

2001 Census of Population and Dwellings - 2001 Post-enumeration Survey Results

Introduction

Counting over 3.7 million people throughout New Zealand is a major undertaking. Inevitably, some people will be missed by the census. Many countries conduct surveys to estimate the populations not enumerated by their censuses. The 2001 Post-enumeration Survey (PES) was the second such survey to be undertaken in New Zealand (the first was held after the 1996 Census).

The main objective of the 2001 PES was to gauge the level of coverage (undercount/overcount) in the 2001 Census. The 2001 PES, like the 1996 PES, was a sample survey of individuals in private dwellings. The survey was carried out during 21 March to 3 April 2001, beginning two weeks after the census day (6 March). It comprised about 11,000 dwellings (0.7 percent of total dwellings in New Zealand), and 25,200 individuals participated in the survey.

It is important to note that a post-enumeration survey is one method of examining the quality of census output and processes. As such, the 2001 PES will assist Statistics New Zealand in developing an enumeration strategy for the 2006 Census. A fuller report on other aspects of the quality of the 2001 Census will be produced in due course.

A PES is also necessary so that a reliable population base for deriving post-censal population estimates and projections can be calculated. The population base will be adjusted for both the estimated net undercount and the estimated number of residents temporarily away overseas on census night. Thus a PES is essential for producing population estimates and projections, as well as for calculating demographic, social and health indices that are comparable with similar statistics produced by other developed countries.

This is the first release of results from the 2001 Post-enumeration Survey (PES). A reference report called "[A Report on the 2001 Post-enumeration Survey](#)", carrying details of survey methodology and a more detailed analysis of PES results is available.

Under-enumeration of New Zealanders

Overall, the 2001 Census coverage was high, and this reflects the cooperation and support of the New Zealand public, and the quality work of field staff. The PES showed that about 97.8 percent of New Zealand residents in the country on census night were enumerated in the 2001 Census. This represents a net undercount of 2.2 percent or 85,000 people. This resulted from an estimated undercount of 107,000 people, offset by 22,000 people being counted more than once. In comparison, the 1996 PES showed that about 98.4 percent (revised) of New Zealand residents in the country were enumerated in the 1996 Census.

While the 2001 Census enumerated 3.74 million residents in New Zealand, the PES results suggest that the number of New Zealand residents in New Zealand on census night was closer to 3.82 million. This figure excludes New Zealand residents temporarily away overseas on census night.

Given the small size of the sample, the net undercount figures provided by the 2001 PES are subject to sizeable error margins, called the sample error. Therefore, the undercount estimates need to be interpreted with caution. The overall sample error was 0.3 percent. This suggests that the net undercount lies between 1.9 and 2.5 percent. The corresponding 1996 estimate of net undercount was between 1.4 and 1.8 percent. This was based on a net undercount of 1.6 percent (revised) and a sample error of 0.2 percent.

International comparison

It is inevitable that in an exercise of the scale of the census that some people will be missed. It is an experience shared by many census-taking nations. The New Zealand net undercount rate compares well with other countries. The net undercount for the 1996 Canadian Census was 2.4 percent and for the 1996 Australian Census 1.6 percent.

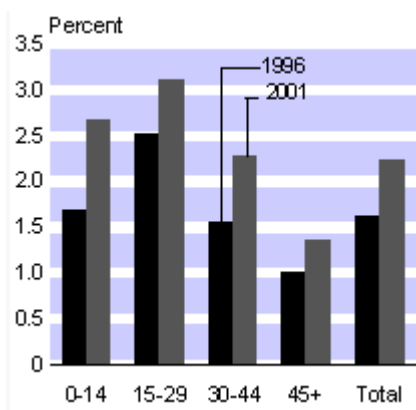
Analysis by sex and age

Below the national level, there were significant variations in net undercount by age, sex, ethnicity and region. Some groups were more completely enumerated than others.

The 2001 PES found that the 2001 Census missed more males than females -- in net terms, about 48,000 males compared with 37,000 females. The net undercount was 2.6 percent for males and 1.9 percent for females. These differentials are broadly consistent with the 1996 PES results, which gave figures of 1.9 percent for males and 1.3 percent for females. The differences are also consistent with overseas studies on census coverage.

An analysis by age shows that young adults (15 to 29 years), who are quite mobile and have a greater risk of being missed in the census, had the highest net undercount of 3.1 percent. Children (0 to 14 years) had an undercount rate of 2.7 percent, just below that for young adults. New Zealanders aged 45 years and over were more fully enumerated. The undercount for this group was 1.4 percent. The same general patterns (albeit at lower levels) in undercount by age were found by the 1996 PES.

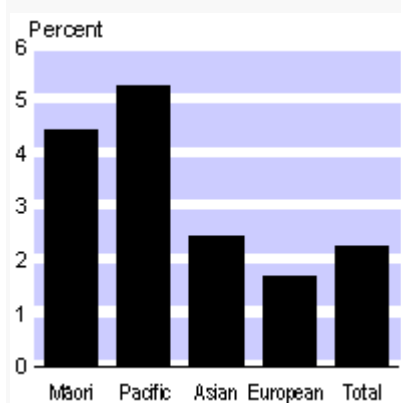
Net undercount by age group 1996 and 2001 Censuses



Ethnic differentials

Ethnic differentials are marked. The net undercount was 5.2 percent for Pacific peoples, 4.4 percent for the Māori population, 2.4 percent for the Asian population, and 1.7 percent for the European population. The sample size was too small to give reliable information on the undercount of other ethnic groups.

Net undercount by ethnicity 2001 Census



Variations by region

Undercount in the 2001 Census differed between regions, as was also observed in the 1996 PES. Undercount was highest in the northern half of the North Island (Northland, Auckland, Waikato and Bay of Plenty Regions) at 2.7 percent. This compares with the rest of the North Island at 2.2 percent. The South Island was more completely enumerated, with a net undercount of just 1.3 percent. The 1996 PES showed net undercounts of 1.9 percent, 1.3 percent and 1.3 percent respectively.

The differences in undercount by region can be partly attributed to the ethnic and age composition of the northern North Island, where Māori and Pacific peoples are concentrated. Over half of Māori and about three-quarters of Pacific peoples reside in the four northernmost regions. The northern regions also have higher proportions of their populations under 30 years of age.

Dwellings

The estimated number of permanent private dwellings undercounted by the 2001 Census was about 0.2 percent or 2,400 nationally, compared with about 0.5 percent or 6,000 nationally for the 1996 Census. The 2001 Census counted 1.5 million dwellings, and the 1996 Census counted almost 1.3 million dwellings.

Revision of the 1996 PES results

All results for the 1996 PES included for comparison in this paper are revised undercount estimates. The revision was necessary for two reasons, both related to the methodology adopted for estimating net undercount in 1996. Firstly, a small number of individuals were incorrectly left out of the 1996 PES calculations. Secondly, the 1996 eligibility criteria were overly restrictive, more so than the 2001 eligibility criteria. The use of more conservative eligibility criteria used in deriving results from the 1996 PES partly reflected the fact that the 1996 PES was our first such survey. The revised 1996 PES figures adjust for both of these methodological factors. The revision increased the estimated net undercount in the 1996 Census from 1.2 percent to 1.6 percent nationally.

Population base for post-censal estimates and projections

The 2001 Census counts will not be revised in light of the 2001 PES results. However, the PES results are used to adjust the population estimates and projections time series. The population base used for estimates and projections is the estimated resident population at 30 June 2001. The population base will be adjusted for census undercount, as given by the 2001 Post-enumeration Survey, and for the estimated number of residents temporarily away overseas at census time. A similar adjustment was made to the population base after the 1996 Census.

Resident [population estimates](#) based on the 2001 Census of Population and Dwellings are available. The first set of [population projections](#) based on the 2001 Census is available.

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Appendix: Technical Notes ...

2001 Post-enumeration survey

The 2001 PES, like the 1996 PES, was a sample survey of individuals in private dwellings. The survey was carried out during 21 March to 3 April 2001, beginning two weeks after the census (6 March). It comprised about 11,000 dwellings (0.7 percent of total dwellings in New Zealand), and 25,200 individuals participated in the survey. Interviewers, not census enumerators, were used to collect information on residents'

whereabouts on census night, and whether or not they returned their census forms to Statistics New Zealand.

Because of the limited sample size, it is only possible to provide reliable estimates of undercount for broad groups of the population. Results from the 2001 PES reported in this paper are expressed in terms of the 2001 Census usually resident counts.

Objective

The primary objective of the 2001 PES was to measure the level of coverage (undercount/overcount) of the 2001 Census of Population and Dwellings. The PES did not attempt to gauge the quality of the information provided by respondents who completed the 2001 Census forms. This will be derived from demographic analyses.

Survey form

Personal details sought on the PES questionnaire included: name, date of birth or age, sex, ethnicity and address. Besides usual address and census night address, the survey also collected information on any other address(es) where the person might have been included on any other census form. This was to help increase the chances of finding and matching any individual census form(s) for a particular person and to assist in identifying multiple counts.

Sampling error

Net undercount estimates produced from the PES are subject to sampling error (Table 1). Since only a sample of dwellings was included in the PES, estimates derived from the survey may differ from figures which would be obtained if all dwellings had been included. The sampling error indicates the extent to which an estimate from the PES might have varied by chance because only a sample of dwellings was included. Some estimates have high sampling errors and their use warrants caution.

When undercount estimates are compared, both sampling error and non-sampling error must be borne in mind.

Non-sampling error

The imprecision due to sampling variability is a separate matter from non-sampling errors arising from imperfections in:

- reporting by respondents
- data collection
- data processing.

Such non-sampling errors are minimised by careful design of forms, training and supervision of interviewers and efficient operating procedures. Non-sampling errors are likely to be higher for a PES, compared to non-sampling errors of other surveys.

Table 1
1996 and 2001 Post-enumeration Survey Results

Variable	Net Undercount 1996 ¹		Net Undercount 2001 ²	
	Percent	Sample Error ³	Percent	Sample Error ³
Total	1.6	0.2	2.2	0.3
Mal	1.9	0.3	2.6	0.4
Felame	1.3	0.2	1.9	0.3
0-14 years	1.7	0.4	2.7	0.5
15-29 years	2.5	0.5	3.1	0.6
30-44 years	1.5	0.3	2.3	0.5
45+ years	1.0	0.3	1.4	0.3
Māori	..	..	4.4	1.0
Pacific Peoples	..	..	5.2	1.6
Asian	..	..	2.4	0.8
European	..	..	1.7	0.3
Northern North Island ⁴	1.9	0.3	2.7	0.5
Southern North Island ⁵	1.3	0.3	2.2	0.5
South Island	1.3	0.3	1.3	0.3

- 1 Revised.
- 2 Ethnic figures for 2001 are based on total response.
- 3 The sample error indicates the extent to which an estimate from the PES might have varied by chance because only a sample of dwellings was included. For example, there is a 95 percent chance that the true undercount for New Zealand would have been between 1.9 and 2.5 percent if all dwellings had been included in 2001.
- 4 Northland, Auckland, Waikato and Bay of Plenty Regions.
- 5 Gisborne, Hawke's Bay, Taranaki, Manawatu-Wanganui and Wellington Regions.
- .. Not available.

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