

Estimated resident population 2023: Data sources and methods





Crown copyright ©

[See Copyright and terms of use](#) for our copyright, attribution, and liability statements.

Citation

Stats NZ (2025). *Estimated resident population 2023: Data sources and methods*. Retrieved from www.stats.govt.nz.

ISBN 978-1-991307-58-3 (online)

Published in April 2025 by

Stats NZ Tatauranga Aotearoa
Wellington, New Zealand

Contact

Stats NZ Information Centre: info@stats.govt.nz

Phone toll-free 0508 525 525

Phone international +64 4 931 4600

www.stats.govt.nz

Contents

Purpose and summary	5
Purpose	5
Summary	5
Estimated resident population at 30 June 2023	7
About the ERP	7
Published ERP	7
Population measures	8
How the ERP is derived	9
Data sources and flows	10
Accuracy of the ERP	11
Ethnic group ERPs	14
Māori descent ERP	16
Estimated uncertainty intervals	17
Historic comparison of the contributing components to ERP	20
Estimated resident population at 7 March 2023	22
2023 Census counts	22
Gender and sex	23
Net census undercount	24
Residents temporarily overseas	27
Calculating the ERP at 7 March 2023	28
Population change from 7 March to 30 June 2023	30
Births and deaths	32
Net migration	33
Imputation in component datasets	35
Calculating the ERP at 30 June 2023	36
Measuring uncertainty in the ERP	37
Adjustments to the ERP	39
Implausible small sub-population estimates	39
Demographic reconciliation	39
Glossary	41
Appendix 1: Overview of data sources by ERP component	43
Appendix 2: Geographic areas used in population estimation	46
National level	46
Subnational level	46

List of tables and figures

List of tables

1 National summary of components contributing to the ERP at 30 June 2023	10
2 ERP at 30 June 2023 and 95 percent uncertainty intervals for selected population groups.....	19
3 Contributing components to ERP at 30 June, 1996–2023	21
4 Net census undercount (NCU) estimates by selected population groups, 2023 Post-enumeration Survey.....	26
5 Estimates of components contributing to the ERP at 30 June 2023, by selected population groups	31
6 Level of item missingness observed in population components, in deriving ERP at 30 June 2023... 36	
7 Overview of sources of uncertainty and methods to measure uncertainty in the ERP	43
8 Overview of data sources, variables fully observed, and variables with missingness in the ERP components	44

List of figures

1 Conceptual inclusions in key population statistics produced by Stats NZ.....	8
2 Data sources and flows into producing the ERP at 30 June 2023.....	11
3 Māori population statistics at the national level, 1991–2024	16
4 ERP at 30 June 2023 for selected ethnic groups, by single year of age and sex.....	18
5 Deriving the preliminary ERP at census date	22
6 Deriving the ERP at 30 June 2023	30
7 Demographic reconciliation as percentage of ERP at 30 June 2023, by single year of age and sex..	40

Purpose and summary

Purpose

Estimated resident population 2023: Data sources and methods describes the data sources and methods used to produce the 2023-base estimated resident population (ERP) at 30 June 2023. It includes descriptions of the data sources and methods used to estimate the contributing components at national and subnational levels, by age, sex, level 1 ethnic groups, and Māori descent. The report is aimed at technical users who want to gain an understanding of the magnitude and quality of the contributing components used to produce the ERP at 30 June 2023.

Summary

The 2023-base ERP of Aotearoa New Zealand is an estimate of all the people who usually live in New Zealand at 30 June 2023. The ERP is derived from the 2023 census usually resident population count with adjustments for net census undercount, residents temporarily overseas, and estimates of population change due to births, deaths, and migration between census night (7 March 2023) and the mid-year reference date (30 June 2023).

In this report, we describe the data sources and the methods used to estimate each of the components, the methodological steps for compiling the ERP, and the adjustments included in the ERP. While the methods to compile the ERP in 2023 have remained largely consistent with those followed in 2018, some changes have been introduced due to the extended use of administrative (admin) data. For example, linking of the 2023 Census and ERP components in Stats NZ's [Integrated Data Infrastructure](#) (IDI) enabled us to share attribute values across the different components.

All population measures, including census counts and population estimates, have some uncertainty around them. This report also describes the methods and the contributing data sources we used to measure the uncertainty around the ERP at 30 June 2023.

The process to compile the ERP included using admin data sources and census coverage results. Admin data has always been used in population estimation, and this has been extended to strengthen the accuracy of the 2023-base ERP. In summary, the ERP has been compiled by:

- using the 2023 Census dataset that had been created by combining census forms and admin data ([Methodology for using admin data to count people in the 2023 Census](#))
- using the results of net census undercount as measured by the Post-enumeration Survey ([2023 Post-enumeration survey: Methodology](#))
- accessing linked admin data and 2023 Census data in the IDI to obtain information on resident location, ethnic group, and Māori descent where not otherwise available
- accessing linked address notifications data in the IDI for estimating internal migration to and from geographic areas between census and mid-year
- deriving natural increase from birth and death registrations, which included information about resident location, ethnic group, and Māori descent
- accessing linked border movements for identifying migrant arrivals and departures between census night and mid-year using the outcomes-based migration measure ([Outcomes versus intentions: Measuring migration based on travel histories](#))

- including an adjustment to the ERP at 30 June 2023 of children (aged 0–14 years) as a reconciliation of the differences in demographic estimates from admin records and ERP for these ages. The demographic reconciliation was based on admin records of births, deaths, and international migration.

Estimated resident population at 30 June 2023

This section provides an overview of the data and methods used to produce the ERP at 30 June 2023 and includes a national summary of the ERP broken down by components. We discuss the uncertainty estimates of the ERP and conclude with a tabulated summary for selected population groups with estimated uncertainty intervals.

About the ERP

All official population estimates currently produced by Stats NZ relate to the resident population. This report focuses on the derivation of the ERP as at midnight of 30 June 2023, which is the base (starting point) for subsequent post-2023 ERPs.

A 'resident' is a person who usually lives in an area. This is a statistical, not a legal, definition and is generally based on a person's self-identified usual address. The term 'resident' may be used differently in other contexts, such as in economic statistics, or to describe immigration or visa status.

In international travel and migration statistics, a resident is a person who has been living in New Zealand for 12 months or more as defined by travel histories and the '12/16-month rule' ([Migration Data Transformation](#)).

For more information, see:

- [Defining migrants using travel histories and the '12/16-month rule'](#)
- [Outcomes versus intentions: Measuring migration based on travel histories](#).

The ERP dataset at 30 June 2023 is a detailed aggregate dataset, but is not a unit-record dataset. Despite the extensive use of population estimates, the aim of population estimation is not to replicate or update the census dataset for subsequent reference dates. Instead, the usual approach of national statistical agencies is to estimate the population for selected key sub-populations.

We derived the 2023 ERP by age, sex, usual resident location at meshblock level, level 1 ethnic group indicators (European, Māori, Asian, Pacific, Middle Eastern/Latin American/African (MELAA), Other), and Māori descent indicator. A New Zealand-born indicator is included to facilitate derivation but is not published. We derived estimates at meshblock level to provide flexibility in aggregating the ERP to all statistical output geographies needed by our diverse range of customers (see [Appendix 2](#)).

Published ERP

Population estimates are published for a variety of geographic and demographic variables, while some breakdowns are available on request. To request breakdowns, email us at info@stats.govt.nz.

[Estimated resident population \(2023-base\): at 30 June 2023](#) has summary tables and commentary on the 2023-base ERP.

[Aotearoa Data Explorer](#) has more detailed tables, including:

- [Estimated resident population \(ERP\), adjustments to derive ERP at 30 June 2023 \(from census usually resident population count\)](#)

- [Estimated resident population \(ERP\), national population by ethnic group, age, and sex, 30 June 1996, 2001, 2006, 2013, 2018, and 2023](#)
- [Estimated resident population \(ERP\), subnational population estimates \(RC, SA2\) by ethnic group, age and sex, 30 June 1996, 2001, 2006, 2013, 2018, and 2023](#)
- [Estimated resident population \(ERP\), subnational population estimates \(TALB, SA3, SA2\) by ethnic group, age and sex, 30 June 1996, 2001, 2006, 2013, 2018, and 2023](#)
- [Estimated resident population \(ERP\) of Māori descent, by age and sex, at 30 June 2001, 2006, 2013, 2018, and 2023](#)
- [Estimated components of subnational intercensal population change \(RC, TA\), 1981-2023.](#)

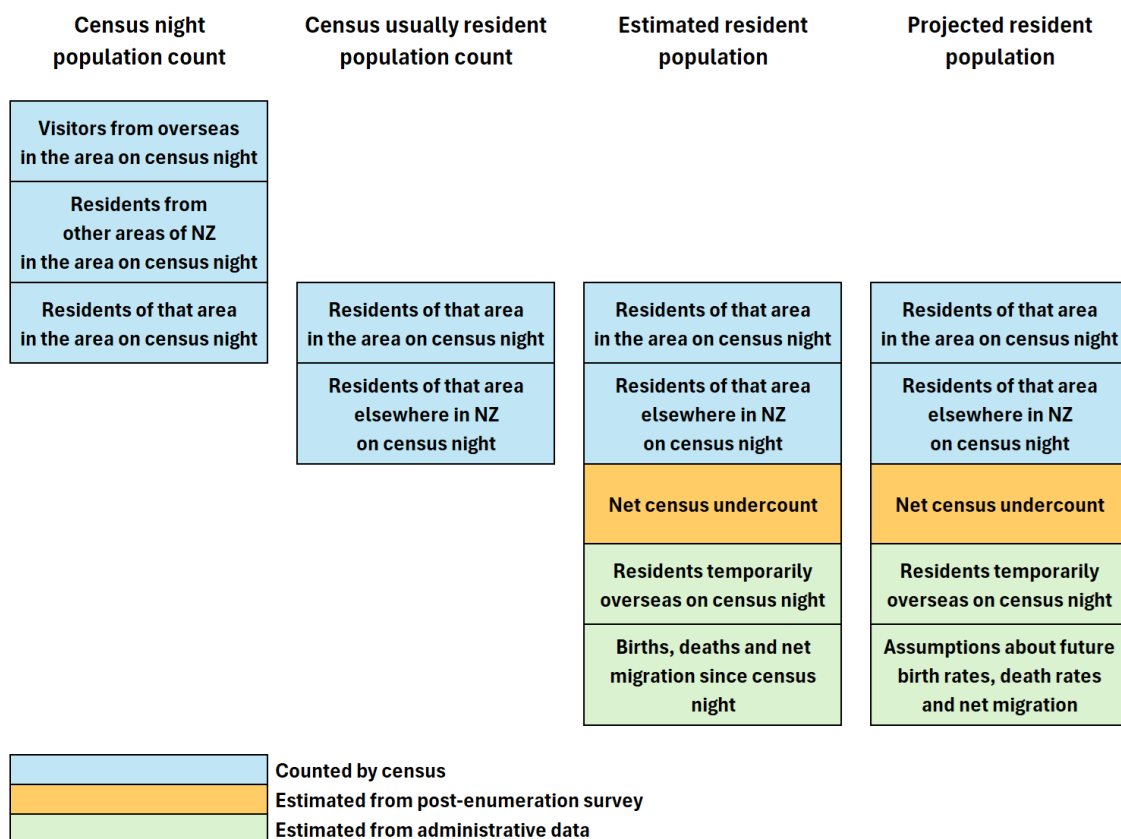
For intercensal and post-censal population estimates, see [Infoshare](#) (Population < Population Estimates – DPE) and [Aotearoa Data Explorer](#).

Population measures

The term ‘estimated resident population’ (ERP) clarifies that it is a demographic estimate and differentiates it from two other population measures: ‘census usually resident population count’ and ‘census night population count’ (figure 1). A distinction is also made between estimates, which are measures for past dates and based (largely) on recorded data and projections that indicate the population size and structure at future dates, typically based on assumptions about future fertility, mortality, and migration. For more information, see [Population statistics – user guide](#).

Figure 1

Conceptual inclusions in key population statistics produced by Stats NZ



The ERP is produced following the availability of the census usually resident population count:

- to represent the best possible measure of the resident population for a wide variety of customers and uses, including use in demographic projections and indices, and for household survey benchmarks
- to meet the need for updated population estimates beyond census date as an indication of demographic change.

How the ERP is derived

The ERP at 30 June 2023 is compiled from the 2023 census usually resident population count, with adjustments at census date, combined with components of population change between 7 March and 30 June 2023 (table 1).

The preliminary ERP at census date consists of:

- the 2023 census usually resident population count
- the adjustment for net census undercount, as measured by the 2023 PES
- the adjustment for the number of residents temporarily overseas on census night, based on short-term resident traveller data.

Population change between 7 March and 30 June 2023 consists of:

- natural increase (births less deaths), using birth and death registrations
- net international migration (migrant arrivals less migrant departures), based on the 12/16-month migration rule (outcomes-based method)
- net internal migration (in-migration less out-migration between areas of New Zealand), using internal movements identified by integrated 2023 Census data and admin address notifications.

The ERP at 30 June 2023:

- combines the preliminary ERP at census date and the estimated population change between 7 March and 30 June 2023
- includes a demographic reconciliation for children aged 0–14 years, based on national-level demographic estimates from admin records of births, deaths, and international migration.

The data sources that have been used to produce the components of population change are described in [Data sources and flows](#), and table 8 in [Appendix 1](#) provides an overview of their contribution to the compilation of the ERP.

The methods for compiling the ERP are described in [Calculating the ERP at 7 March 2023](#) and [Calculating the ERP at 30 June 2023](#).

The adjustments included when compiling the ERP are described in [Adjustments to the ERP](#).

Table 1

National summary of components contributing to the ERP at 30 June 2023		
Component	Estimate	Percentage of ERP
At 7 March 2023 (census date)		
Census usually resident population count	4,993,923	96.0
Net census undercount ⁽¹⁾	57,100	1.1
Residents temporarily overseas	98,700	1.9
Population change between 7 March 2023 and 30 June 2023		
Natural increase (births less deaths)	5,900	0.1
Net migration (migrant arrivals less migrant departures)	44,400	0.9
Total population change	50,300	1.0
At 30 June 2023		
Demographic reconciliation ⁽²⁾	0	0.0
Estimated resident population	5,200,000	100.0
<p>1. The modelled mean adjustment for net census undercount may differ slightly from the equivalent median estimate from the 2023 PES (table 4).</p> <p>2. Adjustment of ERP at ages 0–14 years based on national-level demographic estimates from admin records of births, deaths, and international migration. The reconciliation nets to almost zero when summed across the ages.</p> <p>Note: Owing to rounding, individual figures may not sum to the stated totals.</p> <p>Source: Stats NZ</p>		

At the national level, the main components added to the census usually resident population count to get the ERP at 30 June 2023 were residents temporarily overseas on census night (1.9 percent of the ERP) and the net census undercount (1.1 percent of the ERP). The contribution of population change between census date and mid-year (1.0 percent of the ERP) was mainly driven by international migration. The demographic reconciliation to the ERP at 30 June 2023 netted to almost zero when summed across ages (0–14 years).

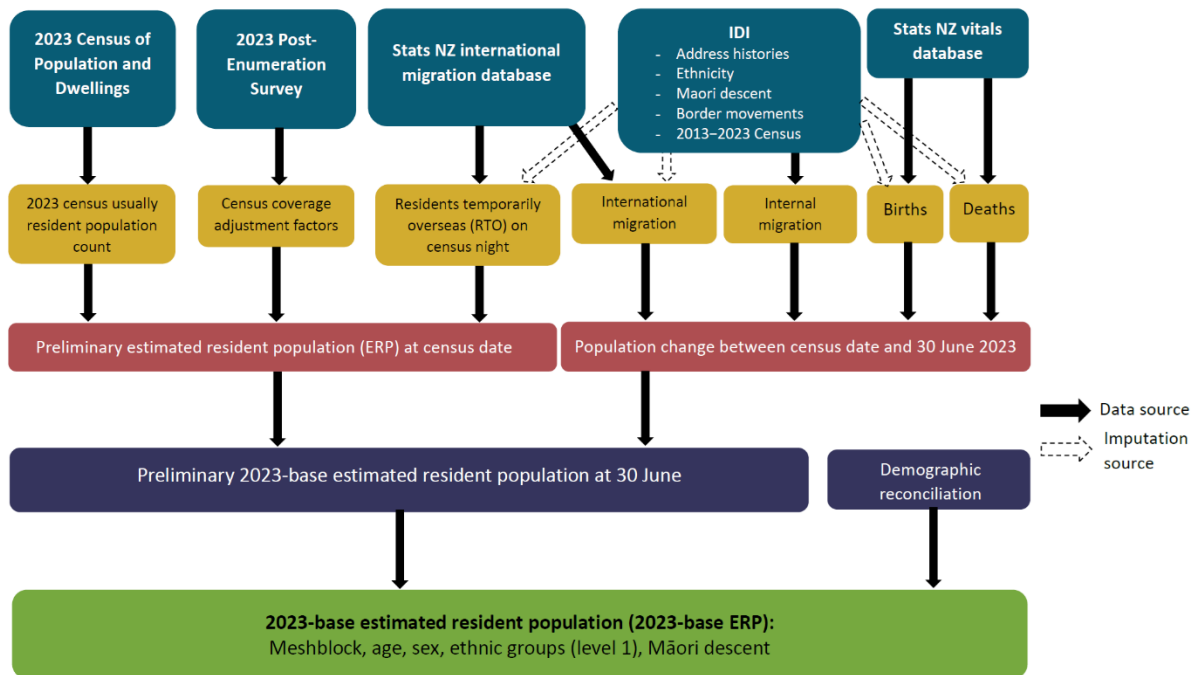
A summary of the components contributing to the ERP at 30 June 2023 for sub-populations is presented in table 5 in [Population change from 7 March to 30 June 2023](#).

Data sources and flows

The individual components contributing to the ERP at June 2023 were estimated using a wide range of sources (figure 2). The 2023 Census of Population and Dwellings provided the census usually resident population count, and results from the 2023 PES provided estimates of the gross undercount and gross overcount. Border movements data provided the estimates of residents temporarily overseas (RTOs). The components of population change are estimated from birth and death registrations and border movements, with other admin sources used to estimate internal migration.

Figure 2

Data sources and flows into producing the ERP at 30 June 2023



Source: Stats NZ

Natural increase between census date and mid-year used birth and death registration data collected by Department of Internal Affairs (DIA) and compiled by Stats NZ for statistical purposes. The ERP process accessed integrated border movements, collected by the New Zealand Customs Service and compiled by Stats NZ, to produce estimates of RTOs on census night, and estimates of migrant arrivals and migrant departures between 7 March and 30 June 2023. These were combined before the demographic reconciliation was applied at the youngest ages to produce the ERP at 30 June 2023.

Stats NZ’s IDI database was accessed to merge resident location, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator with border movements data, and to define records of internal migration, their ethnic group indicators, Māori descent indicator, and New Zealand-born indicator. The IDI regularly updates tables of integrated address notifications and ethnic group information from a range of admin sources. The IDI sources included the 2013 to 2023 Censuses for information on resident location, ethnicity, Māori descent, and birthplace.

For more detail on how we used the data to compile the ERP at 30 June 2023, see [Estimated resident population at 7 March 2023](#) and [Population change from 7 March to 30 June 2023](#). Table 8 of [Appendix 1](#) provides an overview of the data sources.

Accuracy of the ERP

Official population estimates in New Zealand are based on the results from the census with adjustments for people not counted in the census: net census undercount (NCU) and residents temporarily overseas (RTOs) on census night.

Post-censal estimates are updated to incorporate estimates of births, deaths, and external (international) migration. For subnational areas, internal migration is also incorporated. For Māori ethnic population estimates, inter-ethnic mobility (people changing their ethnic identification over time) is also incorporated.

Historically, inaccuracies in post-censal estimates were generally considered to reflect inaccuracies in the components of change, especially:

- measures of international migration, which relied on the stated intentions of travellers arriving in, and departing from, New Zealand
- estimates of internal migration, which relied on symptomatic or indirect data on people changing address and moving within New Zealand, such as building consents or changes in admin-data populations (eg, school rolls, primary health organisation enrolments).

The accuracy of population estimates is typically measured by ‘intercensal discrepancy’ – the difference between population estimates produced before the census and population estimates rebased after the census. Intercensal discrepancy is the net combined effect of various factors including inaccuracies in:

- the census counts at the beginning and end of the period
- the adjustments to derive population estimates (from census counts) at the beginning and end of the period
- the components of population change (births, deaths, migration) during the period.

Stats NZ has retrospectively assessed the accuracy of post-censal population estimates since the ERP measure was adopted after the 1996 Census. [Evaluation of the accuracy of Stats NZ population estimates and projections, 1996–2018](#) has more information.

Births and deaths data are high quality. Based on registrations over the last decade, 95 percent of births are registered within 6 months of birth, and 99 percent of deaths are registered within 6 weeks of death.

Measuring migration, both international and internal, was identified as a major contributor to inaccuracy.

With the implementation of an outcomes-based measure in 2019, New Zealand’s international migration is accurately estimated by international standards. International migration is also more accurately estimated than the previous intentions-based measure, which relied on stated intentions on arrival and departure cards. The outcomes-based measure uses an objective ‘12/16-month rule’ and linking of arrivals and departures, with estimates derived back to 2001. For more information, see [Migration Data Transformation](#).

The linking of international migration data and census data helps identify differences in the resident status of individuals between these two data sources. Notably, there are two sub-populations which can be measured differently between international migration data and census data, and are therefore likely to be contributing to the accuracy of population estimates (intercensal discrepancy):

- New Zealand residents identified as temporarily overseas (RTOs) on census night
- visitors from overseas identified as New Zealand residents in the census.

New Zealand residents identified as temporarily overseas on census night

The scope of the 2023 Census was to count all people physically in New Zealand on census night, regardless of where they usually live. This is sometimes referred to as a ‘de facto’ census. For this reason, the published census counts attempt to exclude respondents who were not in New Zealand on census night, even if they completed a census form before or after their departure¹.

While including RTOs in the census dataset might meet the aim of the ERP in covering all people living in New Zealand, an advantage of excluding respondents who were not in New Zealand on census night is that this approach is less ambiguous about who should complete a census form. Excluding RTOs also removes a potential wait of up to 12 months for residents to return from overseas and complete a census form.

A small number of RTOs may remain in the census dataset. The post-enumeration survey measures some overcount from their inclusion, which is included in the adjustment for net census undercount. For more information, see [Net census undercount](#).

Visitors from overseas identified as New Zealand residents in census

When answering the ‘Where do you usually live?’ question in the census, people are classified as either usually living in New Zealand (ie, a resident) or usually living overseas (ie, a visitor from overseas). There is guidance for those who may be unsure how to self-identify:

Which address do I give?

If you live in New Zealand or are staying here for 12 months or more, excluding short overseas trips, follow these guidelines to give the right address:

- if you are a primary or secondary school student at boarding school, give your home address
- if you are a tertiary student, give the address where you live during term
- if you live in more than one dwelling, give the address of the one you most consider to be your home. If you spend equal amounts of time at different addresses, give only one of those addresses
- children in shared care should give the address where they spend the most nights. If children spend equal amounts of time at different addresses, they should give only one of those addresses.

If you will be staying in New Zealand for fewer than 12 months, give your home country.

Despite this guidance, there can be a difference between respondent’s interpretation of the question and their actual duration of stay in New Zealand. Some people identify as New Zealand residents, despite not being in New Zealand long enough to be classified as migrants according to the international migration data. Conversely, some people identify as visitors from overseas, despite

¹ Information from these people is used to inform family and household derivations, but the individuals are not included in the person-level census counts.

being in New Zealand long enough to be classified as migrants according to the international migration data.

Based on the linking of international migration data and census data in the IDI, there was a net addition in each of the 2013 to 2023 Censuses of 30,000 to 60,000 people who were counted as New Zealand residents when the international migration data indicated they were visitors from overseas.

It could be argued that changing the resident status of census respondents to be consistent with their migrant status would improve the accuracy of the population estimates. However, the high-level design of the 2023 Census noted that we would respect respondents' intentions and use the given response as the default:

“The combined model will continue to respect respondents' answers in the forms, with minimal-change methods implemented for data processing.” ([2023 Census: High Level Design](#))

Options to rely less on self-reported usual address and more on rules-based determinations also involve a time lag to determine migrant status.

Ethnic group ERPs

Ethnicity is the ethnic group or groups that people identify with or feel they belong to. Ethnicity is a measure of cultural affiliation, as opposed to race, ancestry, nationality, or citizenship. Ethnicity is self-perceived and people can belong to more than one ethnic group. For more information, see [Statistical standard for ethnicity](#).

The ERP is derived with the six level 1 ethnic group indicators (yes/no):

- European
- Māori
- Pacific
- Asian
- MELAA
- Other.

However, the ERP is published for five level 1 ethnic groupings, with 'European' and 'Other' combined. Published tabulations of ethnic group ERPs at 30 June 1996 to 2023 (census years) include age, sex, and geographic area. For more information, see [Published ERP](#).

While the census may collect very detailed information about the characteristics or attributes of the population, it is not feasible to produce population estimates by every attribute:

- Information on how net census undercount varies by each attribute may not be available.
- Information on births, deaths, and migration of people with each attribute may not be available.

There are three main implications for ethnic group ERPs:

- Census year ERPs are only published for the five level 1 ethnic groupings.

- A combined ‘European or Other (including New Zealander)’ ethnic grouping is published, rather than separate ‘European’ or ‘Other’ groupings.
- In non-census years, the only ethnic group ERPs that are published are for the Māori ethnic group.

Level 1 ethnic groupings

Census-year ERPs are currently published only for five level 1 ethnic groupings. Limited information is available from the PES or migration data to produce ERPs for lower-level ethnic groupings. This largely reflects the smaller population size of level 2 ethnic groupings, which increases the uncertainty of any population estimates. Despite the uncertainty, estimates of the relatively small MELAA ethnic grouping have been produced to give complete coverage of the level 1 ethnic groupings.

[National-level ethnic population projections](#) are published for five level 1 ethnic groupings. They are also available for the largest level 2 ethnic groupings:

- Indian
- Chinese
- Samoan.

These give an indication of future population change from an estimated base population, with estimated uncertainty intervals. Some customers choose to use these projections as a proxy for population estimates, given the availability of the projections by single year of age and sex for each year of the projection period.

‘European or Other’ grouping

A combined ‘European or Other (including New Zealander)’ grouping has been published to provide a coherent time series, to support use as population denominators (eg, for fertility and mortality indices), and for use in population projections. Separate population estimates for the ‘European’ ethnic grouping and the ‘Other (including New Zealander)’ ethnic grouping at 30 June 2023 have been derived but are not published, although they are available on request.

This approach was adopted after the 2006 Census, following changes to the ethnicity standard and classification in 2005, as discussed in [Guidelines for Using Ethnicity Data: 2006 Census](#).

Aside from the census, ‘Other’ ethnicity is not widely reported in admin-data collections such as birth and death registrations. This makes population estimation or projection difficult for separate ‘European’ and ‘Other’ ethnic groupings. The lack of comparability of ‘European’ and ‘Other’ between census and other collections also suggests that separate estimates are of limited use and may be misleading if inappropriately used as denominators.

Māori ERP in non-census years

In non-census years, ethnic population estimates are currently published only for Māori, and only at the national level. For more information, see [Māori population estimates](#).

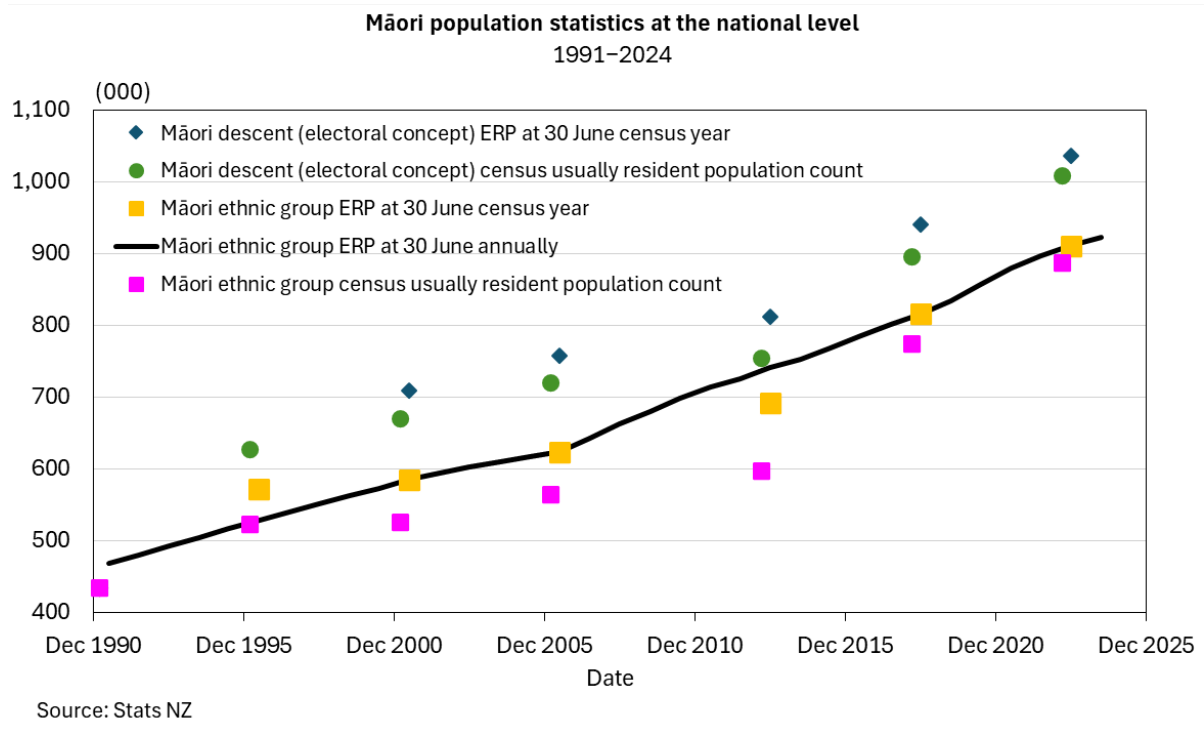
The limited intercensal population estimates historically reflect the lack of migration data directly available by ethnicity. This introduces a high level of uncertainty into population estimation, where international migration is a significant component of population change.

National-level Māori ethnic population estimates are published six-monthly, with ‘as at 30 June’ estimates published in November and ‘mean year ended 31 December’ estimates published in May. These estimates are similar in magnitude but serve different purposes as denominators (depending on the stock or flow nature of the numerator data).

The national-level Māori ethnic population estimates time series begins in 1991 and aligns with the census year ERPs at 30 June 2001, 2006, 2018, and 2023 (figure 3). The annual estimates are independent of census counts and census year ERPs in:

- 1991 and 1996: These estimates are calculated backwards from the 2001 ERP, based on the estimated components of change. This reflects net census undercount first being measured in 1996, and the different census ethnicity questions and results between 1996 and 2001.
- 2013: These estimates are calculated using a weighted average of forward estimates from 2006 to 2018 and backward estimates from 2018 to 2006, based on the estimated components of change. This reflects an under-estimate of the Māori population in 2013, discussed in [Māori population under-estimation in 2013: Analysis and findings](#).

Figure 3



Māori descent ERP

The ERP is produced for the Māori descent population. Māori descent is based on whakapapa, while affiliation to the Māori ethnic group is a self-determined cultural affiliation.

The ERP uses the electoral concept of Māori descent, which is used to determine electoral populations. This differs from the concept used elsewhere in the 2023 Census, which allows respondents to state that they don't know if they were descended from Māori. In the ERP, the 'don't know' responses have been imputed to 'Māori descent' and 'No Māori descent'. For more information, see [Māori descent electoral – 2023 Census: Information by concept](#).

The published tabulation in Aotearoa Data Explorer of the Māori descent ERP at 30 June 2001–2023 (census years) includes age, sex, and geographic area: [Estimated Māori descent resident population, at 30 June 2001, 2006, 2013, 2018, and 2023](#).

[Local Electoral Amendment Act 2002](#) (Schedule 1A) requires us to provide updates of estimated Māori and general electoral population for cities, districts, wards, constituencies, communities, and subdivisions. This includes using the most recent information on the census Māori descent population (electoral) adjusted for net undercount (as measured by the PES), RTOs on census night, and estimated population change between census date and a given reference date. For this purpose and more general Māori population analyses, we have included the Māori descent indicator as a variable in all contributing data sources used to derive ERP at 30 June 2023.

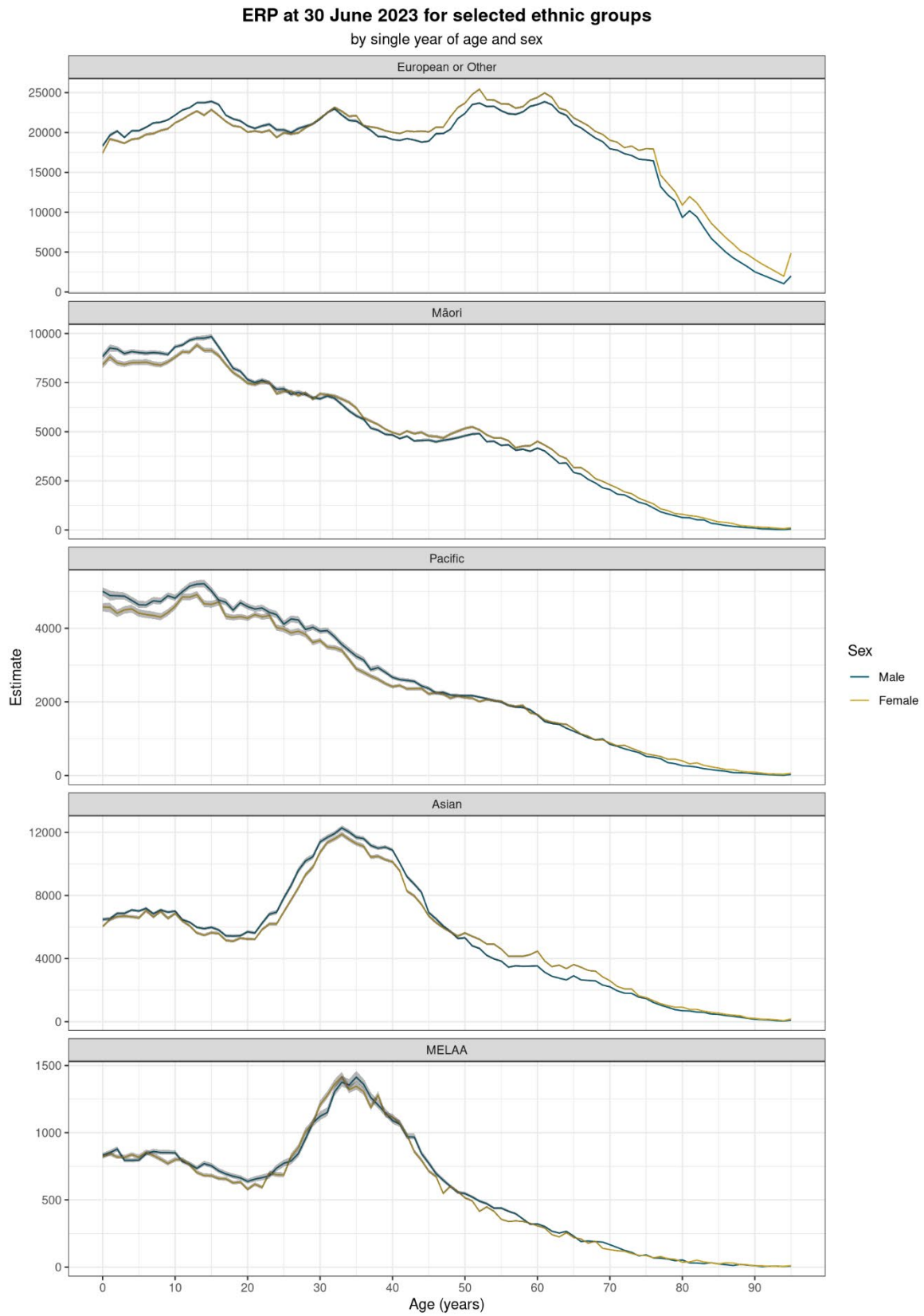
The Māori descent ERP is not used for general election purposes, such as determining the number of electorates or electorate boundaries. Under the [Electoral Act 1993](#), census counts are used for these purposes. A Māori descent indicator is derived for all residents counted in the census for the purpose of determining New Zealand's electoral districts. The 2023 data sources and methodology for deriving the Māori descent indicator for electoral purposes, including the imputation of Māori descent responses that were not 'yes' or 'no', is described in [Data sources and imputation for Māori descent in the 2023 Census \(updated\)](#).

Estimated uncertainty intervals

The ERP at 30 June 2023 includes estimates of uncertainty from contributing data and estimation processes, where possible. Overall, the main source of uncertainty in the ERP was the estimated net census undercount as measured by the PES. However, the process did not incorporate uncertainty around data quality in individual sources or from adjustments made to the ERP at 30 June 2023. For more information, see [Adjustments to the ERP](#).

Measures of uncertainty in the ERP, represented as 95 percent intervals given by the 2.5th and 97.5th percentiles, are most evident as wider intervals for young adults within the MELAA ethnic group, and for children within the Pacific ethnic group (figure 4 and table 2).

Figure 4



Note: The shaded area represents the 95 percent uncertainty interval for the ethnic group ERP by age and sex.

Final age is 95+ years.

Source: Stats NZ

Table 2

ERP at 30 June 2023 and 95 percent uncertainty intervals for selected population groups				
Population group	ERP at 30 June 2023 (mean estimate)	Lower percentile estimate (2.5th percentile)	Upper percentile estimate (97.5th percentile)	Percentage share (mean estimate) of total ERP
Total	5,200,000	5,188,400	5,211,800	100.0
Sex				
Male	2,590,000	2,582,200	2,597,900	49.8
Female	2,610,000	2,602,600	2,617,500	50.2
Broad age group (years)				
0–14	970,000	965,400	974,900	18.7
15–39	1,786,300	1,779,500	1,794,200	34.4
40–64	1,595,800	1,590,800	1,600,800	30.7
65+	848,000	845,100	850,800	16.3
Broad ethnic group⁽¹⁾				
European or Other ⁽²⁾	3,493,800	3,486,200	3,501,600	67.2
Māori	911,200	905,900	917,000	17.5
Pacific	464,200	459,900	468,700	8.9
Asian	973,700	967,600	980,600	18.7
MELAA ⁽³⁾	103,700	102,100	105,800	2.0
Māori descent⁽⁴⁾				
Māori descent	1,035,900	1,030,300	1,042,000	19.9
No Māori descent	4,164,100	4,154,100	4,174,500	80.1
Regions				
Auckland	1,755,200	1,749,800	1,761,600	33.8
Wellington	538,000	535,700	540,200	10.3
Rest of North Island	1,680,200	1,675,200	1,685,100	32.3
Canterbury	676,600	674,400	679,100	13.0
Rest of South Island	549,400	547,900	551,100	10.6
<p>1. People who reported more than one ethnic group are included once in each group reported. These are therefore overlapping ethnic populations.</p> <p>2. Includes 'New Zealander' responses.</p> <p>3. Middle Eastern/Latin American/African.</p> <p>4. Māori descent electoral concept. This is different from the Māori descent indicator used elsewhere in the 2023 Census. For more information, see Māori descent electoral – 2023 Census: Information by concept.</p> <p>Note: Owing to rounding, individual figures may not sum to the stated totals.</p> <p>Source: Stats NZ</p>				

Estimated relative uncertainty intervals were typically narrower for larger population groups but also reflected different patterns of census coverage and coverage uncertainty. The following estimates are based on results of the 95 percent uncertainty intervals:

- For the total population, the estimated uncertainty of the ERP was +/- 0.2 percent of the mean estimate.
- Uncertainty estimates were slightly higher for the younger population groups. For age group 0–14 years it was +/- 0.5 percent of the mean ERP, for age group 15–39 years it was +/- 0.4 percent, and for age group 40+ years it was +/- 0.3 percent.
- The ERP for the Middle Eastern/Latin American/African (MELAA) ethnic group had higher uncertainty than other ethnic groups, with the interval estimated as 1.6 percent lower to 2.0 percent higher than the mean ERP. By comparison, the uncertainty interval was approximately +/- 0.9 percent for Pacific, +/- 0.6 percent for Asian, and +/- 0.6 percent for the Māori ethnic group.
- The relative uncertainty interval of the ERP for regions ranged from Hawke's Bay (+/- 1.2 percent) down to Auckland (+/- 0.3 percent).

Not all sources of uncertainty in the ERP are measurable. Results from the census have not included formal uncertainty measures from census enumeration and processing errors (eg, respondent errors, misrecognition during scanning, uncertainty from age imputation).

Census coverage estimates are sourced from a sample survey (PES) and are therefore subject to sample errors. The modelled approach to coverage estimation included coherent measures of uncertainty in estimates of census undercount and overcount.

[Measuring uncertainty in the ERP](#) describes the sources and methods used to measure uncertainty in the ERP.

Historic comparison of the contributing components to ERP

Historic demographic trends have influenced the changes observed in the sizes of the components contributing to the ERP (table 3). Other changes have been the result of changes to methods and measurement rules for estimating the individual components.

Historically, the adjustment for net census undercount has exceeded the adjustment for residents temporarily overseas. In 2023, this pattern reversed, reflecting the higher census coverage achieved and more New Zealand residents out of the country on census night (partly reflecting slightly longer durations of trips overseas rather than more trips being made).

The net migration estimate contributing to the 2023 ERP was higher than the contributions made in previous census years. This reflects the higher net migration experienced in March to June 2023 than in other years.

The demographic reconciliation contributed around 0.1 percent of the total ERP in 1996 to 2013 but was higher in 2018 with an extended age range. The adjustments typically covered ages 0–9 years (ages 0–4 years in 2006 and 0–14 years in 2018 and 2023), depending on the confidence in the net migration estimates. In 2023, the absolute value of the overall adjustment was smaller, netting to zero, with increases to age 0–5 years offset by decreases to ages 6–14 years.

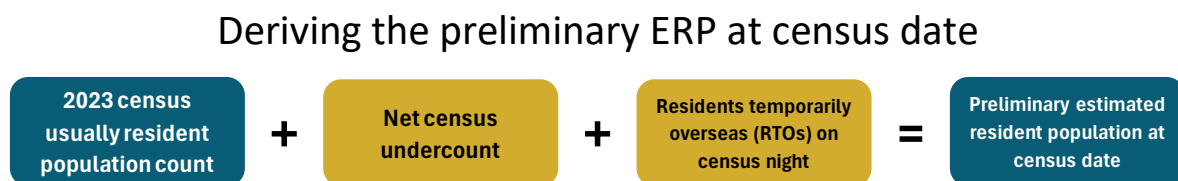
Table 3

Contributing components to ERP at 30 June 1996–2023						
Component	1996	2001	2006	2013	2018	2023
At census date⁽¹⁾						
Census usually resident population count	3,618,300	3,737,280	4,027,947	4,242,048	4,699,755	4,993,923
Estimated net census undercount ⁽²⁾	58,900	80,900	80,100	104,200	124,900	57,100
Residents temporarily overseas ⁽³⁾	39,800	54,500	64,500	81,700	77,200	98,700
Population change between census date and 30 June						
Natural increase (births less deaths)	8,600	8,600	10,000	9,100	8,000	5,900
Net migration (migrant arrivals less migrant departures) ⁽⁴⁾	2,500	-4,500	-1,300	200	7,300	44,400
Total population change	11,100	4,100	8,700	9,300	15,400	50,300
At 30 June						
Demographic reconciliation ⁽⁵⁾	3,900	3,700	3,400	4,800	-16,600	0
Estimated resident population	3,732,000	3,880,500	4,184,600	4,442,100	4,900,600	5,200,000
<p>1. Census date was 5 March in 1996 and 2013; 6 March in 2001 and 2018; and 7 March in 2006 and 2023.</p> <p>2. The modelled mean adjustment for net census undercount may differ slightly from the equivalent median estimate from the 2023 PES (table 4) and earlier PES results which were directly from the survey.</p> <p>3. The apparent drop in RTOs between 2013 and 2018 reflects a change in estimation methodology, not a real drop in the number of NZ-residents travelling overseas. Up to 2013, the method used the intended duration of absence of New Zealand-resident travellers reported on departure cards. From 2018, the method uses linked New Zealand-resident traveller departures and arrivals.</p> <p>4. Migration estimates reflect the official measures of international migration in use at the time of the ERP derivation. For 1996–2013, this was an intentions-based measure using passenger card responses. For 2018–2023, this was an outcomes-based measure using linked arrivals and departures to create travel histories and the 12/16-month rule.</p> <p>5. The demographic reconciliation was applied to ages 0–4 years in 2006; 0–9 years in 1996, 2001, and 2013; and 0–14 years in 2018 and 2023.</p> <p>Note: Owing to rounding, individual figures may not sum to the stated totals.</p> <p>Source: Stats NZ</p>						

Estimated resident population at 7 March 2023

This section describes the data sources used to produce the preliminary ERP at census date, 7 March 2023. It is a preliminary estimate because it has yet to undergo the demographic changes between 7 March and 30 June, and the demographic reconciliation at 30 June, to derive the final ERP. We provide details of the 2023 Census counts and how they were used, and outline data and methods used in the adjustments to estimate the net census undercount (NCU) and the residents temporarily overseas (RTOs) on census night (figure 5).

Figure 5



2023 Census counts

The starting population for deriving the 2023 ERP is the 2023 census usually resident population count. The census usually resident population count of New Zealand is a count of all people who usually live, and are present, in New Zealand on census night. This count excludes visitors from overseas and residents who are temporarily overseas on census night.

The census usually resident population count includes people counted from census forms and from ‘admin enumeration’. However, the census counts include no adjustments for coverage based on the Post-enumeration Survey.

Residents were counted at the meshblock of their usual residence. Those who were temporarily elsewhere in New Zealand on census night were included in the meshblock they usually live in. A meshblock is the smallest geographic area we use for statistical purposes – see ‘Geographic areas used in population estimates’ in [Appendix 2](#).

Following on from the experience of the 2018 Census, the 2023 Census used data from alternative sources to:

- add individual records to the census dataset (see [Methodology for using admin data to count people in the 2023 Census](#))
- fill gaps when the attributes of people or dwellings were not provided on census forms (see [Editing, data sources, and imputation in the 2023 Census](#)).

For filling gaps in attributes, the alternative sources were the 2013 and 2018 Censuses, and a range of admin data sources such as birth registrations and health information. Where appropriate, statistical imputation was also used when attributes could not be sourced from alternative data sources.

Where people were listed as a member of a household but did not complete an individual form, or where people were counted through ‘admin enumeration’, alternative sources and imputation were the source of nearly all individual census attributes.

[Data quality in the 2023 Census](#) has more information about the 2023 Census data sources and methods.

Gender and sex

The 2023 Census was the first New Zealand census to collect data on gender. Gender refers to a person's social and personal identity, such as male, female, or another gender or genders that may be non-binary. Gender has three output categories: male, female, and another gender.

[Gender, sex, and LGBTIQ+ concepts in the 2023 Census](#) has more information.

Previous censuses have collected sex data, which had two output categories: male and female. Sex refers to a person's sex characteristics, such as their chromosomes, hormones, and reproductive organs. A person's sex can change over the course of their lifetime and may differ from their sex recorded at birth.

Census data is one of several data sources used to calculate population estimates. The preliminary ERP at census date mainly uses census data, along with the number of residents temporarily overseas. The Post-enumeration Survey, which measures census coverage and is used in calculating the ERP, also collected gender. There is sufficient gender information in this data to publish the preliminary ERP at census date broken down by gender at the national level.

When calculating the ERP at 30 June 2023, additional data sources for estimating births, deaths, internal migration, and international migration are used. These do not consistently measure gender, and are generally still based on sex, or a mixed concept of sex and gender. International migration, for example, is dependent on how gender or sex is identified in passports from different countries.

As a result of not being able to consistently collect sufficient data on gender across the components that make up population change, the ERP at 30 June 2023 continues to be based on sex, with no gender breakdowns available.

Post-censal population estimates (and projections) convey how the population is changing over time, whether it be by age, ethnicity, sex, or gender. There is currently limited information on how an individual's gender may change over their lifetime (what might be termed 'inter-gender mobility'), or whether patterns seen in the 2023 Census will change over time. For example, 60 percent of the population aged 15+ years who had another gender were aged 15–29 years (2023 Census). More data over time is needed to observe the trends in gender identification, such as whether the higher proportion of young people having another gender continues and/or whether this higher proportion continues as the cohort ages.

Until inter-gender mobility is better understood, and component data by gender is collected across the statistical system or can be estimated, population estimates (and projections) will continue to be based on sex. This means that demographic indices calculated from population estimates (eg, fertility rates, mortality rates including those in life tables) will also continue to be based on sex.

Net census undercount

It is usual that some people will be missed by the census and some people will be counted more than once. Historically, census coverage patterns have varied by age, gender/sex¹, ethnic group, and geographic area of usual residence. Consequently, the census coverage adjustments for different population groups, which are often interrelated, reflect these coverage patterns.

Typically, more people are missed by the census than are counted in error or counted twice, so coverage rates are most often expressed as a net census undercount (NCU). This is the difference between people who were not counted at all (gross undercount), and people who were counted more than once or in error (gross overcount).

Measuring the net census undercount

The PES measures net undercount, gross undercount, and gross overcount in the census.

[2023 Post-enumeration Survey: Methodology](#) describes in more detail the survey design, results from the integration of the PES with the 2023 Census, and the census coverage estimation approach using this data.

The 2023 PES was carried out soon after census date (7 March 2023), with interviewers visiting approximately 17,000 private dwellings throughout New Zealand, with 37,500 people responding to the survey.

Survey collections were carried out in two waves due to extended census collections in the Auckland area:

- Wave 1: Collection took place in all regions except for Auckland between 2 June and 30 July 2023.
- Wave 2: Collection took place in the Auckland region between 1 July and 31 August 2023.

The 2023 PES was a face-to-face interviewer-administered survey with an electronic questionnaire. All usual residents in a selected private dwelling were asked for basic demographic information and to provide any addresses where they might have filled in a census form, or had one filled in for them.

Results from data integration of 2023 PES and 2023 Census records provided indicators of PES respondents' inclusion in the census. They were:

- undercounted if the respondent should have been counted but was not found in the census
- overcounted if the respondent was counted in error or counted more than once by the census.

The pool of PES respondents correctly included in the census is the basis for estimating probabilities of undercount and overcount in the census. An improved design for linking the 2023 PES responses to the 2023 Census, followed by a robust quality-assurance process, has provided additional confidence from 2018 in the detection of both overcount and undercount. In particular, the 2023 linking process was more effective at detecting overcount caused by census duplicates, as well as

¹ Gender was collected in the 2023 PES, sex in the 1996 to 2018 Post-enumeration Surveys.

large improvements in linking rates across all level 1 ethnic groups ([2023 Post-enumeration Survey: Final linking methodology](#)).

The 2023 PES estimation model was generally consistent with the modelled approach implemented for estimating the census coverage adjustment in the 2018 ERP ([Post-enumeration survey 2018: Methods and results](#)).

It provided stabilised estimates of undercount and overcount probabilities at the disaggregated level, simultaneously. Hierarchical logistic regression models for estimating undercount and overcount probabilities were specified at the individual level and their structures included the multi-level survey design, and household and geographic area effects. These coverage models included individual effects and interactions of age, gender, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator. For a fuller discussion of the modelling approach, see [Small Domain Estimation of Census Coverage – A Case Study in Bayesian Analysis of Complex Survey Data](#).

As with the 2018 PES models, the 2023 PES models allowed us to estimate coverage probabilities to the territorial authority and Auckland local board area (TALB) level (the 2013 model estimated to regional council area). Within each TALB, the models allow coverage to vary by age, gender, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator. However, within each TALB, meshblocks are assumed to have the same effect on coverage as the TALB, after accounting for all other attributes.

The net census undercount (NCU) is measured as the difference between the coverage-adjusted census population (PES estimated population) and the census usually resident population count. The estimates of undercount and overcount probabilities are combined to calculate a census coverage adjustment ratio by age, gender, ethnic group indicators, Māori descent indicator, New Zealand-born indicator, and TALB. The coverage adjustment ratios are then applied to the census usually resident population file to derive the PES estimated population.

[Calculating the ERP at 7 March 2023](#) describes the calculations of the NCU as part of the ERP compilation process.

The modelled approach for estimating census coverage based on the PES sample provides direct measures of uncertainty for demographic cross-tabulations of the NCU.

[Measuring uncertainty in the ERP](#) provides a technical description of the uncertainty measure associated with the NCU and other ERP components.

Demographic attributes of the net census undercount

As in previous censuses, NCU varied by age, gender/sex, ethnic group, and geographic region (table 4). The main features of the differential NCU in 2023 were that:

- males (1.5 percent) had higher NCU than females (0.8 percent) and people of another gender (0.6 percent), although there are large credible intervals around the latter estimate
- people aged under 45 years had higher NCU than those aged 45+ years
- the broad Asian (2.2 percent) and Middle Eastern/Latin American/African (2.9 percent) ethnic groupings had the highest NCU rates, although there are large credible intervals around these estimates

- among regions, Auckland (1.4 percent) had the highest NCU, slightly higher than the rest of New Zealand (1.0 percent).

Table 4

Net census undercount (NCU) estimates by selected population groups		
2023 Post-enumeration Survey		
Population group	NCU median estimate⁽¹⁾	NCU median percentage⁽²⁾
Total	57,200	1.1
Gender		
Male	36,800	1.5
Female	20,000	0.8
Another gender	100	0.6
Broad age group⁽³⁾ (years)		
0–14	18,400	1.9
15–29	13,900	1.4
30–44	17,900	1.7
45–64	8,700	0.7
65–74	-1,200	-0.2
75+	-700	-0.2
Broad ethnic group⁽⁴⁾		
European or Other (including New Zealander)	23,400	0.7
Māori	14,400	1.6
Pacific	7,100	1.6
Asian	19,500	2.2
Middle Eastern/Latin American/African	2,700	2.9
Māori descent⁽⁶⁾		
Māori descent	15,500	1.5
No Māori descent	41,400	1.0
Regions		
Auckland	24,000	1.4
Waikato	5,700	1.1
Wellington	5,600	1.1
Rest of North Island	10,300	0.9
Canterbury	6,800	1.0
Rest of South Island	4,500	0.8

1. Medians are not additive, and median totals may differ from the sum of the component median estimates. Median PES results may also differ slightly from the mean NCU adjustment applied in derivation of the ERP (tables 2 and 4).
2. The NCU median percentage is relative to the PES estimated population, not to the ERP.
3. Age at census night, 7 March 2023.
4. People who reported more than one ethnic group are included once in each group reported. These are therefore overlapping ethnic populations.
5. Māori descent electoral concept. This is different from the Māori descent indicator used elsewhere in the 2023 Census. For more information, see [Māori descent electoral – 2023 Census: Information by concept](#).

Source: Stats NZ, [Post-enumeration survey: 2023](#).

For more detailed census coverage results, see:

- [Post-enumeration survey: 2023](#)
- [2023 Post-enumeration Survey: Methodology](#).

Residents temporarily overseas

Residents temporarily overseas (RTOs) on census night are not in scope to be included in the census. However, estimates of the resident population at census date include RTOs because, by definition, they are people usually in New Zealand and only temporarily away overseas (for less than 12 months). Most RTOs return to New Zealand within a few weeks of their departure.

The number of RTOs (civilian and military combined) at the time of the 2023 Census was 98,700. This included 98,400 civilian and 200¹ military RTOs. For a comparison of RTO estimates at census dates, see table 3 in [Historic comparison of the contributing components to ERP](#).

Over one-third of RTOs (46 percent) were estimated to be resident in Auckland, with the next-largest allocation (8 percent) being to Christchurch city. For the distribution of RTOs at national and selected sup-population levels, see table 5 in [Population change from 7 March to 30 June 2023](#).

The definition of 'resident' for assigning RTO or short-term resident traveller status is compatible with the rule for identifying international migrants based on the outcomes-based measure ([Defining migrants using travel histories and the '12/16-month rule'](#)).

To be classified as an RTO, a person must be a resident after their departure and on their arrival, so must satisfy these rules:

- a. They must be a resident after their departure.
- b. They must be a resident on the date of their arrival.
- c. They must not stay overseas for 12 months or more out of 16 months after their departure date.
- d. The 2023 Census date, specifically midnight of 7 March 2023, must fall between the person's departure and arrival dates.

¹ These rounded values do not sum to the 98,700 total which is independently rounded.

At the national level, the number of civilian RTOs by age and sex is derived by applying the above rules to linked international travel and migration data. The number of RTOs at census night was calculated by matching New Zealand-resident traveller arrivals to (earlier) departures, to determine those out of the country at midnight of 7 March 2023.

The ERP is derived with more detailed attributes than what is available in short-term resident traveller data. RTO records include information on age, sex, and country of citizenship. The merging of border movements data with integrated admin sources in Stats NZ's IDI and 2023 Census data therefore assigned resident meshblock location, gender, ethnic group indicators, and Māori descent indicator to the civilian RTO records. This was followed by a multiple-imputation process to fill in missing attribute information. For more information about the imputation process, see [Imputation in component datasets](#).

International travel and migration data does not generally include movements of military personnel, so the number and attributes of military RTOs (meshblock, age, sex) used information supplied by the New Zealand Defence Force, with some imputation of missing attributes. The inclusion of military RTOs is small but important, given military RTOs tend to be concentrated subnationally.

Calculating the ERP at 7 March 2023

Our ultimate objective is to estimate the resident population at 30 June 2023 ($ERP_{Jun_{mase}}$). To provide greater flexibility in meeting customer needs, we calculate at a more granular level than published, by:

- meshblock of usual residence – m
- year and quarter of birth – a (to enable generic age calculation)
- sex – s
- combination of indicators (yes/no) for each of European, Māori, Pacific, Asian, MELAA, and Other ethnic groups; Māori descent; and New Zealand-born – e .

The first step derives the preliminary ERP on census night ($ERPCen_{mase}$). This is the resident population in New Zealand on census night as counted by the 2023 Census and adjusted for net undercount ($CenAdj_{mase}$), and for residents temporarily overseas on census night (RTO_{mase}) who are out of scope of the census. It is a preliminary estimate because it has yet to undergo the demographic changes between census night and 30 June, and the demographic reconciliation at 30 June. We simulate 1,000 iterations ($i = 1, 2, 3, \dots, 1,000$) of each dataset, and the i th iteration of the preliminary ERP at census date is then:

$$1. \quad ERPCen_{mase}^i = CenAdj_{mase}^i + RTO_{mase}^i$$

The preliminary ERP at census date is also derived by gender (male/female/another gender). However, the derivation by sex in the preliminary ERP is used in the calculation of the ERP at 30 June 2023 because gender is unavailable in the component data sources.

Coverage adjustment of the census

A census coverage adjustment ratio is calculated using estimated census undercount and overcount of the resident population in New Zealand on census night as measured by the PES. Draws (samples)

from posterior distributions of undercount (ϕ^{under}) and overcount (ϕ^{over}) probabilities provided iterations of the adjustment ratio. The draws were at a broader demographic level than the ERP calculations, denoted by d below as a ‘TALB by age, by gender, by ethnic group, by Māori descent, by New Zealand-born’ cell.

The census coverage adjustment ratio for cell d is calculated as:

$$2. R_d = \frac{1 - \phi_d^{over}}{1 - \phi_d^{under}}$$

The expected value of the adjusted census count for cell d is denoted as $CenAdj_{mase}^i$ (for iteration i) and calculated by applying the census coverage adjustment ratio to the count of census records in scope for coverage estimation ($Census_{mase}^{in\ scope}$) and adding the count of census records out of scope for coverage adjustment ($Census_{mase}^{out\ of\ scope}$):

$$3. CenAdj_{mase}^i = R_d^i \cdot Census_{mase}^{in\ scope} + Census_{mase}^{out\ of\ scope}$$

The census records in scope for coverage adjustment were records of the resident population identified as being in New Zealand on census night, having returned a census form before the PES field enumeration started, and not enumerated as living in prisons ([2023 Post-enumeration Survey: Methodology](#)).

Calculating the net census undercount

The net census undercount (NCU_{mase}) is the difference between the coverage-adjusted census population (PES estimated population) and the census usually resident population count ($Census_{mase}$); that is, it is calculated for cell $mase$ and iteration i as:

$$4. NCU_{mase}^i = CenAdj_{mase}^i - Census_{mase}^i$$

In general, the cell values of the net census undercount are not integers. Results of the net census undercount may be produced as part of the ERP process and will for this purpose include random rounding to whole numbers. The mean of these estimates may differ slightly from the median PES results (for more information, see [Net census undercount](#)).

Population change from 7 March to 30 June 2023

This section describes the data processes used to estimate population change between census date and mid-year, to derive the ERP at 30 June 2023.

The ERP at 30 June 2023 is compiled by combining the preliminary ERP at census date with datasets representing the components of population change between census night and mid-year¹ (figure 6). Datasets of population change refer to natural increase (the difference between births and deaths) and net migration (the difference between migrant arrivals and migrant departures). The final step combines a demographic reconciliation of ages 0–14 years with the ERP at 30 June 2023 (for more information, see [Demographic reconciliation](#)).

Figure 6



Table 5 provides a summary of the sizes of the components contributing to the ERP at 30 June 2023 for selected population groups, with more detail in Aotearoa Data Explorer: [Estimated resident population \(ERP\), adjustments to derive ERP at 30 June 2023 \(from census usually resident population count\)](#).

¹ More specifically, these are population changes during the 115 days between midnight of 7 March and midnight of 30 June 2023.

Table 5

Estimates of components contributing to the ERP at 30 June 2023 by selected population groups							
Population group	At 2023 Census			Component change (between 7 March and 30 June 2023) ⁽²⁾		At 30 June 2023	
	Census usually resident population count	Net census under- count ⁽¹⁾	Residents temporarily overseas	Natural increase (births less deaths)	Net migration (migrant arrivals less migrant departures)	Demographic reconciliation ⁽³⁾	Estimated resident population
Total	4,993,923	57,100	98,700	5,900	44,400	0	5,200,000
Sex⁽⁴⁾							
Male	2,470,893	36,900	51,700	3,000	26,700	800	2,590,000
Female	2,523,030	20,300	46,900	2,900	17,700	-800	2,610,000
Broad age group⁽⁵⁾ (years)							
0–14	936,300	..	..	..	..	..	970,000
15–39	1,687,920	..	..	..	..	..	1,786,300
40–64	1,541,112	..	..	..	..	..	1,595,800
65+	828,588	..	..	..	..	..	848,000
Broad ethnic group⁽⁶⁾							
European or Other ⁽⁷⁾	3,433,020	23,400	43,000	1,100	-6,700	0	3,493,800
Māori	887,493	14,600	6,800	4,100	-2,000	100	911,200
Pacific	442,632	7,200	8,700	2,700	2,900	100	464,200
Asian	861,576	19,500	44,400	3,400	44,600	100	973,700
MELAA ⁽⁸⁾	92,760	2,900	3,400	500	4,100	0	103,700
Māori descent⁽⁹⁾							
Māori descent	1,009,590	15,700	8,300	4,300	-2,100	100	1,035,900
No Māori descent	3,984,333	41,500	90,300	1,500	46,500	-100	4,164,100
Regions							
Auckland	1,656,486	24,000	45,600	3,300	25,800	0	1,755,200
Wellington	520,971	5,600	9,500	500	1,400	0	538,000
Rest of North Island	1,630,551	16,200	23,800	1,600	8,000	0	1,680,200
Canterbury	651,027	6,800	11,600	500	6,700	0	676,600
Rest of South Island	534,255	4,500	8,100	0	2,600	0	549,400

1. The modelled mean adjustment for net census undercount may differ slightly from the equivalent median estimate from the 2023 PES ([Table 4](#)).
2. We assume zero net change due to people changing their ethnic or Māori descent identification over this period.
3. Adjustment of ERP at ages 0–14 years based on national-level demographic estimates from admin records of births, deaths, and international migration.
4. The ERP components aside from census and PES are based on a binary ‘sex’ variable, therefore such a variable must be derived from census and PES data here for compatibility. Census counts presented here are based on ‘sex at birth’ as a proxy for ‘sex’, rather than imputing ‘sex’ from ‘gender’. The ERP is subsequently used as the denominator for fertility statistics and projections, which rely on data using the ‘sex at birth’ concept.
5. When analysing population change for any given age group, cohort effects also have an impact. For example, those people aged 20–24 years at 7 March 2023 are not exactly the same people as those aged 20–24 years at 30 June 2023. For this reason, explicit age group adjustments are not shown here.
6. People who reported more than one ethnic group are included once in each group reported. These are therefore overlapping ethnic populations.
7. Includes New Zealander responses.
8. Middle Eastern/Latin American/African.
9. Māori descent electoral concept. This is different from the Māori descent indicator used elsewhere in the 2023 Census. For more information, see [Māori descent electoral – 2023 Census: Information by concept](#).

Note: Owing to rounding, individual figures may not sum to the stated totals.

Symbol: .. not available

Source: Stats NZ

Births and deaths

The number of births and deaths occurring in the period between census night and mid-year is recorded through the national registration system, administered by the Registrar-General under the auspices of the Department of Internal Affairs. As birth and death registrations are required by law, this data is of high quality.

By law, both parents of a child born in New Zealand must jointly notify Births, Deaths and Marriages as soon as is reasonably practicable after the birth (deemed by the Registrar-General as generally being within two months of the birth). Deaths are required to be registered within three working days after disposal of the body concerned.

However, not all births that occurred between 7 March and 30 June 2023 were registered at the time of the ERP compilation. Therefore, we included an allowance for the expected number of births that would have occurred during this period but had not yet been registered at the time of ERP compilation.

Historical data indicated there were likely to be fewer than 20 deaths occurring during the period 7 March to 30 June 2023 that had yet to be registered as of early 2025 for inclusion in the 2023 ERP. This number was considered too small to include as an adjustment.

To ensure the births and deaths data was as complete as required for the compilation of the ERP, the data included the following adjustments:

- Around 300 births were added to the estimate of births between 7 March and 30 June 2023 to account for delayed and late registrations based on completed birth registrations for previous years. The ethnic group indicators, Māori descent indicator, and region of residence information for these births were derived by sampling from donors of previous late registrations, as late registrations tend to have different attributes to earlier registrations.
- Small proportions of birth and death registrations had missing ethnic group, Māori descent, and/or resident meshblock location information. An imputation process filled in missing responses for these variables in the datasets. For more information about the imputation process, see [Imputation in component datasets](#).

Net migration

The net migration for geographic areas is estimated as the difference between the number of people who arrive in an area and the number of people who depart from the same area. At the national level, this is equivalent to international migrant arrivals less international migrant departures. At the subnational level, it is the combined inflows to a geographic area of internal and international migrants less the combined outflows of internal and international migrants from a geographic area.

The international and internal migration components are separately estimated at the TALB level by age, sex, ethnic group indicators, and Māori descent indicator. We calculate the combined net migration at the TALB level, and this is distributed to the meshblocks for the TALB according to the distribution of the estimated resident population at census. For more information about the calculation of net migration, see [Calculating the ERP at 30 June 2023](#).

Estimation of internal and international migration between 7 March and 30 June 2023 are described as two different processes below.

International migration

Migrant arrivals and departures between 7 March and 30 June 2023 were defined by the outcomes-based international migration measure using linked travel histories and a rule for determining a change in resident status, which defines:

- a migrant arrival as an overseas resident who arrives in New Zealand and cumulatively spends 12 out of the next 16 months in New Zealand
- a migrant departure as a New Zealand resident who departs New Zealand and cumulatively spends 12 out of the next 16 months out of New Zealand.

This rule is independent of both the individual's legal residence status and the information stated on arrival and departure passenger cards¹.

The numbers of migrant arrivals and departures were classed as final by the outcomes-based migration rule and are available by variables such as age, sex, and country of citizenship. The migration data are linked in Stats NZ's IDI for resident location, ethnic group indicators, and Māori descent indicator. Migrants may have address notifications recorded before and after the migrant

¹ The arrival card is now the [New Zealand Traveller Declaration](#) (NZTD), which can be completed digitally from mid-2023, while the departure card was discontinued in November 2018.

arrival or departure date. The address notifications closest to the reference dates are selected irrespective of the time sequence of address notification in relation to movement.

Varying levels of missingness were observed in the resident location, ethnic group, and Māori descent information after linking migration datasets to the IDI. For a summary of relative levels of missingness across these variables in the migration records, see table 6 in [Imputation in component datasets](#).

Migrant arrivals in general have more missing data than departures and, overall, the Māori descent indicator had the highest level of missing data. Resident location information was imputed at the TALB level due to the large number of records with missing data and the limited input data available for the imputation process.

[Imputation in component datasets](#) explains the imputation method and details for the specific variables in the migration datasets.

Internal migration

The internal migration flows between geographic areas have been estimated using integrated 2023 Census data and admin address notifications data compiled by Stats NZ's IDI from key data sources (table 8 in [Appendix 1](#)).

Measurement of internal migration between 7 March and 30 June 2023 involves summarising individual linked-address histories with these main steps:

- From linked data in the IDI, we observed paired origin and destination locations at the meshblock level. From this data, internal movements in and out of meshblocks were identified.
- For the short period observed, it was assumed that net internal migration estimates for TALB areas, derived by the count of movements to and from areas, represented an accurate measure of net internal migration. Estimates of net internal migration for the same period of previous years show consistent results.
- Migrants arriving in New Zealand, infants born, and deaths during the period were all excluded from internal migration estimation.
- The migration flows to TALB areas, including universities or other key tertiary education providers, were adjusted to account for the time lag in address-notifications data compared with time of movement. There were large numbers of address changes by students who moved to certain TALBs for tertiary study. We assumed that most of these moves occurred before tertiary courses commenced, that is, by the end of February.
- Small adjustments were applied to the internal migration estimates to avoid flows to/from meshblocks with zero populations, and to ensure the estimates balanced at the national level.

The internal migration dataset was created at the TALB level. From integrated data in the IDI, information on date of birth, sex, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator were included at the unit-record level. An imputation process followed to fill in missing ethnic group and Māori descent indicator responses. For a description of the imputation methods, see [Imputation in component datasets](#).

The ERP process required estimates of net migration, that is, international and internal flows combined to calculate in-migration less out-migration at the meshblock level.

[Calculating the ERP at 30 June 2023](#) describes the process for compiling ERP and includes a step to distribute the net migration component derived at the TALB level to meshblocks within the TALB.

Imputation in component datasets

The ERP derivation process involved imputing missing attribute information in the component datasets. Imputing missing attributes in the vitals (births, deaths) and ‘migration’ (RTOs, international migration, and internal migration) datasets involved a two-step process:

1. We used integrated data, including address-notification histories and ethnic group information, to impute missing information. The integrated data sources included 2013, 2018, and 2023 Census data. Māori descent information was imputed from census and vitals data. For more information about the admin sources used, see table 8 of [Appendix 1](#).
2. We used multiple imputation to resolve any remaining missingness in the attributes.

Records entering the ERP process and sourced from registration data and admin collections had complete information on date of birth and sex. However, missingness was observed in one or several of the other attributes, including resident location, ethnic group indicator, Māori descent indicator, and New Zealand-born indicator.

Levels of missingness varied by component (table 6). There were small proportions of missingness in birth and death records. By comparison, after use of integrated admin data to fill gaps, 90 percent of migrant arrivals and 29 percent of migrant departures were missing Māori descent indicator, 21 percent of migrant arrivals and 7 percent of migrant departures were missing ethnic group indicators, and 11 percent of migrant arrivals and 7 percent of migrant departures were missing resident location information.

After using integrated data to impute missing attribute information in step 1, we used hot-deck imputation to fill in any remaining missingness by selecting observed values from ‘similar’ records within the dataset (including those imputed in step 1). The process involved imputing the attributes sequentially in order of least to most missingness and was repeated 1,000 times to reflect the uncertainty in the imputed values of attributes.

Hot-deck imputation assumes that individuals with similar observed attributes are likely to have similar values for the attributes with missingness. It imputes missing values by drawing observed values from a pool of suitable ‘donors’ that are selected based on similarity in a set of auxiliary attributes, often referred to as ‘domain’ attributes. For example, when imputing New Zealand-born indicator in migration data, domain attributes can include age, sex, and country of citizenship. This approach helps maintain the distribution of observed data by ensuring the imputed values are consistent with the underlying patterns in the dataset.

Table 6

Level of item missingness observed in population components in deriving ERP at 30 June 2023				
Component	National total (number)	Missingness (percentage of total)		
		Location of usual residence	Ethnic group indicator	Māori descent indicator
Residents temporarily overseas ⁽¹⁾	98,700	4	3	21
Births ⁽²⁾	17,700	0	0	3
Deaths ⁽²⁾	11,800	1	0	13
International migrant arrivals ⁽¹⁾	77,100	11	21	90
International migrant departures ⁽¹⁾	32,700	7	7	29
Internal migration ⁽¹⁾	0	2

1. Missingness percentages are after use of admin data but before statistical imputation. Before use of admin data, these variables had 100 percent missingness.

2. Missingness percentages are before use of admin data and statistical imputation.

Symbol: ... not applicable

Source: Stats NZ

Calculating the ERP at 30 June 2023

The steps to produce the ERP at 30 June 2023 combine the preliminary ERP at census date and the components of population change between 7 March and 30 June 2023. The natural increase (births less deaths) is added at the required demographic level (meshblock, age, sex, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator). However, for computational efficiency, the net migration contribution to population change has been calculated at the TALB level (see [Internal migration](#)).

The ERP at 30 June 2023 is calculated in the following steps:

1. adding births
2. subtracting deaths
3. adjusting for negative population cells (see [Implausible small sub-population estimates](#))
4. aggregating the combined ERP dataset to TALB level:
 - i. adding net international migration
 - ii. adjusting for implausible population cells due to migrant departures (see [Implausible small sub-population estimates](#))
 - iii. adding net internal migration
 - iv. adjusting for implausible population cells due to internal out-migration (see [Implausible small sub-population estimates](#)) and adjusting to balance net internal migration at the required demographic level
5. distributing net migration to the meshblock level according to demographic distributions in the ERP dataset.

The final step combines a demographic reconciliation of ages 0–14 years with the ERP at 30 June 2023 (see [Demographic reconciliation](#)).

In summary, the final computational step for the i th iteration combines the components of population change births (Bth_{mase}^i), deaths (Dth_{mase}^i), and net migration ($netMig_{mase}^i$) with the ERP at census date ($CenERP_{mase}^i$) before including the demographic reconciliation ($DemRec_{mase}^i$) in the calculations of the final ERP at 30 June 2023:

$$ERP_{Jun}^i_{mase} = CenERP_{mase}^i + Bth_{mase}^i - Dth_{mase}^i + netMig_{mase}^i + DemRec_{mase}^i$$

Measuring uncertainty in the ERP

Uncertainty measures incorporated in the components sourced from registration and admin data came from the imputation processes for missingness observed in resident geographic location, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator (see table 7 in [Appendix 1](#)).

However, these processes have not incorporated uncertainty around the selection of records and related data-quality measures in the auxiliary data sources. As a result, the estimated uncertainty in the 2023-base ERP is a partial indication of uncertainty and builds on the work started in the 2013-base ERP (see [Measuring uncertainty in the 2013-base estimated resident population](#)).

The estimated uncertainty intervals available with the ERP results at 30 June 2023 comprised contributions from census coverage estimation, as measured by the PES and from imputation processes implemented at the demographic-variable level when compiling the component datasets (mainly RTOs and net migration).

Census coverage estimation used hierarchical models for estimating undercount and overcount probabilities, and these models provide coherent and integrated measures of uncertainties of coverage probabilities. By taking draws from their posterior distributions and incorporating them into the calculation of the coverage adjustment ratio (equation 2 in [Coverage adjustment of the census](#)), we have directly accounted for the uncertainty associated with the calculation of the net census undercount.

[2023 Post-enumeration Survey: Methodology](#) describes the 2023 PES modelled method (under ‘Estimation methods’), which is compatible with the method used in 2018. This uses a Bayesian modelling approach to produce PES results and uncertainty measures for much finer sub-populations than available up to 2013. In contrast, a direct weighted estimation method was used for the 1996 to 2013 Post-enumeration Surveys, based on the method used by other Stats NZ household surveys. The direct weighted approach involved multiple weight adjustments and calibration steps to ensure the PES sample correctly represented the full population of New Zealand.

The process for compiling the 2023 ERP used a simulation approach to account for the uncertainties in the contributing data. The preliminary ERP at census date, and the imputation processes used to compile the component datasets, generated 1,000 independent iterations. Each of the ERP calculation steps (outlined in [Calculating the ERP at 7 March 2023](#) and [Calculating the ERP at 30 June 2023](#)) were carried out over all these iterations.

The ERP results in published tabulations refer to estimated means of the data. Estimates of uncertainty intervals of ERP results refer to the 95 percent intervals as defined by the 2.5th and 97.5th percentile estimates.

Adjustments to the ERP

This section describes the methods used for the two final adjustments in the ERP process. The first adjustment applies an iterative process to adjust implausible estimates at 30 June 2023 for small population groups. The second adjustment was to reconcile the population estimates for ages 0–14 years with admin-based demographic estimates.

Implausible small sub-population estimates

The steps for calculating the ERP at mid-year included removing population by subtracting deaths and by subtracting out-migration. These steps can create implausible negative population estimates for some variable combinations at the detailed level.

The input components of the ERP have been compiled independently at the most detailed demographic level. Imputation processes and other data edits can result in the size of some population groups in deaths and out-migration data not being plausible when compared with the size of the preliminary ERP at census date.

A deterministic adjustment approach redistributed records with implausible population estimates across records with plausible estimates. It was an iterative approach that maintained the population group distributions with least missingness and resulted in adjustments being made to records with higher levels of imputation.

The processes to adjust for implausible population group estimates due to inconsistencies in deaths and out-migration data had negligible impact across all demographic distributions. Consequently, these adjustments have not been separately identified as an explicit component of the ERP.

Demographic reconciliation

An adjustment to the ERP at 30 June 2023 for ages 0–14 years accounts for the discrepancy observed between resident population estimates derived from admin-based demographic data (independent of the census and PES) and resident population estimates derived from census, PES, RTO adjustments, and components of population change for these ages.

The admin-based demographic estimates are regarded as high quality. This reflects the high coverage of birth and death registrations in New Zealand, and the accuracy of the outcomes-based migration estimates (available from 2001) in measuring international migration. These provide a precise national estimate of the resident population at single year of age for the youngest ages.

The simplicity of using admin-based demographic data contrasts with the complex process of running a census, running a PES to estimate NCU, adjusting for RTOs, and finally adjusting for the components of population change between 7 March and 30 June, while minimising duplication in these steps. The census counts do include admin enumerations at the youngest ages, but these are based on admin data available at the time of integration (mid-2023). The demographic reconciliation is able to utilise more recent birth and death registrations and updated international migration estimates.

The national admin-based demographic estimates for ages 0–14 years are provided by birth and death registrations, and international migrant arrivals and departures, for cohorts born in the

September quarter of 2008 onwards. A small allowance was made for births that occurred in the most recent years but are yet to be registered, by inflating birth registrations for years ending June 2019 to 2023 relative to birth notifications.

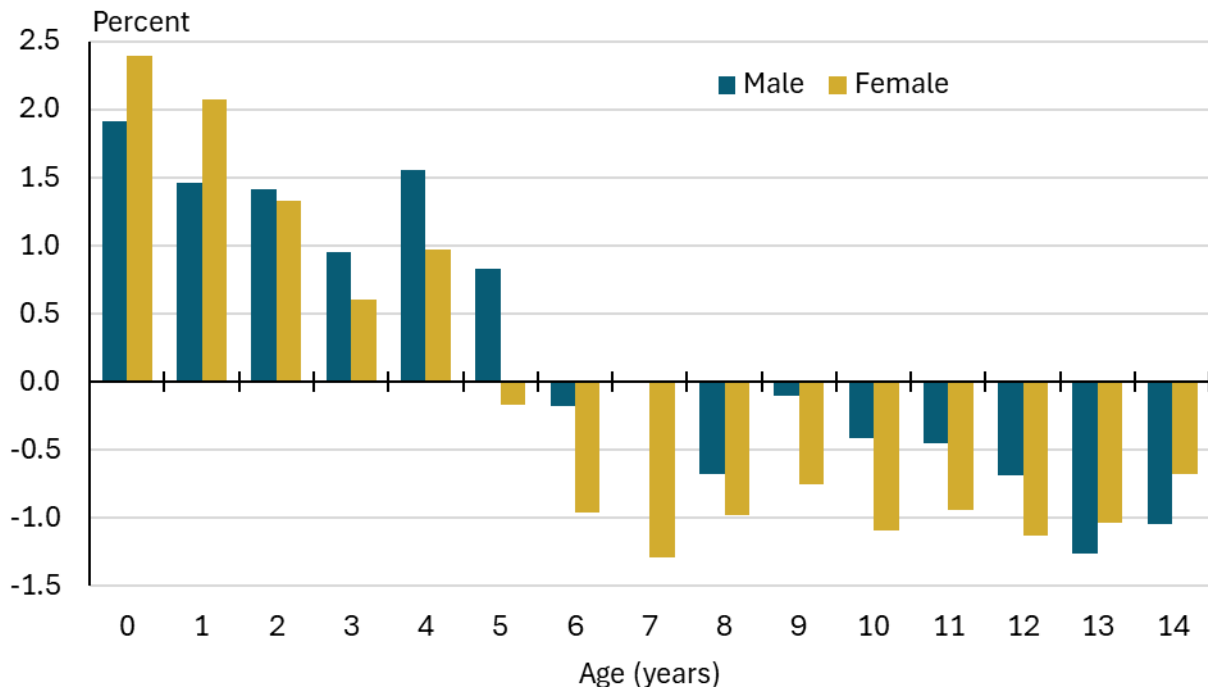
The resident population estimates at 30 June 2023 aggregated to year and quarter of birth and sex for ages 0–14 years formed the basis for comparison with the admin-based estimates. The adjustment factor (by year and quarter of birth and sex) was calculated as the ratio of the admin-based demographic estimates to the mean of the resident population estimates (over 1,000 iterations). The adjustment factors (by year and quarter of birth and sex) were applied consistently across sub-population domains, such as geographic area, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator.

[Calculating the ERP at 30 June 2023](#) describes further how the ERP compilation process implemented the demographic reconciliation at the sub-population level.

The demographic reconciliation increased the male ERP (aged 0–14 years) by 800, but decreased the female ERP by 800, resulting in a negligible overall change. Table 5 ([Population change from 7 March to 30 June 2023](#)) includes estimates of the demographic reconciliation for selected population groups. Figure 7 summarises the reconciliation as a percentage of the final ERP at 30 June 2023, by single year of age and sex.

Figure 7

Demographic reconciliation as percentage of ERP at 30 June 2023
by single year of age and sex



Source: Stats NZ

Glossary

administrative (admin) data – data collected by government or other organisations to operate. Data can be collected for, or as part of, service delivery, an application, membership, regulation, or registration. For example, admin records are maintained to deliver health and education services; to collect tax; to administer benefits such as superannuation; to regulate the flow of goods and people across borders; and to respond to the legal requirements of registering births, deaths, and marriages.

admin enumeration – use of administrative data to add records to the census dataset when an individual has not provided a response.

base population – the starting population, usually distributed by age and sex, from which population estimates and projections are derived.

census usually resident population count – a count of all people who usually live in a given area, and are present in New Zealand, on a given census night. The 2023 Census count includes people counted from forms and supplemented by admin enumerations in a combined census model. Census counts are not adjusted for coverage results from the Post-enumeration Survey.

The census usually resident population count of New Zealand *excludes* visitors from overseas and *excludes* New Zealand residents who are temporarily overseas.

For a subnational area, the count *excludes* visitors from overseas and elsewhere in New Zealand (people who do not usually live in that area) but *includes* residents of that area who are temporarily elsewhere in New Zealand on census night (people who usually live in that area but are absent).

cohort – a group of people sharing a common demographic experience. For example, the 2000 birth cohort refers to the people who were born in the year 2000.

demographic reconciliation – an adjustment to population estimates based on national-level demographic data (births, deaths, migration), independent of census and PES, which might be considered more accurate than census counts with subsequent adjustments, especially at the youngest ages.

estimated resident population (ERP) – an estimate of all people who usually live in an area.

The estimated resident population of an area *includes* all residents present in New Zealand and counted by the census, residents who are temporarily elsewhere in New Zealand and counted by the census, residents who are temporarily overseas (who are not included in the census), and an adjustment for residents missed or counted more than once by the census (net census undercount). Visitors from elsewhere in New Zealand and from overseas are *excluded*.

For a reference date after census night, the estimated resident population is updated for births, deaths, and net migration (arrivals less departures) of residents, during the period between census night and the reference date.

intercensal discrepancy – the difference between population estimates produced before the census and population estimates rebased after the census. It is a measure of the accuracy of population estimates and is the net combined effect of various factors including inaccuracies in:

- the census counts at the beginning and end of the period

- the adjustments to derive population estimates (from census counts) at the beginning and end of the period
- the components of population change (births, deaths, migration) during the period.

multiple imputation – the repeated process of replacing missing information in a dataset with plausible values.

net census undercount (NCU) – the difference between gross undercount and gross overcount. It is usually expressed as a percentage of the PES estimated population rather than as a percentage of what was counted.

- **gross undercount (under-coverage/under-enumeration)** – the number of people who should have been counted by the census but were missed.
- **gross overcount (over-coverage/over-enumeration)** – the number of people who should not have been counted by the census but were counted in error, plus the number of people who were counted more than once.

post-enumeration survey (PES) – a sample survey to check the accuracy of coverage and/or response of a census. In New Zealand, the PES is a sample survey carried out soon after each census to measure census coverage and response rates.

posterior distribution – an estimate combining the prior distribution (what we assumed before seeing the data) with the likelihood (information provided by the data).

resident – a person who lives in an area. This is a statistical, not a legal, definition generally based on a person's self-identified usual address. For example, in census statistics a resident is a person who self-identifies on the census individual form that they usually live in an area.

residents temporarily overseas (RTOs) – residents of New Zealand who are out of New Zealand for less than 12 months. Strictly speaking, under the 12/16-month rule for determining migrant status, an RTO must meet these criteria:

- a. They must be a resident after their departure.
- b. They must be a resident on the date of their arrival.
- c. They must not stay overseas for 12 months or more out of 16 months after their departure date.
- d. The reference date at which they are an RTO must fall between the person's departure and arrival dates.

visitor – a person who usually lives elsewhere. This is a statistical, not a legal, definition generally based on a person's self-identified usual address.

Appendix 1: Overview of data sources by ERP component

Table 7

Overview of sources of uncertainty and methods to measure uncertainty in the ERP		
ERP component	Source of uncertainty included in the ERP	Method for uncertainty measure
Census usually resident population count	None	Editing, data sources, and imputation in the 2023 Census
Net census undercount	Estimate of coverage adjustment ratio by age, sex, TALB, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator (Calculating the ERP at 7 March 2023)	Estimates of undercount and overcount probabilities by Bayesian hierarchical models use multiple draws from the posterior distributions
Residents temporarily overseas on census night	Missingness from integration of short-term New Zealand-resident traveller records with resident location, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator (Imputation in component datasets)	Multiple imputation by chained equations (MICE)
Births and deaths	Missingness in ethnic group indicators, resident location, Māori descent indicator, and New Zealand-born indicator	Hot-deck imputation approach
International migration	Missingness from integration of international migrant records with resident location, ethnic group indicators, Māori descent indicator, and New Zealand-born indicator (Imputation in component datasets)	Hot-deck imputation approach at the TALB level
Internal migration	Missingness from integration of internal migration records with ethnic group indicators, Māori descent indicator, and New Zealand-born indicator (Imputation in component datasets)	Hot-deck imputation approach at the TALB level
Demographic reconciliation	None	None
Source: Stats NZ		

Table 8

Overview of data sources, variables fully observed, and variables with missingness in the ERP components			
ERP component	Data sources used	Variables fully observed	Variables with missingness
Census usually resident population count	2023 Census of Population and Dwellings	Meshblock of usual residence, year and quarter of birth, sex at birth, gender, ethnic group (level 1 indicators), Māori descent indicator (electoral)	New Zealand-born indicator was imputed prior to coverage adjustment. There are no other ERP variables with missingness due to the use of alternative data sources (including admin data) and statistical imputation in the 2023 Census (Editing, data sources, and imputation in the 2023 Census (updated)).
Census coverage adjustment ratio	2023 Post-enumeration Survey	TALB of usual residence, year and quarter of birth, gender, ethnic group (level 1 indicators), Māori descent indicator (electoral), New Zealand-born indicator	PES demographic variables used for coverage estimation have been imputed for missing values.
Residents temporarily overseas (RTOs) on census night	<ul style="list-style-type: none"> • Civilian RTOs from short-term resident traveller records (Stats NZ migration database) • Compiled address notifications from linked admin data including 2023 Census (Stats NZ IDI) • Compiled ethnicity information from linked admin data including 2023 Census (Stats NZ IDI) • Māori descent (electoral), New Zealand born and gender information from linked admin data including 2023 Census (Stats NZ IDI) 	Year and quarter of birth, sex	Meshblock of usual residence, gender, ethnic group (level 1 indicators), Māori descent indicator, New Zealand-born indicator
	<ul style="list-style-type: none"> • Military RTOs from New Zealand Defence Force 	Region of usual residence, year and quarter of birth, gender, ethnic group (level 1 indicators), Māori descent indicator	Meshblock of usual residence, sex, New Zealand-born indicator

Births	Registrations (Stats NZ vitals database)	Year and quarter of birth, sex (including an adjustment for late registrations)	Meshblock of usual residence, ethnic group (level 1 indicators), Māori descent indicator, parental ethnic group (level 1 indicators), parental Māori descent indicators
Deaths	Registrations (Stats NZ vitals database)	Year and quarter of birth, sex	Meshblock of usual residence, ethnic group (level 1 indicators), Māori descent indicator
International migration	<ul style="list-style-type: none"> • Migrant records (Stats NZ migration database) • Compiled address notifications from linked admin data including 2023 Census (Stats NZ IDI) • Compiled ethnicity information from linked admin data including 2023 Census (Stats NZ IDI) • Māori descent (electoral) and New Zealand-born information from linked admin data including 2023 Census (Stats NZ IDI) 	Year and quarter of birth, sex, country of citizenship, country of birth (country of citizenship and country of birth have missingness but are not imputed)	TALB of usual residence, ethnic group (level 1 indicators), Māori descent indicator, New Zealand-born indicator
Internal migration	<ul style="list-style-type: none"> • Migrant records (Stats NZ migration database) • Compiled address notifications from linked admin data including 2023 Census (Stats NZ IDI) • Compiled ethnicity information from linked admin data including 2023 Census (Stats NZ IDI) • Māori descent (electoral) and New Zealand-born information from linked admin data including 2023 Census (Stats NZ IDI) 	TALB, year and quarter of birth, sex	Ethnic group (level 1 indicators), Māori descent indicator, New Zealand-born indicator
Source: Stats NZ			

Appendix 2: Geographic areas used in population estimation

The ERP at 30 June 2023 was compiled at the most detailed geographic level, meshblock, which allows aggregation of the ERP to all standard statistical geographies. Each component of the ERP has been estimated at that level, enabled by the admin sources used (see table 8 in [Appendix 1](#)).

Population estimates are not published at meshblock level, but are aggregated to various statistical output geographies, typically for the latest geographic pattern available (see [Geographic boundaries annual release: As at 1 January 2025](#)).

National level

New Zealand – for statistical purposes, the term ‘New Zealand’ refers to ‘geographic New Zealand’. This includes offshore islands, but does not include the Cook Islands, Niue, or the Tokelau Islands.

Subnational level

Regional council areas (regions)

The boundary of each regional council conforms as far as possible to one or more water catchment areas and considers factors such as natural resource management, land-use planning, and environmental matters. Generally, regional council areas contain complete territorial authority areas. Where territorial authorities straddle regional council boundaries, the affected area has been statistically defined in complete area units.

Territorial authority areas

A territorial authority is a city council or district council. There are 67 territorial authorities comprising 12 cities, 53 districts, Auckland, and Chatham Islands territory. ‘Community of interest’ was a key factor in determining the boundaries of territorial authority areas.

Auckland local board areas

Twenty-one local board areas were established as part of the new local government arrangements for Auckland in 2010. Statistics at the local board level are often presented alongside territorial authority-level statistics to provide greater detail for Auckland.

Statistical area 2 (SA2)

The SA2 geography aims to reflect communities that interact together socially and economically. In populated areas, SA2s generally contain similar-sized populations. SA2s in city council areas generally have a population of 2,000 to 4,000 residents, while SA2s in district council areas generally have a population of 1,000 to 3,000 residents. SA2 replaces the area unit geography from the Standard Areas Classification 1992. At 1 January 2025, there were 2,395 SA2s across New Zealand.

Statistical area 3 (SA3)

SA3 is an output geography introduced in 2023 that allows aggregations of population data between the SA2 geography and territorial authority geography.

The SA3 geography aims to meet three purposes:

1. approximate suburbs in major, large, and medium urban areas
2. in predominantly rural areas, provide geographical areas that are larger in area and population size than SA2s but smaller than territorial authorities
3. minimise data suppression.

SA3s in major, large, and medium urban areas were created by combining SA2s to approximate suburbs as delineated in the Fire and Emergency NZ Localities dataset. Some of the resulting SA3s have very large populations.

Outside of major, large, and medium urban areas, SA3s generally have populations of 5,000 to 10,000. These SA3s may represent either a single small urban area, a combination of small urban areas and their surrounding rural SA2s, or a combination of rural SA2s.

Urban-rural

There are three urban-rural geographies:

- urban rural (UR)
- functional urban area (FUA)
- urban accessibility (UA).

Urban rural

Urban rural is a statistical geography that classifies New Zealand into areas that share common urban or rural characteristics. It is used to present a range of Stats NZ population and demographic statistics.

Urban areas are characterised by high population density with many built-environment features, where people and buildings are located close together for residential, cultural, productive, trade, and social purposes.

Rural areas represent land-based areas outside urban areas. A rural settlement is a cluster of residential dwellings about a place that usually contains at least one community or public building. Other rural areas are the mainland areas and islands located outside urban areas or rural settlements.

Functional urban area (FUA)

The FUA offers a broader definition of 'urban' by adding the surrounding rural hinterland to larger urban areas. FUAs consist of a densely inhabited city and a less densely populated commuting zone whose labour market is highly integrated with the city.

Urban accessibility (UA)

The UA provides a consistent measure of urban accessibility to measure the degree of influence that New Zealand's urban areas have on their surrounding rural areas. This approach distinguishes the degrees of rurality in New Zealand and enhances understanding of the differences across rural areas. The UA groups small urban areas and rural SA1s according to their proximity to larger urban areas.

Meshblock

Meshblocks are the smallest geographic unit for which we collect statistical data. Meshblocks vary in size from part of a city block to large areas of rural land. Each meshblock borders on another to form a network covering all New Zealand, including coasts and inlets. The meshblock classification extends out to New Zealand's 200-nautical-mile (370 kilometre) exclusive economic zone and is digitised to the 12-mile (22-kilometre) limit. Meshblocks are aggregated to build larger geographic areas, such as SA2, territorial authority, and regional council areas. At 1 January 2025, there were 57,551 meshblocks across New Zealand, with a mean population size of about 90 people.