

**Methodology Report
for the 2008 New Zealand
Tobacco Use Survey**

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1 Introduction

The New Zealand Tobacco Use Survey (NZTUS) is part of the New Zealand Health Monitor (Ministry of Health 2005), an integrated programme of household surveys and cohort studies managed by the Health and Disability Intelligence unit (HDI) of the Ministry of Health.

The NZTUS measures self-reported smoking behaviours, including consumption, addiction, quitting, second-hand smoke exposure, and knowledge and attitudes among the usually resident New Zealand population living in permanent private dwellings. The NZTUS 2008 was the second comprehensive national tobacco use survey to be conducted in New Zealand. The first NZTUS was carried out in 2006, with smoking prevalence for 2007 measured using the 2006/07 New Zealand Health Survey (here referred to as the NZ Health Survey). The third NZTUS was repeated in early 2009¹.

The 2008 survey involved face-to-face interviews with 5132 adults (aged 15 to 64 years); the 2006 survey involved face-to-face interviews with 5703 adults. All New Zealanders aged 15 to 64 years who were usually resident in permanent, private dwellings at the time of the survey were eligible for selection in this survey.

This methodology report details the procedures and protocols followed to ensure the NZTUS produces the high-quality and robust data expected of official statistics. Publication of descriptive analyses in *Tobacco Trends 2008* (Ministry of Health 2009) and in online data tables, as well as further information and documentation, can be accessed at <http://www.moh.govt.nz/moh.nsf/indexmh/tobacco-trends-2008>.

1.1 Background

HDI developed the objectives and content of the NZTUS in consultation with stakeholders and an Independent Monitoring Group. The fielding of the three surveys in 2006, 2008 and 2009 was contracted to a specialist survey provider, National Research Bureau Ltd (NRB), which undertook the interviewing and cleaned the data. HDI has led the analysis and dissemination of the data.

The NZTUS is a key component of the New Zealand Health Monitor, an integrated programme of household surveys and cohort studies managed by HDI, which aims to monitor the health of the New Zealand population (Ministry of Health 2005). It is also an important element in the cross-sector Programme of Official Social Statistics managed by Statistics New Zealand.

As a signatory to the Protocols of Official Statistics (Statistics New Zealand 2007), the Ministry of Health has employed best-practice survey techniques to produce high-quality data through the NZTUS.

¹ Results from the NZTUS 2009 will be available in 2010.

1.1 Objectives of the NZTUS

The objectives of the NZTUS are to:

- provide a measure of the prevalence of smoking annually
- collect valid and reliable measures of tobacco use, including consumption, initiation, addiction, quitting, relapse and exposure to second-hand smoke
- collect comprehensive measures of knowledge, attitudes and beliefs about tobacco smoking and control
- provide reliable measures for populations of interest: New Zealand Māori, Pacific and Asian peoples, and 15- to 19-year-olds
- monitor changes in tobacco use, quitting behaviour and attitudes and beliefs about tobacco over time.

1.2 Ethical approval

The New Zealand Health and Disability Multi-Region Ethics Committee granted approval for the NZTUS (MEC/05/09/107), confirming that the study met the following ethical principles:

- validity of research
- minimisation of harm
- privacy and confidentiality
- informed consent
- cultural and social responsibility.

The Ethics Committee approved the wording of all public materials from the survey.

The 2006 and 2008 questionnaires are available online from:

<http://www.moh.govt.nz/moh.nsf/indexmh/tobacco-trends-2008>.

2 Population and Frame

This section discusses the target population, the survey population and the sample frame. The *target population* is the population the survey aims to represent. All statistics for the survey refer to the target population. The *survey population* is the population that had a probability of being selected to participate in the survey. For various reasons (discussed below), there was a small proportion of people who did not have a chance of being selected to participate in the survey. As a result, the survey population is slightly smaller than the target population. The sample *weights* are designed to reflect the target population, so that the weighted statistics produced from the NZTUS can be taken to be representative of this population.

The *sample frame* is the list of areas, and the lists of dwellings and people within these areas, that was used to select the NZTUS sample from the survey population.

2.1 Target population

The target population was the usually resident civilian population of all ages living in permanent private dwellings in New Zealand. The target population was approximately 2.7 million adults (aged 15 to 64 years).

For reasons of practicality and cost-effectiveness, the target population is defined to include only permanent private dwellings, so temporary private dwellings are excluded, including caravans, cabins and tents in a motor camp, and boats. The target population also excludes non-private dwellings (institutions). Examples of this type of dwelling are: hotels, motels, guest houses, boarding houses, homes for the elderly, hostels, motor camps, hospitals, barracks and prisons.

People were eligible to be interviewed at their usual residence only. If they were temporarily visiting a household that was selected into the NZTUS, they were not eligible to be selected as part of that household. This process ensured that no-one had a double chance of being selected in the survey.

People who were usually resident in a private dwelling in New Zealand, but who were temporarily overseas for some of the survey period, were in the scope of the survey. In the great majority of cases these individuals had a chance of being selected in the survey, as the survey provider made eight repeated call-backs to non-contacted households in the sample over the survey period. The benchmarks used in weighting the survey also included usual residents temporarily overseas.

People aged 15 to 64 years were in the target population for the survey.

2.2 Survey population

For practical reasons a small number of households (1.1%) that were part of the defined target population were excluded from the survey population, but these have been accounted for in the final estimates via the survey weights. Households not included were those in meshblocks with fewer than nine occupied dwellings (according to the 2006 New Zealand Census of Population and Dwellings), and those located off the main

islands of New Zealand (North, South and Waiheke), such as those on other sparsely inhabited off-shore islands, on-shore islands, waterways and inlets. Due to the small number of households omitted, any possible bias is likely to be extremely small.

2.3 Sample frame

An area-based frame of Statistics New Zealand's meshblocks was used, based on New Zealand 2006 Census meshblocks, containing 34,728 meshblocks. A sample of 500 meshblocks was selected from this frame. Interviewers listed all the addresses in each of these areas. These lists of dwellings were then used as a frame from which a sample of dwellings was selected from each meshblock. One eligible adult (if any) was then selected from each selected dwelling.

3 Sample Design

The survey was designed to be able to produce nationally representative estimates of tobacco smoking. NZTUS 2008 adopted a multi-stage, stratified, probability-proportional-to-size (PPS) sampling design. There were two changes in the sample design from NZTUS 2006 to NZTUS 2008:

- inclusion of District Health Board (DHB) areas as strata, to ensure the sample reflected the different areas around New Zealand
- not boosting the sample for Asian people, as it was found that Asian people were already well represented without having to include a booster sample for them.

3.1 Sample selection

A four-step selection process was used to achieve the sample.

Step 1: Put all meshblocks into strata

In five of the larger DHBs (Auckland, Counties Manukau, Waitemata, Hutt and Capital & Coast), meshblocks with an adult population of whom at least 20% identified with a Pacific ethnicity were put into a Pacific stratum. Meshblocks in each of the six smallest DHBs (Lakes, Tairāwhiti, Whanganui, Wairarapa, West Coast and South Canterbury) were placed in six separate strata. The remaining meshblocks not in the smaller DHBs nor the Pacific stratum were placed in the final eighth stratum.

Step 2: Select meshblocks within strata

Meshblocks vary considerably in size and were therefore selected by PPS design within each stratum. The size measure was the number of occupied dwellings in the meshblock according to the 2006 Census. This means that larger meshblocks had an increased chance of selection in the design. In summary:

- 100 meshblocks were selected from within the Pacific stratum
- 10 meshblocks were sampled from each of the six small DHB areas (Lakes, Tairāwhiti, Whanganui, Wairarapa, West Coast and South Canterbury)
- 340 meshblocks were selected from the remaining stratum.

Thus a total of 500 meshblocks were selected.

Step 3: Select households within meshblocks

Within each meshblock some households were selected to form the core sample, and some households were selected to form the screened or booster sample. Households in the core sample were selected by a systematic procedure of beginning at a random point pre-allocated in the meshblock and knocking on the door of every k th house.

Households in the screened sample were selected by knocking on every j th house, excluding the core households in the same meshblock².

Within the Pacific stratum a core sample of 16 dwellings was systematically chosen from a random starting point. Within the other strata a core sample of 16 dwellings was first systematically chosen, then from the remaining dwellings a screened sample of 14 dwellings was systematically chosen.

In total 12,816 households were approached to be included in the sample.

Step 4: Select respondents within households

The procedure for selecting respondents in the 'core' and 'screened' households was essentially the same. Within each household all eligible adults (those aged 15–64 years who usually resided at that dwelling) were identified. The names of all eligible respondents were then listed in descending order of age on a sampling Kish grid (Kish 1949), and the ethnicities (obtained by proxy from the person who answered the door using the Statistics New Zealand question that has been used in the 2001 and 2006 Census) of all household members were recorded. One adult was selected based on whose names fell alongside predetermined indicators on the sampling Kish grid. No interview was conducted in households in the first 10 dwellings in the screen sample if there were no household members who identified as Māori or Pacific, or aged 15–24 years. No interview was conducted in households in the last four dwellings in the screen sample if there were no household members who identified as being of a Pacific ethnicity.

Overall, 5132 adults aged 15–64 years participated in NZTUS 2008. There was no substitution of households or respondents if the selected household or respondent was not contactable or was unavailable.

3.2 Rationale for the sample design

This sample design was selected from multiple options as the best possible way to meet the objectives of NZTUS 2008 while producing limited variation in the weights and the lowest possible design effects. The simplest possible sample design would be a random sample of all people in New Zealand, so that everyone has an equal and independent chance of being selected in the sample. However, a design of this type would not be feasible because:

- there is not a sufficiently accurate list of all addresses in New Zealand to use as a sampling frame
- the sample would be geographically very dispersed, requiring interviewers to travel great distances between interviews.

Also, a simple random sample would not result in large enough numbers of Māori, or Pacific people, or young people aged 15–24 years in the sample to enable adequate

² For example, every k^{th} house might be every 16th house in the meshblock, while every j^{th} house might be every 12th house.

statistics for these groups. Because of this, NZTUS 2008, like most household surveys, uses a complex sample design.

Complex designs have two main features that affect the precision of statistics coming from the survey.

1. *Different people have a different chance of selection.* This is captured in the 'weight', which is the number of people that each survey respondent represents in the target population. In NZTUS 2008, Māori and Pacific people and those aged 15–24 have lower weights than other people to reflect the fact that these groups had an increased chance of selection in the sample relative to simple random sampling. Sampling of one adult per household also leads to different weights, because adults in larger households receive a larger weight.
2. *The sample is 'clustered'.* In NZTUS 2008 a sample of meshblocks was selected, and then a sample of households was selected from each meshblock. If the households in the sample were shown on a map of New Zealand they would appear clumped. Clustering makes the survey more affordable, in that interviewers do not have to travel between as many areas as they would if simple random sampling were used.

The net effect of a complex design can be measured by the 'design effect' (or DEFF). The DEFF is the ratio of the variance (a measure of precision) of an estimate achieved by a complex design relative to the variance of the same estimate that would be achieved by a simple random sample of the same size. The closer the DEFF is to 1, the closer the design is to simple random sampling. Design effects of between 2 and 4 are typical in population health studies, which means the variance is larger than would have been obtained using a simple random sample. A complex design like that used in NZTUS 2008 is less precise than a simple random sample with the same sample size, but is much more precise than could be achieved by a simple random sample with the same budget.

Nevertheless, DEFFs should not be too large. On the one hand, it is appropriate for weights to vary across the sample, otherwise it would not be possible for Māori and Pacific people, and those aged 15–24 years, to have an increased chance of selection in the sample. On the other hand, if the variation in weights is too extreme, the DEFF will be very large, and this would be counter-productive for all statistics, even for Māori and other sub-population groups. The best statistical methods available for sampling sub-populations were used to ensure the design was appropriate for achieving adequate precision for national and sub-population estimates within the survey budget.

Note that the design effects are different for each statistic. The design effect for current smoker for the national estimate was 1.45, it was 1.55 for Māori and 1.32 for Pacific peoples.

4 Data Collection Instruments

The content of NZTUS 2008 was the same as that for NZTUS 2006, where possible, to allow for comparisons between the two surveys.

4.1 Consultation on content

A review of NZTUS 2006 was carried out with an advisory review panel in October 2007. This informed the content of NZTUS 2008.

4.2 Outline of key changes to NZTUS 2008

General changes

- Adult and youth components were combined, with some specific questions for youth interspersed within the appropriate sections
- Categorical-response questions have been changed to discrete-response questions, where appropriate, enabling, for example, the calculation of the average number of cigarettes smoked per day.

Section-specific changes

- *Prevalence and smoking history* – this is largely unchanged and remains the key section for determining smoking status and the relevant questions the respondent is then asked through the questionnaire.
- *Consumption* – this section has been condensed to specifically look at differences between tailor-made cigarettes and roll-your-own use.
- *Addiction and dependence* – the Hooked on Nicotine Checklist questions are now being used on adults as well as youth (Wellman et al 2006).
- *Cessation* – this section has been split into two: quitting behaviour, and cessation programmes and services. The questions on quitting focus more on ‘last 12 months’.
- *Second-hand smoke exposure* – these questions have been refined, and the settings of interest have been refined to house and vehicle.
- *Knowledge and attitudes* – these questions reflect the current demand for information about use and knowledge of nicotine in cigarettes and nicotine replacement therapies.
- *Socio-demographic* – this section is exactly the same as in NZTUS 2006.
- The sections on *smoking intensity* and *pregnancy* have been removed because they were not useful and were not analysed from NZTUS 2006.
- Two new sections have been added to the survey: one on *health services and health professionals* and one on the *impact of pictorial warnings* and media campaign awareness.

4.3 Questionnaire content

The NZTUS 2008 adult questionnaire is available from <http://www.moh.govt.nz/moh.nsf/indexmh/tobacco-trends-2008>. Table 1 outlines the topic areas in the questionnaire.

Table 1: Summarised content of the NZTUS 2008 questionnaire

Module	Information domains	Output details
Prevalence and smoking history	Prevalence, frequency and initiation	<ul style="list-style-type: none"> • Prevalence of smoking status and frequency, age of initiation and age of cessation
Consumption	Individual consumption, product details and source	<ul style="list-style-type: none"> • Product type • Reasons for smoking roll-your-own cigarettes • Product details: brand, brand type, brand variant and source of purchase • Daily cigarette consumption
Addiction and dependence	Addiction and dependence	<ul style="list-style-type: none"> • Self-reported dependence • Smoking patterns
Quitting behaviour	Quitting attempts, success	<ul style="list-style-type: none"> • Stage of change • History of quit attempts • Success of quit attempts
Cessation programmes and services	Quitting programmes, services and products	<ul style="list-style-type: none"> • Reasons for quitting • Products, services, advice used • Reduction in cigarette consumption • Regret
Exposure to second-hand smoke	Second-hand smoke exposure	<ul style="list-style-type: none"> • Exposure in the home, in the car and elsewhere • Attitudes to second-hand smoke exposure
Health services and health professionals	Assessment of ABC approach to cessation	<ul style="list-style-type: none"> • Health professionals seen • Asked about smoking, given brief advice, offered cessation service or treatment
Pictorial warning and awareness of media campaigns	Cigarette and tobacco counter displays and anti-smoking advertisements	<ul style="list-style-type: none"> • Attitudes and awareness of tobacco control campaigns

Module	Information domains	Output details
Knowledge and attitudes	Knowledge and attitudes	<ul style="list-style-type: none"> • Knowledge of health effects of tobacco and nicotine
Socio-demographics	Gender, age, ethnicity, language, country of birth, education, income, occupation	<ul style="list-style-type: none"> • Standard questions and classifications

Note: ABC refers to health service providers asking about smoking status, giving brief advice, and offering cessation service or treatment

5 Data Collection and Quality Control

5.1 Collection mode

Interviews were conducted in respondents' homes, with the interviewer typing responses directly into a laptop computer using Blaise Computer Assisted Personal Interview (CAPI) software. Show cards with predetermined response categories were used to assist respondents, where appropriate.

5.2 Interviewer training

Interviewers received a two-day training course on how to conduct the NZTUS 2008 interviews. NRB field supervisors and research staff assigned to the NZTUS conducted the training, which included all aspects of interviewer conduct, procedures and interviewing methods.

5.3 Enumeration

Before selecting households to participate in NZTUS 2008, interviewers re-enumerated the dwellings in their area (meshblock) to take account of the number of new dwellings built and the number of buildings demolished since the last pre-census enumeration.

5.4 Call pattern

The call pattern used in NZTUS 2008 was an important part of achieving a high response rate.

Number of calls

The 'call' refers to one visit on one day during a particular time band (eg, 5 to 8 pm). NRB conducted a total of up to eight calls at each sampled dwelling, at different times of the day and on different days of the week, before accepting that dwelling as a non-contact.

Invigilation

Invigilation refers to the field supervisor in each area phoning back the household to confirm that the interview was done and to check that the respondent is the one stated. It is rare for interviewers who are properly trained and field-supported to falsify interviews, but nevertheless NRB perform a 20% field check on each interviewer as a precautionary measure.

5.5 Informed consent

NZTUS 2008 was voluntary, relying on the goodwill of participants, and consent was obtained without coercion or inducement.

Participants selected for the survey were given an invitation letter from the Ministry of Health and an information brochure (available in six languages). If they agreed to take

part, they were asked to sign a consent form. The consent form included a request for an interpreter if required (in multiple languages). It was also possible to match respondents and interviewers by language, ethnicity and gender when requested. (See Appendix 1 for examples of the information provided to the participants.)

5.6 Language assistance

Professional language interpreters assisted with fewer than 0.1% of interviews. A further 1.6% (81) of interviews had language assistance provided by a friend or family member of the respondent, while 1.5% (77) of interviews were conducted with language assistance from the interviewer.

5.7 Pilot

A pilot survey of 107 respondents was run in December 2007. A pilot was done because a number of changes had been made from the NZTUS 2006 survey, and it was important to test the functioning of the CAPI instrument and that the survey questions were all working as expected.

The pilot sample was not random and was not included in the main NZTUS sample. A mix of ethnic groups, age groups and geographic locations were included in the pilot sample. As a result of the pilot survey, a few changes were made to the questionnaire; the planned survey processes and CAPI instrument were otherwise shown to work well.

5.8 Field dates

Interviews were conducted from February to June 2008.

5.9 Respondent burden

The response rate (74%) and the high proportion of respondents happy to be re-contacted to answer further questions of interest to the Ministry of Health (80%) indicate that the survey was well received by the public.

The median time taken to complete an interview was 21 minutes, and the mean time taken to complete an interview was 23.9 minutes. These times are the CAPI times and include all question modules. They do not include the time spent in a household before or after the interview was conducted.

6 Final Response Rates

The main measure used to assess the overall quality of a survey is the final response rate. The response rate is a measure of how many people who were selected to take part in the survey actually participated. A high response rate means the survey results are more representative of the target population.

6.1 Adult response rate

The final response rate for adults in NZTUS 2008 was 74%. The response rate reflects the proportion of people interviewed from those who were selected into the sample, and describes the success of the study in terms of achieving co-operation from the population being measured.

There are four components to the response rate calculation:

- ineligibles (eg, vacant sections, vacant dwellings and non-residential dwellings)
- eligible responding (interview conducted, respondent confirmed to be eligible for the survey)
- eligible non-responding (interview not conducted, but enough information collected to indicate that the household did contain an eligible adult – almost all refusals were in this category)
- unknown eligibility (eg, non-contacts and refusals who provided insufficient information to determine eligibility).

The response rate was calculated as follows:

$$\text{Response rate} = \frac{\text{number of eligible responding}}{\left[\begin{array}{c} \text{number of eligible} \\ \text{responding} \end{array} \right] + \left[\begin{array}{c} \text{number of eligible} \\ \text{non-responding} \end{array} \right] + \left[\begin{array}{c} \text{estimated number of eligibles} \\ \text{from the unknowns} \end{array} \right]} \times 100$$

The justification for this response rate was that a proportion of the unknowns were likely to be eligible if contact could have been made. As contact could not be made with the estimated number who would be eligible, they were classified as non-respondents.

The estimated number of unknown eligibles was calculated as follows:

$$\left[\begin{array}{c} \text{Estimated number} \\ \text{of eligibles from the} \\ \text{unknowns} \end{array} \right] = \left[\begin{array}{c} \text{number} \\ \text{of} \\ \text{unknowns} \end{array} \right] \times \frac{\left[\begin{array}{c} \text{number of eligible} \\ \text{responding} \end{array} \right] + \left[\begin{array}{c} \text{number of eligible} \\ \text{non-responding} \end{array} \right]}{\left[\begin{array}{c} \text{number of eligible} \\ \text{responding} \end{array} \right] + \left[\begin{array}{c} \text{number of eligible} \\ \text{non-responding} \end{array} \right] + \left[\begin{array}{c} \text{number of} \\ \text{ineligibles} \end{array} \right]}$$

7 Data Processing

This section outlines the processes used to collect, check and output the data for NZTUS 2008.

7.1 Capture

Questionnaire responses were entered directly on interviewers' laptops using Blaise CAPI software.

7.2 Coding

Most of the questions used single-response options. However, there were some exceptions. A number of questions required discrete numerical responses, such as age at the time of a specific event, or the number of visits to a specific medical professional.

A number of questions in the questionnaire offered an 'other' category, where respondents could specify non-standard responses. Each 'other' category response was recorded (in free text) in the Blaise computer software. Each response was then re-categorised to an existing code, coded to a newly set-up 'standard' code, or coded as 'other' by NRB coders. This coding was checked by both NRB and HDI.

A number of questions allowed for multiple responses. For these questions all responses were retained, with each response shown as a separate variable on the data file.

7.3 Security of information

Any information collected in the survey that could be used to identify individuals has been treated as strictly confidential. Data were transferred from interviewers' laptops to head office at NRB by a secure internet upload facility. Data were transported to HDI at the Ministry of Health on CD-Rom by signed courier.

Names and addresses of people and households who participated in the survey have not been stored with response data. Unit record data were stored in a secure area and were only accessible on a restricted ('need to know') basis.

7.4 Checking and editing

NRB undertook routine checking and editing of the data throughout the field period of NZTUS 2008. In addition, the final unit record data sets provided to HDI have been edited for range and logic.

7.5 Imputation

Household and personal income questions, as well as date-of-birth questions, had high levels of refused or 'don't know' responses. The knowledge and attitudes questions also had a high level of 'don't know' responses. Most other questions had less than 1% missing data due to 'don't know' responses and refusals.

Where Q55 and Q56 were skipped (relating to the nicotine medication subsidy card), but the information could be taken from the free text response for Q54a (where did you get your nicotine medication from), responses to these questions were imputed.

7.6 Creation of derived variables

A number of derived variables have been created for the NZTUS 2008 data set. Where possible, standard definitions have been used and all derivations were thoroughly checked.

- *Current smoker* was defined as someone who had smoked more than 100 cigarettes in their lifetime and at the time of the survey smoked at least once a month.
- *Ex-smoker* was defined as someone who had smoked more than 100 cigarettes in their lifetime and at the time of the survey had stopped smoking more than one month ago.
- *Non-smoker* included those who responded 'no' or 'don't know' or refused to answer whether they had smoked more than 100 cigarettes in their lifetime. Ex-smokers and those who had never smoked cigarettes or tobacco at all at the time of the survey were also included as non-smokers.
- For the purpose of ethnic group analyses, non-response was included as European/Other, as was 'New Zealander'.

For more information on the derived variables in NZTUS 2008, refer to the confidentialised unit record file (CURF) documentation, which will become available in late 2009.

8 Weighting

To ensure that no group is under- or over-represented in estimates from the survey, 'weights' are calculated for every survey participant. The weight can be thought of as the number of people in the population represented by a given survey participant.

8.1 Overview of weighting process

Most national surveys have complex sample designs, where different groups have different chances of being selected in the survey. These complex designs are used for a variety of purposes, including:

- reducing interviewer travel costs by ensuring the sample is geographically clustered, or 'clumped'
- ensuring all regions of interest, including small regions, have a sufficient sample to enable adequate estimates
- ensuring all sub-populations (in the NZTUS, especially the Māori and Pacific populations) have a sufficient sample to enable adequate estimates.

To ensure no group is under- or over-represented in estimates from a survey, a method of calculating estimates that reflects the sample design must be used. Estimation weights are used to achieve this aim. A weight is calculated for every respondent, and these weights are used to calculate estimates of population totals (counts), averages and proportions. Typically, members of groups who have a lower chance of selection are assigned a higher weight, so that these groups are not under-represented in estimates. Conversely, groups with a higher chance of selection (eg, Māori and Pacific populations who are included in the booster samples) receive lower weights. Also, groups that have a lower response rate (eg, older men) are usually assigned a higher weight so that these groups are correctly represented in all estimates from the survey.

Weights are designed to:

- a) reflect the probabilities of selection of each respondent
- b) make use of external population benchmarks (typically obtained from a population census) to correct for any discrepancies between the sample and the population benchmarks – this improves the precision of estimates and reduces bias due to non-response.

The first aim, (a), can be achieved by setting weights equal to 1 divided by the probability of selection for the respondent. This method is called inverse probability weighting. However, a better method is calibrated weighting, which can achieve both (a) and (b). This is the method used for NZTUS 2008, and is discussed below.

Once weights have been calculated for all respondents, estimates of means, totals, counts and proportions can be calculated as follows.

Proportions

The proportion of the population who belong to a particular group (eg, the proportion of the population who smoke daily) is estimated by calculating the sum of the weights for the respondents in the group, divided by the sum of the weights of all respondents.

Proportions within population groups

The proportion of people in a population group who belong to a subgroup (eg, the proportion of Māori who smoke daily) is estimated by calculating the sum of the weights for the respondents in the subgroup (Māori who smoke daily), divided by the sum of the weights for the respondents in the population group (Māori).

Totals (counts)

Estimates of totals are given by the sum of the respondents of the weight multiplied by the variable of interest. For example, the estimate of the total number of people who smoke daily in the whole population would be given by the sum, over all respondents, of the number of respondents who smoke daily multiplied by the weight.

Averages (means)

The population averages (eg, the average age of daily smoking initiation) are estimated by calculating the sum, over all respondents, of the weight multiplied by the variable of interest divided by the sum of the weights.

Averages within population groups

Sometimes the average within a group is of interest (eg, the average age of daily smoking initiation among males). The estimate is given by calculating the sum, over respondents, in the group of the weight multiplied by the variable of interest, divided by the sum of the weights of respondents in the group.

8.2 Calibrated weights

The most commonly used methodology for survey weighting is calibrated weighting, and this is what was used for NZTUS 2008. Calibrated weights are calculated using population benchmark information obtained externally from the survey. In the case of NZTUS 2008, this benchmark information consists of population counts from the 2006 Census, broken down by age, sex and ethnic group and adjusted to 2008 population estimates. The idea is to incorporate this external information about the population into the weights.

Calibrated weighting means that if the sample differs from the population according to any of the benchmarking categories, then the estimation weights will correct for the discrepancy. For example, if young men are under-represented in the sample relative to the census counts (as is often the case due to non-response), the weights for young male respondents would be increased so that this group is correctly represented in estimates.

Calibrated weights are calculated to achieve two requirements.

- a) The weights should be close to the inverse of the probability of selection of each respondent.
- b) The weights are calibrated to the known population counts for a range of sub-populations (eg, age-by-sex categories). This means that the sum of the weights for respondents in the sub-population must exactly equal the known benchmark for the sub-population size.

To be more mathematically precise, the weights are chosen to minimise a measure of the distance between the weights and the inverse selection probabilities, subject to (b) being satisfied. Requirement (a) ensures that estimates have low bias, while requirement (b) improves the precision of estimates and achieves consistency between the survey estimates and external benchmark information.

A number of distance measures are in common use. A chi-square distance function (case 1 in Deville and Särndal 1992: 378) was used for the weighting of NZTUS 2008, which corresponds to generalised regression estimation (also known as GREG).

The inverse selection probability is sometimes called the initial weight. The final calibrated weights are sometimes expressed as:

$$\text{final weight} = \text{initial weight} \times \text{g-weight.}$$

The g-weight indicates the factor by which calibration has changed the initial weight.

8.3 Benchmark populations used for NZTUS 2008

The benchmarks used in the NZTUS 2008 weighting were population counts by:

- age in years (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64)

by

- sex (male, female)

by

- total ethnic group (Statistics New Zealand Level 1 classification) (Māori, Pacific, Other).

Age, sex and ethnicity were included because these variables are related to smoking behaviour and to non-response, and were a key output classification for the survey.

The most recent New Zealand Census was conducted in March 2006, whereas the NZTUS was conducted from February to June 2008. Population benchmarks for weighting the NZTUS were compiled as follows.

- a) Statistics New Zealand provided 2006 Census counts for usual residents in private dwellings by age, sex, ethnicity and DHB, adjusted for undercount.

- b) The Census was conducted in mid-2006, whereas the NZTUS was conducted from February to June 2008. The Statistics New Zealand-estimated resident population series was therefore used to estimate population growth between mid-2006 and mid-2008. Growth factors were calculated by taking the ratios of the 2008 estimated resident population to the 2006 estimated resident population, by sex and age.
- c) The growth factors from (b) were applied to the undercount-adjusted census counts for (a). This gave estimates of the usually resident population in private dwellings in March 2008.

Note: The population growth was calculated at the age-by-sex level, but applied to age-by-sex-by-ethnicity. In reality, population growth over 2006 to 2008 would vary by ethnicity. This would have only a minor effect on estimated counts from NZTUS 2008, however, and an even smaller effect on prevalence estimates.

8.4 Replicate weights

Standard errors are a measure of the precision of an estimate, and replicate weights are a method for obtaining standard errors for any weighted estimate. In NZTUS 2008 100 replicate weights were produced for every respondent in the sample. For any weighted estimator, 100 'replicate estimators' can be calculated using these replicate weights. The standard error of the population estimate is based on the variation of the replicate estimates. This process can be done automatically in a number of statistical packages, including SUDAAN, STATA and R. The SAS programmes developed for analyses incorporate these replicate weights.

The replicate weights were produced using the GREGWT package, which was provided by the Australian Bureau of Statistics. Each of the 100 replicate estimators corresponds to removing a group of meshblocks, reweighting the remaining sample, and applying an appropriate scaling factor. This is called a grouped jack-knife method. For technical information on replicate variance estimation in surveys, see Rao and Wu (1988) and Shao and Tu (1995).

9 Technical Notes for Analysis

The descriptive NZTUS 2008 analyses presented in *Tobacco Trends 2008* (Ministry of Health 2009) used a number of specific techniques, which are discussed below.

9.1 Suppression due to small numbers

Small sample numbers can affect both the reliability and the confidentiality of results. Problems with reliability occur when the sample becomes too small to adequately represent the population from which it has been drawn. Problems with confidentiality can occur when it becomes possible to identify an individual, usually someone in a subgroup of the population within a small geographical area.

In order to ensure the survey data presented are reliable and that the confidentiality of the participants is protected, data have only been presented when there are at least 30 people in the denominator (the population group being analysed). Care has been taken to ensure that no participant can be identified in the results.

9.2 Age standardisation

Unadjusted rates have been presented in this report for estimates of the prevalence in the total population and by age group. However, age is an important determinant of health, so populations with different age structures (such as men and women, due to women having a longer life expectancy) will have different rates due to these age differences. Age standardisation takes into account the effect age may have on prevalence estimates, allowing comparisons between different populations.

For this report, age standardisation was performed by the direct method using the World Health Organization (WHO) world population age distribution (Ahmad et al 2000). This statistical method of standardising for age has been used in analyses by gender, ethnic group and neighbourhood deprivation (NZDep2006), and for comparisons between the different NZTUS and NZ Health surveys.

9.3 Confidence intervals

Ninety-five percent confidence intervals have been used to represent the sample error for estimates. A 95% confidence interval means there is a 95% chance the true value of the estimate (if we were to survey the whole population) lies between the lower and upper confidence interval values.

Differences between estimates are said to be statistically significant when the confidence intervals for each rate do not overlap. Sometimes, however, even when there are overlapping confidence intervals the difference between the groups can be statistically significant. In *Tobacco Trends 2008* (Ministry of Health 2009), any differences between two variables where the confidence intervals overlapped were tested using a t-test. The significance of a t-test is represented by the p-value. If a p-value is below 0.05, then we are 95% confident the difference between the two estimates is statistically significant. Unless otherwise stated, all differences noted in the text in *Tobacco Trends 2008* are statistically significant.

Small numbers

When calculating confidence intervals for percentages, if:

- the numerator (number of respondents with the variable of interest) was less than 30, or
- the lower confidence interval resulted in a value less than 0,
- or
- the upper confidence interval resulted in a value greater than 100

the Korn and Graubard (1998) method was used to calculate the confidence interval. If any of the above criteria are satisfied or if a confidence interval spreads outside the range of a percentage, the confidence interval may be asymmetrical.

Percentiles

To calculate variances (and hence confidence intervals) using replicate weights for percentiles (including medians), the Woodruff method was used (Woodruff 1952).

9.4 Adjusting population totals for item non-response

To account for item non-response in population total estimates, a factor was calculated using the sum of the weighted denominator and the weighted number of item non-respondents divided by the weighted denominator. The factor was applied to both the weighted numerator and the weighted denominator.

9.5 Data set extension for total response ethnicity

Total response ethnic groups were used and standardised rate ratios and median differences presented to compare each ethnic group to the total New Zealand population. A table of the number of respondents with single and multiple ethnic groups is presented in Appendix 3.

Specific methods were used for rate ratios and their 95% confidence intervals to account for having ethnic groups that were not mutually exclusive. When calculating the confidence intervals for these, the co-variance between the two groups needs to be taken into account. The delete-a-group jack-knife method was used to do this, because this technique gives a good approximation of the variance between groups by summing up all the differences between two groups within a replicate sample. This process is straightforward when considering rates; for mean and median differences it is more complex, but it can be done using a method outlined by Kish (1965).

Age-standardised weights for each ethnic group were calculated separately to account for people with multiple ethnicities. There were 100 standardised replicate weights for each total response ethnic group the data were analysed by.

A data set was created in which every respondent was represented at least twice: once as part of the total New Zealand population and once for each of the ethnic groups they identified with. Each respondent then had different standardised replicate weights for

each of their ethnic groups and for the total New Zealand population. This resulted in a data set that had more records than the number of respondents.

Table 2 presents an example of a data set created using this method. In this example, respondent A (who identified with two ethnic groups) has three records in the data set: one for the total New Zealand population (Total NZ), one for Māori and one for Asian. Standardised weights and replicate weights would be created for each of these records, and this data set then used for all analyses.

Table 2: Example of template for a standardised total response ethnic group data set

Respondent	Total response ethnicity	Final standardised weight	Standardised replicate weight 1	Standardised replicate weight 2	Standardised replicate weight ... G
A	Total NZ				
A	Māori				
A	Asian				
B	Total NZ				
B	Pacific				

For more information on the use of total response ethnic groups for New Zealand Health Monitor surveys, see Ministry of Health 2008d.

10 Comparability of NZTUS 2008 Data with Other Survey Data

In order to determine any changes in the prevalence of indicators over time, some analyses were carried out comparing current 2008 prevalence estimates with earlier prevalence estimates. Where possible in the descriptive outputs, data from NZTUS 2008 was compared with data from NZTUS 2006 and the 2006/07 NZ Health Survey. This section gives a brief description of the surveys used in the time trend analyses and provides information on the comparability of the surveys.

Caution is recommended when comparing results between surveys, because there are differences in sample sizes, response rates, questions and methodology. We advise that these aspects be taken into account before making comparisons between results from different surveys.

10.1 NZTUS 2006

The target population for NZTUS 2006 was the usually resident New Zealand adult population, aged 15–64 years, living in permanent private dwellings. An area-based frame using meshblocks as primary sampling units was used as the sample frame. A booster sample was taken of Māori, Pacific peoples and Asian people, as well as 15- to 24-year-olds.

Data were collected from January to March 2006 using face-to-face CAPI interviewing. The total response rate for the survey was 75.4%. A total of 5703 people responded to the survey, including 1071 Māori, 615 Pacific people and 710 Asian people. Full details on the methodology of NZTUS 2006 can be found in *New Zealand Tobacco Use Survey 2006* (Ministry of Health 2007).

10.2 2006/07 NZ Health Survey

The target population for the adult component of the 2006/07 NZ Health Survey was the usually resident New Zealand adult population, 15 years and over, living in permanent private dwellings. An area-based frame using meshblocks as primary sampling units was used as the sample frame. A booster sample was taken of Māori, Pacific people and Asian people.

Data were collected from October 2006 to November 2007 using CAPI face-to-face interviewing. The total response rate for the survey was 68%. A total of 12,488 people responded to the survey, including 3160 Māori, 1033 Pacific people and 1513 Asian people.

Smoking-related questions in the 2006/07 NZ Health Survey included prevalence, product type, average consumption per day, stage of change and second-hand smoke exposure. Full details on the methodology of the 2006/07 NZ Health Survey can be

found in the *Methodology Report for the 2006/07 New Zealand Health Survey* (Ministry of Health 2008b).

10.3 Comparability of the surveys

NZTUS 2006 and 2008 had the same target population, included face-to-face interviews and had similar response rates. The time-trend analyses in *Tobacco Trends 2008* were restricted to questions that were comparable between the surveys.

Where time-trend analyses were presented using the 2006/07 NZ Health survey, these were analysed using the 15–64-year-old population from the survey. Although care was taken to ensure that only questions with similar wording were used to assess changes in indicators, caution is required when comparing the results as other factors (such as question order) can influence responses to an unknown extent.

It should be noted that the daily smoking time trend presented in *A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey* were for those aged 15 years and over (Ministry of Health 2008a). Because smoking prevalence is lower among older people, the prevalence rate was lower for those aged 15-plus years than it was for 15- to 64-year-olds.

Annual time-trend comparison of smoking prevalence

In *Tobacco Trends 2008* Figure 1 presents current smoking prevalence for those aged 15-plus years from 1983 to 2008. Rather than adjust the NZTUS 2006 figure to account for those aged 65-plus years, it was decided to use the Census 2006 prevalence figure for the year 2006, because this is for those aged 15 years and over. The 2006/07 NZ Health Survey was used for the 2007 year, because the majority of the interviews completed for this survey were carried out in 2007 (it went into the field in October 2006, and there was no crossover with either the 2006 NZTUS or the 2006 Census).

NZTUS 2008 current smoking prevalence was then adjusted to calculate the prevalence of current smoking for those aged 15-plus years. To do this, the ratios of current smoking among those aged 65-plus divided by 15–64-year-olds by gender and prioritised ethnic group (Māori, Pacific, Other) were calculated from the 2006/07 NZ Health Survey.

Too few (prioritised) Pacific males aged 65-plus were in the sample to calculate the ratio for them, so the ratio for total (prioritised) Pacific peoples was used for Pacific males. These ratios were then multiplied by the current smoker rates for 15- to 64-year-olds calculated from NZTUS 2008 to estimate rates for those aged 65-plus by gender and ethnic group.

These rates were applied to the estimated 2008 population counts of the usually resident New Zealand population living in permanent private dwellings and aged 65-plus, by gender and ethnic group. The resulting counts were then summed and added to the count estimate of 15- to 64-year-old current smokers in 2008. The current smoking prevalence for those aged 15 years and over was then calculated for 2008.

11 Dissemination of Data

There are several ways to access the results and data from NZTUS 2008:

- publications
- online data tables
- confidential unit record files (CURFs).

11.1 Publications

Reports and technical papers about the NZTUS are available on the Ministry of Health website at: <http://www.moh.govt.nz/moh.nsf/indexmh/tobacco-trends-2008>. The first publication on NZTUS 2008 was released in May 2009: *Tobacco Trends 2008* (Ministry of Health 2009). This report provided a brief update of tobacco use in New Zealand, examining current smoking, youth smoking and the consumption and supply of tobacco products. Changes over time in the prevalence of current smoking were also presented. The report presented the key findings of NZTUS 2008 by gender, age group, ethnic group and neighbourhood deprivation. Results were compared with earlier surveys, where possible.

In addition to this methodology report, other technical reports and papers related to the NZTUS have been published:

- Ministry of Health. 2008d. *Presenting Ethnicity: Comparing prioritised and total response ethnicity in descriptive analyses of New Zealand Health Monitor surveys*. Wellington: Ministry of Health
- Ministry of Health. 2008a. *A Portrait of Health: Key results of the 2006/07 New Zealand Health Survey*. Wellington: Ministry of Health
- Ministry of Health. 2008c. *Monitoring Tobacco Use in New Zealand: A technical report on defining smoking status and estimates of smoking prevalence*. Wellington: Ministry of Health
- Ministry of Health. 2007. *New Zealand Tobacco Use Survey 2006*. Wellington: Ministry of Health
- Ministry of Health. 2006. *Tobacco Trends 2006: Monitoring tobacco use in New Zealand*. Wellington: Ministry of Health.

Further publications about the NZTUS are planned and will be available from www.moh.govt.nz/phi/publications.

11.2 Online data tables

To see the data for all key descriptive analyses presented, by gender, ethnic group, age group and NZDep2006, go to <http://www.moh.govt.nz/phi/surveys/tus>, where you can access the data tables online in Excel format in Appendix 1 of *Tobacco Trends 2008*.

11.3 Access to confidential unit record files (CURFs)

The analyses presented in publications are only a small proportion of those that could be undertaken. HDI encourages researchers to use NZTUS data sets to explore topics of interest. The NZTUS 2008 CURF, with accompanying documentation and user guides, will be available in late 2009. The NZTUS 2006 CURF is available now.

CURFs have had all identifying information about individuals removed and have been modified to protect individual information. Approval is subject to certain criteria, terms and conditions and the researcher's organisation must sign a microdata access agreement with HDI. Refer to HDI's Microdata Data Access Protocol online for more information and to download the application form (www.moh.govt.nz/phi/dataaccess).

11.4 Contacting HDI

Health and Disability Intelligence
Health and Disability Systems Strategy Directorate
Ministry of Health
PO Box 5013
Wellington
New Zealand

Tel: +64 (4) 816 2000

Fax: +64 (4) 816 2340

Email: hdi@moh.govt.nz.

Or, to contact staff directly, email: firstname_lastname@moh.govt.nz.

References

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Appendix 1: Information provided to participants

Invitation letter



133 Molesworth St
P.O. Box 5013
Wellington
New Zealand
Phone (04) 496 2000
Fax (04) 496 2340

January 2008

Dear Householder

Re: Notice of the 2008 New Zealand Tobacco Use Survey

Your household has been selected by chance to participate in the 2008 New Zealand Tobacco Use Survey. The NZ Tobacco Use Survey collects information about tobacco use (past and present), exposure to second-hand smoke and attitudes surrounding smoking. About 5,500 households have been asked to participate. The information will be used by the Ministry of Health to monitor the use of tobacco in the New Zealand population and develop health policy and programmes to better meet the needs of New Zealanders.

One adult (15 years and over) from your household will be invited to take part in this important survey. If you agree to an interview, an interviewer from the National Research Bureau (NRB) will visit your house to speak with you and answer any questions you may have.

The Ministry of Health hopes you will take the time to participate in the 2008 New Zealand Tobacco Use Survey.

Yours sincerely,

Stephen McKernan
Director General of Health



MANATU HAUORA

2008 New Zealand Tobacco Use Survey

A survey of smokers and non-smokers

The Ministry of Health invites you to take part in the 2008 New Zealand Tobacco Use Survey. Please take the time to read this carefully, your participation is important!

What is the NZ Tobacco Use Survey?

He aha tēnei kaupapa te Tirohanga Whānui ki te mahi kaihi-kareti ki Aotearoa?

The New Zealand Tobacco Use Survey collects information about tobacco use, exposure to second-hand smoke, and attitudes surrounding smoking. Around 5,500 households throughout New Zealand have been asked to participate in the 2008 NZTUS. Interviewing takes place from Jan to May 2008.

Who is carrying out the Survey?

Mā wai e kawē tēnei tirohanga whānui?

A company called National Research Bureau (NRB Ltd.), has been contracted by the Ministry of Health to do the interviewing for the NZ Tobacco Use Survey.

Why was I asked to participate?

He aha te take i whakaurua mai ai ahau ki tēnei tirohanga?

Addresses from selected areas of New Zealand were chosen by chance. One person aged 15 years and over from your household will be randomly selected and asked to take part.

What questions will be asked?

He aha ngā pātai?

Some examples of questions in the NZ Tobacco Use Survey are:

- Have you ever-smoked tobacco at all, even just a few puffs? Please include cigars and pipes.
- Which of these products do you smoke?
- Thinking of the car you usually travel in, has anyone, including yourself, smoked in the car?

Each question will have options for you to choose from. The interviewer will be there to guide and answer any questions you may have. The survey will take approximately 20 to 30 minutes to complete. You can tell the interviewer if you don't want to answer a question at any time.

What will the information be used for?

Ka pēhea te whakamahi i ngā putanga kōrero?

The Ministry of Health uses the information collected in the NZ Tobacco Use Survey to:

- Monitor tobacco use in New Zealand, particularly within specific groups in the population
- Monitor the use of cessation services
- Develop health and tobacco policies
- Develop programmes and services to meet the needs of New Zealanders
- Conduct additional research

Health researchers outside the Ministry of Health can apply to use NZ Tobacco Use Survey data. They are given confidential unit records that do not contain any information that could identify you (in accordance with the Health Act 1956, clause 22H).

Where can I find the survey results?

Kei hea te wāhi e kite ai ahau i ngā hua o tēnei tirohanga whānui.

These will be published on the Ministry of Health website in 2009. www.moh.govt.nz/ publications.

A copy of the results can also be requested from the Ministry to be mailed to you free of charge.

Common Questions

I don't smoke, why interview me?

Kāhore ahau e kai hikareti ana. He aha te take ka tau ēnei mahi pātai ki ahau?

The Ministry of Health needs information from people who don't smoke, so that it can be compared with those who do smoke. It is also important to know if non-smokers smoked in the past or not, if members of their household smoke, or if they experience second-hand smoke at work or socially.

Can I choose an interviewer?

E wātea ana ahau ki te kōwhiri i te kaipatapātai?

Yes, you are able to choose an interviewer of the same ethnicity or gender as yourself. Please let the interviewer know, or phone the NRB survey line.

Is it compulsory?

He herenga anō tēnei?

No, it is very helpful if everyone who is chosen takes part. However, it is not compulsory. You need not answer any question that you don't wish to, and you will not be disadvantaged in any way if you don't. We are asking for your goodwill on behalf of our NZ health services.

How is my privacy protected?

Ka pēhea te tiaki i ōku pūnanga?

The information you provide is confidential and protected by the Privacy Act. Your answers will be entered directly into a computer and a code number will be assigned to your responses. Your answers will not be stored with any information that could identify you, e.g. your name or address.

The information you provide will only be used for statistical and research purposes. Your information will be combined with information from other people to prepare summary statistics about groups of different people. No one will be able to know that you participated in this study, or be able to find out what your answers were.

Further Enquiries

For more information on the NZ Tobacco Use Survey, please visit:

www.moh.govt.nz/phi/surveys

If you have any further questions about the NZ Tobacco Use Survey, feel free to contact:

NRB Survey line 0800 672-476

If you have any queries or concerns regarding your rights as a participant in this study, you may wish to contact a Health and Disability Advocate:

Northland to Franklin	0800 555 05
Mid/Lower North Island	0800 423 638
South Island	0800 377 766
Christchurch	03 377 7501

This study has been approved by the Multi-region Ethics Committee. Translations of this pamphlet are available in Maori, Tongan, Samoan, Hindi and Chinese.

Public Health Intelligence

133 Molesworth Street, Thorndon,
Wellington, New Zealand

Tel: +64 (4) 496 2000 Fax: +64 (4) 495 4401

Email: phi@moh.govt.nz Webpage: www.moh.govt.nz/phi

Consent form



NZ TOBACCO USE SURVEY CONSENT FORM

REQUEST FOR INTERPRETER			
English	I wish to have an interpreter	Yes	No
Maori	E hiahia ana ahau ki tetahi kaiwhakamaori/ kaiwhaka pakeha	Ae	Kao
Samoan	Ou te mana'o ia i ai se fa'amatala upu	Ioe	Leai
Tongan	Oku ou fiema'u ha fakatonulea	Io	Ikai
Cook Island	Ka inangaro au i tetahi tangata uri reo	Ae	Kare
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko kupu	E	Nakai
Chinese	我希望有口译员	是	不
Korean	통역사가 필요합니다.	예	아니오

I agree to help the Ministry of Health on the New Zealand Tobacco Use Survey by taking part in the interview.

The survey has been explained to me by the NRB interviewer and I have been given a copy of the brochure to keep.

The National Research Bureau Interviewer has told me that:

- My answers will be used only for statistical research.
- My name is not put in or with the questionnaire.
- Nobody can know or find out what my answers were.
- My answers are protected by the Privacy Act, which means they can only be used for the purposes that have been told to me.
- I understand that the data from this survey will be used by NZ and overseas researchers over many years to analyse trends and to compare between countries.
- Only the survey supervisor may call me to check on the interviewer's work and manner.
- It is my choice to take part. I can stop if I want to. There is no disadvantage to me if I don't take part or stop.
- I have been shown the phone number(s) I can call if I feel upset by the interview.

Signed: _____ Print name: _____

Date ___/___/___ Interviewer's signature: _____ Interview No: _____

WHITE COPY: NRB COPY

BLUE COPY: RESPONDENT'S COPY

Additional contacts

Additional contacts/services:

ASH
PO Box 99 126
Newmarket
Auckland 09 520 4866
ashnz@ash.org.nz
www.ash.org.nz

Asthma & Respiratory Foundation
PO Box 1459
Wellington
04 499 4592
arf@asthmanz.org.nz
www.asthma.org.nz

Cancer Society NZ
PO Box 12 145
Wellington
04 494 7274
www.cancernz.org.nz

Maori Smokefree Coalition
PO Box 12 084
Thorndon
Wellington
04 499 6494
atak@xtra.co.nz

National Heart Foundation
PO Box 17 160
Greenlane
Auckland
09 571 9191
info@nhf.org.nz
www.nhf.org.nz

The Quit Group
PO Box 12 605
Wellington
0800 778 778
04 915 9899
quit@quit.org.nz
www.quit.org.nz

Te Hotu Manawa Maori
PO Box 17 160
Greenlane
Auckland
09 571 9018
info@thmm.co.nz
tehotu@ihug.co.nz
www.tehotumanawa.org.nz

Ministry of Health
PO Box 5013
Wellington
04 496 2000
www.moh.govt.nz

Appendix 2: Sample sizes

Tables A1 to A4 show the NZTUS 2008 sample sizes and the total usually resident population counts by gender, age, ethnicity and NZDep2006 quintile. Please note that due to the complex sample design of the survey, the sample size is not the only determinant of the reliability of the results. The geographic clustering of the sample, the unequal probabilities of selection, and the boosted sampling of Māori and Pacific peoples and 15–24-year-olds in the survey also affect the precision of the estimates.

Table A1: Sample sizes and population counts, by gender, 15–64 years, NZTUS 2008

Gender	Sample size	Population
Men	2280	1,302,500
Women	2852	1,407,500
Total	5132	2,710,100

Note: Population rounded to the nearest hundred

Table A2: Sample sizes and population counts, by ethnic group and gender, 15–64 years, NZTUS 2008

Ethnic group	Gender	Sample size	Population
European/Other	Men	1650	1,009,100
	Women	2020	1,082,500
Māori	Men	388	157,000
	Women	545	183,600
Pacific	Men	231	75,200
	Women	297	83,100
Asian	Men	247	155,600
	Women	309	165,400

Note: Population rounded to the nearest hundred

Table A3: Sample sizes and population counts, by age group and gender, 15–64 years NZTUS 2008

Age group	Gender	Sample size	Population
15–17 years	Men	186	90,900
	Women	160	85,300
18–19 years	Men	113	58,900
	Women	110	60,200
15–19 years	Men	296	149,700
	Women	273	145,500
20–24 years	Men	225	133,200
	Women	285	140,600
25–29 years	Men	187	113,000

	Women	273	134,000
30–39 years	Men	476	272,100
	Women	689	318,300
40–49 years	Men	507	297,700
	Women	566	298,800
50–59 years	Men	390	228,400
	Women	535	274,900
60–64 years	Men	199	95,300
	Women	231	108,400

Note: Population rounded to the nearest hundred

Table A4: Sample sizes and population counts, by NZDep2006 quintile and gender, 15–64 years, NZTUS 2008

NZDep2006 quintile	Gender	Sample size	Population
Quintile 1 (least deprived neighbourhoods)	Men	374	270,100
	Women	464	307,900
Quintile 2	Men	434	275,000
	Women	557	310,900
Quintile 3	Men	410	266,400
	Women	495	257,500
Quintile 4	Men	571	255,400
	Women	472	272,400
Quintile 5 (most deprived neighbourhoods)	Men	590	235,600
	Women	765	258,800

Note: Population rounded to the nearest hundred

Appendix 3: Single and combination ethnic groups

Table A5: Number of adult respondents in NZTUS 2008, by single and combination ethnic groups

Single and combination ethnic groups	Number of respondents	Unweighted percent (%)	Weighted percent (%)
European/Other only	6406	59.21	68.14
Māori only	1016	9.39	6.77
Pacific only	810	7.49	4.32
Asian only	986	9.11	10.39
European/Other and Māori	1071	9.90	7.01
European/Other and Pacific	153	1.41	0.88
European/Other and Asian	93	0.86	1.01
Māori and Pacific	111	1.03	0.46
Pacific and Asian	39	0.36	0.25
Māori and Asian	15	0.14	0.06
European/Other, Māori and Pacific	60	0.55	0.40
European/Other, Māori and Asian	28	0.26	0.19
European/Other, Pacific and Asian	12	0.11	0.04
Māori, Pacific and Asian	4	0.04	0.02
European/Other, Māori, Pacific and Asian	15	0.14	0.05

Notes: The unweighted percentage presents the percentage of survey respondents who were in each ethnic group. The weighted percentage presents the estimated percentage of the total population aged 15–64 years who were in each ethnic group. The weighted percentage column does not sum to 100% exactly due to rounding.

