

## Purpose

The New Zealand Travel Survey provides data to assist in the development of policy and evaluation of programmes relating to transport 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 travel over time, comparable survey methods were used to the previous national travel surveys of 1989/90 and 1997/98.

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 is sent from the Ministry of Transport to the households selected for interview. Included with this is a [pamphlet about the survey \(PDF, v7.0, 1,903kb\)](#) briefly describing the aims and content of the survey.

During the week prior to the survey days, the interviewer calls 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 \(PDF, v7.0, 143kb\)](#) for each respondent to use for recording travel. From 2008, people who drove for a job (eg bus, truck or taxi driven) were provided with a separate [professional driver memory jogger \(PDF, v7.0, 148kb\)](#) in which they recorded their personal travel (including travel to and from work) only.

Finally, as soon as possible after the travel days, the interviewer returns to conduct a personal interview with each member of the household.

## Questionnaire

To enable comparison with the results of the earlier travel surveys, the household and personal questionnaires used are essentially the same as in the 1997/ 98 and 1989/90 surveys. There is the further advantage of using a survey instrument that has performed well in the field previously. Minor changes were made to update wording and response categories.

Laptop computers are used by interviewers to improve data quality and reduce the time required for the interviews.

## Data gathered

Two questionnaires are used: one to gather information about the household ([Household questionnaire \(PDF v7.0, 44Kb\)](#)) and a [Personal interview questionnaire \(PDF v7.0, 168 kb\)](#) to record individual travel, demographics, and alcohol usage .

In addition, the interviewers have [Show cards \(PDF, v7.0, 64kb\)](#) for coding occupation, driving experience, ethnicity, income, drinking venue and types and quantities of alcohol consumed.

The following data are gathered (or are 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 - gender, age, employment, income, driving experience, number of road crashes, number of trips, ethnicity, marital status, 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, age and gender of people in the vehicle, and which household vehicle was used (linked to information on vehicle make and model, vehicle age, engine capacity, ownership).

**Alcohol drinking sessions:** For each person - times, locations and types and amounts of alcohol consumed.

**Traffic crashes (2003-2008 only):** For each person - crash involvement over the last two years, location of crashes, and type of crash. The accident module in the questionnaire was discontinued from 1 July 2008.

### **Interviewers' training and supervision**

All interviewers undergo a two-day training session and their work is closely supervised and audited.

## **Sample design**

### **Stratification**

The sample strata and substrata are geographically based using Statistics NZ definitions for the 2001 Census of Population and Dwellings: 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 are proportional to 2001 Census populations except for the following:

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

### **Sample frame and sampling method**

Survey costs are 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) are used as the first stage sampling units and are sampled independently within the strata.

The sampling frame for meshblocks consisted of the 1996 Census list of meshblocks. The meshblocks were sampled with probability proportional to size without replacement where size was defined as 1996 Census population.

To compile an up-to-date sampling frame of households within the sampled meshblocks, the selected meshblocks are visited and all dwellings are listed together with street addresses.

Meshblocks are surveyed in random order within Regions. One in seven households from sampled meshblocks are sampled. A systematic sample of households is taken by randomising a list of all households within sampled meshblocks and sampling every seventh household from this list. Introductory letters are sent to households prior to the interviews of household members. Sampled households and household members from whom responses could not be obtained are not replaced by other respondents, but are imputed for using data obtained from other similar respondents (see below).

#### **Allocation of travel days**

The households selected according to the sampling scheme are each allocated two consecutive travel days (i.e. days about which the household members should report their travel). The travel days are allocated to the sample of households in a fashion that maintains a wide geographical spread (of areas being surveyed) at any given time of the year. An even spread by day-of-week is maintained by systematic allocation of travel days.

#### **Coverage**

The sampling frame consists of all New Zealand households, excluding some sparsely populated remote areas in Westland, East Coast of the North Island, Southland and Northland.

Guests at hotels and motels are not surveyed as it is assumed that this group of people have a chance of being sampled at their home residence. There are also likely to be difficulties in gaining access to these people for interviews, particularly as the survey method requires 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.

Bias due to non-response is 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 under-representation of people who travel a lot as they are not at home when surveyed.

## **Estimation of distance**

For all their recorded trips, respondents are 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 Limited\(external link\)](#) are 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.

Approximations are used in cases when a street number was not valid (the closest valid address is used). Where a route is used that deviates from the shortest route (e.g. a scenic drive), the interviewer records an intermediate address along the route taken to show that a longer route was taken.

A number of addresses that cannot be automatically digitised (i.e. encoded as map co-ordinates) were digitised manually by referring to street maps. In a small number of cases where there is insufficient detail in the recording of the address, the respondent's own estimate of the trip distance (which is recorded for all non-pedestrian trips) is used as the best distance measure.

For pedestrians, time spent walking and number of roads crossed are recorded. Currently it is not possible to use the same algorithm as for driving or cycling to calculate distance walked. A project is under way to develop an accurate pedestrian network.

## **Estimation of means and totals**

Since the sample is not a simple random sample of the population, a simple mean or total of the sample observations is not appropriate for estimating population means and totals.

Weighted means and totals are used, where the weights are approximately equal to the reciprocals of the probability of selection of the respondents. Weights are also used to reduce the inevitable bias due to non-response.

## **Estimation of sampling errors**

Sampling errors are calculated using SAS, accounting for two-stage stratified sampling.

## **Crash and injury data**

Information about motor vehicle crashes is extracted from the Ministry of Transport'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 NZ Transport Agency. 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 vehicle crashes in New Zealand*.

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.

1. 2001 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.
2. The probability proportional to size sampling method used, due to Sunter (1977), is described in Sarndal et al (1992: p94).

[<< Return to Travel Survey page](#)