full time	4515
Work - part time	1659
Work - casual	444
Looking for work	547
Keeping house	2459
Retired/ aged pensioner	2011
Other pensioner	239
Other	326

Note: the above categories are not mutually exclusive. For example, the same individual may validly be recorded as a full time student **and** a part time worker.

Table PE3: Occupations of survey respondents (main job)

Occupation (Note 1)	Respondents
Legislators, administrators and managers	681
Professionals	840
Technicians and associate professionals	651
Clerks	777
Service and sales workers	1035
Agriculture and fisheries workers	640
Trades workers	664
Plant and machine operators and assemblers	531
Elementary occupations	459
Total with listed occupation	6278
No occupation recorded	7972
Total	14250

Notes:

1. Occupations are categorised in accordance with the New Zealand Standard Classification of Occupations, 1995 (Statistics NZ).
2. Of the 6278 respondents with an occupation listed, 4515 had full time employment.

**Table PE4: Personal income of survey respondents
(ages 16 and over)**

Personal income	Respondents
No income	818
Under $10,000	1953
$10,001-$15,000	1572
$15,001-$17,500	634
$17,501-$20,000	587
$20,001-$30,000	1416
$30,001-$40,000	1267
$40,001-$50,000	714
$50,001-$70,000	462
$70,001-$100,000	187
$100,000+	106
Don't know/ object to state	695
Not recorded	17
Total (age 16 and over)	10428

Table PE5: Local Government Region of residence of survey respondents

Region of residence	Respondents
Northland	732
Auckland	2 601
Waikato	1 598
Bay of Plenty	903
Gisborne	397
Hawkes Bay	676
Taranaki	898
Manawatu/ Wanganui	896
Wellington	1 288
Nelson/ Marlborough	694
Canterbury	1 760
West Coast	389
Otago	645
Southland	773
Total	14 250

Table PE6: Ethnicity of survey respondents

Ethnicity	Female	Male	Total
NZ Maori	759	718	1477
European	5778	5287	11065
Pacific	200	156	356
Other (including not stated)	691	661	1352
Total	7428	6822	14250

Note: The categories 'European' and 'Pacific' include both immigrants and New Zealand-born people of European or Pacific descent respectively. See Appendix C for further details of ethnicity classification.

Table PE7: Survey respondents by urban/ rural area of residence

Area of residence	Respondents
Main urban areas	8511
Secondary urban areas	1323
Rural areas	4416
Total	14250

Comparison with population

The following tables give an indication of the degree of under or over representation of each group within the sample. The figure shown for each group is the ratio of the proportion of the sample accounted for by that group, to the proportion of the population accounted for by the same group. For example, males aged 5-9 made up 5.01% of the total sample but only 4.08% of the population. The *sample: population* ratio for this group is therefore 1.23, indicating that this group was over-represented in the sample by 23%. Similarly, males aged 20-24 were under-represented in the sample by 34%, compared to the total population. The population estimates used were derived from 1996 census data, adjusted to account for demographic changes to December 1997 (the mid-point of the survey) using Statistics NZ estimates of population.

Table PE8: Sample compared to population, for age/ gender groups

Age	Ratio of sample proportion to population proportion		
	Male	Female	Total
0-4	1.00	1.10	1.05
5-9	1.23	1.12	1.18
10-14	1.16	1.05	1.11
15-19	0.78	0.83	0.80
20-24	0.66	0.80	0.73
25-29	0.75	0.90	0.83
30-39	0.92	1.04	0.98
40-49	0.98	1.09	1.04
50-64	1.10	1.16	1.13
65+	1.05	0.99	1.01
Total	1.00	1.00	1.00

Table PE9: Regional age profiles: sample compared to population within region

Local Government Region	Ratio of sample proportion to regional population proportion				
	0-14 years	15-29 years	30-49 years	50+ years	Total
Northland	1.04	0.65	0.94	1.27	1.00
Auckland	1.16	0.77	1.05	1.01	1.00
Waikato	1.05	0.83	1.06	1.03	1.00
Bay of Plenty	0.96	0.91	1.12	0.98	1.00
Gisborne	1.31	0.60	0.77	1.25	1.00
Hawke's Bay	1.06	0.92	0.88	1.13	1.00
Taranaki	1.03	0.99	1.00	0.97	1.00
Manawatu/ Wanganui	1.23	0.67	1.03	1.05	1.00
Wellington	1.24	0.74	0.97	1.06	1.00
Nelson/ Marlborough	1.11	0.77	0.97	1.11	1.00
West Coast	0.96	1.02	1.00	1.02	1.00
Canterbury	1.04	0.88	1.05	1.01	1.00
Otago	1.00	0.62	1.01	1.34	1.00
Southland	1.07	0.94	1.02	0.96	1.00
Total	1.11	0.79	1.01	1.08	1.00

During estimation the sample was weighted by age, gender and region to correct for these differences in representation (see Appendix A).

Driving experience

Survey respondents aged 15 and over were asked to estimate their total driving experience in kilometres. They were asked to describe their experience according to five broad categories: never driven, up to 2000 km, 2001-20 000 km, 20 001-200 000 km and over 200 000km. Those who were unable to estimate their lifetime driving experience were recorded as 'Not known'.

This self-reported driving experience is presented in the following graphs. For example, in the 40+ age group, a higher percentage of women than men have never driven.

Fig PE1: Driving experience by age group and gender

a) Males
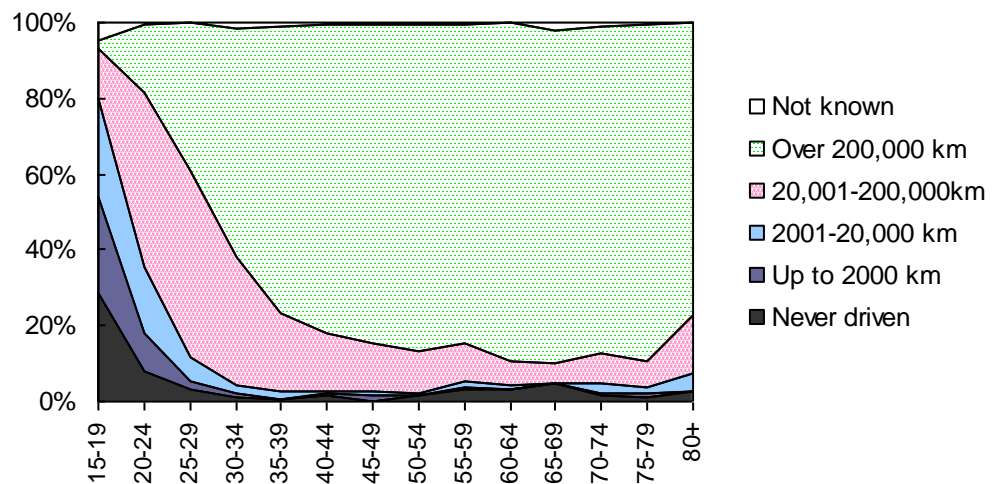
b) Females

**Fig PE2: Young people's driving experience
by single year age group**

Note: Results for single year age groups (as in PE2) are more variable than those for five year age groups, due to the smaller sample sizes.

VEHICLES

Vehicles

Survey respondents were asked to record details of **household** vehicles (registered vehicles usually parked at the address overnight, whether private or company owned) and other **non-household** vehicles used by members of the household.
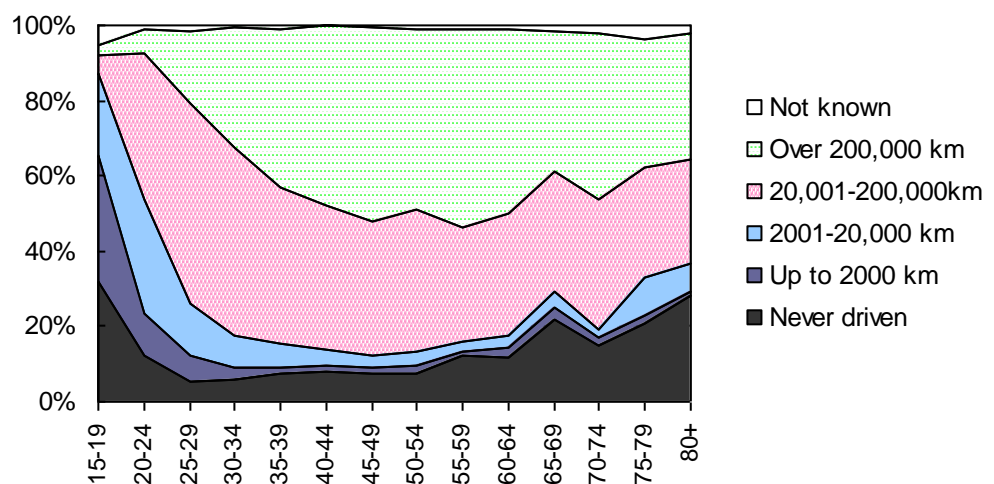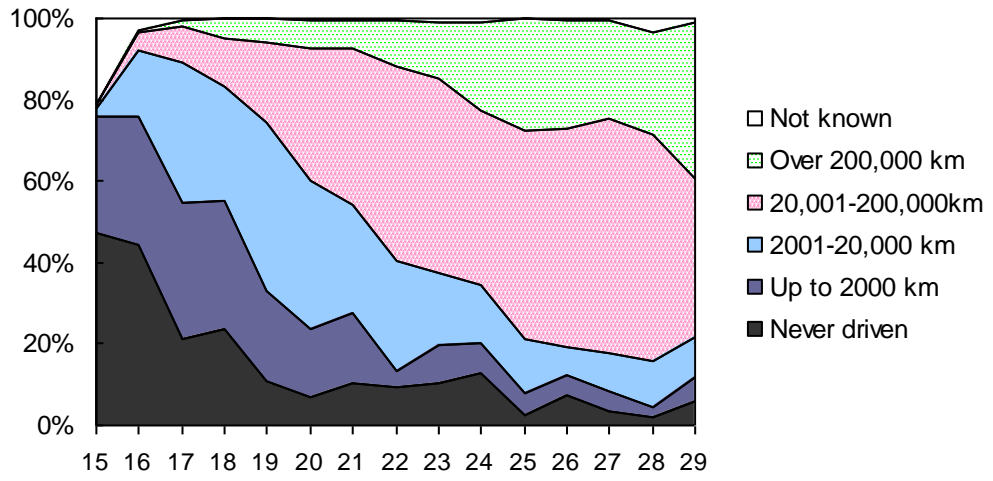
The numbers of household vehicles in the survey can be scaled up using the appropriate weights to provide national estimates of the number of household vehicles. There is however no comparable estimate for non-household vehicles, as some non-household vehicles may belong to other households and so will already have been counted in the household vehicle total. Non-household vehicles that belong to companies may be available for use by a number of people from different households so some multiple counting of the same vehicle might occur. For these reasons no estimates of national totals can be calculated for non-household vehicles.

Table VE1: Vehicle types

Vehicle type	Household vehicles		Non-household vehicles
	Number in survey	National estimate (thousands)	Number in survey
Car/ station wagon	8005	1585.3	2268
Van/ ute	1464	263.8	604
Truck	273	51.6	174
Taxi	7	1.2	11
Motorcycle	316	58.0	38
Other / unknown	40	9.2	144
Total	10105	1969.0	3239

Note: 'Other' includes buses, tractors, heavy machinery, mobility scooters and other unclassifiable vehicles.

Fig VE1: Household vehicles by type 1989/90 vs 1997/98
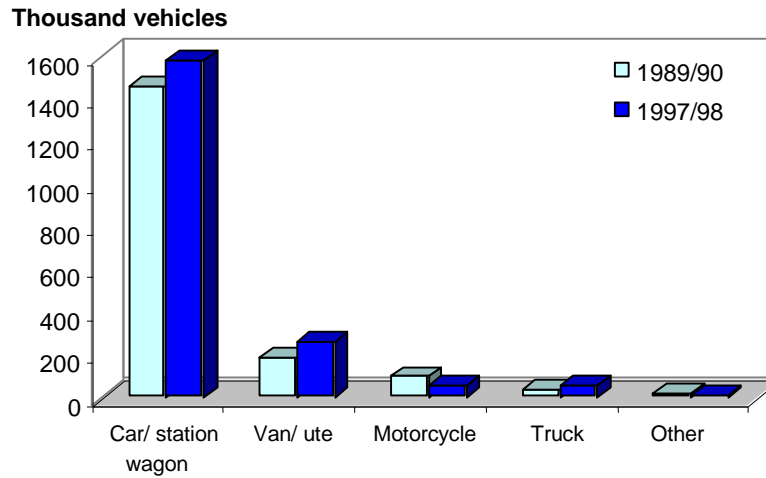
Thousand vehicles

Fig VE2: Age profile of household vehicles, 1989/90 vs 1997/98 (cars, vans and utes)

Percentage of vehicle fleet
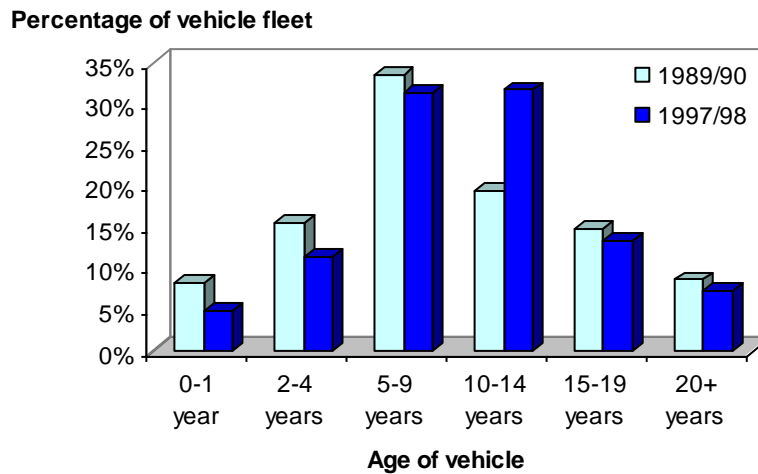
The estimated mean age of the NZ household vehicle fleet (cars, vans and utes) in 1989/90 was 9.9 years, compared to 10.7 years in 1997/98.

Fig VE3: Engine size profile of household vehicles, 1989/90 vs 1997/98 (cars, vans and utes)

Percentage of vehicle fleet
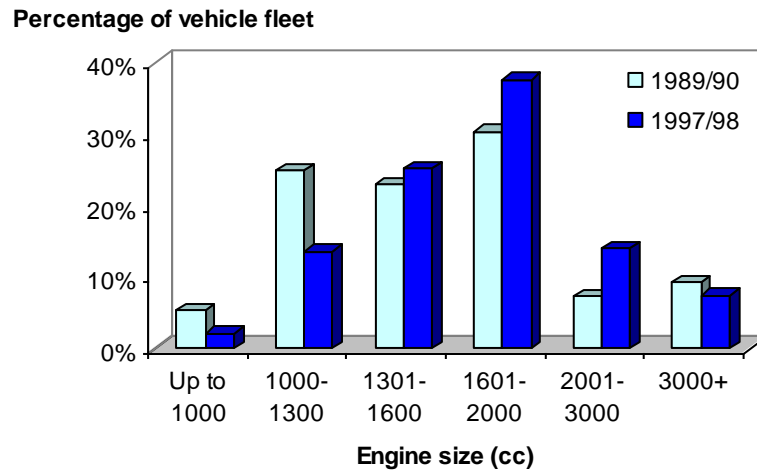
Fig VE4: Engine size of motorcycles (thousands of household vehicles)

Thousands
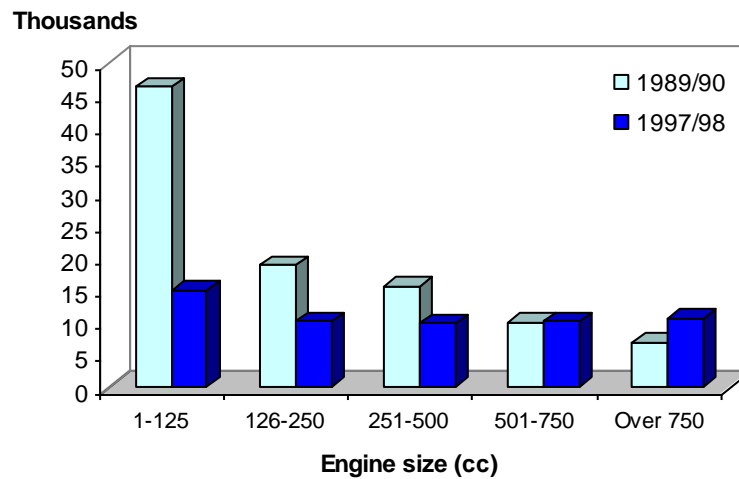
The marked decrease in motorcycle ownership between 1989/90 and 1997/98 was almost entirely the result of a decrease in ownership of smaller motorcycles (under 500 cc). The estimated mean engine size in 1989/90 was 370 cc, compared to 470 cc in 1997/98.

Table VE2: Household vehicles by age and engine size
(National estimates)

a) Cars, vans and utes (thousands)

Engine size (cc)	Age of vehicle						
	0 - 1 year	2 - 4 years	5 - 9 years	10 - 14 years	15 - 19 years	20 years and over	Total
Up to 1000	2.0	1.1	4.4	12.1	6.7	10.9	38.3
1001 - 1300	2.3	9.6	52.2	83.5	55.3	31.1	239.9
1301 - 1600	12.9	49.5	140.3	146.4	63.4	20.3	445.3
1601 - 2000	31.9	64.5	224.5	235.1	73.3	24.9	667.5
2001 - 3000	25.6	51.6	86.7	46.6	12.2	18.2	247.6
Over 3000	10.7	19.4	35.6	26.4	19.5	17.6	130.6
Total	87.2	201.6	556.5	564.5	237.3	130.6	1849.0

Note: Totals include vehicles of unknown age and/or engine size.

b) Motorcycles (thousands)

Engine size (cc)	Age of vehicle						
	0 - 1 year	2 - 4 years	5 - 9 years	10 - 14 years	15 - 19 years	20 years and over	Total
Up to 125	0.1	0.5	2.0	4.8	3.6	0.9	14.9
126 - 250	0.4	0.5	3.9	2.9	1.3	0.6	10.2
251 - 500	0.5	1.5	0.5	2.7	1.7	2.3	9.8
501 - 750	0.3	0.9	1.9	2.2	1.1	2.1	10.2
Over 750	0.7	3.0	2.0	2.2	1.1	0.8	10.6
Total	2.0	6.4	10.6	14.7	8.8	6.8	58.0

Note: Totals include vehicles of unknown ages and/or engine size.

Vehicle travel
Table VE3: Annual distance travelled by cars, vans and utes
(100 million km)

Engine size (cc)	Age of vehicle						
	0 - 1 year	2 - 4 years	5 - 9 years	10 - 14 years	15 - 19 years	20 years and over	Total
Up to 1000	0.1	0.1	0.4	1.2	0.5	0.4	2.7
1001 - 1300	0.4	2.2	6.5	8.3	5.6	2.0	25.4
1301 - 1600	2.4	6.5	21.5	18.5	6.6	1.9	58.5
1601 - 2000	7.1	10.6	32.4	31.6	8.9	1.3	94.3
2001 - 3000	6.1	13.3	15.1	6.3	1.1	1.1	45.4
Over 3000	1.8	3.4	6.6	3.5	2.3	0.8	18.9
Total	18.5	37.1	84.3	70.9	25.7	7.8	253.3

Note: Totals include vehicles of unknown age and/ or engine size.

Fig VE5: Annual distance travelled by cars, vans and utes
Vehicle age, 1989/90 vs 1997/98

100 million km
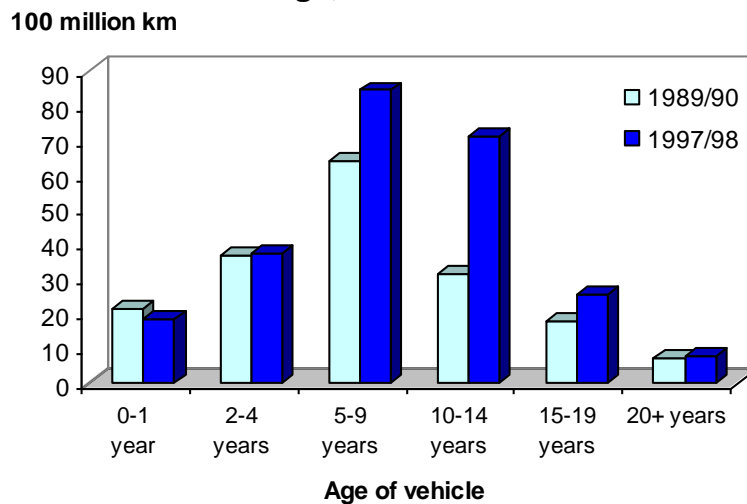
Fig VE6: Annual distance travelled by cars, vans and utes
Engine size, 1989/90 vs 1997/98

100 million km
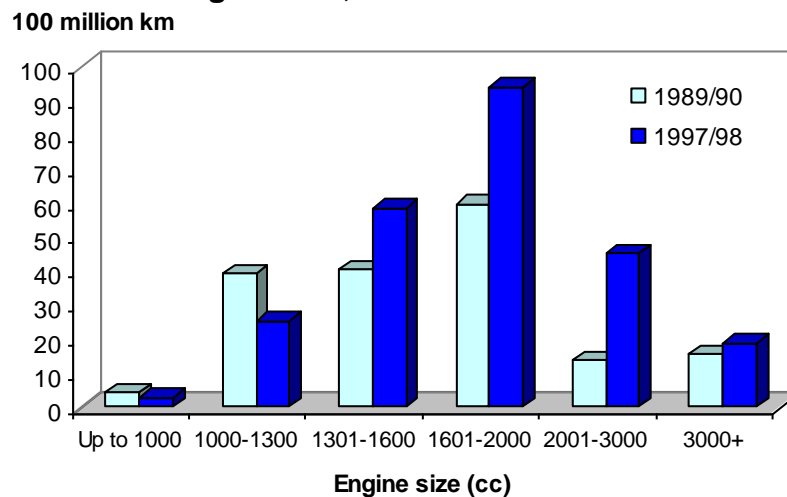
Table VE4: Average distance per trip by cars, vans and utes (km)

Engine size (cc)	Age of vehicle						
	0 - 1 year	2 - 4 years	5 - 9 years	10 - 14 years	15 - 19 years	20 years and over	Total
Up to 1000	3.9	3.5	5.8	6.9	4.5	5.1	5.5
1001 - 1300	9.9	12.7	8.0	6.4	6.0	5.7	6.9
1301 - 1600	9.2	7.3	8.5	7.5	7.0	10.6	7.9
1601 - 2000	10.3	9.1	8.5	7.9	9.0	7.9	8.6
2001 - 3000	12.3	12.2	9.9	9.6	8.4	8.2	11.0
Over 3000	9.3	10.8	11.5	10.3	9.8	7.2	10.5
Total	10.6	9.8	8.8	7.7	7.5	7.3	8.6

Note: Totals include vehicles of unknown age and/ or engine size.

Fig VE7: Average distance per trip (cars, vans and utes) Vehicle age, 1989/90 vs 1997/98
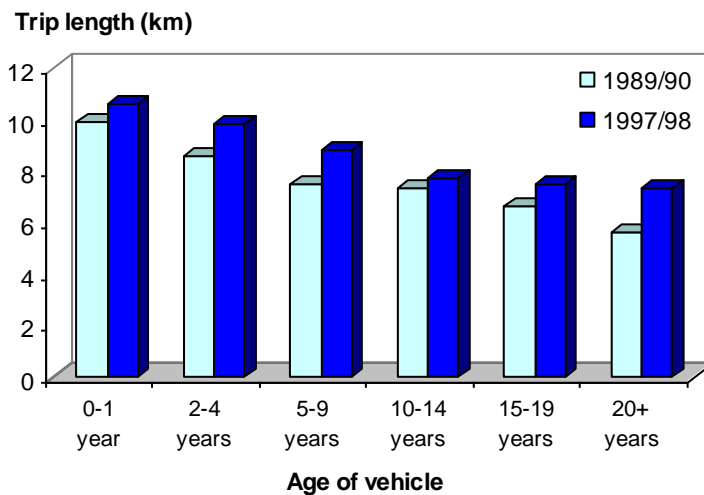
Fig VE8: Average distance per trip (cars, vans and utes) Engine size, 1989/90 vs 1997/98
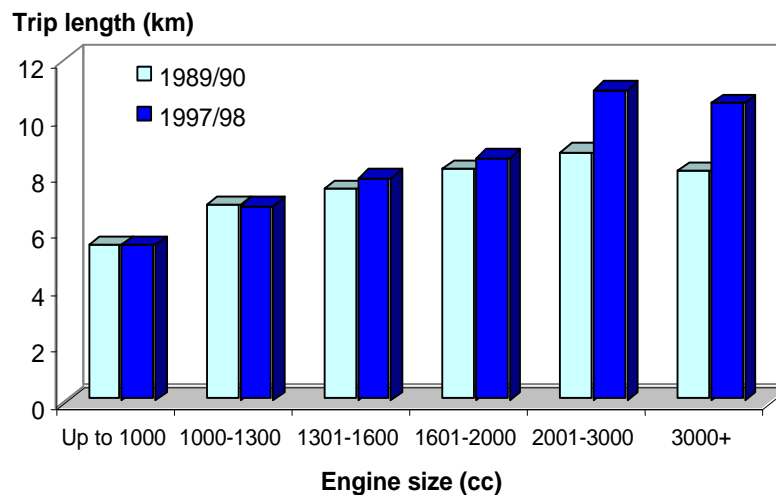
Table VE5: Total distance and average trip distance travelled by motorcycles

Engine size (cc)	National annual distance travelled (million km)		Average distance per trip (km)	
	1989/90	1997/98	1989/90	1997/98
Up to 125	68.1	27.5	3.8	3.7
126-250	44.1	40.7	4.3	7.3
251-500	33.5	17.6	7.4	5.3
501-750	66.3	44.7	18.5	11.3
Over 750	64.9	34.7	16.4	10.4
Unknown	4.2	11.6	12.1	3.2
Total	281.1	176.9	6.9	6.5

Fig VE9: Total annual distance travelled by motorcycles, by engine size
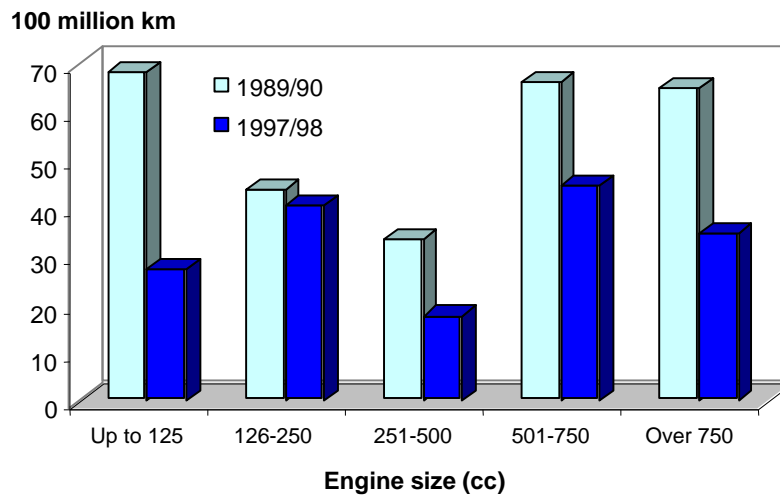
Fig VE10: Average trip length by motorcycles, by engine size
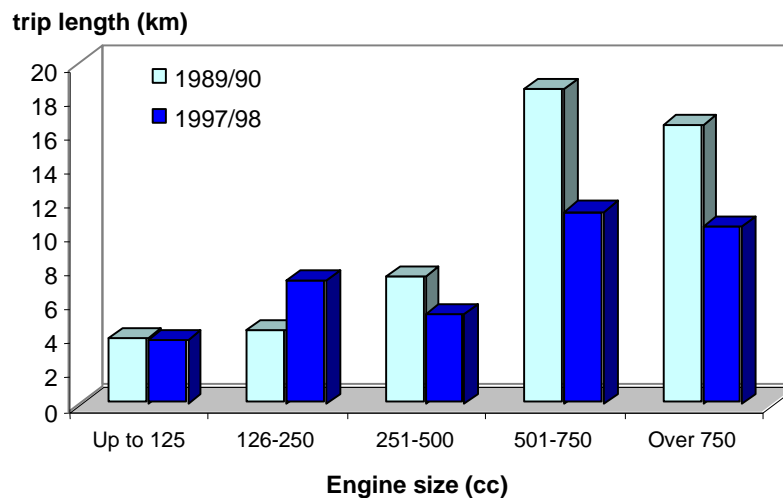
Crash involved vehicles

The crash data from the LTSA's Traffic Crash Report database can be combined with the estimates of annual vehicle kilometres travelled from the Travel Survey, to derive an exposure adjusted measure of vehicle involvement in crashes.

The number of crash involved vehicles per 100 million km is presented in the tables below for cars, vans and utes of different ages, and for motorcycles. Only vehicles involved in injury crashes reported to the Police were included. These results do not necessarily show that one class of vehicle is more or less safe than any other, as important factors such as driver age and gender, urban/ rural travel split or restraint use are not taken into account here.

**Table VE6: Crash involved vehicles per 100 million km travelled
Cars, vans and utes, 1989/90 vs 1997/98**

Age	Fatal crashes		All reported fatal & injury crashes	
	1989/90	1997/98	1989/90	1997/98
0-1 year	2.5	1.6	52.0	28.2
2-4 years	1.8	1.3	48.5	25.8
5-9 years	2.6	1.7	61.2	35.7
10-14 years	4.0	1.9	90.2	47.8
15-19 years	7.4	3.9	147.0	73.6
20 yrs and over	7.0	4.2	158.6	97.0
Total	3.9	2.2	87.2	49.2

Note: Totals include vehicles of unknown ages.

**Table VE7: Crash involved motorcycles per 100 million km
1989/90 vs 1997/98**

Crash type	1989/90	1997/98
Fatal crashes	46.6	33.4
All reported fatal & injury crashes	809	588

Fig VE11: Vehicles involved in crashes per 100 million km by vehicle age (cars, vans and utes)

a) Vehicles in fatal crashes

Fatal crashes/ 100 million km

Age of vehicle
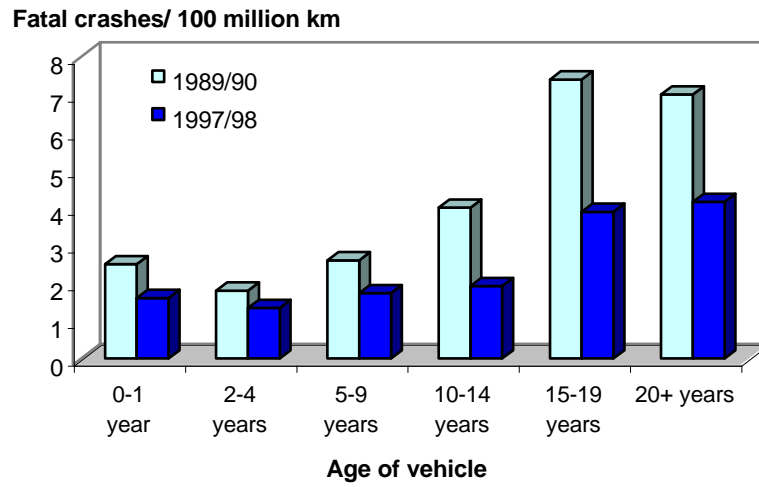
b) Vehicles in all reported fatal and injury crashes

Crashes/ 100 million km

Age of vehicle
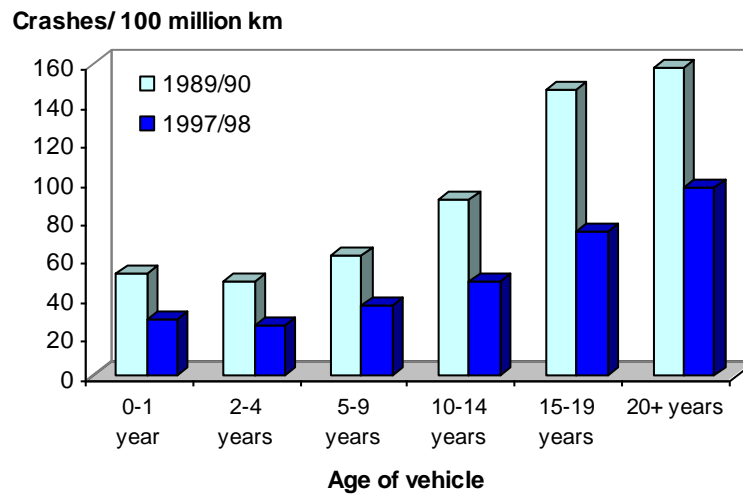
Fig VE12: Age and gender of drivers of cars, vans and utes

Small vehicles, 0-1600 cc

Large vehicles, over 1600 cc

Vehicles aged 0-4 years

Mean age=48.5   %female=51%

Vehicles aged 0-4 years
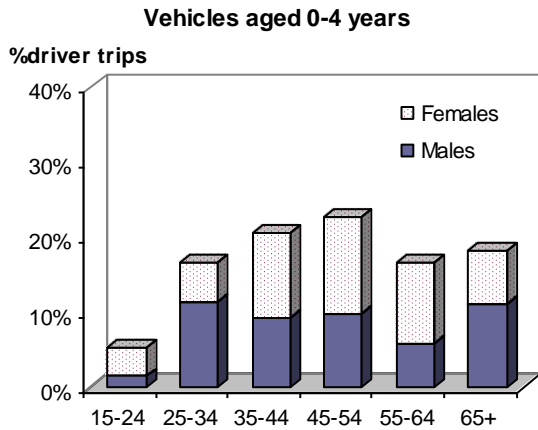
Mean age=43.5   %female=35%

Vehicles aged 5-9 years
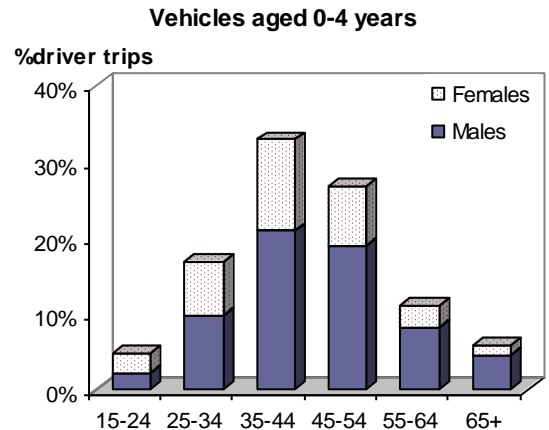
Mean age=43.5   %female=59%

Vehicles aged 5-9 years

Mean age=42.2   %female=44%

Vehicles aged 10 years or older

Mean age=39.0   %female=57%

Vehicles aged 10 years or older
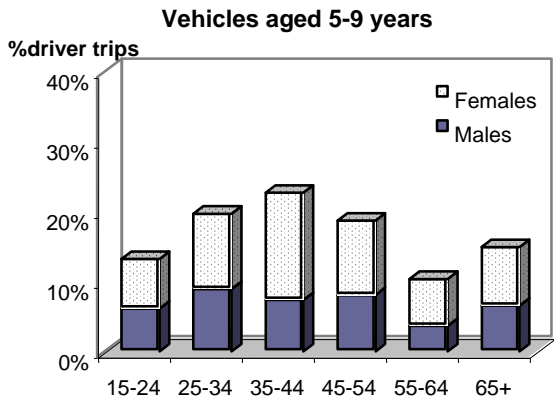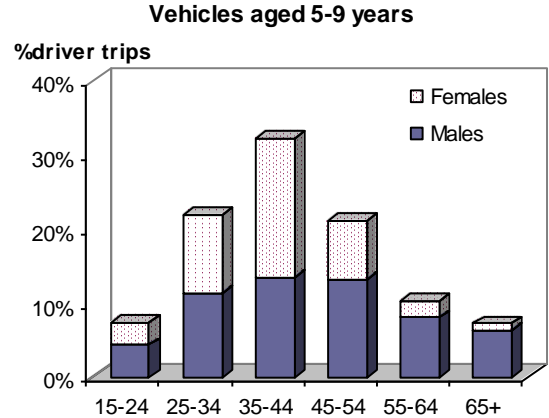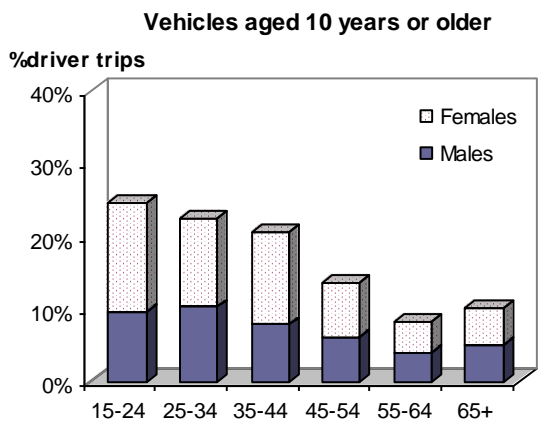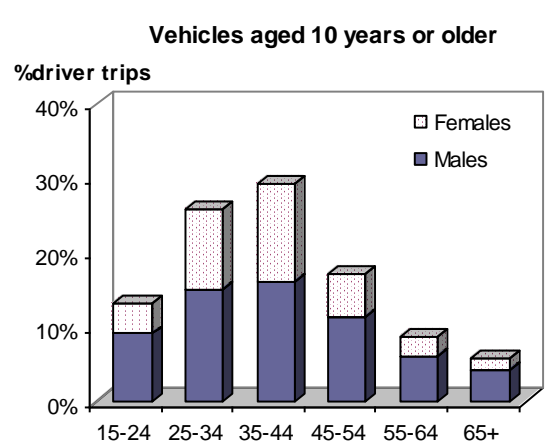
Mean age=39.4   %female=38%

Notes: 1. The graphs show the percentage of all driver trips within the given vehicle category.

2. Mean ages were calculated by averaging ages on a per trip basis.

TRAVEL

Comparing travel modes

Table TR1: Number of trips in the survey by travel mode and overall trip purpose

Trip Purpose	Travel mode (Number of trips in survey)							
	Walk	Vehicle driver	Vehicle pass'ger	Bicycle	Bus	Taxi	Other (Note 1)	Total (Note 2)
Home (Note 3)	7 048	21 195	11 486	1 055	1 010	200	201	42 195
Work - main job	1967	8 806	979	236	171	29	139	12 327
Work - other job	72	428	84	18	14	4	2	622
Work - employer's business	489	5 075	328	60	30	23	48	6 053
Education	1 698	537	1 965	350	752	9	30	5 341
Shopping	3 257	8 259	3 706	163	117	21	40	15 563
Personal business or services (Note 4)	1 392	4 529	1 480	89	47	26	33	7 596
Social/ recreational	5 544	10 315	9 754	610	314	139	153	26 829
Accompanying someone else	1 070	6 398	5 325	21	44	8	14	12 880
Total (Note 2)	22 539	65 543	35 109	2 602	2 499	461	660	129 414

Notes

1. The 'other' category includes 254 train trips, 33 ferry trips, 77 plane trips and 296 trips which were classified as 'other' on the survey forms and may include travel by boat, horse, electric wheelchairs etc.
2. Totals include trips for which purpose and/ or trip mode were not recorded.
3. 'Home' includes all trips whose destination was the respondent's home. This may include returning home from work, education, etc.
4. 'Personal business and services' includes trips for medical, dental and social welfare purposes.
5. In this section each leg of an outing is referred to as a trip. For instance, travelling to work may consist of three separate stages, walking to the station, travelling between suburbs by train and then catching a bus to the place of work. This would be included in the table above as three separate trips, each with a different trip mode but with the same overall trip purpose.

Table TR2: Trips by travel mode and overall trip purpose
National annual estimates, all ages

Trip Purpose	Travel mode (million trips: national annual estimates)							
	Walk	Vehicle driver	Vehicle pass'ger	Bicycle	Bus	Taxi	Other (Note 1)	Total (Note 2)
Home (Note 3)	359.2	1003.9	532.2	45.1	56.0	11.8	11.1	2019.3
Work - main job	109.4	414.4	48.8	13.6	10.3	Note 5	7.6	606.3
Work - other job	5.5	16.9	4.2	Note 5	Note 5	Note 5	Note 5	28.7
Work - employer's business	25.7	233.1	17.7	1.6	2.3	Note 5	2.3	284.3
Education	88.7	30.7	93.9	13.9	35.4	Note 5	2.0	264.9
Shopping	163.1	392.5	171.0	6.2	7.4	Note 5	1.9	743.7
Personal business or services (Note 4)	69.8	206.1	70.6	4.3	2.8	Note 5	1.4	356.9
Social/ recreational	281.5	486.0	438.8	25.5	17.2	7.7	6.3	1263.1
Accompanying someone else	48.0	309.3	240.9	Note 5	2.0	Note 5	Note 5	601.9
Total (Note 2)	1151.1	3093.0	1618.2	111.4	134.8	27.8	33.5	6169.8

Notes

1. The 'other' category includes trips by train, ferry, and plane as well as trips which were classified as 'other' on the survey forms. (These may include travel by boat, horse, electric wheelchairs etc).
2. Totals have been calculated before rounding and include 0.67 million trips (national estimate after weighting) for which purpose and/ or trip mode were not recorded.
3. 'Home' includes all trips whose destination was the respondent's home. This may include returning home from work, education, etc.
4. 'Personal business and services' includes trips for social welfare purposes.
5. Estimates could not be made in categories where the number of trips sampled was less than 30.
6. Where the number of trips in the sample was less than 100 (see Table TR1), the accuracy of the estimates will be unreliable.

Table TR3: Distance travelled by travel mode and overall trip purpose
National annual estimates, all ages

Trip Purpose	Travel mode (100 million km travelled: national annual estimates)						
	Vehicle driver	Vehicle pass'ger	Bicycle	Bus	Taxi	Other (Note 1)	Total (Note 2)
Home (Note 3)	86.8	54.4	1.1	6.6	0.7	6.0	155.5
Work - main job	43.9	5.7	0.4	0.9	Note 5	1.0	52.1
Work - other job	1.5	0.5	Note 5	Note 5	Note 5	Note 5	2.3
Work - employer's business	27.0	2.7	0.0	0.2	Note 5	5.3	35.5
Education	3.5	4.8	0.3	4.7	Note 5	0.2	13.5
Shopping	22.9	14.7	0.1	0.9	Note 5	0.3	38.9
Personal business or services (Note 4)	13.5	6.1	0.1	0.6	Note 5	1.2	21.5
Social/ recreational	53.6	58.8	0.7	3.4	0.3	1.5	118.4
Accompanying someone else	20.7	16.9	0.0	0.3	Note 5	Note 5	38.3
Total (Note 2)	273.2	164.6	2.9	17.9	1.5	16.1	476.1

Notes

1. The 'other' category includes trips by train, ferry, and plane as well as trips which were classified as 'other' on the survey forms. (These may include travel by boat, horse, electric wheelchairs etc).
2. Totals have been calculated before rounding and include 0.67 million trips (national estimate after weighting) for which purpose and/ or trip mode were not recorded.
3. 'Home' includes all trips whose destination was the respondent's home. This may include returning home from work, education, etc.
4. 'Personal business and services' includes trips for medical, dental and social welfare purposes.
5. Estimates could not be made in categories where the number of trips sampled was less than 30.
6. Where the number of trips in the sample was less than 100 (see Table TR1), the accuracy of the estimates will be unreliable.
7. Distance was not recorded for walking trips. Distances for 'other' modes are based on respondent estimates. Other distances were calculated from route information given by the respondent.

Table TR4: Number of trips and distance travelled by travel mode

Travel mode	Trips in survey	National, annual estimates					
		Million trips		100 million km		km per trip (Note 2)	
	1997/98	1997/98	%change since 1989/90	1997/98	%change since 1989/90	1997/98	%change since 1989/90
Vehicle driver	65 543	3093.0	22%	273.2	35%	8.8	10%
Vehicle passenger	35 109	1618.2	15%	164.6	14%	10.2	-1%
Walk	22 539	1151.1	2%	Note 5	Note 5	Note 5	Note 5
Bicycle	2 602	111.4	-39%	2.9	-19%	2.6	35%
Bus	2 499	134.8	-11%	17.9	16%	13.7	13%
Taxi	461	27.8	58%	1.5	64%	5.4	6%
Train	254	15.3	17%	3.3	-10%	21.9	-21%
Plane (Note 3)	77	3.9		11.9		459.4	
Ferry (Note 3)	33	2.0		0.3		19.8	
Other (Note 4)	296	12.3	17%	0.6	-53%	5.4	-58%
Total	129 414	6169.8	14%	476.1	24%	7.7	9%

Notes:

1. As travel by children under five was not included in the 1989/90 travel survey, the percentage change figures in the above table are based on travel by ages 5 and over only. (1997/98 estimates includes trips by all ages).
2. Distance per trip has been calculated on trips of known length only. The 'million trips' column shows all trips including those of unknown length.
3. The accuracy of the estimates for plane and ferry travel may be unreliable due to small samples sizes. For the same reason, percentage change comparisons could not be calculated.
4. The 'other' category includes travel by boat, horseback, electric wheelchairs etc.
5. Distance estimates are not available for walking trips.
6. Totals have been calculated before rounding.

Table TR5: Travel mode

a) by age group

Age group	Travel mode (million trips: national annual estimates)						
	Walk	Vehicle driver	Vehicle passenger	Bicycle	Bus	Other (Note1)	Total trips (Note 2)
0-4	52.3		322.3	0.6	1.3	1.7	378.8
5-9	87.5		278.2	10.4	17.4	1.7	396.8
10-14	111.5		211.4	33.0	35.5	4.2	397.0
15-19	135.9	144.2	155.9	20.8	28.4	7.8	493.1
20-24	110.3	262.8	108.9	18.5	9.2	10.2	519.8
25-29	94.0	313.5	76.3	3.9	5.9	5.0	498.6
30-34	92.6	359.9	74.8	4.5	7.0	4.4	543.2
35-39	86.0	456.7	62.6	3.3	7.8	5.3	621.6
40-44	59.3	384.4	54.7	3.9	4.0	5.0	511.2
45-49	74.1	336.4	57.8	1.5	4.4	4.7	479.0
50-54	58.8	247.5	43.8	2.1	3.0	2.0	357.3
55-59	42.2	173.6	39.3	0.8	3.3	4.2	263.3
60-64	33.0	127.4	31.6	1.6	1.7	0.9	196.2
65-69	39.1	105.5	31.4	3.4	2.8	0.5	182.8
70-74	29.9	80.8	28.3	2.0	1.2	0.6	142.9
75-79	24.0	58.6	24.2	1.0	0.3	1.9	109.9
80+	14.8	23.8	14.4	0.1	1.1	0.8	55.0
Total (Note 2)	1151.1	3093.0	1618.2	111.4	134.8	61.3	6169.8

b) by gender

Gender	Travel mode (million trips: national annual estimates)						
	Walk	Vehicle driver	Vehicle passenger	Bicycle	Bus	Other (Note1)	Total trips (Note 2)
Female	632.5	1401.0	961.9	24.7	72.7	29.2	3122.0
Male	518.6	1691.8	656.3	86.7	62.0	32.1	3047.7
Total	1151.1	3093.0	1618.2	111.4	134.8	61.3	6169.8

Notes:

1. The 'Other' category includes travel by train, ferry, taxi and plane as well as boat, horseback, electric wheelchairs etc.
2. Totals have been calculated before rounding and include trips where respondent age or travel mode was unknown.

Fig TR1: Age group profiles: percentage of age group trips by mode

Legend: ■ Walk ■ Vehicle driver □ Vehicle passenger ■ Bicycle ▨ Bus ■ Other
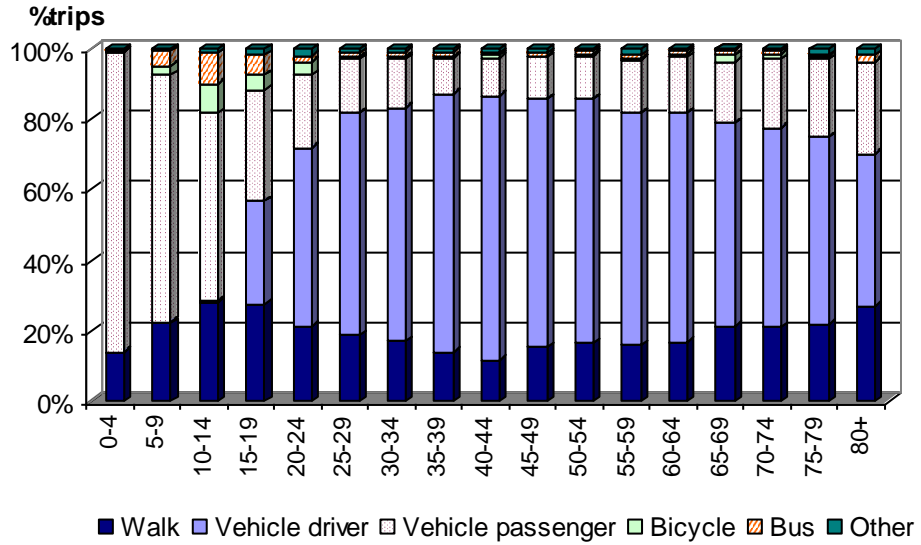
Fig TR2: Trip duration by mode

Duration categories

- ■ 30+ min
- □ 15-30 min
- ■ 10-15 min
- ■ 5-10 min
- ■ under 5 min
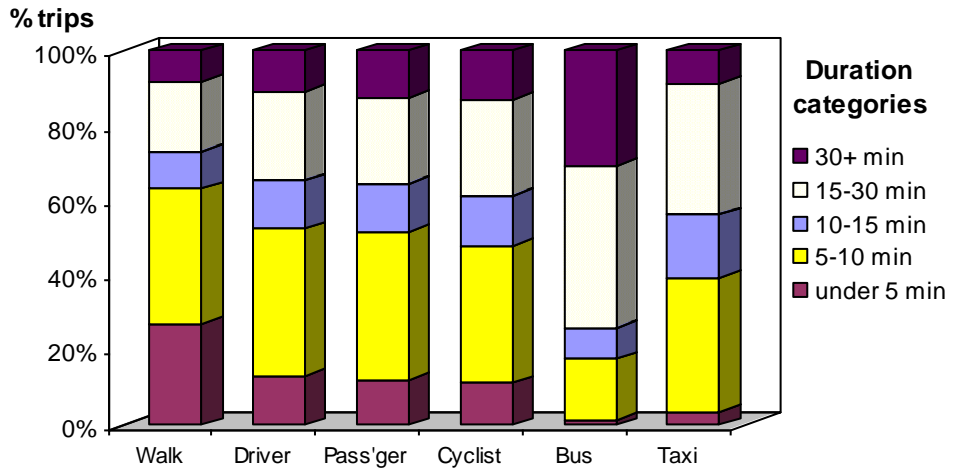
Fig TR3: Trip distance by mode

Distance categories

- ■ 10+ km
- □ 5-10 km
- ■ 2-5 km
- ■ 1-2 km
- ■ Under 1km
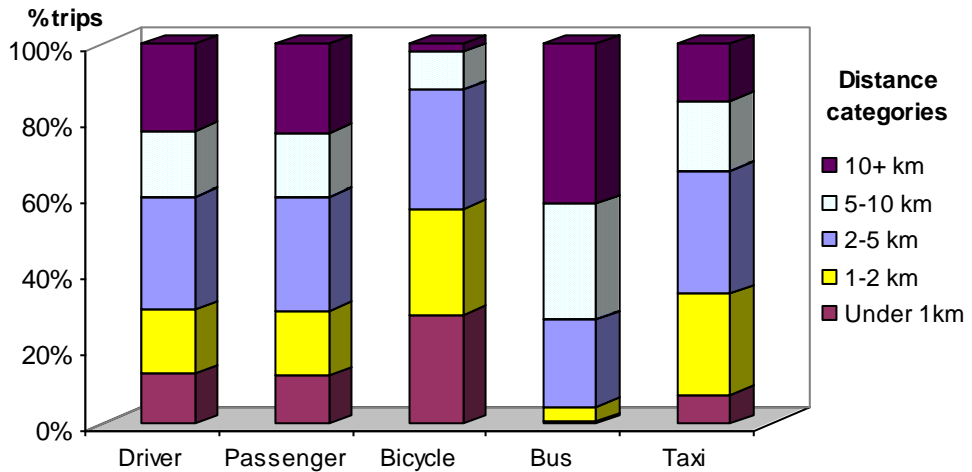
**Table TR6: People killed or injured in reported injury crashes
per 100 million km travelled, by travel mode**

Age group	Driver (light 4 wheeled vehicle)	Passenger (light 4 wheeled vehicle)	Motorcycle rider	Cyclist (Note 1)	Bus passenger
0-14		11		291	1.1
15-29	48	45	973	187	0.9
30-44	18	17	325	270	1.8
45-59	15	13	517	283	1.2
60+	26	19	Note 2	116	1.7

**Table TR7: People killed or injured in reported injury crashes
per million hours of travel, by travel mode**

Age group	Driver (light 4 wheeled vehicle)	Passenger (light 4 wheeled vehicle)	Motorcycle rider	Cyclist (Note 1)	Bus passenger	Pedestrian
0-14		4		23	0.3	7
15-29	18	18	279	24	0.3	4
30-44	7	8	104	39	0.5	3
45-59	5	6	174	33	0.4	2
60+	9	7	Note 2	13	0.5	5

Notes to Table TR6 and TR7

1. Cyclists injured in reported motor vehicle crashes only
2. There were insufficient trips to permit calculation of reliable estimates for this age group.
3. These age bands were selected to give adequate sample sizes for all modes of transport in the table. Where sample sizes permit, more detailed age breakdowns are given in the relevant sections of this report (drivers, passengers etc).

Table TR8: Number of trips and distance travelled by vehicle type

a) Drivers

Vehicle type	Trips in survey		National, annual estimates					
			Million trips		100 million km		km per trip (Note 2)	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
Car or station wagon	30505	52395	2089.0	2543.4	158.3	213.0	7.6	8.4
Van or ute	3973	9965	296.8	405.5	25.4	40.3	8.6	10.0
Truck	960	2144	71.9	101.1	12.6	16.4	17.5	16.3
Motorcycle	549	615	40.6	27.2	2.8	1.8	6.9	6.5
Other (incl. unknown type)	195	253	18.1	13.6	1.5	1.6	8.5	11.8
Total	36406	65539	2529.4	3093.0	201.7	273.2	8.0	8.8

b) Passengers aged 5 and over

Vehicle type	Trips in survey		National, annual estimates					
			Million trips		100 million km		km per trip (Note 2)	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
Car or station wagon	13717	22779	951.2	1065.1	101.5	110.1	10.7	10.3
Van or ute	1550	4595	117.9	192.9	14.4	23.2	12.3	12.0
Truck	257	462	34.1	22.4	3.6	3.5	10.6	15.7
Motorcycle (see Note 3)	34	33	3.0	1.4	Note 3	Note 3	Note 3	Note 3
Other (incl. unknown type)	96	306	6.8	14.2	1.0	0.4	14.8	23.5
Total	15850	28175	1124.5	1295.9	121.6	139.0	10.8	10.7

c) All passengers, 1997/98 survey

Vehicle type	Trips in survey	National, annual estimates		
		Million trips	100 million km	km per trip (Note 2)
Car or station wagon	28642	1338.2	131.8	9.9
Van or ute	5601	238.0	26.8	11.3
Truck	502	25.5	3.8	14.7
Motorcycle (see Note 3)	40	1.7	Note 3	Note 3
Other (incl. unknown type)	324	14.7	2.1	14.3
Total	35109	1618.2	164.6	10.2

Notes to Table TR8

1. Travel by children under five was not included in the 1989/90 travel survey and is excluded from the 1997/98 figures in table b) above to enable comparison between the two surveys.
2. The 'million trips' column shows **all** trips including those of unknown length. Distance per trip has been calculated on trips of known length only.
3. The accuracy of the estimates for motorcycle passengers may be unreliable due to small sample sizes.

Driver trips
Table TR9: Million driver trips annually (all vehicle types) by age group and gender

Age group	Females		Males		Total	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
15-19	39.4	68.7	70.5	75.6	109.9	144.2
20-24	89.9	129.3	180.2	133.4	270.1	262.8
25-29	117.7	142.6	170.5	170.8	288.3	313.5
30-34	164.4	170.0	189.2	189.9	353.6	359.9
35-39	146.1	233.8	186.0	222.9	332.2	456.7
40-44	144.7	194.3	153.8	190.0	298.5	384.4
45-49	102.0	135.3	154.8	201.0	256.7	336.4
50-54	62.9	96.1	107.5	151.4	170.4	247.5
55-59	47.7	61.5	88.1	112.1	135.8	173.6
60-64	42.8	55.8	93.7	71.6	136.5	127.4
65-69	19.0	36.0	66.4	69.4	85.4	105.5
70-74	17.8	35.8	30.6	45.0	48.4	80.8
75-79	12.8	22.7	13.9	35.9	26.7	58.6
80+	3.7	9.3	10.3	14.5	14.0	23.8
Total	1012.8	1401.0	1516.6	1691.8	2529.4	3093.0

Note: Totals include estimates based on travel by respondents of unknown age

Table TR10: Distance driven by age group and gender for drivers of all vehicle types (national annual estimates, 100 million km)

Age group	Females		Males		Total	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
15-19	2.5	4.4	4.8	5.7	7.3	10.1
20-24	6.6	11.2	17.1	13.4	23.7	24.5
25-29	7.4	11.0	18.8	19.9	26.2	30.9
30-34	9.8	11.4	19.6	20.1	29.4	31.5
35-39	8.1	16.5	18.9	24.6	27	41.1
40-44	8.8	12.7	15.4	21.8	24.2	34.4
45-49	6.1	10.3	12.2	21.2	18.3	31.4
50-54	3.7	6.7	10.7	16.1	14.4	22.7
55-59	2.5	4.8	6.6	10.2	9.1	15
60-64	2.1	3.3	9.5	7.3	11.6	10.6
65-69	1.1	2.8	3.9	6.1	5.0	8.9
70-74	0.7	2.2	3.0	3.3	3.7	5.5
75-79	0.5	0.8	0.6	2.5	1.1	3.3
80+	0.2	0.3	0.4	0.8	0.6	1.1
Total	60.2	99.2	141.5	174.0	201.7	273.2

Note: Totals include estimates based on travel by respondents of unknown age and/or gender.

Drivers of cars, vans and utes

Table TR11: Drivers of cars, vans and utes; estimates of number of trips, distance driven and distance per trip by age group and gender (1997/98).

Age group	Females				Males			
	Trips in survey	Million trips	100 million km	km per trip (Note 1)	Trips in survey	Million trips	100 million km	km per trip (Note 1)
15-19	1 183	68.2	4.4	6.5	1 262	70.3	5.4	7.6
20-24	2 267	127.6	11.0	8.6	1 970	120.4	11.9	9.9
25-29	2 908	140.7	10.8	7.7	2 673	156.4	17.3	11.1
30-34	3 661	168.1	11.3	6.7	3 535	182.2	17.9	9.8
35-39	5 095	228.2	16.0	7.0	4 180	197.9	21.4	10.8
40-44	4 152	192.5	12.6	6.5	3 881	179.3	19.3	10.8
45-49	3 247	134.2	10.2	7.6	3 772	189.3	19.2	10.1
50-54	2 316	95.6	6.6	6.9	3 095	133.4	13.3	10.0
55-59	1 649	61.1	4.8	7.8	2 470	103.7	9.5	9.2
60-64	1 209	52.7	3.1	5.9	1 718	67.3	7.0	10.4
65-69	875	36.0	2.8	7.7	1 559	66.8	6.0	8.9
70-74	733	35.8	2.2	6.3	982	42.1	3.1	7.4
75-79	446	22.7	0.8	3.5	687	35.7	2.5	6.9
80+	184	9.3	0.3	3.6	347	14.5	0.8	5.5
Total (Note 2)	30 115	1382.4	97.7	7.1	32 245	1566.5	155.6	10.0

Notes

1. The 'million trips' column shows **all** trips including those of unknown length. Distance per trip has been calculated on trips of known length only.
2. The total rows include trips for which driver age was not recorded.

Fig TR4: Annual distance driven in light 4-wheeled vehicles National estimates (100 million km)

100 million km

Age group
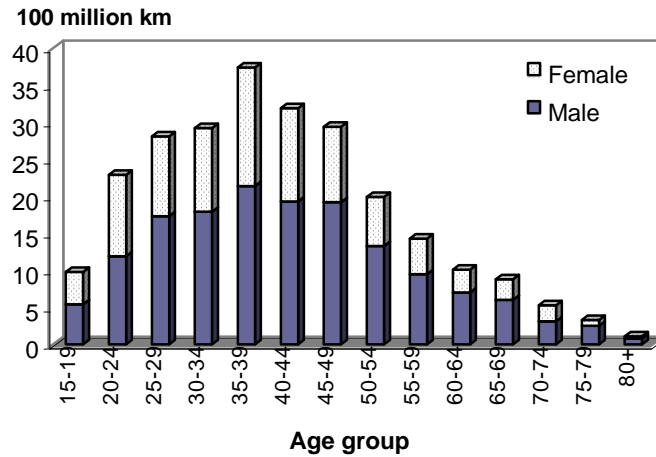
Fig TR5: Drivers involved in reported fatal & injury crashes (cars, vans and utes, annual average 1997/98)

Drivers

Age group
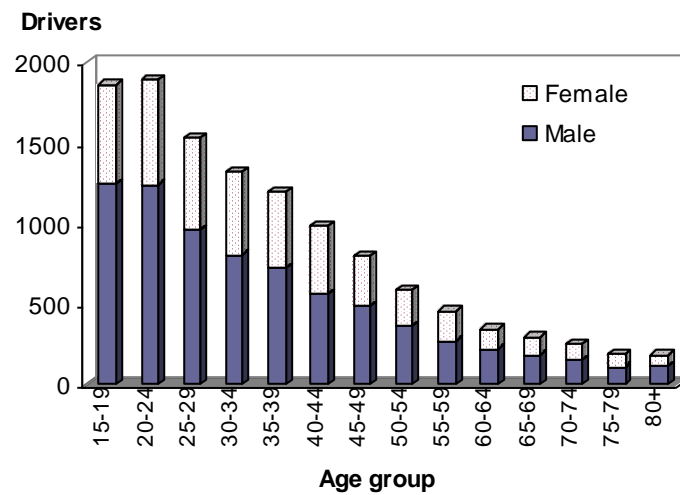
Fig TR6: Drivers involved in fatal crashes (cars, vans and utes, annual average 1997/98)

Drivers

Age group
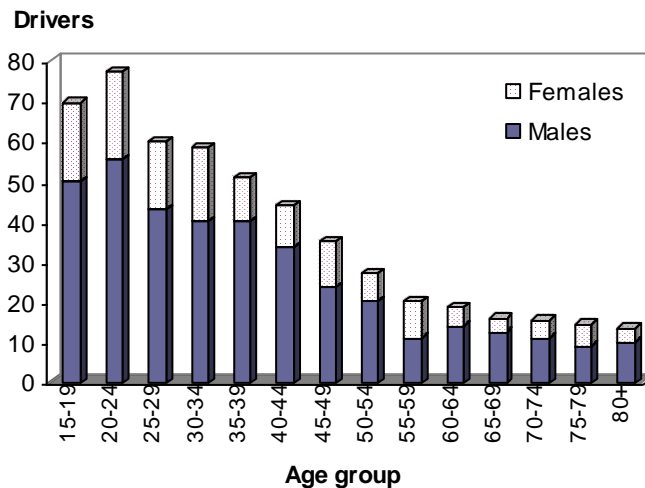
Fig TR7: Drivers involved in reported fatal and injury crashes per 100 million km driven (cars, vans and utes)

Crashes/ 100 million km

Age group
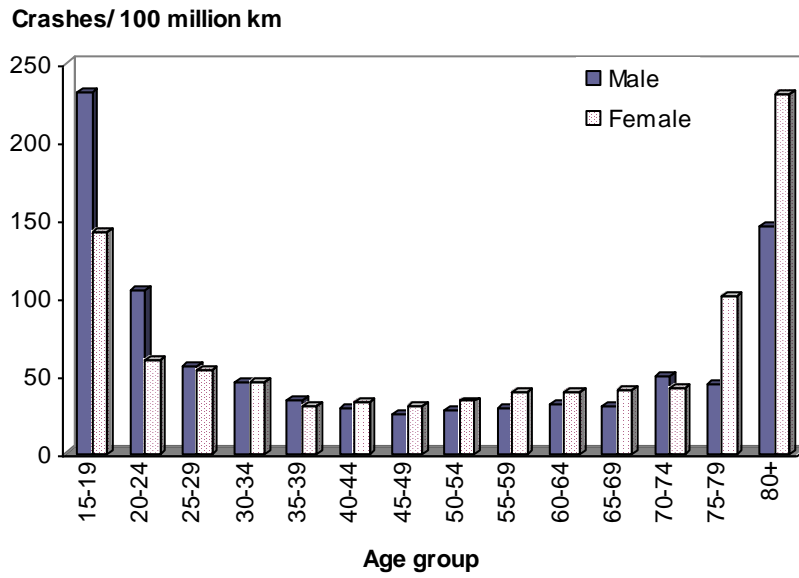
Fig TR8: Drivers involved in fatal crashes per 100 million km driven (cars, vans and utes)

Fatal crashes/100 million km

Age group
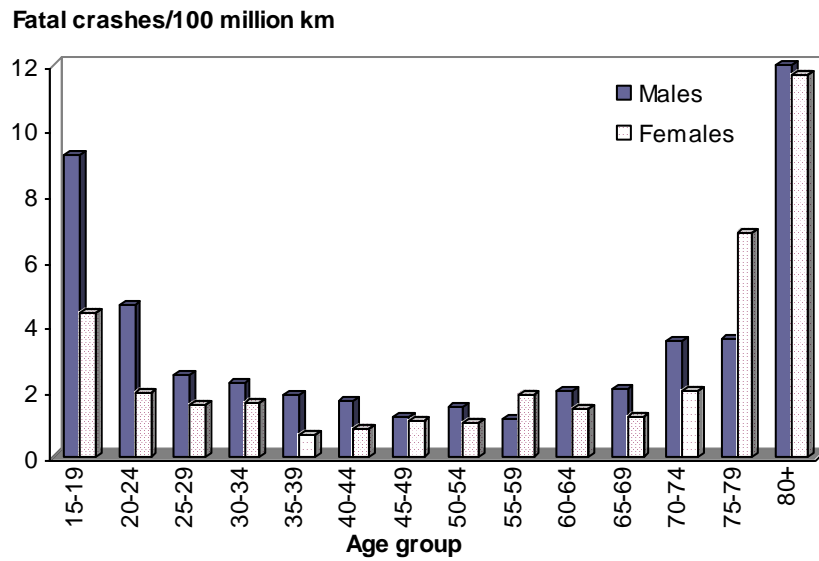
Fig TR9: Total distance driven annually in cars, vans and utes National estimates, 1989/90 vs 1997/98

100 million km driven

Age group
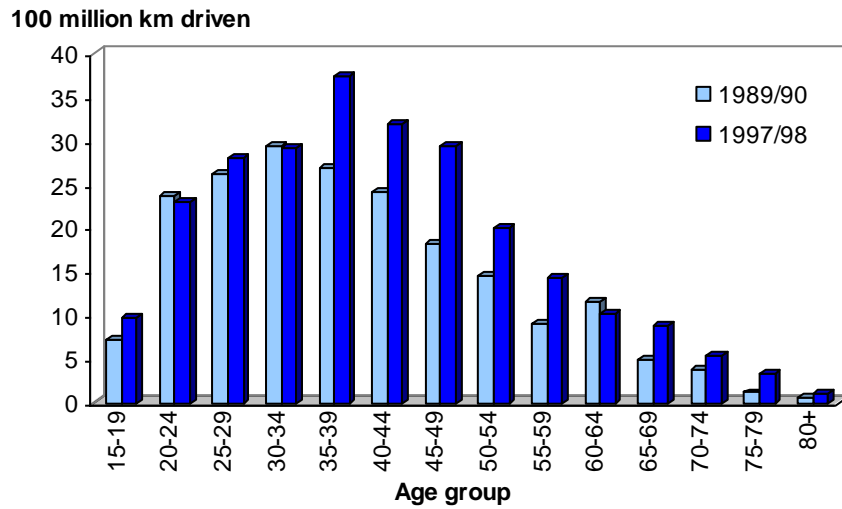
Fig TR10: Drivers involved in reported fatal and injury crashes (cars, vans and utes, annual average 1989/90 vs 1997/98)

Drivers

Age group
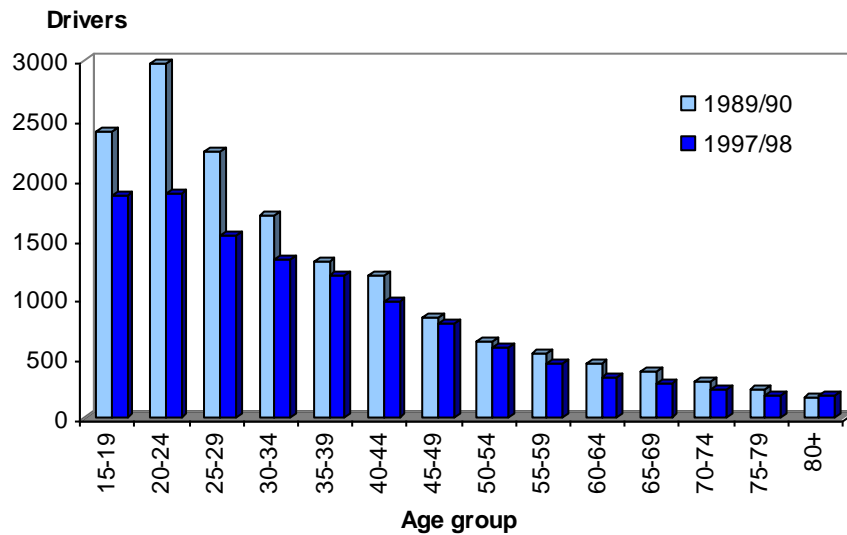
Fig TR11: Drivers involved in reported fatal and injury crashes per 100 million km driven, 1989/90 vs 1997/98

Drivers involved in crashes per 100 million km driven
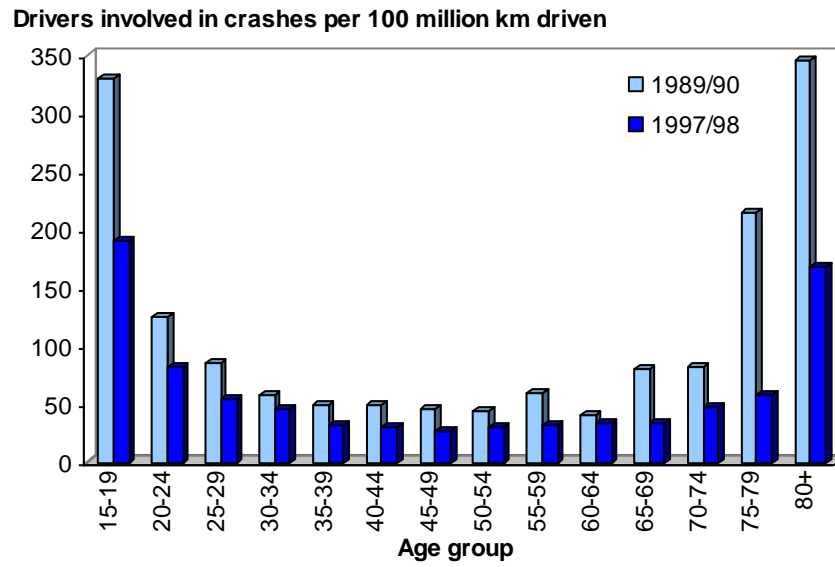
Age group

Fig TR12: Number of trips by length of trip (Drivers of cars, vans and utes)

Million trips

Trip length (0=0-1km, 1=1-2km, etc)
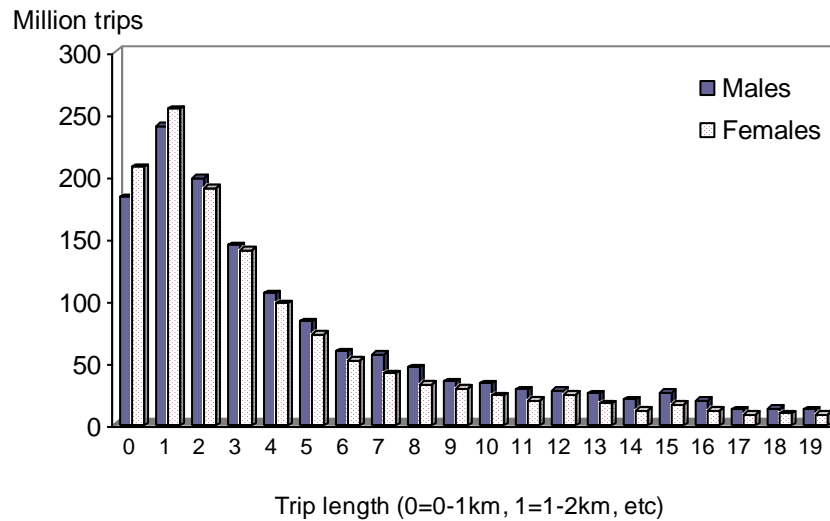
Note: 11.7% of trips by males and 7.0% of trips by females were over 20 km in length.

Motorcycle riders

Table TR12: Motorcycle riders: trips and distance ridden by age group

Age group	Trips in survey		National annual estimates					
			Million trips		Million km		km per trip	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
15-24	209	127	14.9	5.3	118.5	26.3	8.0	4.9
25-34	164	193	13.0	7.8	88.1	56.7	6.8	7.3
35-44	82	123	5.7	9.6	32.7	65.4	5.7	6.8
45+	77	164	5.5	4.3	39.0	20.0	7.0	4.6
Total	549	615	40.6	27.2	281.1	176.9	6.9	6.5

Note: Total includes trips by riders of unknown age.

Table TR13: Percentage of trips and distance ridden by male riders

	1989/90	1997/98
% trips	81%	86%
% distance	90%	81%

Fig TR13: Distance ridden by motorcycle riders (national annual estimates, million km)
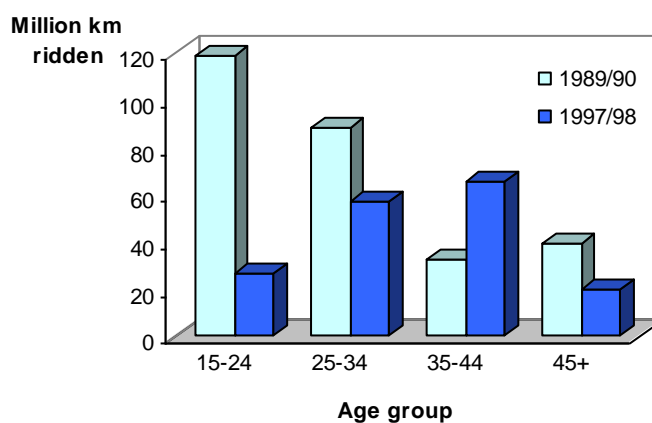
Fig TR14: Motorcycle riders involved in reported fatal & injury crashes (annual average 1989/90 vs 1997/98)
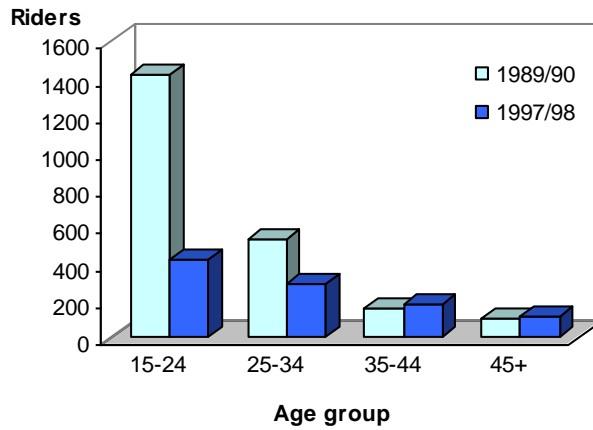
Fig TR15: Motorcycle riders involved in crashes per 100 million km ridden
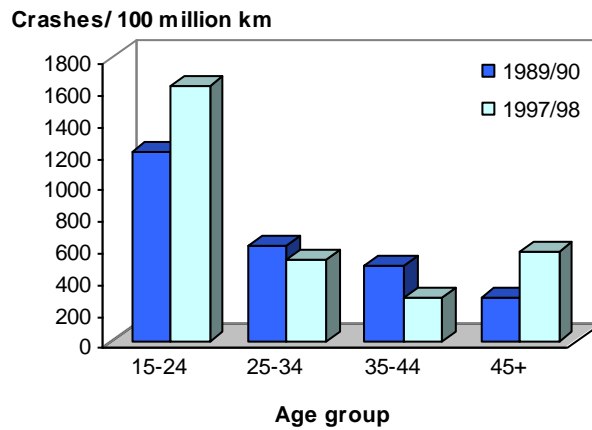
Time of day and day of week
(All drivers and motorcycle riders)

Table TR14: Trips and distance travelled by day of week

Day of week	Trips in survey	National annual estimates	
		Million trips (see note)	100 million km
Mon	9 512	468.6	41
Tue	10 293	483.4	41
Wed	10 500	473.8	39
Thu	9 934	461.4	38
Fri	10 332	497.2	47
Sat	8 518	402.0	37
Sun	6 454	306.5	32
Total	65 543	3 093.0	273

Note: The 'million trips' column includes all trips including those of unknown length.

Fig TR16: Distance driven by day of week

100 million km driven
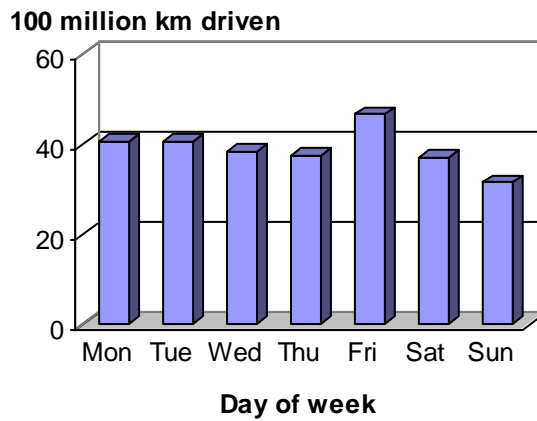
Day of week

Fig TR17: Reported injury crashes by day of week
(Annual average 1997/98)

Crashes

Legend: Minor, Serious, Fatal
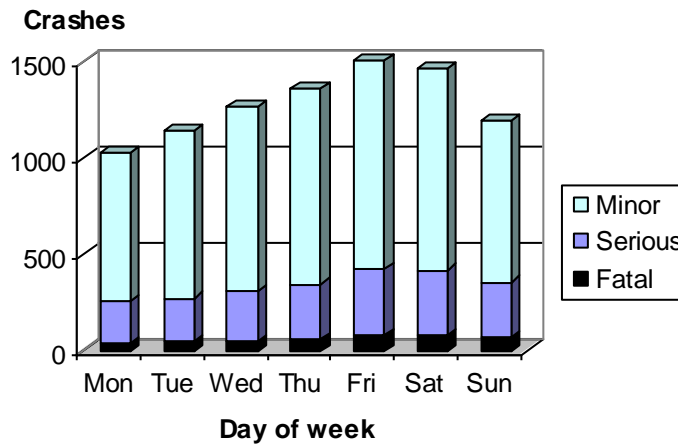
Day of week

Fig TR18: Reported injury crashes per 100 million km
by day of week

Crashes/ 100 million km

Legend: Minor, Serious, Fatal

Day of week
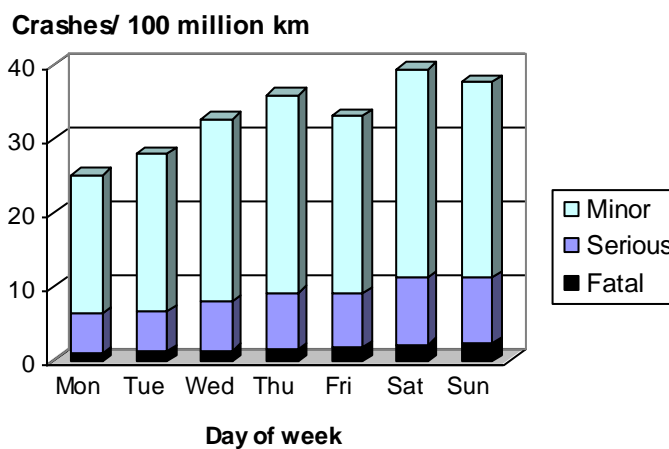
Fig TR19: Distance driven by hour of day (100 million km)
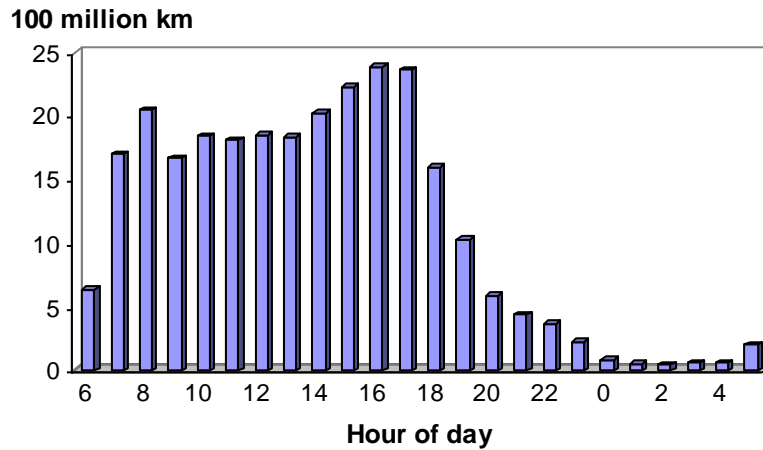
100 million km

Fig TR20: Reported injury crashes by hour of day (annual average 1997/98)
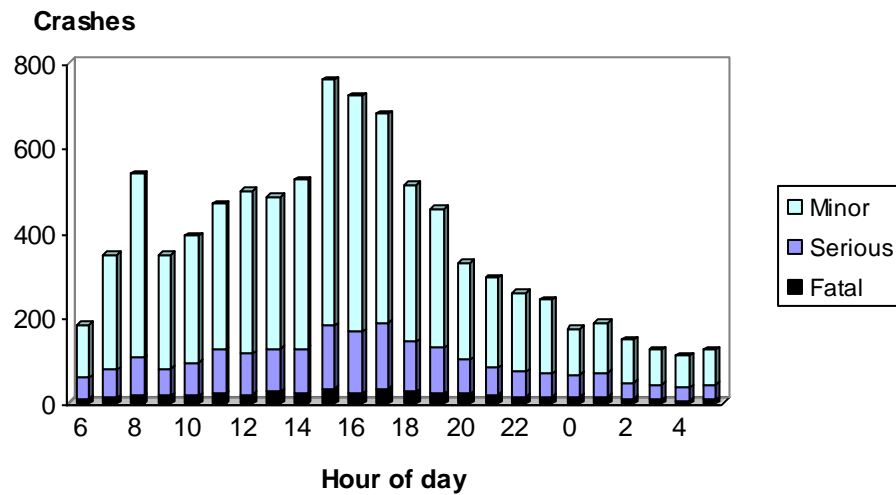
Crashes

Fig TR21: Reported injury crashes per 100 million km driven, by hour of day

Crashes/ 100 million km
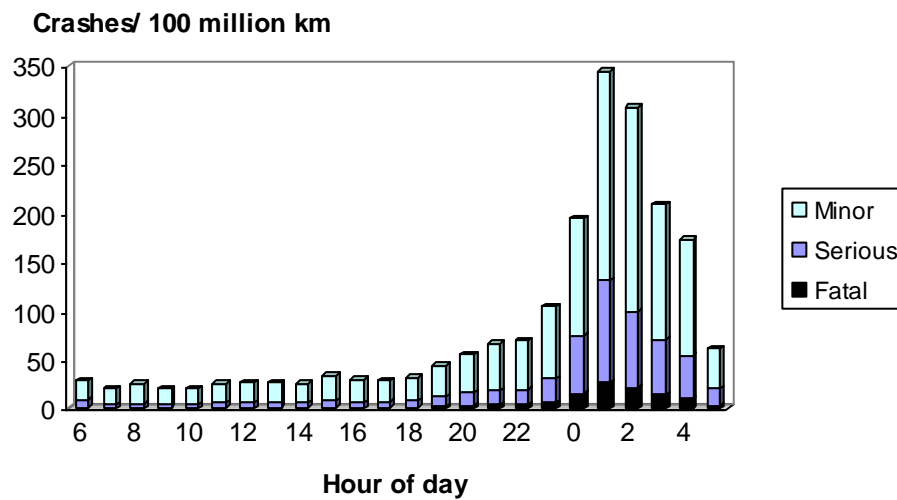
Fig TR22: Annual distance driven by hour of day and day of week
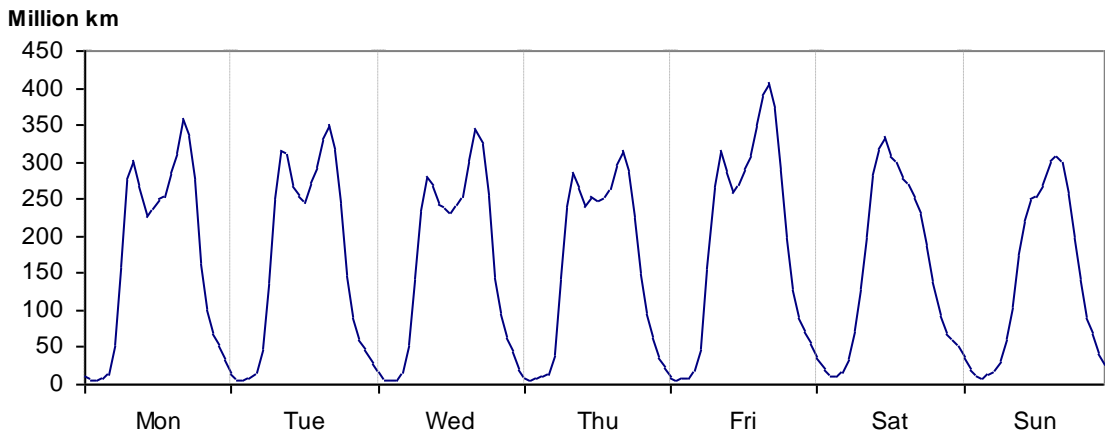
Million km

Fig TR23: Reported injury crashes per year, by hour of day and day of week
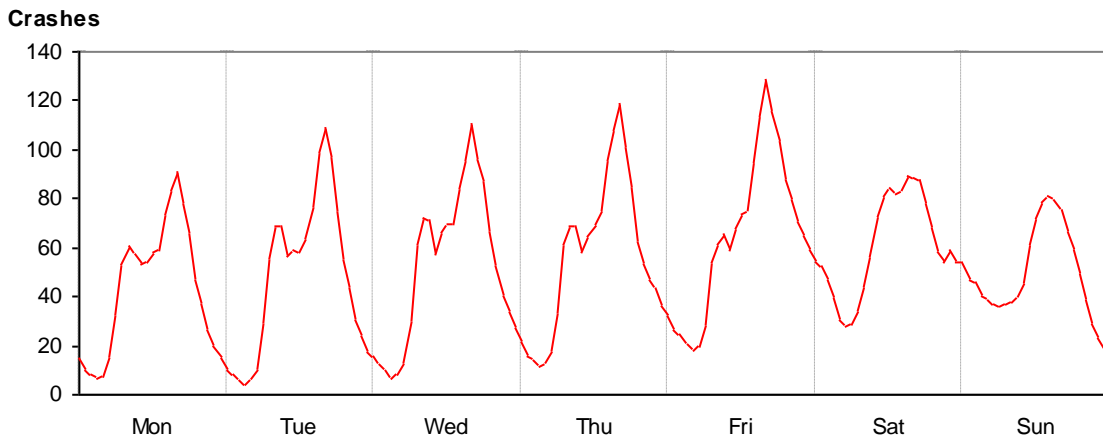
Crashes

Fig TR24: Reported injury crashes per 100 million km driven by hour of day and day of week

Crashes/ 100 million km
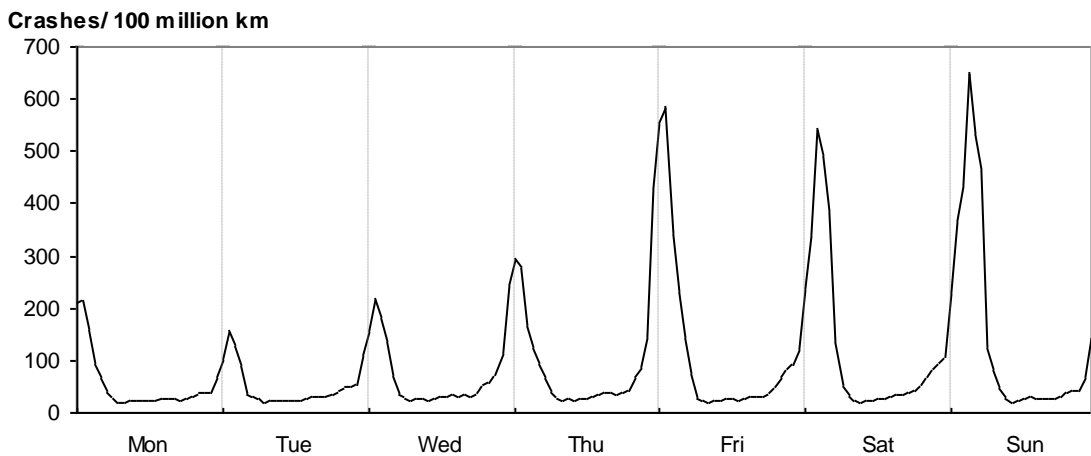
Notes: 1. Vertical lines indicate midnight of each day.

2. The data have been smoothed with a three-hour moving average.

Passengers

Table TR15: Distance travelled by passengers in cars, vans and utes
(National annual estimates)

Age group	Distance travelled (100 million passenger km)					
	Females		Males		Total (Note 1)	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
0-4	Note 2	12.4	Note 2	13.0	Note 2	25.4
5-9	8.2	9.9	8.0	10.8	16.2	20.7
10-14	6.0	7.9	8.9	9.4	14.9	17.3
15-19	7.9	7.8	9.3	6.9	17.2	14.7
20-24	10.1	8.4	5.4	4.9	15.5	13.3
25-29	5.7	5.8	2.8	2.7	8.4	8.5
30-34	5.8	5.8	3.2	2.4	9.0	8.2
35-39	5.0	5.0	1.0	2.3	6.1	7.3
40-44	3.8	6.2	1.7	2.9	5.5	9.1
45-49	3.4	6.5	1.1	1.9	4.5	8.4
50-54	2.7	3.8	0.8	1.0	3.5	4.8
55-59	3.7	4.6	0.9	1.4	4.6	6.0
60-64	3.7	3.0	0.7	0.9	4.4	3.9
65-69	2.0	3.5	0.7	0.9	2.7	4.4
70-74	1.8	2.0	0.1	1.2	1.9	3.2
75-79	0.7	1.8	0.1	0.3	0.8	2.1
80+	0.3	0.7	0.2	0.3	0.5	1.0
Total (ages 5+)	70.9	82.8	45.0	50.4	116.0	133.3
Total (all ages)		95.2		63.5		158.6

Notes

1. Totals include estimates based on travel by respondents of unknown age.

2. Children under 5 were not included in the 1989/90 travel survey.

Table TR16: Passenger trips in cars, vans and utes, distance travelled and distance per trip by age and gender

Age group	Females				Males			
	Trips in survey	National annual estimates			Trips in survey	National annual estimates		
		Million trips	100 million km	km per trip		Million trips	100 million km	km per trip
0-4	3 455	157.6	12.4	7.8	3 414	160.7	13.0	8.1
5-9	3 154	131.2	9.9	7.5	3 402	138.3	10.8	7.8
10-14	2 243	103.6	7.9	7.6	2 406	100.9	9.4	9.4
15-19	1 774	87.5	7.8	8.9	1 230	65.6	6.9	10.6
20-24	1 042	65.5	8.4	12.9	592	39.6	4.9	12.5
25-29	1 010	51.3	5.8	11.3	451	23.0	2.7	11.7
30-34	1 150	53.2	5.8	10.8	368	19.1	2.4	12.7
35-39	983	43.6	5.0	11.4	417	17.0	2.3	13.4
40-44	921	39.2	6.2	15.8	334	14.4	2.9	20.1
45-49	1 009	45.6	6.5	14.3	277	10.6	1.9	18.1
50-54	748	32.9	3.8	11.7	228	9.4	1.0	11.2
55-59	713	29.4	4.6	15.6	208	9.4	1.4	15.3
60-64	583	23.1	3.0	13.1	155	7.0	0.9	12.6
65-69	502	24.1	3.5	14.7	171	6.9	0.9	12.3
70-74	406	17.7	2.0	11.2	140	10.5	1.2	11.3
75-79	349	19.9	1.8	9.1	63	3.5	0.3	7.2
80+	236	9.9	0.7	7.1	65	2.6	0.3	12.7
Total (ages 5+)	16 855	779.5	82.8	10.6	10 519	478.5	50.4	10.5
Total (all ages)	20 310	937.1	95.2	10.2	13 933	639.2	63.5	9.9

Note: The 'million trips' column shows all trips including those of unknown length. Distance per trip has been calculated on trips of known length only.

Fig TR25: Total annual passenger km travelled (cars, vans and utes)
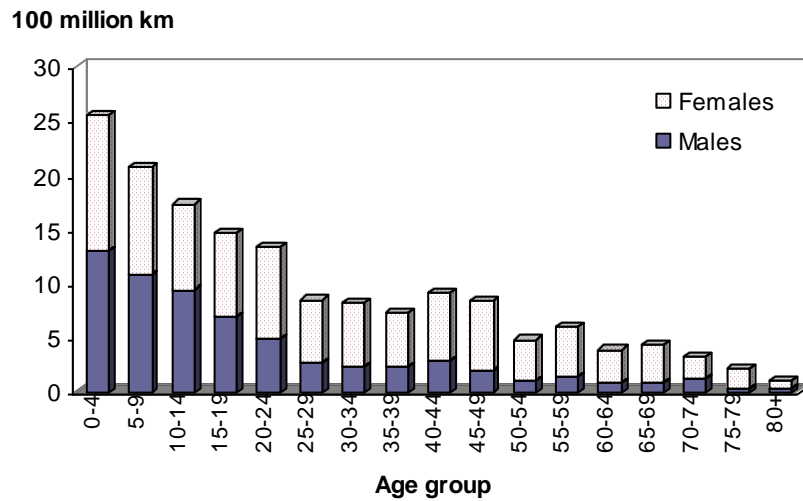
100 million km

Fig TR26: Passengers killed and injured in reported injury crashes (cars, vans and utes, annual average 1997-98)

Casualties
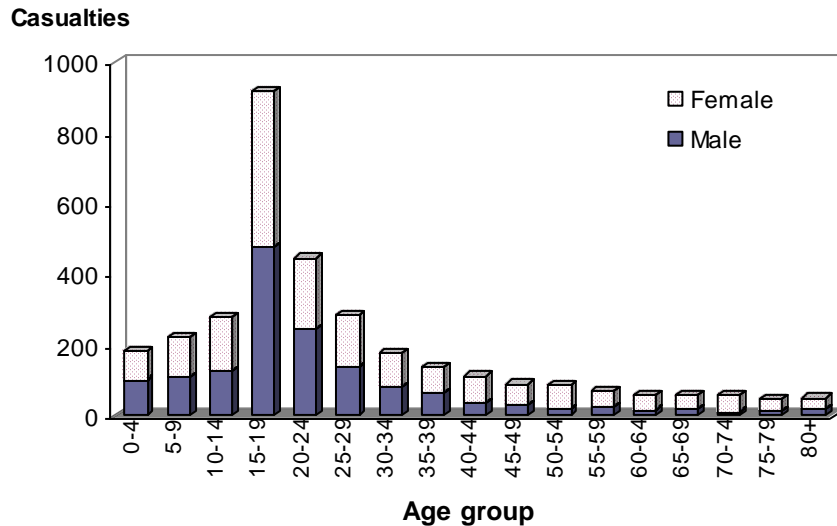
Fig TR27: Passengers killed and injured in reported injury crashes per 100 million km travelled (cars, vans and utes)

Casualties/ 100 million km
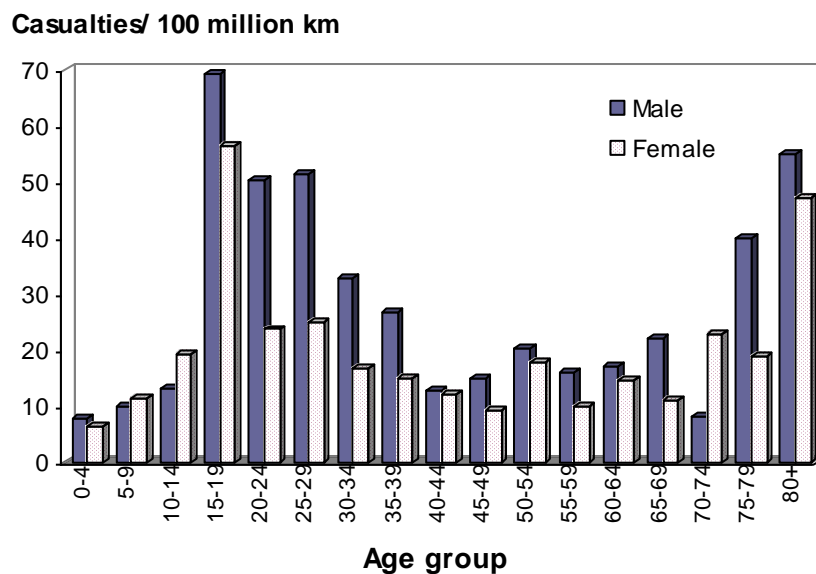
Fig TR28: Passengers killed and injured in reported injury crashes per 100 million km travelled, cars, vans and utes, 1989/90 vs 1997/98

Casualties/ 100 million km
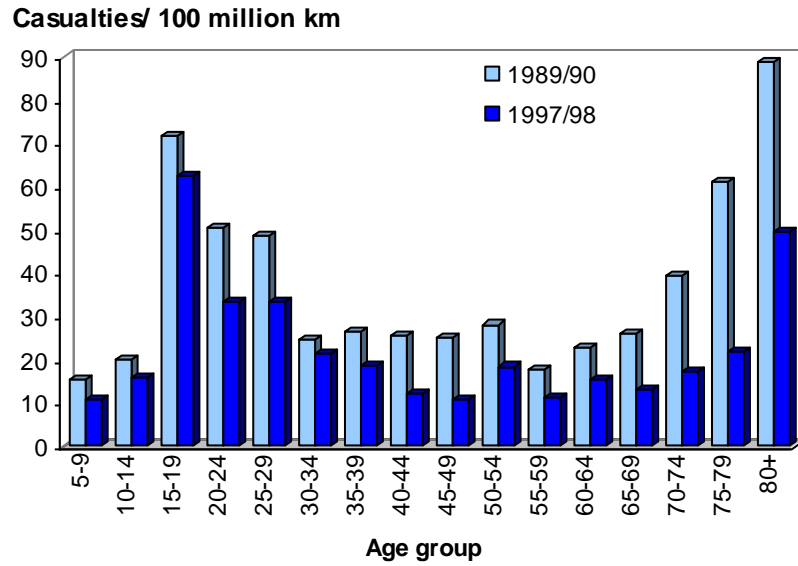
Age group

Table TR17: Trips and distance travelled by bus and taxi passengers

Age group	Buses			Taxis		
	Trips in survey	Million trips	Million km	Trips in survey	Million trips	Million km
0-4	33	1.3	18.4	16	1.2	2.1
5-9	390	17.4	193.6	15	0.6	1.0
10-14	755	35.5	483.7	17	0.7	1.6
15-19	458	28.4	392.7	49	3.6	12.2
20-29	219	15.0	193.2	131	8.5	45.2
30-39	209	14.8	164.1	88	5.1	29.0
40-49	154	8.4	123.1	57	3.7	37.5
50-59	124	6.3	102.8	42	2.0	13.2
60-69	87	4.5	87.4	12	0.4	1.9
70+	63	2.6	30.2	31	1.8	5.5
Total	2499	134.8	1790.8	461	27.8	149.4

Table TR18: Passenger trips (ages 5 and over)

	Million trips		Million km	
	1989/90	1997/98	1989/90	1997/98
Cars, vans and utes	1069	1258	11595	13320
Buses	125	133	1529	1772
Taxis	17	27	87	147

Note: Children under 5 were not included in the 1989/90 Travel Survey

Cyclists

All cycle trips referred to in this chapter took place on public roads. Off road cycling was not included in the Travel Survey.

Table TR19: Cycle trips, hours spent cycling, distance ridden and distance per trip by age group and survey year

Age group	Trips in survey		National, annual estimates							
			Million trips		Million hours		Million km		km per trip	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
5-9	286	290	22.5	10.4	3.4	1.8	16.8	14.1	0.7	1.4
10-14	936	959	60.6	33.0	13.4	7.9	101.0	63.3	1.7	1.9
15-19	674	468	41.9	20.8	8.5	5.1	82.7	54.9	2.0	2.7
20-24	216	199	14.5	18.5	2.6	3.3	32.8	50.4	2.3	2.7
25-29	147	94	8.9	3.9	2.9	1.4	32.3	19.1	3.6	4.9
30-34	112	97	9.7	4.5	2.6	1.3	27.5	22.6	2.8	5.0
35-39	92	97	6.8	3.3	1.7	0.8	18.9	10.3	2.8	3.1
40+	245	383	16.5	16.4	4.1	4.3	39.5	49.5	2.4	3.0
Total (ages 5+)	2708	2587	181.5	110.8	39.2	26.0	351.6	284.2	1.9	2.6

Notes

1. Children under 5 were not included in the 1989/90 travel survey. In the 1997/98 survey, there were too few trips by children under 5 to enable calculation of reliable estimates for this age group.
2. Totals were calculated before rounding and may include trips by cyclists of unknown age.
3. Distance per trip has been calculated on trips of known length only.

Table TR20: Cycle trips, distance ridden and distance per trip by age group and gender

Age group	Females				Males			
	Trips in survey	National annual estimates			Trips in survey	National annual estimates		
		Million trips	Million km	km per trip		Million trips	Million km	km per trip
5-9	82	2.8	4.0	1.4	208	7.5	10.2	1.4
10-14	289	9.8	20.8	2.1	670	23.2	42.5	1.8
15-19	112	3.5	9.4	2.7	356	17.3	45.5	2.6
20-39	110	4.9	16.8	3.4	377	25.4	85.6	3.4
40+	100	3.2	8.3	2.6	283	13.2	41.2	3.1
Total (ages 5+)	693	24.2	59.2	2.5	1894	86.6	225.0	2.6

Notes

1. There were too few trips by children aged under 5 to enable calculation of reliable estimates for this age group.
2. Totals include trips by cyclists whose age was not recorded.
3. Distance per trip has been calculated on trips of known length only.

Fig TR29: Total annual distance cycled (million km) by age and gender
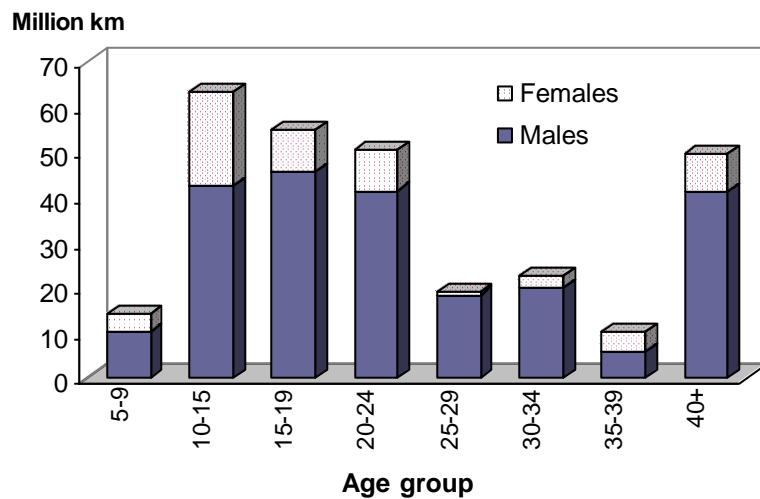
**Fig TR30: Total annual distance cycled (million km)
1989/90 vs 1997/8**

Million km

Age group
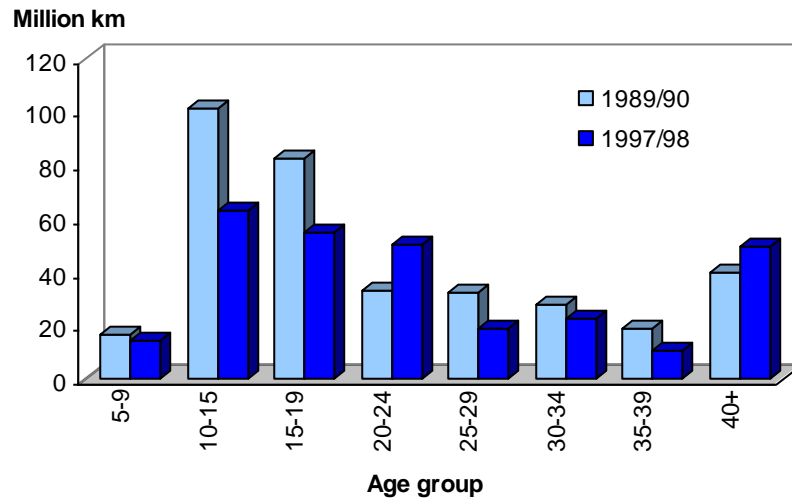
**Fig TR31: Total annual hours spent cycling (million hours)
1989/90 vs 1997/98**

Million hours

Age group
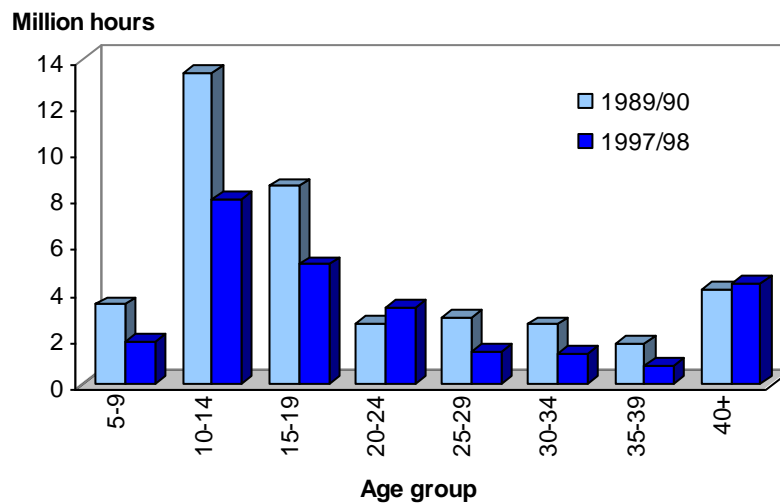
Cyclists killed and injured in crashes involving motor vehicles

The graphs below show cyclists killed and injured in crashes involving motor vehicles. Cyclist-only and cyclist-pedestrian crashes are not reported to the LTSA and hence are not included in these figures. For estimates of cyclist risk in crashes not involving a motor vehicle (eg cyclist-only or cyclist-pedestrian crashes), see the following section.

Fig TR32: Cyclists killed and injured in crashes involving motor vehicles (annual average 1997/98)
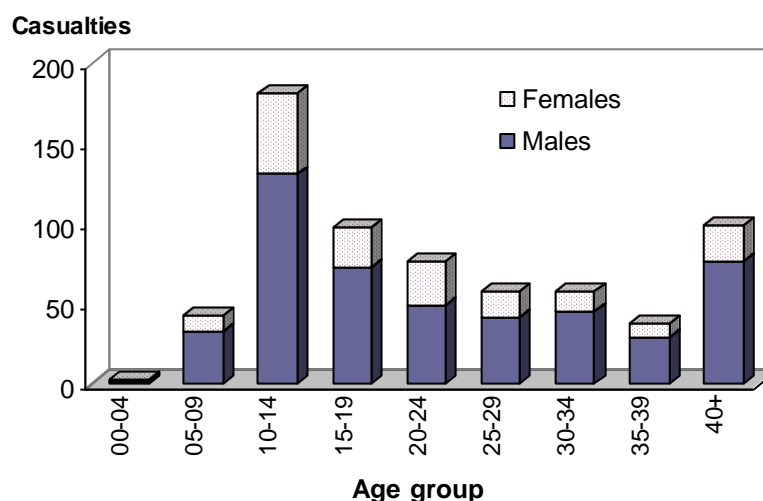
Fig TR33: Cyclists killed and injured in crashes involving motor vehicles per 100 million km travelled
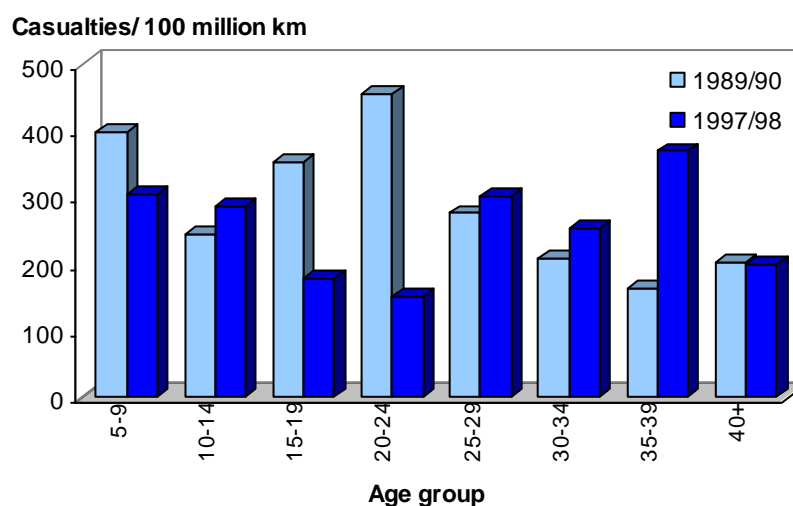
Notes

1. There were too few female cyclists to enable calculation of separate estimates for males and females.
2. Children under 5 were not included in the 1989/90 Travel Survey

Fig TR34: Cyclists killed and injured in crashes involving motor vehicles per million hours spent cycling

Casualties/ million hours

Age group
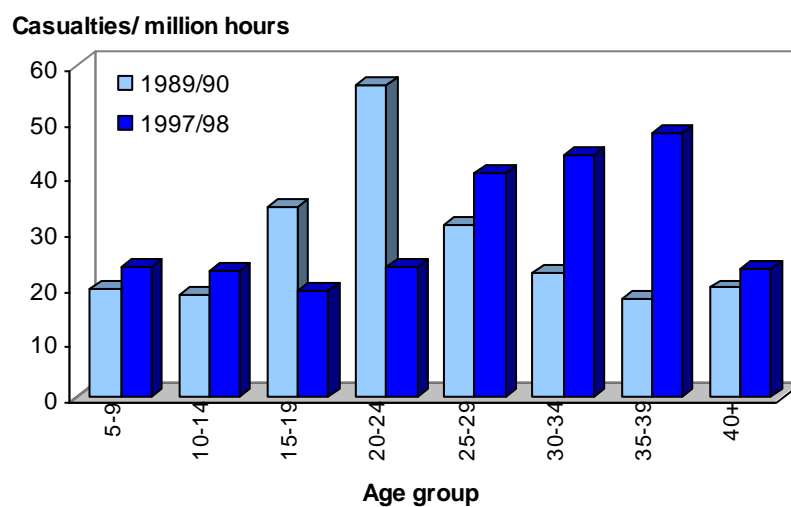
Table TR21: Cyclists killed and injured, distance cycled and estimated risk 1989/90 vs 1997/98

	1989/90	1997/98
Cyclists killed and injured in crashes involving motor vehicles (annual average)	1074	687
Million km cycled (on-road)	351.6	284.2
Million hours spent cycling (on-road)	39.2	26.0
Cyclists killed and injured per 100 million km cycled	306	242
Cyclists killed and injured per million hours spent cycling	27.4	26.4

Note: To enable comparison with the 1989/90 survey, travel by children under five is excluded from the 1997/98 figures in this table.

Fig TR35: Distance ridden by hour of day

Million km cycled
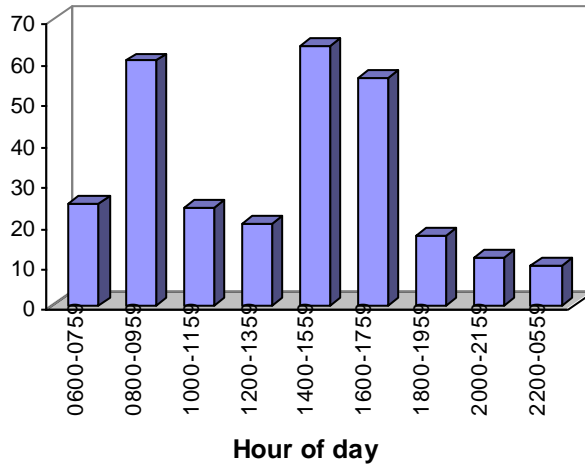
Fig TR36: Cyclists killed and injured in crashes involving motor vehicles, by hour of day

Cyclists killed and injured
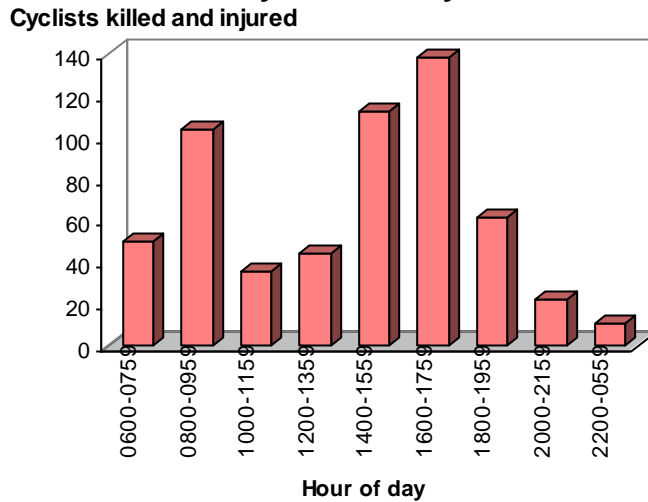
Fig TR37: Cyclists killed and injured in crashes involving motor vehicles per 100 million km ridden, by hour of day

Cyclists injured/ 100 million km
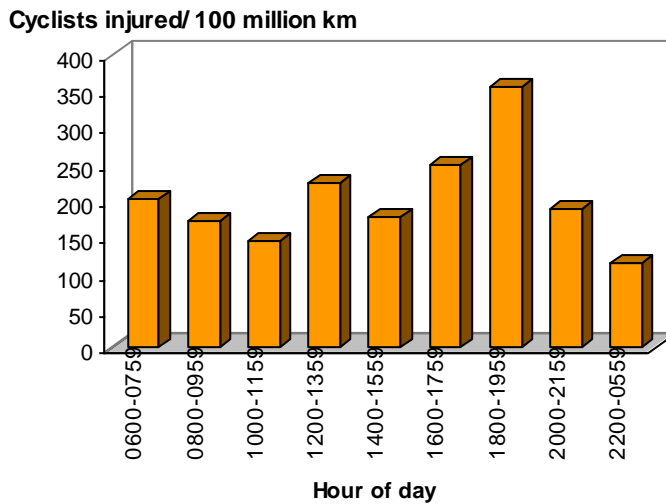
Cyclists injured in crashes not involving a motor vehicle

A measure of injury in crashes where a motor vehicle was not involved (such as cyclist-only or cyclist-pedestrian accidents), can be derived from hospitalisation data supplied by the New Zealand Health Information Service. This dataset includes cyclists admitted overnight as a result of crashes. It excludes those who died before admission to hospital, and minor injuries requiring outpatient treatment only.

Fig TR38: Cyclist admissions to hospital per 100 million km ridden (as a result of non motor vehicle crashes on a public road)

Casualties/ 100 million km

Age group
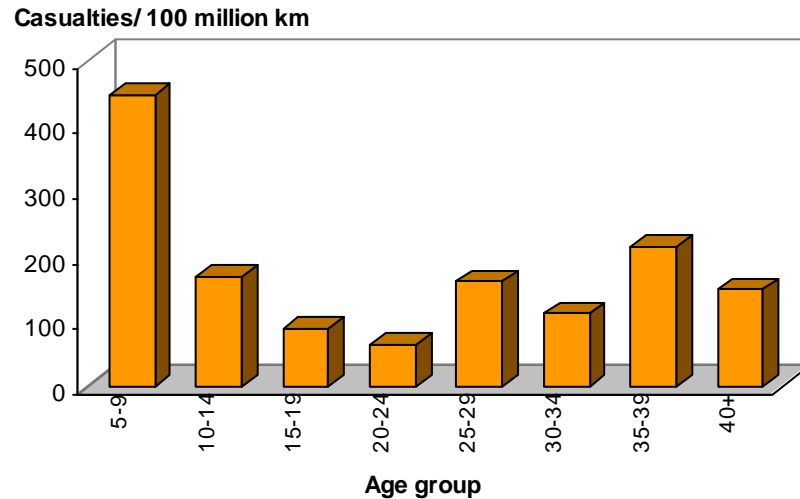
Note: The above includes only crashes identified as occurring on a public road. Location was not recorded for a large number of crashes, and it is to be expected that many of these also occurred on public roads.

Pedestrians

Table TR22: Pedestrian trips, time spent walking and road crossings by age group

Age group	Trips in survey		National, annual estimates					
			Million trips		Million hours		Million roads crossed	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
0-4	See note	1122	See note	52.3	See note	10.3	See note	101.2
5-9	1475	2168	97.4	87.5	16.2	14.7	153.9	145.2
10-14	1857	2418	127.7	111.5	24.2	22.1	278.0	244.8
15-19	1898	2226	146.9	135.9	29.1	28.7	325.2	306.2
20-24	1437	1660	109.4	110.3	19.8	20.3	248.5	265.2
25-29	1357	1559	79.2	94.0	14.4	19.6	177.0	227.3
30-34	1113	1679	76.1	92.6	12.3	16.9	138.6	206.9
35-39	1173	1651	74.9	86.0	11.6	13.4	125.4	175.3
40-44	1032	1326	64.9	59.3	9.4	11.4	110.0	122.9
45-49	781	1363	56.9	74.1	8.9	11.2	90.5	140.1
50-54	644	1252	42.5	58.8	7.1	9.7	72.5	110.5
55-59	587	1011	41.4	42.2	6.3	7.3	61.0	82.7
60-64	663	767	59.2	33.0	12.4	6.5	96.5	63.3
65-69	528	823	37.0	39.1	6.7	7.8	57.7	87.6
70-74	385	631	28.5	29.9	5.3	5.9	49.2	54.1
75-79	370	467	26.9	24.0	5.6	4.3	39.2	37.1
80+	174	302	10.9	14.8	2.5	3.2	21.5	30.4
Total (ages 5+)	15 474	21 417	1079.7	1098.8	191.7	204.4	2044.6	2314.8
Total (all ages)		22 539		1151.1		214.7		2416.0

Notes

1: Travel by children under five was not included in the 1989/90 travel survey.

2: Totals include travel by pedestrians of unknown age.

Table TR23: Pedestrian trips, time spent walking and number of road crossings, by age group and gender

Age group	Females				Males			
	Trips in survey	National annual estimates			Trips in survey	National annual estimates		
		Million trips	Million hours	Million road crossings		Million trips	Million hours	Million road crossings
0-4	539	24.5	4.3	46.8	583	27.8	6.0	54.4
5-9	1015	40.7	7.0	68.0	1153	46.9	7.6	77.2
10-14	1225	57.7	11.2	116.8	1193	53.8	11.0	128.0
15-19	1161	70.4	16.5	154.3	1065	65.6	12.2	151.9
20-24	1039	64.2	10.8	132.3	621	46.1	9.5	132.9
25-29	960	52.2	11.3	122.9	599	41.8	8.3	104.4
30-34	1117	57.5	10.1	111.7	562	35.0	6.8	95.3
35-39	920	44.3	6.9	89.2	731	41.7	6.5	86.1
40-44	806	35.2	5.8	67.8	520	24.1	5.7	55.1
45-49	847	44.6	6.3	71.6	516	29.5	4.9	68.5
50-54	852	38.0	6.2	67.3	400	20.8	3.5	43.2
55-59	577	23.4	4.1	40.1	434	18.8	3.2	42.6
60-64	375	15.7	3.1	26.4	392	17.3	3.4	36.9
65-69	406	19.7	3.8	36.6	417	19.5	3.9	50.9
70-74	363	17.2	3.1	32.3	268	12.7	2.7	21.9
75-79	291	15.0	2.6	22.5	176	9.0	1.6	14.5
80+	173	8.5	1.9	16.8	129	6.3	1.3	13.6
Total	12 743	632.5	115.7	1232.7	9796	518.5	98.9	1183.3

Note: Totals include trips by respondents of unknown age.

Fig TR39: Annual time spent walking (million hours) by gender

Million hours

Age group
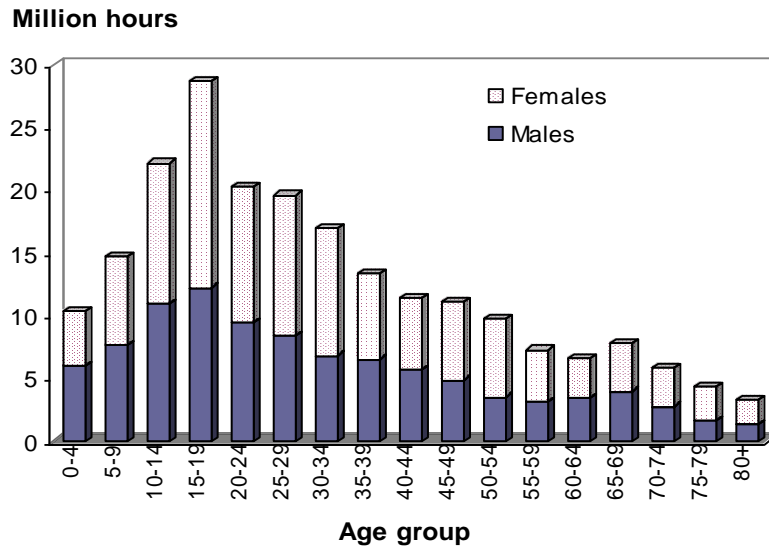
Fig TR40: Annual time spent walking (million hours) 1989/90 vs 1997/98

Million hours

Age group
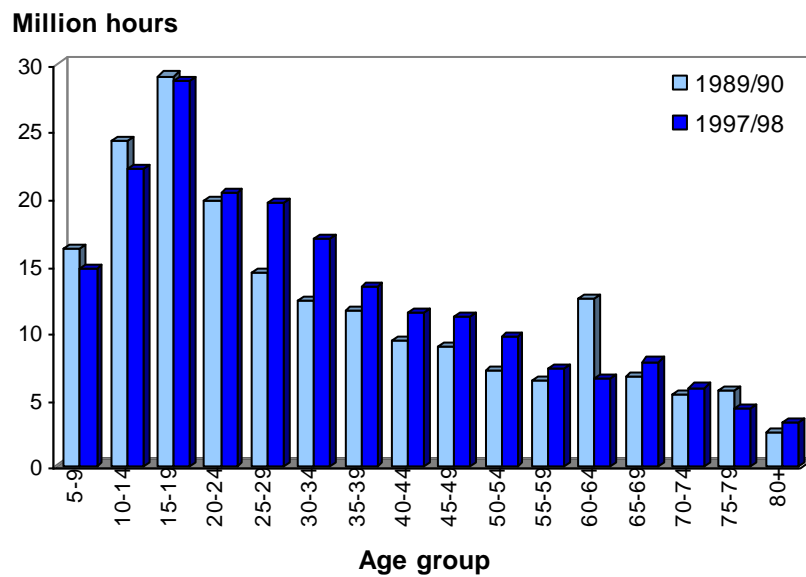
Note: Children under five were not included in the 1989/90 travel survey.

Fig TR41: Annual number of road crossings (million crossings)

Million road crossings
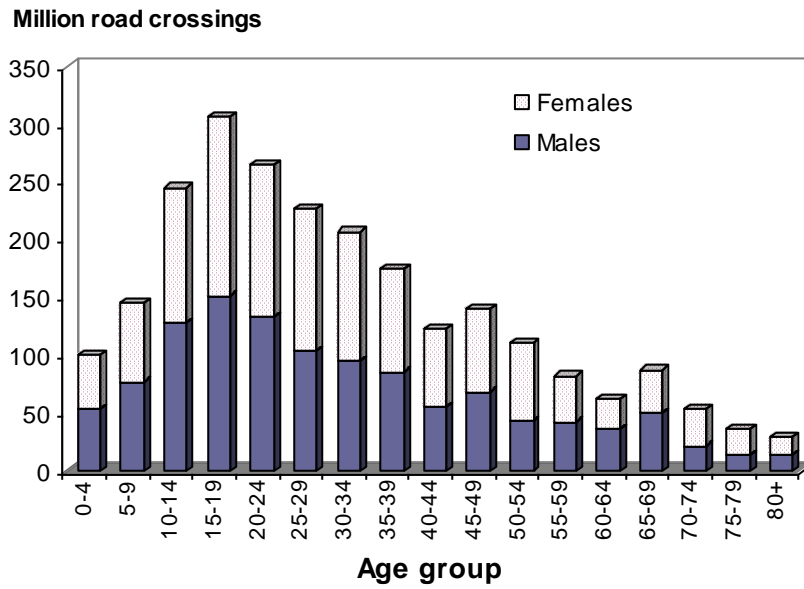
Fig TR42: Pedestrians injured in reported motor vehicle injury crashes (annual average 1997-98)

Pedestrians injured
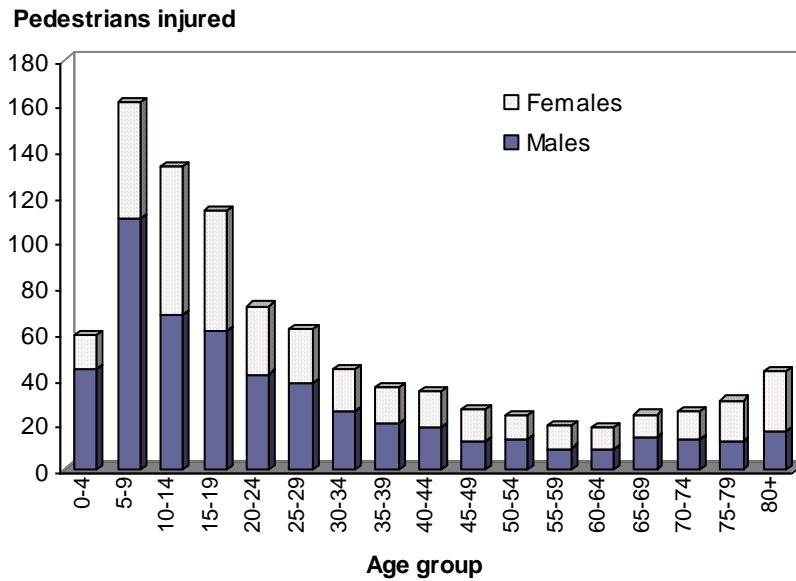
Fig TR43: Pedestrians injured in reported motor vehicle injury crashes per million hours spent walking

Pedestrians injured/ million hours

Age group
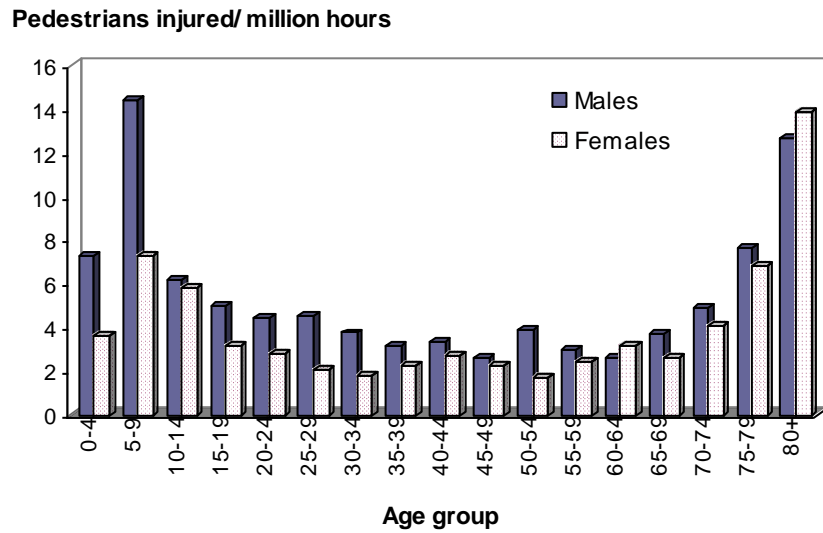
Fig TR44: Pedestrians injured in reported motor vehicle injury crashes per million road crossings

Pedestrians injured/ million road crossings

Age group
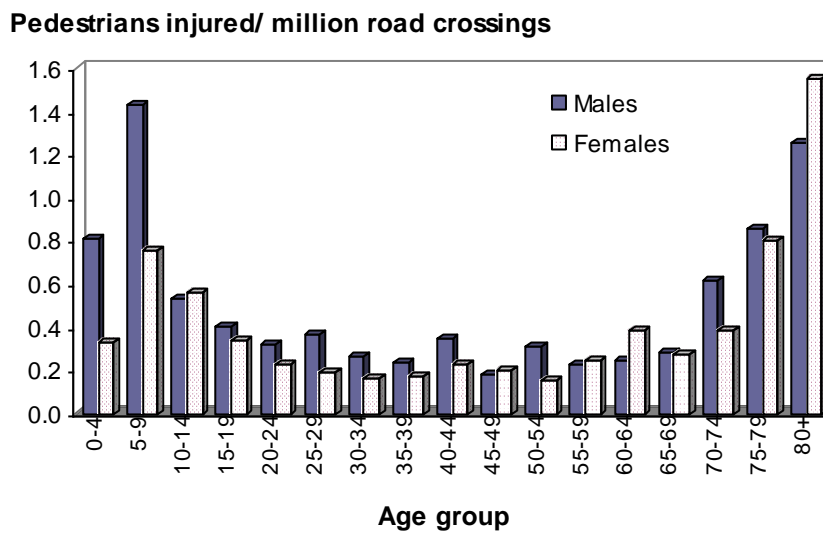
Fig TR45: Pedestrians injured in reported motor vehicle injury crashes per million hours spent walking, 1989/90 vs 1997/98

Pedestrians injured/ million hours
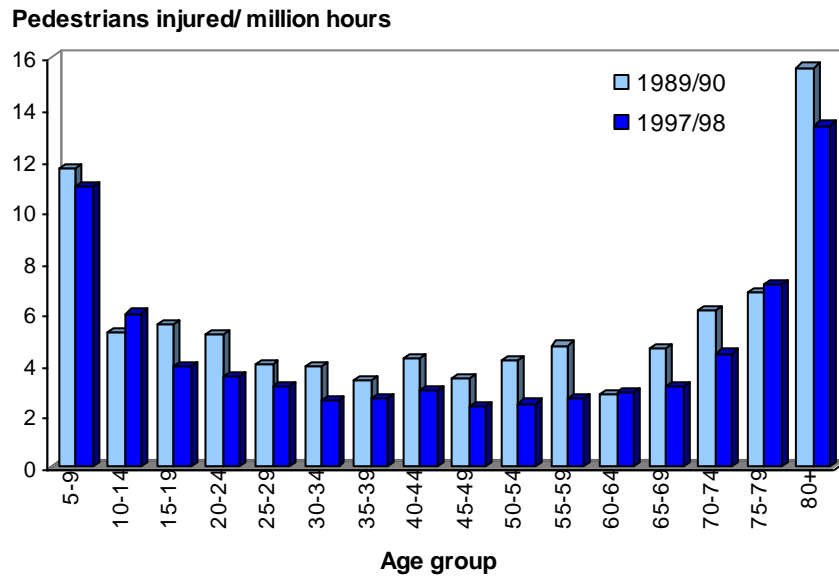
Fig TR46: Annual time spent walking by time of day (national annual estimates 1997/98)

Million hours
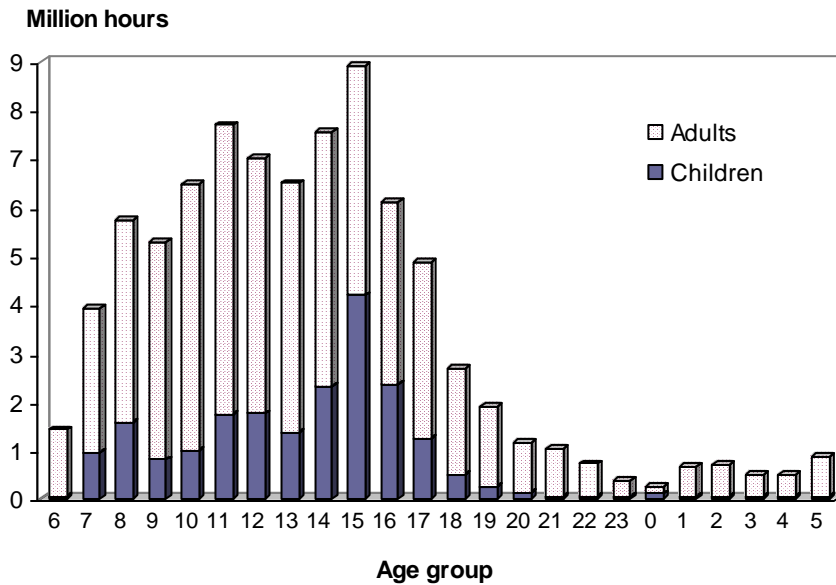
Note: "Children" refers to people aged 17 and under; "Adults" to those 18 or more.

Fig TR47: Pedestrians injured in reported injury motor vehicle crashes by time of day (annual average 1997/98)

Pedestrians injured
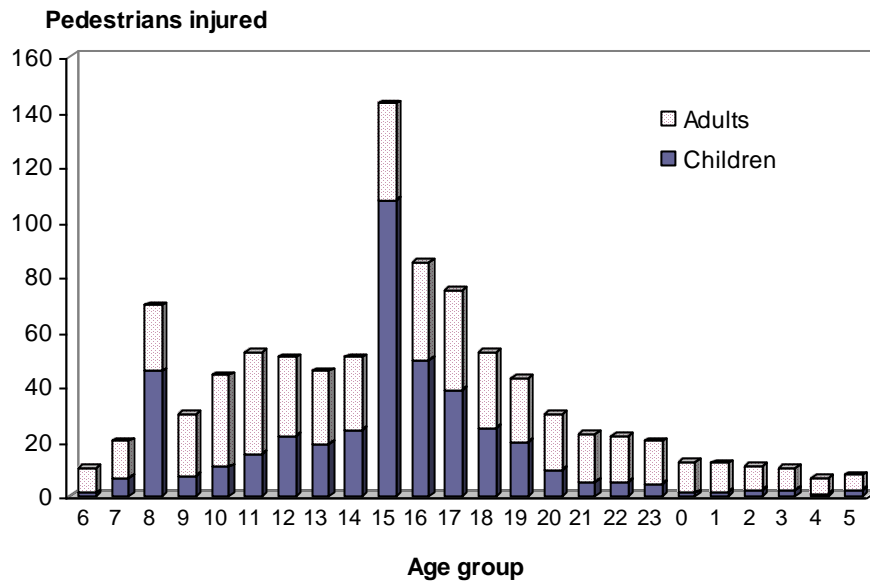
Note: "Children" refers to people aged 17 and under; "Adults" to those 18 or more.

Fig TR48: Pedestrians injured in reported motor vehicle injury crashes per million hours spent walking, by time of day (0600 - 2259)

Pedestrians injured/ million hours
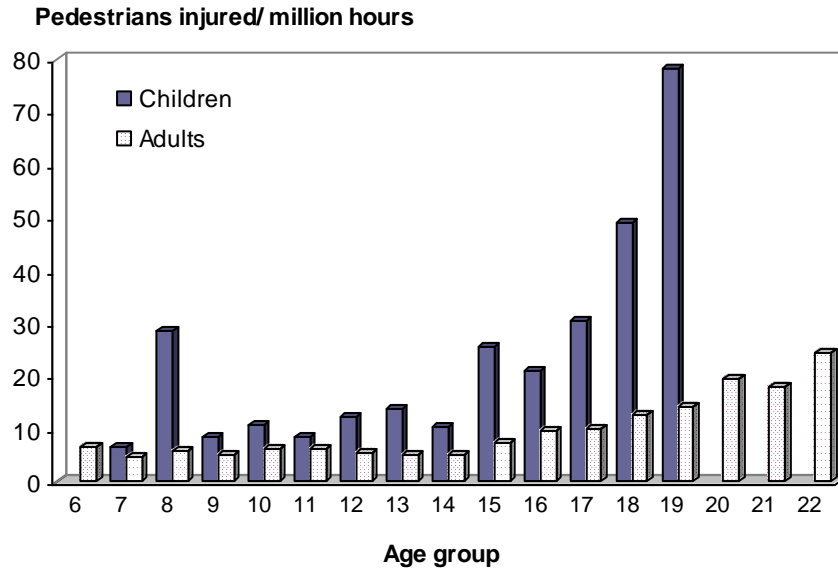
Notes:

1. "Children" refers to people aged 17 and under; "Adults" to those 18 or more.

2. Values were not calculated for children in the hours beginning 0600, 2000, 2100 and 2200 as the numbers of trips and/ or casualties were too small to give reliable estimates.

Urban and rural residents

This section compares the travel patterns of urban residents (people living in Main or Secondary Urban areas, that is, towns or cities with populations of at least 10,000) with residents of smaller towns and rural areas (called 'rural residents' here).

Table UR1: Million trips per year by mode and area of residence type

Frequency	Urban	Rural	Total
Walk	972.4	178.6	1151.1
Vehicle driver	2423.2	669.7	3093.0
Vehicle passenger	1252.1	366.0	1618.2
Bicycle	92.1	19.3	111.4
Train	14.7	0.6	15.3
Bus	96.1	38.7	134.8
Ferry	1.7	0.3	2.0
Plane	3.2	0.6	3.9
Taxi	26.9	0.9	27.8
Other	5.7	6.6	12.3
Total	4888.3	1281.5	6169.8

Note: totals include trips with unknown mode.

Table UR2: Percentage of trips by trip purpose

Trip Purpose	Urban	Rural	Total
Home	30%	31%	30%
Work - main job	9%	9%	9%
Work - other job	0%	1%	0%
Work - on employer's business	5%	4%	4%
Education	4%	4%	4%
Shopping	11%	12%	11%
Personal business/ services	5%	6%	5%
Social/ recreational	19%	23%	19%
Change to another mode	7%	4%	6%
To accompany someone else	10%	8%	9%
Total	100%	100%	100%

Fig UR1: Weekly distance travelled per person by major modes (Residents of urban and rural areas)

km/ person

- Urban residents
- Rural residents

| Driver (km/ driver) | Passenger | Bus |
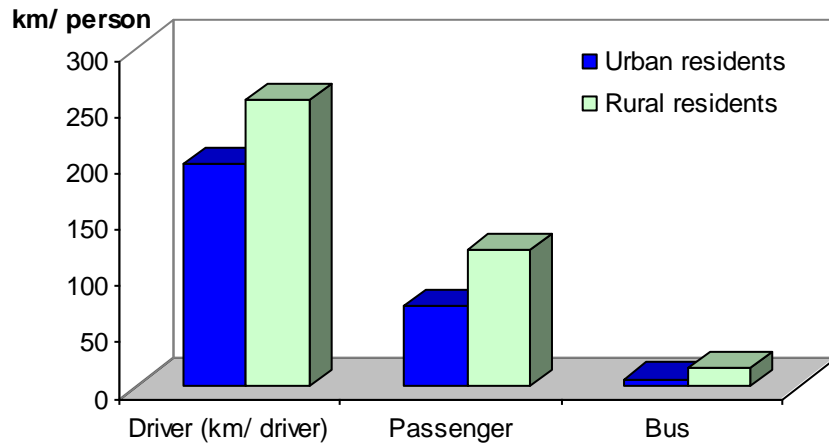
Fig UR2: Hours spent travelling per person per week, by major modes (Residents of urban and rural areas)

hours per person

- Urban residents
- Rural residents

| Driver (hours per driver) | Passenger | Bus | Walk |
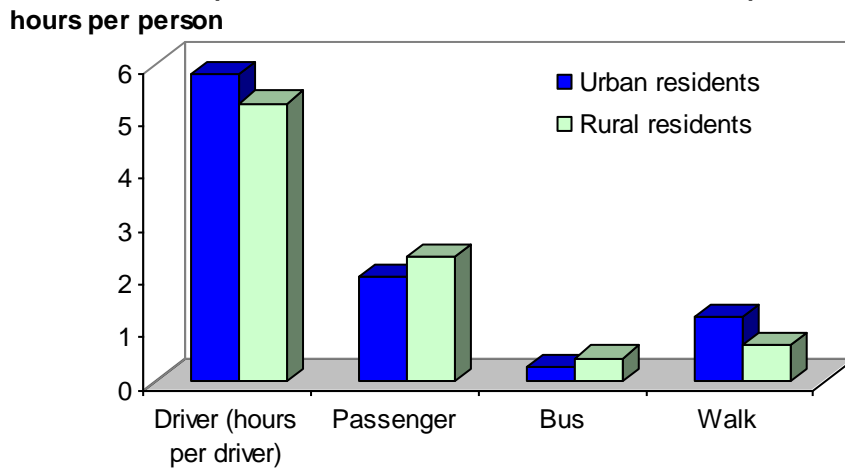
Local Government Regions

The region of residence of each respondent was recorded with their travel. Estimates in this section are based on travel by **residents** of the specified region. This may differ from travel actually occurring **in** a particular region.

Table RE1: Trips in sample by region and mode

Region	Driver (cars, vans and utes)	Passenger (cars, vans and utes)	Cyclist	Pedestrian	Bus
Northland	2 756	1 630	50	764	151
Auckland	11 282	6 182	181	4 314	515
Waikato	6 155	3 336	212	1 518	297
Bay of Plenty	3 758	2 236	150	1 129	79
Gisborne	1 519	809	115	396	74
Hawke's Bay	3 292	2 062	188	1 215	52
Taranaki	4 307	2 688	170	2 561	147
Manawatu / Wanganui	3 516	1 784	229	823	100
Wellington	6 159	3 587	180	3 157	376
Nelson / Marlborough	2 445	1 351	165	885	65
Canterbury	8 633	4 380	522	3 254	334
West Coast	1 522	798	118	443	46
Otago	3 163	1 367	118	1 183	123
Southland	3 853	2 033	204	897	140
Total	62 360	34 243	2 602	22 539	2 499

Table RE2: Million trips by region and mode

Region	Annual estimates: millions of trips				
	Driver (cars, vans and utes)	Passenger (cars, vans and utes)	Cyclist	Pedestrian	Bus
Northland	86.0	54.0	1.4	28.2	5.7
Auckland	923.2	484.7	17.5	370.7	45.5
Waikato	249.3	134.2	8.1	58.9	14.8
Bay of Plenty	178.4	108.6	6.4	56.5	3.5
Gisborne	30.5	14.7	1.9	7.8	1.6
Hawke's Bay	132.7	76.5	6.9	44.2	2.2
Taranaki	90.7	58.3	3.4	53.6	2.3
Manawatu/ Wanganui	148.3	76.7	8.6	37.8	4.5
Wellington	325.6	184.2	15.5	208.5	24.6
Nelson/ Marlborough	76.2	37.5	4.6	27.6	2.0
Canterbury	426.4	217.6	24.6	170.0	18.2
West Coast	22.2	12.2	2.0	6.4	0.5
Otago	172.5	72.1	7.0	62.0	6.1
Southland	86.7	45.2	3.4	18.9	3.2
Total	2949.0	1576.3	111.4	1151.1	134.8

Fig RE1: Percentage of each region's trips by mode

%region's trips

■ Driver □ Passenger ■ Cyclist □ Pedestrian ■ Bus
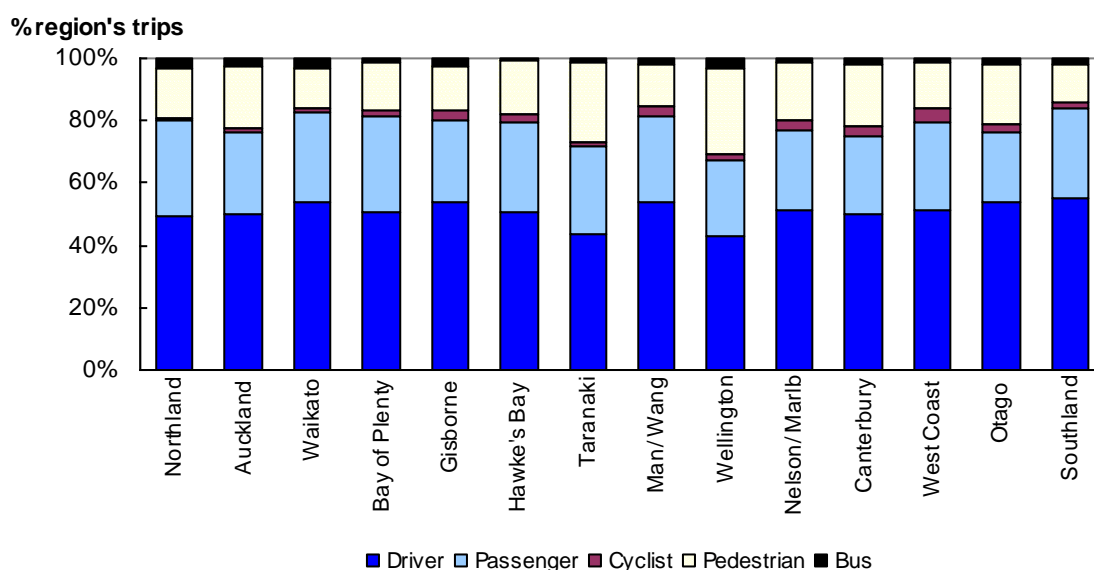
Table RE3: Annual distance travelled by region and mode

Region	Total annual estimates based on trips: million km travelled			
	Driver (cars, vans and utes)	Passenger (cars, vans and utes)	Cyclist	Bus
Northland	1 011.0	853.0	1.5	118.7
Auckland	7 924.8	3 939.5	36.8	461.0
Waikato	2 610.4	1 882.8	26.7	345.8
Bay of Plenty	1 715.1	1 212.2	17.9	82.9
Gisborne	171.1	142.4	3.8	10.4
Hawke's Bay	934.7	606.9	20.1	61.2
Taranaki	774.0	595.5	7.4	38.6
Manawatu / Wanganui	1 555.2	1 155.4	23.7	97.9
Wellington	2 548.7	1 543.2	40.5	157.8
Nelson / Marlborough	580.0	350.8	10.8	50.3
Canterbury	3 330.8	2 051.4	70.4	201.7
West Coast	188.4	146.5	3.2	13.1
Otago	1 261.7	867.0	17.4	79.0
Southland	723.8	518.4	5.1	72.2
Total	25 329.5	15 864.9	285.3	1 790.6

Fig RE2: Distance driven in cars, vans and utes, by region
Annual estimates, 100 million km
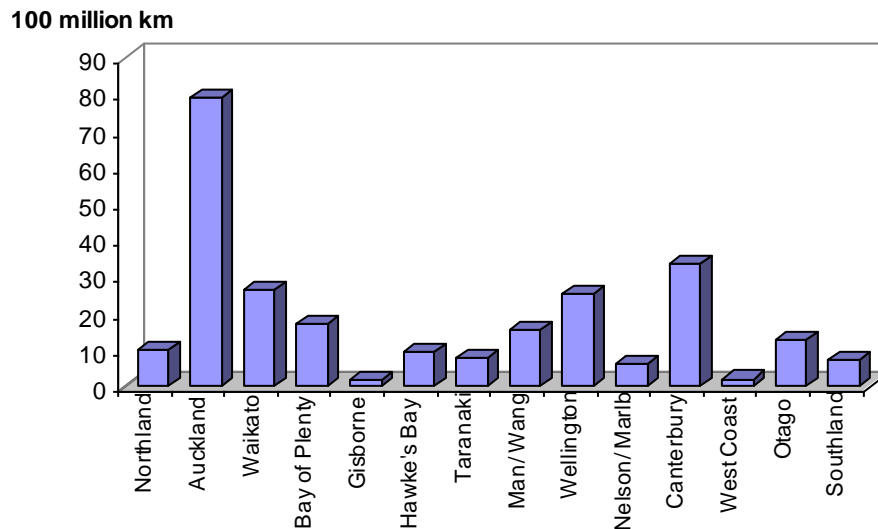
Table RE4: Mean annual distance travelled per person

Region	Mean annual distance per person		
	Distance driven per driver (1000 km per year)	Passenger distance travelled per person (1000 km per year)	Distance cycled per person aged 5+ (km per year)
Northland	11.8	6.0	11
Auckland	10.6	3.5	36
Waikato	11.3	5.2	81
Bay of Plenty	11.5	5.2	84
Gisborne	5.9	3.1	90
Hawke's Bay	9.7	4.2	151
Taranaki	10.8	5.6	76
Manawatu / Wanganui	10.4	5.0	112
Wellington	9.1	3.7	104
Nelson / Marlborough	7.7	3.0	100
Canterbury	9.8	4.2	156
West Coast	8.5	4.4	106
Otago	9.8	4.6	99
Southland	10.7	5.4	57
National average	10.2	4.3	83

Notes:

1. Driver and passenger distances apply to drivers and passengers in cars, vans and utes only.
2. A driver is defined as any person who reported driving at least 20km in the year preceding the survey.

Fig RE3: Annual km driven per driver (cars, vans and utes)

km/ driver
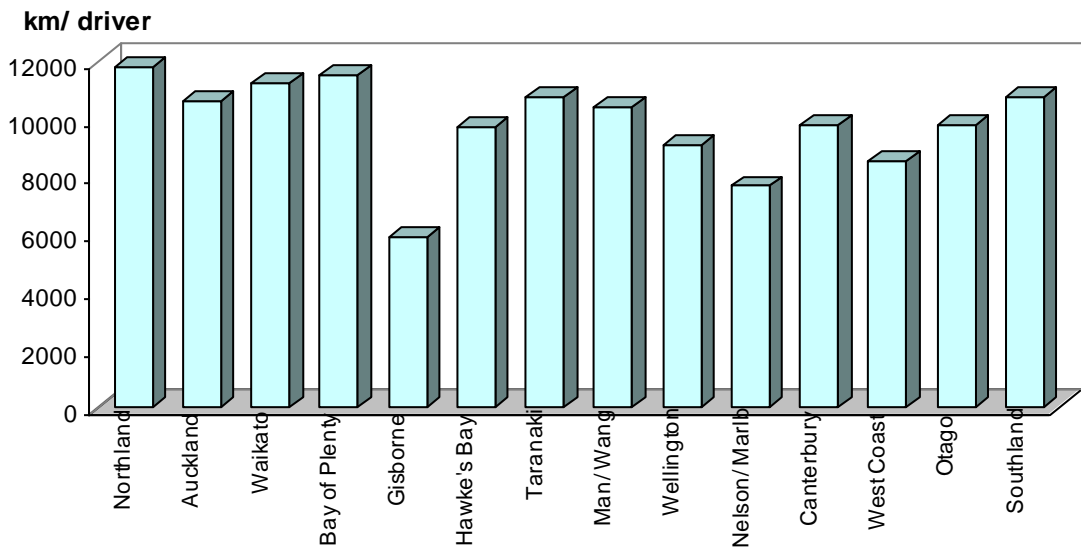
Fig RE4: Annual km per person travelled as a passenger (cars, vans and utes)
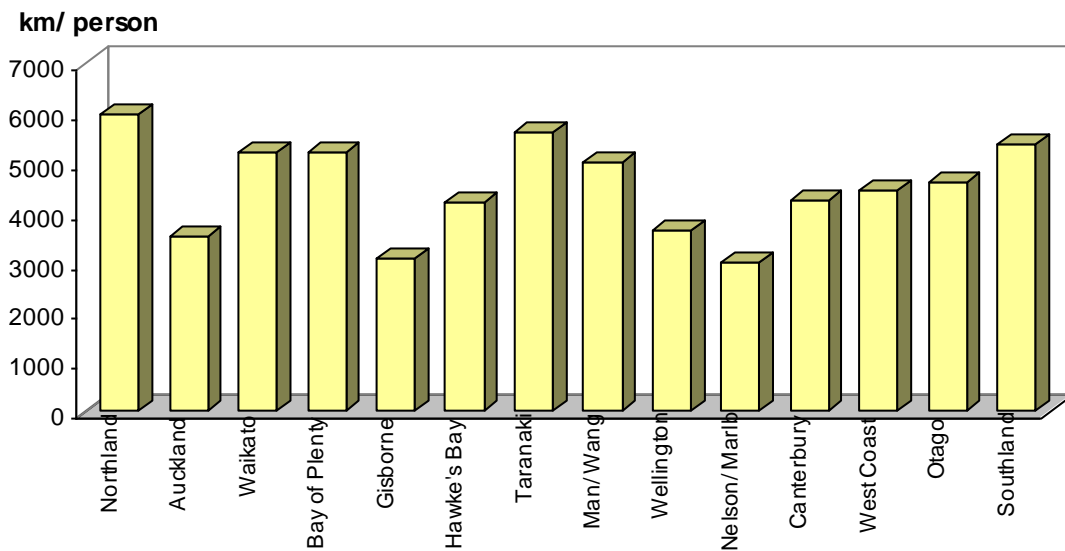
km/ person

Fig RE5: Annual km cycled, per person aged 5 and over
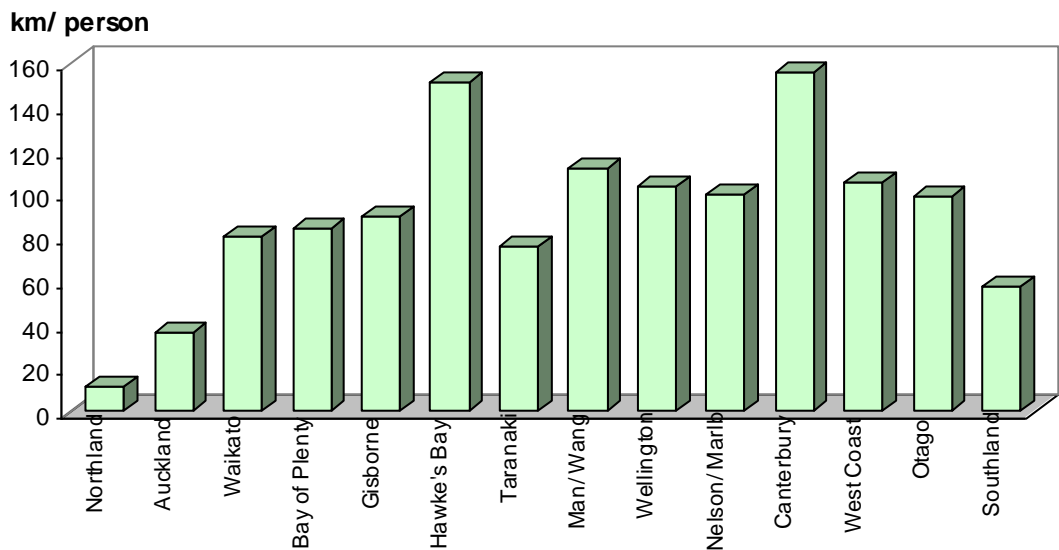
km/ person

Ethnicity

In the personal interviews, respondents were asked to indicate which ethnic group best described them. This section compares travel patterns for three major ethnic groups in New Zealand, those of European descent, Maori people and people of Pacific descent. The European and Pacific groups include both people born in New Zealand and immigrants.

There are several differences between these ethnic groups, including the age structure (the proportion of younger people compared to older people) and the proportion that live in towns and rural areas compared to cities. Travel patterns reflect these as well as cultural and socio-economic differences.

Fig ET1: Average daily distance travelled per person, by age group, ethnicity and mode (excludes walking)

■ Vehicle driver □ Vehicle passenger ■ Bicycle □ Bus ■ Other
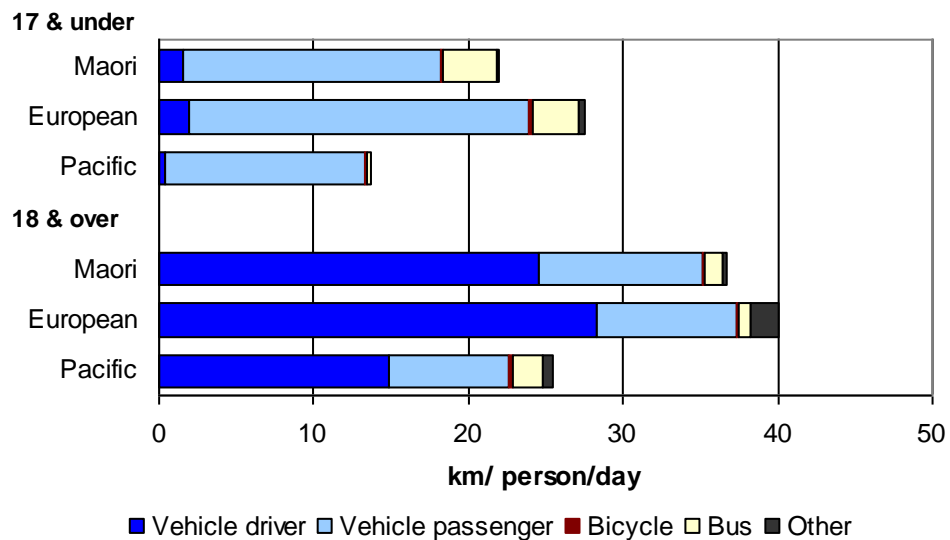
Fig ET2: Average daily time per person spent travelling by age group, ethnicity and mode

■ Vehicle driver □ Vehicle passenger ■ Bicycle □ Bus ■ Other ■ Walk
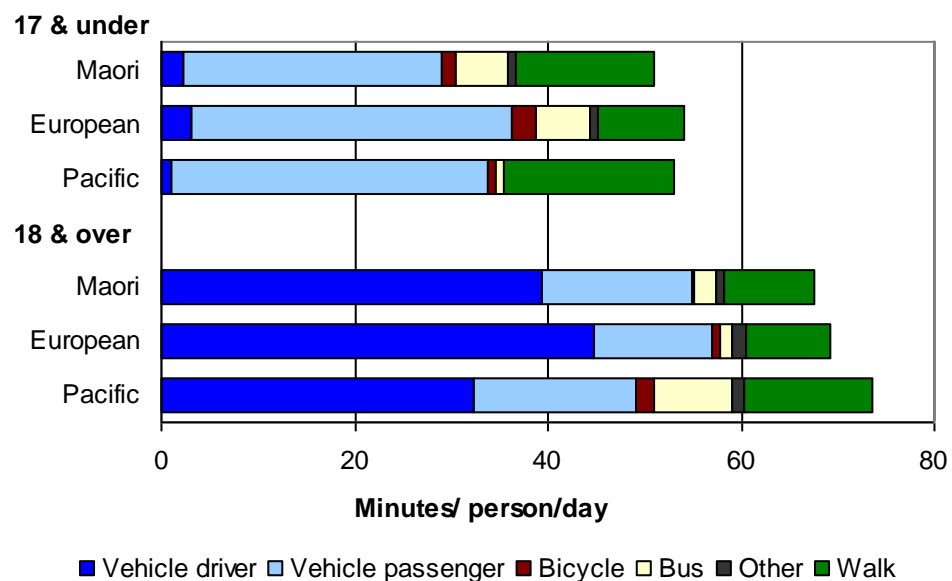
Note: 'Other' includes travel by train, ferry, plane, taxi and by boat, electric wheelchair etc.

Table ET1: Reason for trip

a) Children and youth (aged 17 and under)

Reason for trip	National, annual estimates					
	Million trips			Percentage of trips		
	Maori	European	Pacific	Maori	European	Pacific
Home (Note 1)	56.6	320.9	13.6	33%	32%	31%
Work - main job	1.4	10.0	0.2	1%	1%	1%
Work - other job	0.2	1.1	0.5	0%	0%	1%
Work - employer's business	0.8	4.3	0.8	0%	0%	2%
Education	20.2	114.0	5.2	12%	11%	12%
Shopping	14.6	66.5	2.5	8%	7%	6%
Personal business or services (Note 2)	2.9	16.5	2.9	2%	2%	7%
Medical/ dental	0.6	5.3	0.1	0%	1%	0%
Social/ recreational	40.7	246.2	9.1	23%	24%	21%
Change to another mode	14.2	71.4	2.0	8%	7%	5%
Accompanying someone else	21.9	153.8	6.8	13%	15%	16%
Total (Note 3)	174.1	1010.2	43.6	100%	100%	100%

b) Adults (aged 18 and over)

Reason for trip	National, annual estimates					
	Million trips			Percentage of trips		
	Maori	European	Pacific	Maori	European	Pacific
Home (Note 1)	102.0	1145.9	49.1	31%	30%	31%
Work - main job	35.5	455.3	15.7	11%	12%	10%
Work - other job	2.0	21.1	0.9	1%	1%	1%
Work - employer's business	18.1	230.4	5.4	5%	6%	3%
Education	3.6	36.3	2.1	1%	1%	1%
Shopping	38.1	503.8	16.4	12%	13%	10%
Personal business or services (Note 2)	17.9	215.0	8.5	5%	6%	5%
Medical/ dental	2.2	33.4	1.6	1%	1%	1%
Social/ recreational	63.2	693.7	28.9	19%	18%	18%
Change to another mode	16.3	227.1	15.7	5%	6%	10%
Accompanying someone else	29.8	291.6	16.6	9%	8%	10%
Total (Note 3)	328.9	3853.7	160.8	100%	100%	100%

1. 'Home' includes all trips whose destination was the respondent's home. This may include returning home from work, education, etc.
2. 'Personal business and services' includes trips for social welfare purposes.
3. Totals include trips for which purpose was not recorded.
4. Trips by people whose age was not recorded are excluded from these tables (0.03% of trips).

Table ET2: Proportion of adults who are current drivers

Ethnicity	% adults who are current drivers (see note)	
	Male	**Female**
Maori	84%	64%
European	92%	85%
Pacific	72%	53%

Note: 'Current drivers' are people aged 15 and over who reported driving at least 20km in the twelve months preceding the survey.

Hospitalisations

Ethnicity of crash victims is not recorded on Traffic Crash Reports completed by Police. However, hospital admission statistics held by the New Zealand Health Information Service record the ethnicity of casualties who are injured seriously enough to be admitted to hospital. These can be used to calculate the risk of being hospitalised as a result of a crash, per unit of exposure (kilometre travelled, or hour spent walking). (Note that these are not the same as the risk measures used elsewhere in the Travel Survey, as fatalities and minor injuries are not included).

Table ET3: Drivers and passengers hospitalised per 100 million km travelled 1997/98 (all ages combined)

Ethnicity	**Drivers**	**Passengers**
	Hospital admissions per 100 million km travelled	
Maori	20.5	26.0
European	6.1	6.8
Pacific	17.6	21.9

Table ET4: Pedestrians hospitalised per million hours spent walking 1997/98 (all ages combined)

Ethnicity	**Hospital admissions per million hours spent walking**
Maori	5.4
European	2.3
Pacific	5.6

Fig ET3: Risk of hospitalisation, by age group and ethnicity

a) Drivers: hospital admissions per 100 million km driven
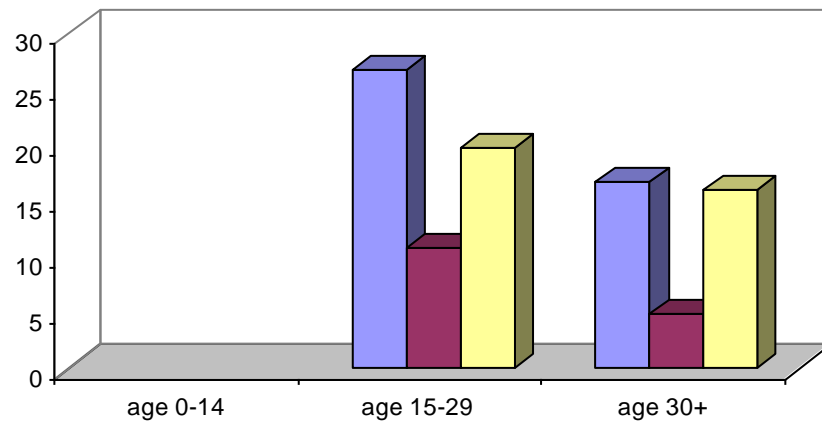
b) Passengers: hospital admissions per 100 million km driven
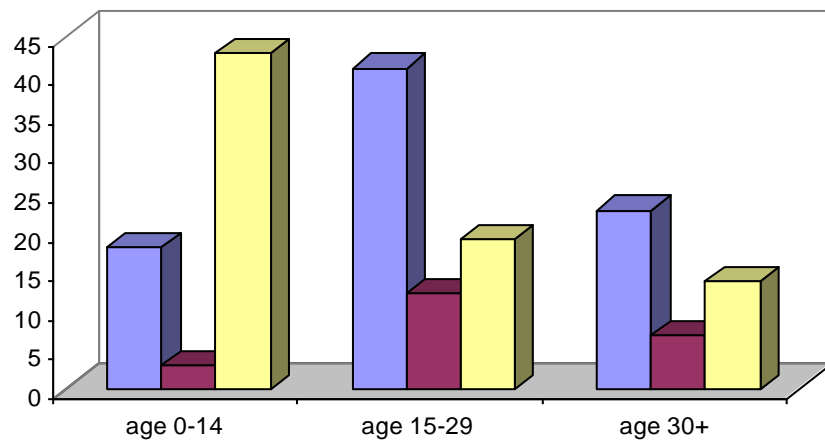
c) Pedestrians: hospital admissions per million hours spent walking

☐ Maori ☐ European ☐ Pacific
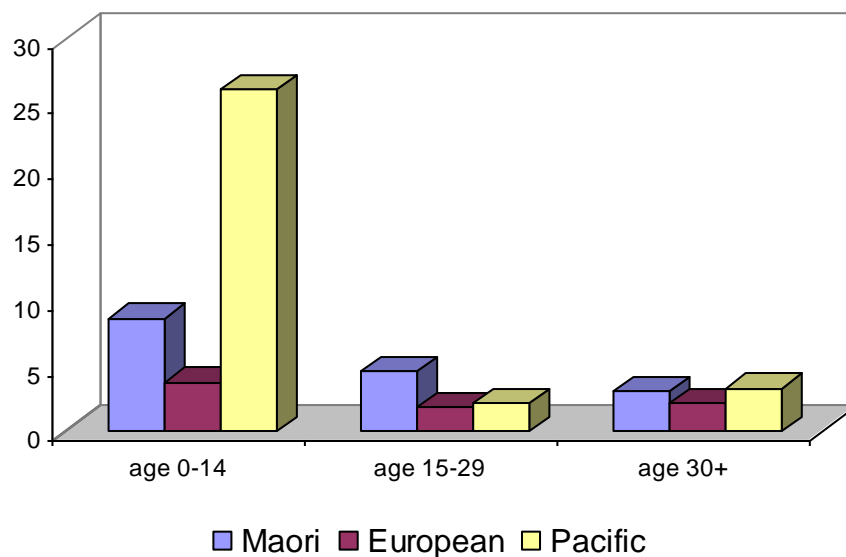
ALCOHOL

Alcohol consumption by drivers

Self-reporting: Respondents who drove at all on the survey days were also asked to record the times, amounts and types of alcohol they drank during the survey period. Drinking session information was recorded in both the 1989/90 and 1997/98 surveys, but the type and amount of alcohol are available for the 1997/98 survey only.

Table AL1: Drinking session by venue

Venue	Sessions in the survey		Estimated national daily average					
			Sessions (thousands)		Hours (thousands)		Average hours per session	
	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98	1989/90	1997/98
Own home	1367	2152	270	282	350	398	1.3	1.4
Other home	442	606	88	79	219	204	2.5	2.6
Hotel/ bar	343	351	64	41	126	82	2.0	2.0
Sports club	144	171	30	23	68	43	2.2	1.9
Other club	147	155	30	16	79	37	2.6	2.3
Restaurant/ cafe	135	211	24	32	51	63	2.1	2.0
Work	147	139	30	22	42	30	1.4	1.4
Sports event/ outdoors	43	89	9	12	21	34	2.4	2.8
Other	67	87	13	9	33	21	2.5	2.4
Total	2835	3977	558	518	989	918	1.8	1.8

Fig AL1: Percentage of total drinking time by venue
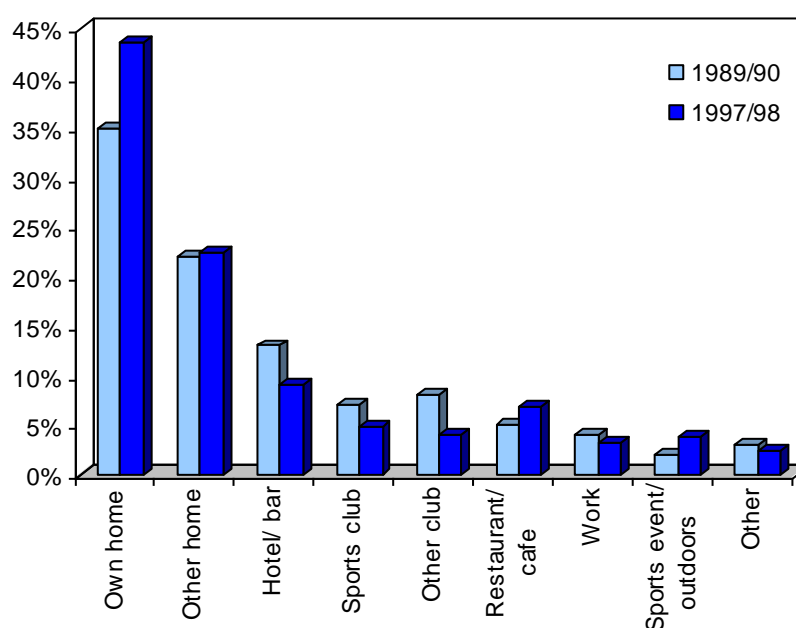
Table AL2: Alcohol consumption by venue (1997/98)

Venue	Percentage of total alcohol consumption	Percentage of total drinking time	Standard drinks per person per hour
Own home	46%	43%	2.4
Other home	18%	22%	1.8
Hotel/ bar	11%	9%	2.8
Sports club	6%	5%	2.7
Other club	4%	4%	2.1
Restaurant/ cafe	6%	7%	1.9
Work	4%	3%	2.7
Sports event/ outdoors	3%	4%	1.8
Other	2%	2%	2.0
Not known	1%	1%	
Total	100%	100%	2.3

Note: One standard drink contains 10g of alcohol.

**Table AL3: Drinking sessions by age and gender
(National daily average)**

Age group	Males			Females		
	Sessions in survey	National daily estimates		Sessions in survey	National daily estimates	
		Sessions (thousands)	Hours (thousands)		Sessions (thousands)	Hours (thousands)
15-19	43	5.8	14.6	23	3.5	8.2
20-24	140	26.8	50.0	80	12.0	25.0
25-29	202	32.4	71.8	125	17.5	37.4
30-34	265	33.9	70.4	157	21.1	41.9
35-39	321	42.0	86.0	209	26.7	53.8
40-44	273	36.2	67.3	162	20.5	36.6
45-49	315	41.0	72.9	196	23.6	38.8
50-54	246	30.5	44.8	137	14.8	20.9
55-59	249	30.5	51.7	122	14.4	19.8
60-64	161	17.2	22.7	72	8.5	9.6
65-69	148	16.4	24.6	55	6.1	7.4
70-74	105	13.3	15.1	42	5.7	5.4
75+	95	12.5	15.5	30	3.9	5.1
Total	2567	339.4	608.4	1410	178.5	310.0

Note: Totals include sessions by drinkers of unknown age.

**Table AL4: Average time spent in drinking sessions
(hours per person per week)**

Gender	Drinking time: hours per person per week (National estimates)	
	1989/90	1997/98
Male	4.6	4.0
Female	2.8	2.3
Total	3.8	3.2

Fig AL2: Average time spent in drinking sessions, by gender
(hours per person per week)

Hours per person per week
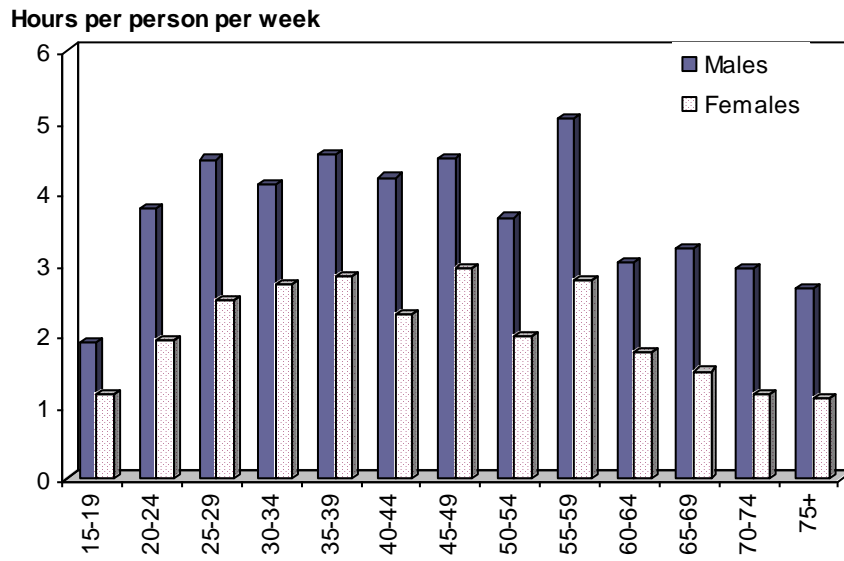
Fig AL3: Average time spent in drinking sessions, 1989/90 vs 1997/98
(hours per person per week)

Hours per person per week
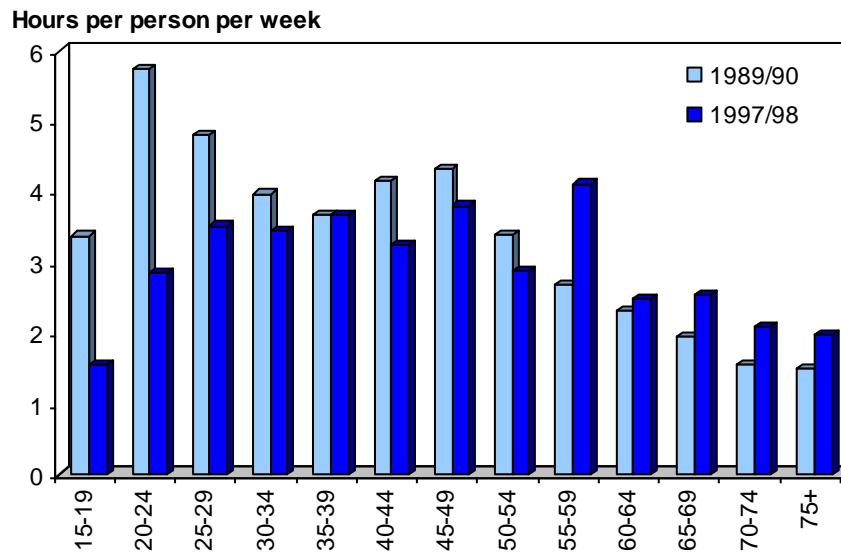
**Table AL5: Total alcohol consumed and standard drinks
per drinking session hour, by age and gender**

Age group	Standard drinks (thousands) National daily estimates			Standard drinks per person per drinking session hour		
	Males	Females	Total	Males	Females	Total
15-19	45	23	68	3.1	Note 1	3.0
20-24	166	65	231	3.3	2.6	3.1
25-29	176	62	239	2.5	1.7	2.2
30-34	166	71	236	2.4	1.7	2.1
35-39	217	84	301	2.5	1.6	2.2
40-44	153	58	211	2.3	1.6	2.0
45-49	167	64	231	2.3	1.6	2.1
50-54	110	39	149	2.5	1.9	2.3
55-59	126	35	161	2.4	1.8	2.3
60-64	66	17	83	2.9	1.8	2.6
65-69	51	16	67	2.1	2.1	2.1
70-74	44	10	54	2.9	1.9	2.6
75+	35	8	44	2.3	Note 1	2.1
Total	1526	553	2079	2.5	1.8	2.3

Note 1: There were insufficient drinking sessions in some female age categories to enable reliable estimates of standard drinks per person per hour.

**Fig AL4: Average weekly alcohol consumption by gender
(standard drinks per person per week)**
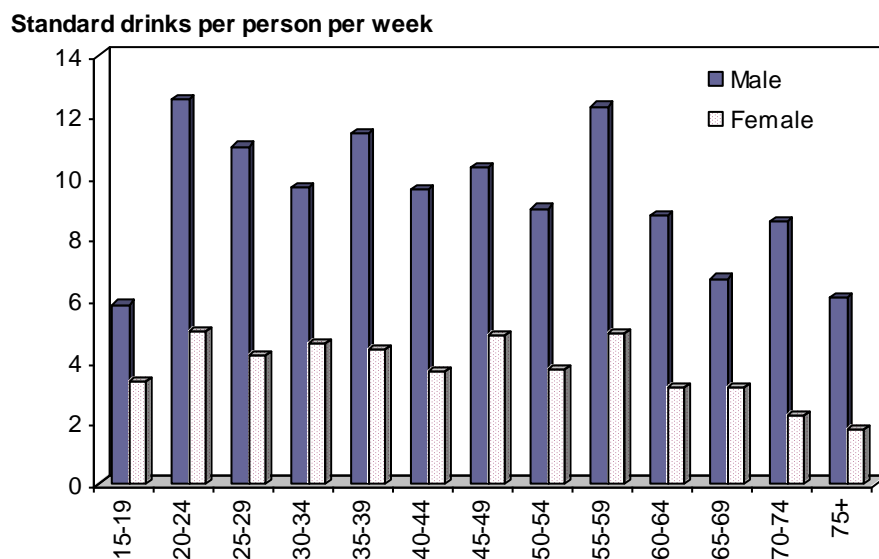
Note: Only people who drove during their travel survey days were asked about alcohol consumption. The above graph is therefore of alcohol consumption *per person who drove during their travel survey days*.

Fig AL5: Percentage of drinking sessions, time and alcohol consumption by day of week
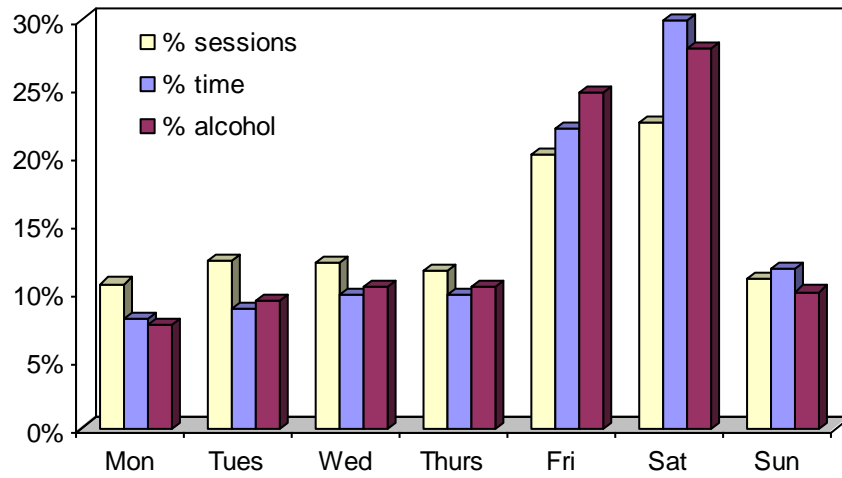
Fig AL6: Percentage of drinking time and alcohol consumption by hour of day (0600 to 0559)
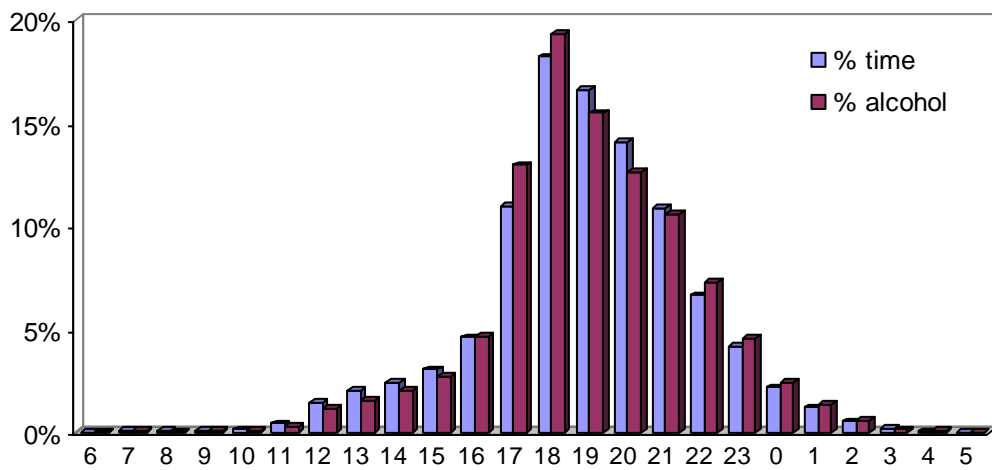
Table AL6: Driver trips within one and four hours after a drinking session

| Age group | Thousand driver trips within one and four hours after a drinking session (national daily estimates) | | | | | |
| | Male | | Female | | Total | |
	Within 1 hour	Within 4 hrs	Within 1 hour	Within 4 hrs	Within 1 hour	Within 4 hrs
15-19	0.4	1.2	0.4	0.5	0.8	1.7
20-24	3.0	5.8	1.3	1.7	4.3	7.4
25-29	4.3	5.7	2.3	3.7	6.6	9.4
30-34	3.9	5.4	1.7	3.1	5.7	8.5
35-39	4.5	9.2	2.3	3.2	6.8	12.4
40-44	4.3	7.3	2.1	3.2	6.4	10.4
45-49	5.1	8.4	2.1	2.9	7.2	11.3
50-54	4.3	6.7	0.5	1.0	4.8	7.7
55-59	2.8	4.2	1.4	2.3	4.2	6.5
60-64	2.2	3.7	0.7	1.6	2.9	5.3
65-69	2.2	2.9	0.4	1.0	2.6	3.9
70-74	1.0	1.5	0.1	0.4	1.1	2.0
75+	0.9	2.1	0.0	0.0	0.9	2.1
Total	38.9	64.0	15.5	24.7	54.4	88.7

Fig AL7: Percentage of driver trips made within one hour after a drinking session
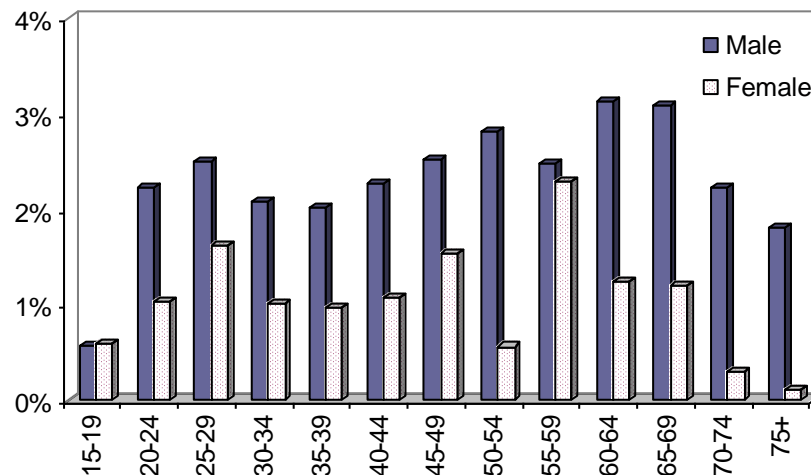
Table AL7: Alcohol-impaired trips per ten thousand driver trips

Time of day and week	Alcohol impaired trips per ten thousand driver trips	
	Males	Females
Trips at all times	46	7
Trips during high alcohol hours	288	89

Notes:

1. "High alcohol hours" are defined as the hours between 10pm and 4am daily, plus 4am-6am on Fridays, Saturdays and Sundays. These hours are used by the Land Transport Safety Authority to represent times when the highest proportions of crashes involving alcohol occur.
2. Drivers were assumed to be alcohol impaired during a particular driving trip, if they drove following a drinking session during which enough alcohol was consumed to place the average person at risk of being over the legal blood alcohol limit. Normal rates of absorption and elimination of alcohol from the blood and the time lag between the drinking session and the driving trip were taken into account.
3. Further breakdown (eg into age groups) is not possible due to the relatively small number of drivers in the survey who had exceeded safe drink-driving guidelines (N=108 drivers).

APPENDICES

Appendix A: Estimation formulas and weights

Estimation of means and totals

The mean of a variable *x* for a particular domain (or subgroup) of the population, d, can be estimated from this same domain in the sample, S_d, by using the weighted mean (Särndel et al, 1992, p185) of all sample members, *ij*: (denoting the person selected in household *j* in meshblock *i*) who belong to domain d.

$$\tilde{x}_{S_d} = \frac{\sum\limits_{ij \in S_d} x_{ij} weight_{ij}}{\sum\limits_{ij \in S_d} weight_{ij}}$$

where *weight$_{ij}$* is the multiple of the sampling weights for each stage of sampling:

$$weight_{ij} = \frac{1}{pr\{mb\ sampled\}_i} \times \frac{1}{sf_i}$$

where

pr{mb sampled} is the probability that the meshblock was sampled, which is proportional to the 1991 Census population of the meshblock in most cases (see above for details)

and

$sf_i = \frac{1}{7}$ or $\frac{1}{8}$, depending on the sampling interval used to sample households.

Non-response weights

Household

A number of sampled households did not supply any data for the survey: either no-one was at home whenever an interviewer called or the household refused to give any information. Such households are referred to as non-responding households. To use zeros for these households would lead to an underestimate of actual travel. Therefore available household information was used to impute a response for these non-responding households. Any given non-responding household was matched to a group of responding households by Local Government Region[4] and urban/rural location of households within Region. These groups are referred to as household non-response groups. For Auckland, there was a further grouping by the four urban areas: North Auckland, West Auckland, South Auckland and Central Auckland. As area and urbanisation are related to travel behaviour, a good imputed response for any non-responding household is the average response of all the responding households in the group to which it belongs.

The household non-response weighting procedure adjusts the weights of the responding households so that their responses can partially represent those of matched non-responding households ("partially", since the average response of several households is always used for imputation).

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[4] All urban areas and Regional classifications are according to the 1991 Census (Statistics NZ, 1992).

Person post-stratification weights

Within sampled households, there are sometimes people who are difficult to contact or who refuse to supply any travel data, while other members of their household do supply information about the household and basic information about the non-responding members. Such households are described as *partially-responding*. For non-responding members of such households, there is more information on which to impute responses, some of which is related to travel behaviour. All responding eligible people were grouped by Region, age groups and gender and then multiplied by a factor that aligned the weighted sample (viz. estimated population numbers) to estimated population data for December 1997 (mid-way through the survey) by the same Region, age group and gender classifications. For the household and person post stratification weights, the area, age and gender categories were chosen so that an adequate number of sample members were always used for imputation.

Trip non-response and post-stratification weights

The last stage of non-response weighting involved firstly using Regional trip data to represent people with missing trip data (but with other information provided) and secondly, post-stratifying the weighted trip data so that there was an even distribution of weighted trips by day of week. This last step was necessary as there is a strong day of week pattern to many trip modes. As there was little evidence of seasonal variation in travel and the sample was already quite well distributed over the full survey year (apart from some Auckland households[5]), there was no attempt to weight trip data to achieve an equal distribution of the sample by time of year.

The estimation of sampling errors

Sampling errors were calculated using a method due to Mahalanobis (1946), described by Wolter (1985). The sample at the meshblock level was randomly divided into $n=5$ groups, each of whose structure matched that of the parent sample. For each group, i, and estimate $\hat{M}$ of the population mean or total (calculated from the entire sample as described above), an estimate, $\hat{M}_i$ was calculated from the members of group i, using the weights and estimators as described above and the same non-response imputation and post-stratification procedures. The variance, $v(\hat{M})$ of the estimates was estimated from these values:

$$v(\hat{M}) = \frac{\sum_{i=1}^{n}(\hat{M}_i - \overline{M})^2}{n \times (n-1)} \quad \text{where } \overline{M} \text{ is the mean of the } \hat{M}_i$$

The variance estimates themselves were quite variable, particularly for estimates from relatively small subgroups. As there was also a marked positive skew to the distribution of variance estimates, the above procedure was repeated for 10 independent random groupings (each with 5 random groups) and the median of these 10 variances was taken as the best variance estimate. Such a procedure generates a variance estimate with 49 degrees of freedom.

A $(1-\alpha) \times 100$ percent confidence interval for M (the population mean or total) is:

$$\left(\hat{M} - t_{49,\alpha/2}\sqrt{median(v(\hat{M}))}, \hat{M} + t_{49,\alpha/2}\sqrt{median(v(\hat{M}))} \right)$$

---

[5] Some parts of Auckland were surveyed during the months of April and May 1999 to replace unreliable data collected during the previous year.

Appendix B: Sampling errors for travel estimates

Introduction

The following section has sampling errors for the main travel estimates generated from the survey data. The sampling errors are computed according to the description in Appendix A. The column headed "95% confidence intervals" gives the half-width of the 95% confidence interval for the parameter being estimated. The centre of this confidence interval is the estimate itself and it can be assumed that there is a 95% chance that the real population value (which is being estimated) will be somewhere within this interval. Where there is a blank space in place of the half-width, either the sample size for that particular cell was too small for the sampling errors to be calculated, or no estimate was calculable. In the former case, this implies that the estimate itself is likely to be based on too small a sample size to be regarded as a viable estimate. In some circumstances, a confidence interval will still be computed for relatively small sample sizes. Occasionally the 95% confidence interval half-width will exceed the value of its associated estimate, in which circumstances the parameter being estimated can be regarded as not being significantly different than zero. As with all sample-based sampling error calculations, the confidence intervals themselves are estimated and have error associated with them.

Where a classifying variable category is not listed, the estimates in the right-hand columns refer to all levels of that variable in aggregate. For example, the first row (with missing purpose and mode) refers to the overall national estimate of distance travelled and trips made.

Table B1: Sampling errors by travel mode and overall trip purpose

Purpose	Mode	95% confidence intervals	
		100 million km	million trips
		20.91	130.23
	Walk[6]		65.33
	Vehicle driver	8.93	88.26
	Vehicle passenger	11.04	50.60
	Bicycle	0.43	16.91
	Train	1.50	4.40
	Bus	3.54	14.86
	Other	9.38	4.81
	Taxi	0.53	6.75
Home		7.84	41.14
Work - main job		4.56	28.05
Work - other job		0.59	5.07
Work - employer's business		6.41	30.12
Education		1.67	15.83
Shopping		3.18	26.54
Personal business or services		2.59	23.78
Social/ recreational		11.73	37.91
To accompany someone		3.22	31.11

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[6] There are no distance estimates for walk trips.

Table B1 (cont): Sampling errors by travel mode and overall trip purpose

Purpose	Mode	95% confidence intervals	
		100 million km	million trips
Home	Walk		24.92
Home	Vehicle driver	3.33	22.32
Home	Vehicle passenger	4.03	13.59
Home	Bicycle	0.19	7.47
Home	Train	0.89	1.80
Home	Bus	1.80	7.29
Home	Other	4.04	1.86
Home	Taxi	0.28	3.04
Work - main job	Walk		10.93
Work - main job	Vehicle driver	4.00	18.56
Work - main job	Vehicle passenger	1.36	7.94
Work - main job	Bicycle	0.15	7.54
Work - main job	Train	0.34	1.63
Work - main job	Bus	0.28	2.68
Work - main job	Other	0.19	1.75
Work - main job	Taxi	0.08	1.07
Work - other job	Walk		2.88
Work - other job	Vehicle driver	0.45	3.06
Work - other job	Vehicle passenger	0.25	1.94
Work - other job	Bicycle	0.01	0.40
Work - other job	Bus		
Work - other job	Other		
Work - other job	Taxi		
Work - employer's business	Walk		7.42
Work - employer's business	Vehicle driver	4.04	26.64
Work - employer's business	Vehicle passenger	0.81	5.19
Work - employer's business	Bicycle	0.03	1.38
Work - employer's business	Bus		
Work - employer's business	Other	4.66	1.03
Work - employer's business	Taxi	0.15	1.04
Education	Walk		8.57
Education	Vehicle driver	0.68	4.99
Education	Vehicle passenger	0.87	6.98
Education	Bicycle	0.08	2.92
Education	Train	0.19	0.70
Education	Bus	1.31	6.04
Education	Other		
Education	Taxi		
Shopping	Walk		12.60
Shopping	Vehicle driver	2.29	14.70
Shopping	Vehicle passenger	1.85	11.63
Shopping	Bicycle	0.03	1.43
Shopping	Train	0.15	0.63
Shopping	Bus	0.45	2.50
Shopping	Other	0.14	0.94
Shopping	Taxi	0.04	0.83

Table B1 (cont): Sampling errors by travel mode and overall trip purpose

Purpose	Mode	95% confidence intervals	
		100 million km	million trips
Personal business or services	Walk		9.16
Personal business or services	Vehicle driver	1.44	12.22
Personal business or services	Vehicle passenger	0.95	9.77
Personal business or services	Bicycle	0.05	1.46
Personal business or services	Train	0.10	0.68
Personal business or services	Bus	0.42	1.17
Personal business or services	Other	1.74	0.56
Personal business or services	Taxi	0.08	1.03
Social/ recreational	Walk		20.37
Social/ recreational	Vehicle driver	5.98	17.59
Social/ recreational	Vehicle passenger	5.64	25.60
Social/ recreational	Bicycle	0.17	4.72
Social/ recreational	Train	0.42	1.11
Social/ recreational	Bus	1.22	3.41
Social/ recreational	Other	1.10	1.33
Social/ recreational	Taxi	0.13	2.70
To accompany someone	Walk		6.84
To accompany someone	Vehicle driver	2.17	15.53
To accompany someone	Vehicle passenger	2.43	19.11
To accompany someone	Bicycle	0.01	0.34
To accompany someone	Train		
To accompany someone	Bus	0.18	0.62
To accompany someone	Other		
To accompany someone	Taxi	0.02	0.24

Table B2: Sampling errors by travel mode and age group

Mode	Age group	95% confidence intervals	
		100 million km	million trips
	0-4	3.80	23.13
	5-9	3.12	22.48
	10-14	2.43	19.36
	15-19	4.46	35.41
	20-24	5.60	37.93
	25-29	7.96	32.88
	30-34	5.55	43.62
	35-39	4.86	44.93
	40-44	5.06	34.38
	45-49	5.20	32.89
	50-54	4.11	35.51
	55-59	3.56	27.94
	60-64	2.45	22.03
	65-69	3.33	22.89
	70-74	1.75	20.40
	75-79	1.81	21.92
	80+	0.79	12.39

Table B2 (cont): Sampling errors by travel mode and age group

Mode	Age group	95% confidence intervals	
		100 million km	million trips
Walk	0-4		7.82
Walk	5-9		9.61
Walk	10-14		13.27
Walk	15-19		22.03
Walk	20-24		18.83
Walk	25-29		19.86
Walk	30-34		14.97
Walk	35-39		13.82
Walk	40-44		11.07
Walk	45-49		15.25
Walk	50-54		13.43
Walk	55-59		8.97
Walk	60-64		7.52
Walk	65-69		8.50
Walk	70-74		7.89
Walk	75-79		6.42
Walk	80+		4.31
Vehicle driver	15-19	1.74	18.30
Vehicle driver	20-24	3.64	27.47
Vehicle driver	25-29	5.04	29.00
Vehicle driver	30-34	3.64	27.21
Vehicle driver	35-39	4.27	41.16
Vehicle driver	40-44	3.17	31.47
Vehicle driver	45-49	3.70	23.08
Vehicle driver	50-54	3.29	35.39
Vehicle driver	55-59	2.27	21.88
Vehicle driver	60-64	2.08	17.05
Vehicle driver	65-69	1.76	14.92
Vehicle driver	70-74	1.18	13.32
Vehicle driver	75-79	0.94	12.05
Vehicle driver	80+	0.54	8.80
Vehicle passenger	0-4	3.64	22.97
Vehicle passenger	5-9	3.48	25.94
Vehicle passenger	10-14	2.35	15.59
Vehicle passenger	15-19	2.93	17.03
Vehicle passenger	20-24	3.09	13.17
Vehicle passenger	25-29	1.40	10.08
Vehicle passenger	30-34	1.85	11.50
Vehicle passenger	35-39	1.56	8.68
Vehicle passenger	40-44	2.18	10.81
Vehicle passenger	45-49	1.86	8.63
Vehicle passenger	50-54	1.09	6.76
Vehicle passenger	55-59	1.53	6.87
Vehicle passenger	60-64	1.37	7.45
Vehicle passenger	65-69	1.47	6.92
Vehicle passenger	70-74	0.97	5.61
Vehicle passenger	75-79	0.82	7.83
Vehicle passenger	80+	0.54	4.75

Table B2 (cont): Sampling errors by travel mode and age group

Mode	Age group	95% confidence intervals	
		100 million km	million trips
Bicycle	0-4	0.01	0.30
Bicycle	5-9	0.06	4.88
Bicycle	10-14	0.15	6.22
Bicycle	15-19	0.16	7.58
Bicycle	20-24	0.26	11.65
Bicycle	25-29	0.15	2.60
Bicycle	30-34	0.15	1.95
Bicycle	35-39	0.06	2.05
Bicycle	40-44	0.07	1.79
Bicycle	45-49	0.05	0.79
Bicycle	50-54	0.06	1.36
Bicycle	55-59	0.04	0.55
Bicycle	60-64	0.02	0.69
Bicycle	65-69	0.08	2.07
Bicycle	70-74		
Bicycle	75-79		
Bicycle	80+		
Bus	0-4	0.18	0.77
Bus	5-9	0.75	4.88
Bus	10-14	1.20	6.79
Bus	15-19	1.21	5.33
Bus	20-24	0.44	2.90
Bus	25-29	0.59	2.79
Bus	30-34	0.71	4.86
Bus	35-39	0.41	3.32
Bus	40-44	0.39	2.01
Bus	45-49	0.58	2.48
Bus	50-54	0.64	1.51
Bus	55-59	0.18	1.86
Bus	60-64	0.19	0.75
Bus	65-69	0.75	1.98
Bus	70-74	0.16	1.06
Bus	75-79		
Bus	80+	0.04	0.78
Taxi	0-4	0.01	0.80
Taxi	5-9	0.01	0.27
Taxi	10-14	0.01	0.48
Taxi	15-19	0.10	2.39
Taxi	20-24	0.10	2.51
Taxi	25-29	0.16	1.91
Taxi	30-34	0.13	1.56
Taxi	35-39	0.06	1.32
Taxi	40-44	0.36	2.33
Taxi	45-49	0.03	0.53
Taxi	50-54	0.03	0.36
Taxi	55-59	0.06	0.82
Taxi	60-64	0.02	0.14
Taxi	65-69		
Taxi	70-74		
Taxi	75-79	0.11	2.58
Taxi	80+		0.34

Table B3: Sampling errors by drivers' gender and age group

Gender	Age group	95% confidence intervals	
		100 million km	million trips
F		5.06	41.89
M		8.75	65.27
F	15-19	0.85	9.92
F	20-24	1.76	19.04
F	25-29	2.07	15.65
F	30-34	2.58	20.43
F	35-39	2.84	21.06
F	40-44	1.59	25.16
F	45-49	1.72	17.88
F	50-54	1.70	15.56
F	55-59	1.05	11.28
F	60-64	0.69	8.16
F	65-69	0.92	6.15
F	70-74	0.72	8.56
F	75-79	0.37	7.25
F	80+	0.20	4.53
M	15-19	1.54	15.03
M	20-24	2.56	16.09
M	25-29	3.25	22.50
M	30-34	3.56	24.45
M	35-39	3.45	27.79
M	40-44	2.83	22.00
M	45-49	3.10	19.30
M	50-54	2.98	27.28
M	55-59	1.86	16.07
M	60-64	2.21	14.12
M	65-69	1.58	12.33
M	70-74	1.01	11.59
M	75-79	0.76	9.85
M	80+	0.45	7.33

Note: Table B2 has sampling errors for driver trips and distance by age group.

Table B4: Sampling errors by driver's ethnicity

Age group	95% confidence intervals	
	100 million km	million trips
NZ Maori	3.43	34.56
European descent	10.55	92.10
Pacific	1.10	18.20
Other	2.16	34.52

Table B5: Sampling errors for driver trips by day of week

Age group	95% confidence intervals	
	million km	million trips
Mon	482.48	28.05
Tue	396.47	26.80
Wed	368.31	45.52
Thu	325.58	33.53
Fri	568.06	37.28
Sat	455.96	27.90
Sun	260.59	23.22

Table B6: Sampling errors for drivers of cars, vans and utes by gender and age group

Gender	Age group	95% confidence intervals	
		100 million km	million trips
	15-19	1.63	17.48
	20-24	3.23	26.58
	25-29	3.86	28.60
	30-34	3.74	27.08
	35-39	4.21	39.31
	40-44	2.85	32.11
	45-49	3.41	23.34
	50-54	3.01	34.04
	55-59	2.38	20.52
	60-64	2.18	17.82
	65-69	1.78	15.61
	70-74	1.13	13.09
	75-79	0.93	11.98
	80+	0.54	8.79
F		4.51	43.80
M		7.96	60.86
F	15-19	0.86	9.80
F	20-24	1.78	18.82
F	25-29	2.05	14.90
F	30-34	2.60	19.72
F	35-39	2.91	21.30
F	40-44	1.56	24.00
F	45-49	1.70	17.80
F	50-54	1.72	15.50
F	55-59	1.07	11.14
F	60-64	0.69	7.85
F	65-69	0.92	6.11
F	70-74	0.72	8.56
F	75-79	0.37	7.27
F	80+	0.20	4.53
M	15-19	1.44	14.88
M	20-24	2.25	14.12
M	25-29	2.96	20.46
M	30-34	3.17	25.19
M	35-39	2.98	31.16
M	40-44	2.39	19.76
M	45-49	2.84	20.19
M	50-54	2.19	23.10
M	55-59	1.83	17.66
M	60-64	2.09	15.12
M	65-69	1.45	13.57
M	70-74	0.92	11.91
M	75-79	0.75	9.77
M	80+	0.44	7.41

Table B7: Sampling errors for trips by cars, vans and utes by vehicle age and engine size

Vehicle age	Engine size (cc)	95% confidence intervals	
		100 million km	million trips
	Up to 1000	0.91	11.29
	1000-1300	4.01	39.92
	1301-1600	5.42	58.62
	1601-2000	6.82	52.98
	2001-3000	4.03	41.82
	3000+	2.36	26.91
00-01yrs		2.80	21.71
02-04yrs		5.08	51.08
05-09yrs		5.60	52.84
10-14yrs		6.14	36.65
15-19yrs		3.47	24.28
20+yrs		1.35	16.32
00-01yrs	Up to 1000	0.09	2.27
00-01yrs	1000-1300	0.25	2.42
00-01yrs	1301-1600	1.58	13.79
00-01yrs	1601-2000	2.62	21.36
00-01yrs	2001-3000	1.91	16.27
00-01yrs	3000+	0.64	9.01
02-04yrs	Up to 1000		
02-04yrs	1000-1300	2.15	8.95
02-04yrs	1301-1600	1.76	19.69
02-04yrs	1601-2000	2.27	26.96
02-04yrs	2001-3000	3.37	22.61
02-04yrs	3000+	1.24	8.82
05-09yrs	Up to 1000	0.31	5.24
05-09yrs	1000-1300	1.41	18.55
05-09yrs	1301-1600	3.17	27.53
05-09yrs	1601-2000	3.48	31.67
05-09yrs	2001-3000	2.93	26.07
05-09yrs	3000+	1.65	12.27
10-14yrs	Up to 1000	0.61	7.16
10-14yrs	1000-1300	1.46	16.87
10-14yrs	1301-1600	3.47	32.72
10-14yrs	1601-2000	3.46	42.66
10-14yrs	2001-3000	1.45	14.08
10-14yrs	3000+	1.17	10.34
15-19yrs	Up to 1000	0.26	4.52
15-19yrs	1000-1300	1.38	18.36
15-19yrs	1301-1600	1.41	15.58
15-19yrs	1601-2000	2.21	16.61
15-19yrs	2001-3000	0.82	5.90
15-19yrs	3000+	0.93	10.00
20+yrs	Up to 1000	0.21	4.17
20+yrs	1000-1300	0.68	10.35
20+yrs	1301-1600	0.85	6.72
20+yrs	1601-2000	0.40	4.42
20+yrs	2001-3000	0.54	5.10
20+yrs	3000+	0.41	6.42

Table B8: Sampling errors for motorcycle riders by age

Age group	95% confidence intervals	
	Million km	million trips
15-24	21.18	3.34
25-34	41.07	3.35
35-44	43.85	8.26
45+	16.01	2.50

Table B9: Sampling errors for passengers of cars, vans and utes by gender and age group

Gender	Age group	95% confidence intervals	
		100 million km	million trips
	0-4	3.73	22.37
	5-9	3.34	26.22
	10-14	2.01	14.95
	15-19	2.75	16.95
	20-24	3.02	13.45
	25-29	1.29	10.01
	30-34	1.86	11.43
	35-39	1.55	8.73
	40-44	2.20	10.41
	45-49	1.81	8.94
	50-54	1.11	7.22
	55-59	1.48	6.89
	60-64	1.33	7.55
	65-69	1.45	6.90
	70-74	0.98	5.63
	75-79	0.82	7.78
	80+	0.45	4.03
F		7.61	33.89
M		6.46	37.13

Table B9 (cont): Sampling errors for passengers of cars, vans and utes by gender and age group

Gender	Age group	95% confidence intervals	
		100 million km	million trips
F	0-4	2.26	11.62
F	5-9	1.75	15.15
F	10-14	1.34	11.90
F	15-19	2.38	11.81
F	20-24	2.41	11.96
F	25-29	1.25	6.11
F	30-34	1.41	8.12
F	35-39	1.28	7.90
F	40-44	1.98	8.59
F	45-49	1.58	7.15
F	50-54	0.86	6.82
F	55-59	1.38	6.73
F	60-64	1.26	8.55
F	65-69	1.44	5.39
F	70-74	0.82	5.04
F	75-79	0.84	7.94
F	80+	0.33	3.55
M	0-4	2.16	20.83
M	5-9	2.27	13.31
M	10-14	1.58	8.41
M	15-19	2.08	12.15
M	20-24	1.81	6.85
M	25-29	1.00	7.08
M	30-34	1.13	4.91
M	35-39	0.61	4.84
M	40-44	1.15	3.68
M	45-49	0.76	3.24
M	50-54	0.55	3.78
M	55-59	1.02	3.66
M	60-64	0.40	2.38
M	65-69	0.44	3.03
M	70-74	0.46	3.62
M	75-79	0.17	1.76
M	80+	0.25	1.42

Table B10: Sampling errors for drivers and passengers of cars/vans/utes, pedestrians and cyclists by region

Region	Mode	95% confidence intervals	
		100 million km	million trips
01 Northland	Walk		6.59
01 Northland	Car driver	1.52	8.73
01 Northland	Car passenger	2.10	9.50
01 Northland	Bicycle		
01 Northland	Bus	0.74	2.01
02 Auckland	Walk		32.16
02 Auckland	Car driver	5.42	59.61
02 Auckland	Car passenger	4.50	23.26
02 Auckland	Bicycle	0.24	10.77
02 Auckland	Bus	1.08	7.20
03 Waikato	Walk		11.32
03 Waikato	Car driver	3.12	26.22
03 Waikato	Car passenger	4.35	14.19
03 Waikato	Bicycle	0.12	3.22
03 Waikato	Bus	1.70	4.40
04 Bay of Plenty	Walk		10.91
04 Bay of Plenty	Car driver	2.04	19.63
04 Bay of Plenty	Car passenger	3.05	15.81
04 Bay of Plenty	Bicycle	0.10	2.41
04 Bay of Plenty	Bus	0.73	2.73
05 Gisborne	Walk		2.68
05 Gisborne	Car driver	0.38	4.83
05 Gisborne	Car passenger	0.60	3.17
05 Gisborne	Bicycle	0.03	1.52
05 Gisborne	Bus	0.05	0.69
06 Hawkes Bay	Walk		9.17
06 Hawkes Bay	Car driver	1.95	14.43
06 Hawkes Bay	Car passenger	1.41	12.85
06 Hawkes Bay	Bicycle	0.10	3.35
06 Hawkes Bay	Bus	0.50	1.12
07 Taranaki	Walk		6.24
07 Taranaki	Car driver	1.12	8.39
07 Taranaki	Car passenger	1.35	7.24
07 Taranaki	Bicycle	0.04	1.42
07 Taranaki	Bus	0.19	1.34
08 Manawatu-Wanganui	Walk		14.15
08 Manawatu-Wanganui	Car driver	2.69	18.14
08 Manawatu-Wanganui	Car passenger	4.39	9.73
08 Manawatu-Wanganui	Bicycle	0.17	3.28
08 Manawatuv	Bus	0.48	2.44
09 Wellington	Walk		30.91
09 Wellington	Car driver	3.25	23.96
09 Wellington	Car passenger	3.12	18.66
09 Wellington	Bicycle	0.28	12.04
09 Wellington	Bus	0.58	5.60

Table B10 (cont): Sampling errors for drivers and passengers of cars/vans/utes, pedestrians and cyclists by region

Region	Mode	95% confidence intervals	
		100 million km	million trips
10 Nelson-Marlborough	Walk		7.89
10 Nelson-Marlborough	Car driver	1.54	12.78
10 Nelson-Marlborough	Car passenger	1.86	6.33
10 Nelson-Marlborough	Bicycle	0.08	2.07
10 Nelson-Marlborough	Bus	0.23	1.03
11 Canterbury	Walk		24.08
11 Canterbury	Car driver	3.64	22.82
11 Canterbury	Car passenger	3.47	20.51
11 Canterbury	Bicycle	0.26	9.16
11 Canterbury	Bus	1.03	4.31
12 West Coast	Walk		2.31
12 West Coast	Car driver	0.48	3.91
12 West Coast	Car passenger	0.63	3.78
12 West Coast	Bicycle	0.02	0.99
12 West Coast	Bus	0.10	0.19
13 Otago	Walk		12.78
13 Otago	Car driver	2.73	17.71
13 Otago	Car passenger	2.35	8.98
13 Otago	Bicycle	0.10	3.65
13 Otago	Bus	0.46	3.00
14 Southland	Walk		3.61
14 Southland	Car driver	1.28	8.87
14 Southland	Car passenger	0.88	7.51
14 Southland	Bicycle	0.03	1.70
14 Southland	Bus	0.37	1.10

Table B11: Sampling errors for pedestrian trips by gender and age group

Gender	Age group	95% confidence intervals		
		million hours	million road crossings	million trips
		16.30	130.12	65.39
	0-4	2.37	18.41	7.82
	5-9	2.08	20.25	9.55
	10-14	2.96	37.02	13.30
	15-19	7.54	47.80	22.03
	20-24	4.12	46.84	18.83
	25-29	4.99	57.22	18.75
	30-34	3.71	45.34	14.99
	35-39	2.71	36.79	13.71
	40-44	3.56	25.48	11.07
	45-49	2.15	32.58	15.18
	50-54	2.41	28.86	13.46
	55-59	1.32	21.04	9.05
	60-64	1.77	15.72	7.48
	65-69	2.34	21.66	8.47
	70-74	2.01	22.77	7.89
	75-79	1.21	12.46	6.51
	80+	1.10	12.80	4.31
F		10.94	69.36	30.99
M		8.87	100.32	40.38
F	0-4	0.98	11.98	5.26
F	5-9	1.41	12.14	4.63
F	10-14	2.54	20.55	8.02
F	15-19	6.90	33.46	12.18
F	20-24	2.73	26.53	10.67
F	25-29	3.41	39.68	13.75
F	30-34	2.24	21.68	11.68
F	35-39	1.19	16.05	7.04
F	40-44	1.33	14.43	5.66
F	45-49	1.49	16.06	10.35
F	50-54	1.64	18.51	9.00
F	55-59	1.47	14.90	6.96
F	60-64	1.20	8.56	4.13
F	65-69	1.36	11.81	5.46
F	70-74	1.09	12.36	4.79
F	75-79	1.06	10.13	5.18
F	80+	1.03	10.34	3.86

Table B11 (cont): Sampling errors for pedestrian trips by gender and age group

Gender	Age group	95% confidence intervals		
		million hours	million road crossings	million trips
M	0-4	2.03	18.11	5.86
M	5-9	1.49	13.55	8.00
M	10-14	2.07	27.72	8.72
M	15-19	2.70	29.98	12.31
M	20-24	2.74	36.52	13.18
M	25-29	2.66	30.67	11.99
M	30-34	2.94	41.72	8.98
M	35-39	1.95	27.14	12.38
M	40-44	3.05	15.30	7.14
M	45-49	1.53	24.77	8.26
M	50-54	1.49	17.67	6.98
M	55-59	0.95	15.55	5.30
M	60-64	1.16	12.46	5.47
M	65-69	1.27	19.05	5.01
M	70-74	1.24	11.17	4.19
M	75-79	0.64	7.28	2.52
M	80+	0.67	8.15	3.02

Table B12: Sampling errors for cyclists by gender and age

Mode	Age group	95% confidence intervals	
		million km	million trips
	5-9	6.13	4.88
	10-14	15.05	6.22
	15-19	16.30	7.58
	20-24	26.45	11.65
	25-29	15.06	2.60
	30-34	15.09	1.95
	35-39	5.74	2.05
	40+	15.36	4.95
F		13.80	5.19
M		38.95	18.00
F	5-9	2.87	2.39
F	10-14	8.48	3.54
F	15-19	5.83	2.27
F	20-24	6.90	1.35
F	25-29		
F	30-34	1.81	0.79
F	35-39	2.66	0.41
F	40+	5.46	1.28
M	5-9	5.55	3.44
M	10-14	12.85	6.00
M	15-19	16.14	6.77
M	20-24	23.14	10.71
M	25-29	16.42	2.49
M	30-34	14.16	1.42
M	35-39	4.86	1.89
M	40+	13.07	4.55

Appendix C: Data classification

C.1: Alcohol consumption

Respondents were asked to indicate the number and type of drinks consumed in each session, using the photographic show cards in Appendix G. Total alcohol consumption was calculated using the volume and alcohol content information shown in Table C1 below. Where a range of alcohol content was possible within a beverage type (eg the alcohol content of beer ranges from 3.5% to 5%), a typical average value was assumed.

Table C1: Data used in calculating alcohol consumption

Beverage type	Photo label (on show card)	Description	Volume (litres)	% alcohol	Alcohol content (g)
Beer/ lager on tap	A	200 ml glass	0.200	4.0	8.00
	B	Half pint	0.300	4.0	12.00
	C	Half pint	0.300	4.0	12.00
	D	Handle	0.500	4.0	20.00
	E	Jug	1.000	4.0	40.00
Beer/ lager in cans or bottles	F	Can	0.330	4.5	14.85
	G	Stubby	0.375	4.5	16.88
	H	Bottle	0.750	4.5	33.75
Beer: home brew	I	Glass	0.300	6.0	18.00
	J	Bottle	0.750	6.0	45.00
Low alcohol beer (above 1.17% alcohol)	K	200ml glass	0.200	2.5	5.00
	L	300ml glass	0.300	2.5	7.50
	M	Can	0.330	2.5	8.25
	N	Stubby	0.375	2.5	9.38
Low alcohol beer (1.17% alcohol or less)	O	200ml glass	0.200	1.0	2.00
	P	300ml glass	0.300	1.0	3.00
	Q	Can	0.330	1.0	3.30
Cider	R	Half pint	0.300	6.0	18.00
	S	Handle	0.500	6.0	30.00
	T	Stubby	0.375	6.0	22.50
Alcoholic soda	U	Bottle	0.375	7.0	26.25
Spirits	V	Double	0.050	40.0	20.00
	W	375 ml bottle	0.375	40.0	150.00
	X	750ml bottle	0.750	40.0	300.00
Cocktails	Y	Clear	4*nip		40.00
	Z	Creamy	2*nip		20.00
Wine	1	Glass	0.100	12.0	12.00
	2	Bottle	0.750	12.0	90.00
Sherry/ port/ vermouth	3	Bottle	0.750	20.0	150.00
	4	Glass sherry	0.060	20.0	12.00
	5	Glass port	0.060	20.0	12.00
Liqueurs	6	Glass	0.030	40.0	12.00

These figures were used in estimating total alcohol consumption. Drivers were considered to be likely to be alcohol impaired if they had consumed more than the maximum number of standard drinks compatible with an average person staying under the legal blood alcohol limit, between the beginning of their drinking session and the beginning of their driving trip. The calculations allowed for an a rate of absorption and elimination from the bloodstream of one standard drink per hour. (One standard drink contains 10g of alcohol). This number of standard drinks is as follows:
Males: 5 in first hour, and one per hour thereafter
Females: 3.5 in the first hour, and one per hour thereafter.

Information about the way in which alcohol consumption was spread over the drinking session was not available, so a constant drinking rate was assumed. This may underestimate the number of people who were unfit to drive (eg where someone consumed most of his/ her drinks in the last hour of a drinking session).

C2: Ethnicity

Respondents aged 15 and over were asked to indicate which of several ethnic groups best described them. Respondents who indicated that their preferred group was not on the list (NZ Maori, NZ European or Pakeha, Other European, Samoan, Tongan) were asked to specify their preferred group. These were manually coded into the additional categories Cook Island Maori, Niuean, Other Pacific, East & South East Asia, India/ NZ Indian/ Pakistan, Other. Individuals who specified more than one ethnicity were allocated to single categories according to the following Statistics NZ priority order[7]:

> If **NZ Maori** is one of the groups reported, then assign to NZ Maori;
> Otherwise, if **any Pacific Island group** is one of the groups reported, then assign to Pacific Island;
> Otherwise, if **any Asian** group is one of the groups reported, then assign to Asian;
> Otherwise, if **any group other than a European group** is one of the groups reported, then assign to Other Ethnic Groups;
> Otherwise, assign to European.

> Asian is ranked after NZ Maori and Pacific Island groups, but before European groups because priority is given to non-European groups, but special priority is given to NZ Maori and Pacific Island groups.

23 people refused to state their ethnic origin, and a further 201 people stated 'New Zealander', 'Kiwi' or 'NZ citizen' only. These made up 2.1% of the sample.

Due to an error in questionnaire design, children under 15 were not asked their ethnic origin. However, the dataset contains information on family relationships. Where possible, the ethnicity of children was imputed from that of their parent(s), using the hierarchy above. The child was assigned the ethnicity of the parent whose ethnicity was highest on the list above. That is to say, if either parent was Maori, the child's ethnicity was recorded as Maori; otherwise, if either parent was of Pacific Island origin, the child's ethnicity was recorded as the appropriate Pacific category, and so on.

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[7] The Interim Standard for Ethnicity 1996.1, Statistics NZ

Appendix D: Travel Survey Datasets

Approximately 14,000 people were interviewed from 7,000 randomly sampled households over the period of a year between June 1997 and July 1998, and during April and May 1999 (some Auckland households only).

This produced a number of inter-related files. They are :

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

The inter-relationships are :

```
                        HOUSEHOLD
                            |
            ┌───────────────┴───────────────┐
         PERSONS                          VEHICLES
            |                        ┌────────┴────────┐
     ┌──────┴──────┐              TRIPS           ACCIDENTS
  ALCOHOL       TRIPS                                 |
              ┌───┴───┐                           ACCIDENT
           ADDRESS                                LOCATION
  Trip geocoding    Address geocoding
```
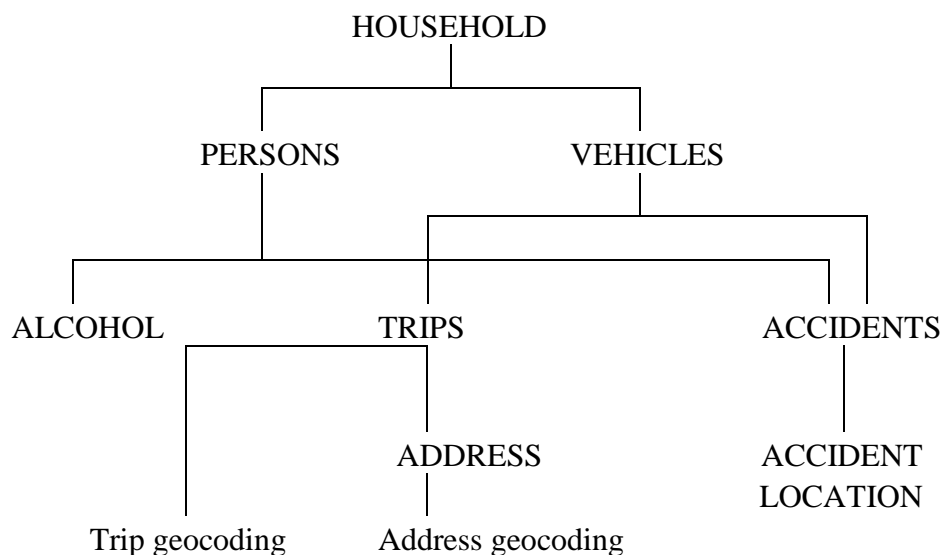
The information in the Address and Trips files was used to calculate digitised trip distances for driver, passenger, cycle, bus and taxi trips. These distances have been added to each trip record.

The Address and Accident Locations files are not available outside the LTSA.

Filenames and linking variables[8]

Household	HH	SAMNO				
Person	PE	SAMNO	PERSON	PEWADDN	PESADDN	
Vehicle	VE	SAMNO	VEHICLE			
Trip	TR	SAMNO	PERSON	TRIPDAY	TRIPNO	VEHICLE
ADDNO						
Alcohol	AL	SAMNO	PERSON	ALDAYNM		
Accident	AC	SAMNO	PERSON	ADDNO		
Address	AA	SAMNO	ADDNO			
Accident location	AXADDR	SAMNO	ADDNO			
Trip geocoding	GTRIPS	SAMNO	PERSON	TRIPDAY	TRIPNO	
Address)	GADDR	SAMNO	ADDNO			
geocoding)						

Trip linking

Consider a commuter travelling from Johnsonville to Wellington. They walk to the station, travel on the train to Wellington, walk to the bus terminal, catch a bus to Willis St then walk to their office building. This would be in the trip files as five separate legs, the first four having a trip purpose of "change mode". When you are dealing with any of the first four legs you do not know what the overall trip purpose is.

To overcome this the trip legs are LINKED. Each trip leg gains information on the overall purpose of the trip, the trip number within the travel day, the number of legs in the trip, and the leg number within the trip.

Data file descriptions

The following tables name and describe the variables in the data files. The 'Data type' column indicates whether a variable is numeric (N), a character variable (A4 indicates a character variable of length 4) or SAS date format (sasdate).

Household data (HH)

Variable name	Data type	Description	
SAMNO	N	Household number	
		The first three (or four) digits are an Ampt Applied Research code for the meshblock used. The last three digits refer to the dwelling within the meshblock.	
REGION	A8	Local Government Region	
TLA	N	Territorial Local Authority	
AREA	N	Area type	
		Main Urban Area	MUA
		Secondary Urban Area	SUA
		Rural area	rural
BATCH	A4	Indicates main 97/98 survey(Main) or Auckland rerun (Auck)	
CITY	A8	City name	
RESPSTAT	A2	Response status:	
		Full response	1
		Sample loss	
		All persons in household out of survey	2
		Vacant dwelling	3
		Dwelling under construction	4
		Non-dwelling	5
		Derelict dwelling	6
		Dwelling demolished	7
		Non-response	
		Full non-contact	8
		Part non-contact	9
		Language problems	A
		Death/ illness in household	B
		Full refusal	C
		Partial refusal	D
		Not surveyed	X
		Unreliable data	E
HHDAYN1	N	First travel day number (days since 22 June 1997)	
HHDATE1	Sasdate	First travel date	
HHDAYW1	N	First travel day of week (1=Monday, 7=Sunday)	
HHDAYN2	N	Second travel day number (days since 22 June 1997)	
HHDATE2	Sasdate	Second travel date	
HHDAYW2	N	Second travel day of week (1=Monday, 7=Sunday)	
HHINTVR	N	Interviewer number (as scheduled)	
ACTINTVR	N	Actual interviewer (where checked)	

Variable name	Data type	Description	
HHWLOAD	N	Workload number	
HHBEFOR	N	Number of calls to household before travel date	
HHAFTER	N	Number of calls to household after travel date	
HHSTRUC	N	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 business or shop	4
		Beach, crib or hut (not a work camp)	5
		Caravan, cabin or tent	6
		Non-private dwelling	7
HHTYPE	N	Household type (inferred by interviewer)	
		Person living alone	1
		Married/ de facto couple	2
		Other adults only	3
		Family (including extended) with children	4
		Family with adults only	5
		Single adult with other adults only	6
		Single adult living with children	7
		Other	8
HHPHONE	N	Phone connected (1=Yes, 2=No)	
HHSECUR	N	Security in place (1=yes, 2=no)	
HHNUMPE	N	Number of people in Household	
NUMINSUR	N	Number of people eligible for survey (calculated field, people with PEINOUT=1)	
NUMFORMS	N	Number of people with partial or complete details (calculated field, people with PEFORMS=1 or 2)	
NUMTRAV	N	Number of people with valid travel details (calculated field, people with PEFORMS=1)	
HHNUMHV	N	Number of household vehicles	
HHNUMOV	N	Number of other vehicles used	
HHNUMBI	N	Number of bicycles in household	
RG1 to RG10	N	Random group identifiers (10 iterations) used for sampling error calculation	
RGHWGT1 to 10	N	Random group weights used for households	
HHWEIGHT	N	Household weight	

Person data (PE)

Variable name	Data type	Description	
SAMNO	N	Household number	
PERSON	N	Person number	
REGION	A8	Region	
TLA	N	Territorial Local Authority	
AREA	N	Area type	MUA
		Main Urban Area	SUA
		Secondary Urban Area	rural
		Rural area	

Variable name	Data type	Description			
CITY	A8	City name			
HHINTVR	N	Interviewer number (as scheduled)			
RESPSTAT	A2	Response Status (see Household file listing)			
PEFORMS	N	Travel survey interview forms (1=complete, 2=part, 3=none)			
PEINOUT	N	Eligible for survey? (1=in survey, 2=out of survey, 3=not in area)			
PEPROXY	N	Interview completed by proxy due to age, disability etc? (1=In person, 2=By proxy, 3=By telephone)			
SEX	A1	Person's gender (M, F, X=not recorded)			
AGE	N	Age at last birthday (blank if cannot compute)			
AGEGRP	A6	Age in 5 year age groups			
DOB	A6	Date of birth (DDMMYY) -could be 99MMYY or 9999YY			
PERELAT	A3	Relationship to head of household			

		H	Head	GRM	Grandmother
		HUS	Husband	GRL	Girlfriend
		W	Wife	GRS	Grandson
		S	Son	HKP	Housekeeper
		D	Daughter	M	Mother
		A	Aunt	ML	Mother in law
		BDR	Boarder	NCE	Niece
		BRL	Brother in law	NPH	Nephew
		BOY	Boyfriend	PTR	Partner
		BRO	Brother	SA	Step Aunt
		COU	Cousin	SIS	Sister
		DL	Daughter in law	SIL	Sister in law
		F	Father	SM	Stepmother
		FLT	Flatmate	SD	Stepdaughter
		FRND	Friend	SBR	Stepbrother
		FL	Father in law	SS	Stepson
		GNC	Grandniece	SU	Step-Uncle
		GNP	Grandnephew	SL	Son in law
		GRD	Granddaughter	U	Uncle
		GRF	Grandfather	VIS	Visitor

Variable name	Data type	Description	
PERACAT	N	Ethnicity	
		NZ Maori	1
		NZ European or Pakeha	2
		Other European	3
		Samoan	4
		Tongan	5
		Cook Island Maori	7
		Niuean	8
		Other Pacific	9
		East & South East Asia	10
		India/ NZ Indian/ Pakistan	11
		Other	6
ESTRACE	N	Indicator variable; 1 if ethnicity of child imputed from parents	

Variable name	Data type	Description	
PEINCOME	A1	Personal Income Category	
		No income	L
		Under $10,000	M
		$10,001-$15,000	N
		$15,001-$17,500	P
		$17,501-$20,000	Q
		$20,001-$30,000	R
		$30,001-$40,000	S
		$40,001-$50,000	T
		$50,001-$70,000	U
		$70,001-$100,000	W
		$100,000+	X
		Unknown	B

Variable name	Data type	Description	
PEEMP01	N	Not yet at school (1=Yes, 2=No)	
PEEMP02	N	Student full time (1=Yes, 2=No)	
PEEMP03	N	Student part time (1=Yes, 2=No)	
PEEMP04	N	Work full time (1=Yes, 2=No)	
PEEMP05	N	Work part time (1=Yes, 2=No)	
PEEMP06	N	Work casual (1=Yes, 2=No)	
PEEMP07	N	Looking for work (1=Yes, 2=No)	
PEEMP08	N	Keeping house (1=Yes, 2=No)	
PEEMP09	N	Retired/ Aged pensioner (1=Yes, 2=No)	
PEEMP10	N	Other pensioner (1=Yes, 2=No)	
PEEMP11	N	Other (1=Yes, 2=No)	
PEOCCUP	N	NZ Standard classification of occupations 1995	
		Legislators, administrators and managers	1
		Professionals	2
		Technicians and associate professionals	3
		Clerks	4
		Service and sales workers	5
		Agriculture and fishery workers	6
		Trades workers	7
		Plant and machine operators and assemblers	8
		Elementary occupations	9
PEJOBS	N	Do you have more than 1 job? (1=yes, 2=no)	
PEEMPLO	N	Employee Status	
		Working for an employer for wages or salary	1
		In own business with employees	2
		In own business without employees	3
		Without pay in family business	4
		Other	5
PE1MJOG	N	Was a memory jogger used on travel day 1? (1=yes, 2=no)	
PE1ANYW	N	Did respondent go anywhere on travel day1? (1=yes, 2=no)	
PE1STAY	N	If not did he/ she stay in same place all day? (1=yes, 2=no)	

Variable name	Data type	Description	
PE1STRT	N	Location at 4am on day 1	
		Home	1
		Work - main job	2
		Work - other job	3
		Social/ recreational	4
		Hospital/ medical	5
		Other	6
PE1ADDN	N	Start of day address number, travel day 1 (addresses run from 001-999 within each household number)	
NUMTR1	N	Number of trip legs in file, travel day 1 (calculated field)	
PE1ALCO	N	If a vehicle driver during survey, was any alcohol consumed during travel day 1? (1=yes, 2=no)	
PE2MJOG	N	)	
PE2ANYW	N	)	
PE2STAY	N	)	
PE2STRT	N	)As for PE1MJOG, PE1ANYW etc above but for Travel Day 2	
PE2ADDN	N	)	
NUMTR2	N	)	
PE2ALCO	N	)	
PESADDN	N	School Address Nr	
PEWADDN	N	Work Address Nr	
PEACCN1	N	Number of crashes involved in (incl no damage, as driver, passenger, pedestrian etc) in year preceding survey	
PEACCN2	N	Number of crashes in year before that	
PENUMAC	N	Number of crash records in accident file	
PEEXP	N	Driving Experience	
		Never driven	1
		Less than 2,000 km	2
		2,001-20,000 km	3
		20,001-200,000 km	4
		More than 200,000 km	5
		Don't know	6
PEKMCAR	N	Km driven in Car last year	
PEKMMC	N	Km driven on Motor Bike Last Year	
PEKMCYC	N	Km ridden on Bicycle Last Year	
PECLICN	N	Car licence held (1=yes, 2=no)	
PECTYPE	N	Car licence type (1=Full, 2=Restricted, 3=Learner)	
PECYEAR	N	Car licence: number of years held	
PECMONTH	N	Car licence number of months held	
PEBLICN	N	Motorbike licence held (1=yes, 2=no)	
PEBTYPE	N	Motorbike licence type (1=Full, 2=Restricted, 3=Learner)	
PEBYEAR	N	Motorbike licence number of years held	
PEBMONTH	N	Motorbike licence number of months held	
PETLICN	N	Truck licence held (1=yes, 2=no)	
PETTYPE	N	Truck licence type (1=Full, 2=Restricted, 3=Learner)	
PETYEAR	N	Truck licence number of years held	
PETMONTH	N	Truck licence number of months held	

Variable name	Data type	Description
PEWEIGHT	N	Person weight (includes household weight)
PEKMWGT	N	Weight to use for 'driving experience' tables only
RG1 to RG10		Random group identifiers (10 iterations) used for sampling error calculation
RGPWGT1 to 10		Random group weights used for people

Trip data (TR)

Variable name	Data type	Description	
SAMNO	N	Household Number	
PERSON	N	Person Number	
TRIPDAY	N	Travel day no	
TRIPNO	N	Trip Number	
AREA	N	Area type	MUA
		Main Urban Area	SUA
		Secondary Urban Area	rural
		Rural area	
REGION	A8	Region	
CITY	A8	City name	
RESPSTAT	A2	Response Status (See household file listing)	
PEFORMS	N	Travel survey interview forms (1=complete, 2=part, 3=none)	
SEX	A1	Gender (M, F, X=Not recorded)	
AGE	N	Age at last birthday (blank if cannot compute)	
AGEGRP	A6	Age in 5 year age groups	
PERACAT	N	Ethnicity (see person file listing)	
HHDATE1	sasdate	First Travel Day - Date (DDMMYY)	
DAYWK	N	Day of week (1=Mon)	
TRSTADD	A3	Origin Address Number	
TRADDNO	A3	Destination Address Number	
TRLEAVE	A4	Departure Time (HHMM)	
LEAVEHR	N	Departure Time in hours (includes decimal fraction part)	
TRARRIV	A4	Arrival Time (HHMM)	
ARRIVHR	N	Arrival Time in hours (includes decimal fraction part)	
DURATION	N	Duration in hours	
TRACTIV	A1	Destination/ purpose of trip leg	
		Home	1
		Work - main job	2
		- other job	3
		- employers business	4
		Education	5
		Shopping	6
		Social welfare	7
		Personal business / services	8
		Medical / dental	9
		Social / recreation	A
		Accompanying someone else	C
		Change mode	B
		Left country	D

Variable name	Data type	Description	
SRVPASS	N	Purpose of trip leg was to accompany someone else (1=Y, 2=N)	
TRMODE	N	Travel Mode	
		Walk	0
		Vehicle driver	1
		Vehicle passenger	2
		Cycle	3
		Train	4
		Bus	5
		Ferry	6
		Plane	7
		Taxi	8
		Other	9
TRPEOPL	N	Number of People in Vehicle	
TRWPARK	N	Where Parked (1-7)	
BESTDIST	N	Digitised distance if available and credible; else reported dist	
CALCDIST	N	Digitised distance	
TRDISTN	N	Reported distance in km	
TRPEDES	N	Nr of Pedestrian Crossings Used	
TRROADS	N	Number of Roads Crossed	
JOURNEY	N	Journey number (Journey = series of trips whose purpose is change mode)	
LEGNO	N	Leg within journey	
NUMLEGS	N	Total number of legs in this journey	
PURPOSE	A1	Overall journey purpose (same codes as TRACTIV)	
JSTADDNO	A3	Journey origin address number	
JADDNO	A3	Journey destination address number	
JLEAVE	A4	Journey departure time (HHMM)	
JLEAVEHR	N	Journey departure time in hours (includes decimal fraction part)	
JARRIV	A4	Journey arrival time (HHMM)	
JARRIVHR	N	Journey arrival time in hours (includes decimal fraction part)	
JSTART	A1	Destination/ purpose of previous journey	
JDESTN	A1	Destination/ purpose of current journey	
VEHICLE	A1	Vehicle Number (1-6 are vehicles owned by household, A-F are other vehicles used by household members)	
TRWEIGHT	N	Trip weight (for 2 days travel)	
ANNWGT1	N	Weight for annual trip estimates (Trweight * 365/2)	
ANNWGT2	N	Annwgt1/ 1000000 (gives million trips per year)	
RGAN1W1 to 10	N	Random group weights used for trips per year	
RGAN2W1 to 10	N	Random group weights used for million trips per year	
RG1 to RG10	N	Random group identifiers (10 iterations) used for sampling error calculation	
RGTWGT1 to 10	N	Random group weights used for trips	

Vehicle data (VE)

Variable name	Data type	Description	
SAMNO	N	Household Number	
VEHICLE	A1	Vehicle Number (1-6 are vehicles owned by household, A-F are other vehicles used by household members)	
VOWNER	N	Vehicle Owner	
		Owned by household member	1
		Company owned or leased	2
		Other	3
		Rented	4
VTYPE	N	Body Type	
		Car/ station wagon	1
		Panel van/ Van/ Ute/ 4 wheel drive	2
		Truck	3
		Taxi	4
		Motorbike	5
		Other	6
VMAKE	A15	Vehicle manufacturer	
VMODEL	A20	Vehicle Model	
VYEAR	N	Year of Manufacture (YY)	
VCC2	N	Engine Capacity (CCs)	

Alcohol data (AL)

Variable name	Data type	Description	
SAMNO	N	Household number	
PERSON	N	Person number	
ALDAYNM	N	Travel day number (1-2)	
ALSESSN	N	Drinking session number	
ALSTART	A4	Time started (HHMM)	
ALFINSH	A4	Time finished (HHMM)	
ALTYPE1	A1	Type of drinks (first type in this session)	
ALNUMB1	N	Number of drinks of type 1	
ALTYPE2	A1	Type of drinks (second type in this session)	
ALNUMB2	N	Number of drinks of type 2	
ALVENUE	N	Drinking venue	
		Own home	1
		Someone else's home	2
		Hotel, bar or tavern	3
		Sports club	4
		Nightclub	5
		Another type of club	6
		Restaurant, café or coffee shop	7
		Work or a workplace	8
		Sports event or outdoors like a beach or park	9
		Other	0

Accident data (AC)

Variable name	Data type	Description	
SAMNO	N	Household number	
PERSON	N	Person number	
AXNO	N	Accident number	
AXDATE	A6	Date of Accident (DDMMYY - could be 99MMYY, 9999YY)	
AXDAYWK	A1	Day of Week (1=Monday)	
AXTIME	A4	Time of Day of Accident (HHMM)	
ADDNO	N	Accident Address Number	
AXFAT	N	Were there any fatalities (1=yes, 2=no)	
AXHOSP	N	Was anyone hospitalised (1=yes, 2=no)	
RESPHOSP	N	Was respondent hospitalised (1=yes, 2=no)	
AXINJ	N	Was anyone injured (1=yes, 2=no)	
RESPINJ	N	Was respondent injured (1=Yes, 2=No)	
AXHOWIN	N	How was respondent involved	
		Driver of a motor vehicle	1
		Driver of a motorbike	2
		Passenger in a motor vehicle	3
		Passenger on a motorbike	4
		On a bicycle	5
		Walking	6
		Not there at the time	7
AXHHVEH	N	Was a household vehicle involved (1=yes, 2=no)	
VEHICLE	A1	Household vehicle number	
NOCARS	N	Number of Cars involved	
NOVANS	N	Number of Vans involved	
NOTRUCKS	N	Number of Trucks involved	
NOMC	N	Number of Motorbikes involved	
NOCYC	N	Number of Bicycles involved	
NOPED	N	Number of Pedestrians involved	
NOOTHER	N	Number of Other Objects involved	
AXPLATE	A2	First 2 characters of vehicle number plate	
AXTYPE	N	Accident Type:	
		One vehicle hitting parked vehicle only	1
		One vehicle hitting the back of another (not parked)	2
		Head on collision	3
		Vehicles hitting each other at an angle	4
		Hitting an object	5
		Driver lost control	6
		Other	7
AXSPEED	N	Speed limit zone where crash occured	
		70 km/h or less	1
		Greater than 70 km/h	2
		Car park, not relevant	3
AXREPOR	N	Was accident reported to Police (1=yes, 2=no, 3=DK)	

Variable name	Data type	Description	
AXCOST	N	Damage Cost	
		Nothing at all	1
		Less than $1,000	2
		$1,001-$5,000	3
		$5,001-$10,000	4
		More than $10,000	5

Address data (AA)

Variable name	Data type	Description
SAMNO	N	Household number
ADDNO	N	Address number
AXADDRS	A77	'Identification' for address (delim '^')
(		
	(	Street Number (delim '^')
	(	Street Name (delim '^')
	(	1 = Street Name validated vs RoadNames file (*)
	(	RoadNames file used refers to Household/Sample
	(	'Home' location/meshblock
	(	Intersecting Street Name (delim '^')
	(	1 = Intersecting Street Name validated vs RoadNames file (*)
	(	RoadNames file used refers to Household/Sample
	(	'Home' location/meshblock
	(	Suburb Name (delim '^')
	(	1 = Suburb validated vs PlaceNames file
	(	'Name' for address / company / school (delim '^')

Accident locations (AXADDR)

Variable name	Data type	Description
SAMNO	N	Household number
ADDNO	N	Accident address number
AXADDR	A110	Address (lines separated by ^)

Geocoded trip data (GTRIPS)

Variable name	Data type	Description
SAMNO	N	Household number
PERSON	N	Person number
TRIPDAY	N	Travel day no
TRIPNO	N	Trip Number
UNIQUEMA	N	Map Identifier
FROM_ADD	N	Origin address number
TO_ADDRE	N	Destination address number
HOW_GOT_	N	Trip mode
ROUTE_TA	A200	Route taken (Q=quickest route)
DEPART_T	N	Departure time (HHMM)
ARRIVAL_	N	Arrival time (HHMM)
USER_SUP	N	Distance estimated by respondent
USERDIST	A200	Unit used for respondent-estimated distance
GDIST	N	Digitised distance (km)
TIME	N	Calculated duration of trip (minutes)
TRIP_COM	A200	Comments

Geocoded address data (GADDR)

Variable name	Data type	Description
SAMNO	N	Household number
ADDNO	N	Address number
MAPID	N	Map ID
MAP_NAME	A50	Map name
MESHBLK	A20	Meshblock number (prefixed by "MB ")
IDENTIFI	A75	Identification of address (eg Home, Middlemore hospital, etc)
NAME	A50	Name of building
STREET	A50	Street name
STRT_VAL	N	Street name validated? (1=yes)
SUBURB	A50	Suburb name
SUBRBVAL	N	Suburb name validated (1=yes)
INTST	A50	Name of intersecting street
INTSTVAL	N	Intersecting street name validated (1=yes)
CAL_MAPN	A50	Critchlow Associates map reference
ROADLENG	N	Road length
GEO_X	N	Geocoded grid reference
GEO_Y	N	Geocoded grid reference
GEO_ACCU	A50	Comment

Appendix E: Description of 1989/90 NZ Household Travel Survey[9]

Response rates

Response (1989/90)	1989/90 Travel Survey		
	Addresses in sample	% of all addresses	% of eligible households
Full response	3102	70.0%	75.2%
Partial response (see Note)	310	7.0%	7.5%
Non-response	711	16.0%	17.2%
Total eligible households	4123	93.0%	100.0%
Sample loss (eg non-dwelling, dwelling under construction, demolished, derelict or vacant)	311	7.0%	
Total households in survey	4434	100.0%	

Note: 'Partial response' refers to households in which some post-travel interviews were completed but in which one or more members refused or was unable to participate.

Method

The previous travel survey was carried out over a full year from July 1989 to June 1990. An initial letter, which described the aims and content of the survey, was sent to the selected households. Next an interviewer called at the address to gather household information, explain the purpose of the survey and leave a memory jogger for each participant to record travel details over the two consecutive travel days selected for that household. Finally, as soon as possible after the travel days, the interviewer returned to conduct the survey. All travel for household occupants aged 5 years or over was recorded. The trip data were recorded in enough detail to allow the trip distances to be measured by tracing out the trip route on a map overlaying a digitising board.

Sample design

The sample was constructed to fulfil initial estimation requirements of the survey. These were:
- (i) Travel estimation for NZ as a whole
- (ii) Travel estimation for large cities individually
- (iii) Travel estimation for sub-periods of the year of 3 months or more for NZ as a whole.

The other main consideration was the minimisation of survey costs, achieved by constructing a survey so that interviewers did not need to travel long distances between households.

All the Major Urban Areas (MUAs: population greater than 45,000 as at the 1986 census) were surveyed throughout the year. So estimates can be made of annual travel for individual cities. The rest of NZ was surveyed in chunks called Territorial Local Authorities (TLAs). The TLAs are smaller population centres, and were sampled with probabilities proportional to their sizes. So a town of 10,000 had twice the chance of selection of a town of 5,000. A couple of TLAs were large enough to be surveyed throughout the year; the remainder were surveyed over a period of weeks or months, depending on their sizes.

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[9] A more detailed description can be found in Ministry of Transport (1992).

To minimise travelling for the interviewers, meshblocks (groups of households in the the same neighbourhood) were selected within the MUAs and sampled TLAs by simple random sampling. Every fifth (or in some cases tenth) household was surveyed within the selected meshblocks. All people in these households aged 5 years or older were asked to provide travel data for the 2 designated days.

A more detailed description of the sample design is included in Ministry of Transport (1992).

Weights

Since the sample was not a simple random sample of the population, an arithmetic average of sample observations was not appropriate for estimating the population mean. Weighted averages were used. The inverse of the probability of selection of a sample unit, whether a household or a person, was used as the weight for the sample unit.

Sampling errors

The random group method of variance estimation was used for estimating the confidence intervals. In this method the sample is divided into a number of random groups. Weights are estimated separately for each random grouping. The spread in the estimates obtained from the separate groups was used to provide an estimate of the variance of the estimate obtained from the overall sample.

Appendix F: References

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Appendix G: Questionnaire, show cards and letter to respondents