

2019 NSW Population Projections



Technical Statement

This Technical Statement is intended to provide data users with information to better understand how the population projections are prepared and how to use and interpret them. It addresses some common questions about projection data and the methods used to prepare the projections.

What are population projections and why do we need them?

Population projections provide a picture of the population as it may develop in the future. They provide an indication of local areas likely future population size, and their age and sex profiles, if assumptions about future births, deaths and migration trends are realised.

An understanding of the size and composition of our future population is essential to making informed planning decisions for the State's future so we have the right number and type of services in the right areas. The projections are used as a common framework across NSW Government to inform planning policy decisions around infrastructure and service delivery such as the provision of hospital beds, school classrooms, roads and public transport.

Population projections are not government targets. The projections are open to change as future demographic behaviour can be impacted by government policies, changing economic and social circumstances or other factors (both in Australia and overseas).

Population projections form part of NSW Government's Common Planning Assumptions

The projections form part of the NSW Government's Common Planning Assumptions. These assumptions are used across agencies to ensure an aligned understanding of the relevant data, policies and assumptions underpinning planning decisions and policy analysis for government strategies and investment decisions. They form a baseline for making decisions about the future.

The NSW Government Common Planning Assumptions Group (CPAG) maintains a register of all approved Common Planning Assumptions, including assumptions, parameters, data sets and plans. CPAG was established in 2016 as a forum for co-ordinating data analysis for the District Planning undertaken by the Greater Sydney Commission, The Strategic Transport Planning Framework led by Transport for NSW and other planning activities.

For further information about the Common Planning Assumptions, click [here](#).

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Projections are released down to the Local Government Area level

The 2019 NSW population projections are released at the NSW, region and Local Government Area (LGA) levels. These geography levels nest within each other and sum to the NSW total population.

LGAs are approximations of local government boundaries as defined by state and territory governments. These government-defined boundaries are provided to the Australian Bureau of Statistics (ABS) as part of the Australian Statistical Geography Standard (AGSG). Using LGAs ensures that the structure of our projections fit together and are comparable over time.

LGA names are abbreviated in the ASGS structure and include a suffix to indicate the LGA's status, with (C) indicating cities and (A) indicating areas. For instance, the City of Albury is called 'Albury (C)', and Armidale Regional Council is called 'Armidale Regional (A)'.

Why are there low, medium and high projection series?

Future demographic behaviour is open to influence from a range of economic, social and political factors both within Australia and overseas. This means there is some degree of uncertainty associated with all projections.

A low, medium and high series have been produced to show three possible future population outcomes, based on what we can observe from the past, and assumptions used by the ABS and net overseas migration forecasts in Australian Government Budgets.

The medium series is the most likely demographic future based on analysis of births, deaths and migration trends. This series forms part of the NSW Government Common Planning Assumptions.

What demographic assumptions underpin these projections?

The projections are underpinned by a series of demographic assumptions about fertility (the number of babies likely to be born to women of different ages), mortality (the age at which people are likely to die) and migration (within NSW, interstate and overseas).

Assumptions are first set at the NSW level where larger population numbers allow more detailed analysis. Assumptions for regions and local government areas (LGAs) are then set in relation to the NSW assumptions. This is called a 'top-down' approach, meaning any projections below the NSW level will add up to the NSW total (see the Cohort Component Method section for more details). Note that all published projections figures are rounded to single digits. This means that in some instances, data table components will not exactly sum to published table totals.

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Jump-off Population

The base (or 'jump-off') population at the start of the projection period is ABS' Estimated Resident Population (ERP) data. This is the official measure of Australia's population. Further information on ERP data can be found below in 'Who do we count in the population projections?'

A detailed table of the assumptions underpinning the Low, Medium and High projection series can be found in Appendix A.

Cohort Component Method

The 2019 NSW population projections are produced using a Cohort Component Method. This method is internationally accepted as the gold-standard for population projections, with all Australian state and territory governments using some form of cohort component method to produce their respective population projections.

The cohort component method divides the population into 'cohorts' – by age and by sex – and models the impact of births, deaths and migration on each of these cohorts. This means that the projections reflect the reality that the likelihood of life events occurring – like having a baby, moving house or dying – changes over the course of a person's lifetime. In essence, births, deaths and migration trends are impacted by the age and sex profile of a given population.

This method incorporates a top-down approach, meaning that projections are produced at the NSW level first, with regional and LGA populations constraining to the NSW total. This means that LGA level populations sum to the regions and to the NSW totals, and the sum of the region projections is equal to the NSW total.

For more information on the cohort component method, see Tom Wilson's paper 'A Review of Sub-Regional Population Projection Methods' (2011), and Martin Bell's paper 'Small Area Forecasting for Infrastructure Planning: Towards a Better Practice' (1997).

Why aren't Census counts used for the 'jump-off' population?

Australia's official population count is the ABS ERP. The Census gives us a rich snapshot of Australia as it is on Census night but is not a suitable data source for setting our jump-off population.

ERP counts provide a more reliable count of the population as it takes Census counts of people where they usually live (accounting for interstate visitors and removing overseas visitors), adjusts for Census undercount and overcount using the Census Post Enumeration Survey (PES), adds in Australians who are temporarily overseas and applies further demographic adjustments. This figure is then 'backdated' from the August Census night to 30 June of that year by subtracting births, adding deaths and accounting for net interstate and net overseas migration. For further information on the underlying ERP methodology, click [here](#).

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Fertility trends

Two factors will determine how many babies are likely to be born in the future: the number of women who are of the right age to have children, and how many babies they may have.

To estimate how many babies are likely to be born in NSW in the years to come, we analyse births statistics from the ABS and the ACT, Queensland, Victoria and NSW Ministry of Health's respective Perinatal Data Collections to understand what NSW birth rates have done in previous years.

We first calculate 'age-specific fertility rates' (ASFRs), or the number of babies born to women aged between 15 and 49 years divided into five-year age groups. These rates are then used to calculate the total fertility rate (TFR), or the number of babies likely to be born to a woman over her lifetime. This process is undertaken at the NSW, region and LGA geography levels.

Mortality trends

We need to know the age at which people are likely to die, or 'life expectancy', in order to estimate the size of our future population. This is the mortality assumption used in the projections.

We use the latest ABS data on the number of deaths by age, together with ERP data to derive a current 'age-specific death rate'. This is used to update a master life table, which derives a probability of death at each age. Through iterative calculations, the life table calculates a life expectancy at each five-year age group for women and men. This is the average age at which a newborn can expect to live, and this differs between women and men. The master life table builds on historic deaths data back to 1975 and uses this to forecast future life expectancies. Once the life expectancy at birth figure is derived, we then compare our assumptions with figures produced by the ABS and the United Nations to make sure they are reasonable.

Migration trends

Understanding where and when people move home is a key part of creating our population projections. Whether moving to the other side of the country, or a few suburbs away, all moves change the local population profile. Without population mobility we would be assuming that everyone lives in the same home from birth to death, which is very rare.

We consider migration in three different ways for our population projections:

Intrastate movements: People moving within NSW, which is the most frequently-occurring type of move.

Interstate movements: People moving between NSW and other states or territories in Australia.

For interstate and intrastate moves, we used 2016 Census data to calculate the likelihood of someone moving based on their age, where they live, and where they are likely to move to.

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Overseas migration: People moving into or out of Australia on a long-term or permanent basis. People are counted in these data when they arrive or depart Australia permanently, or stay out of Australia for 12 out of 16 months. It includes Australian-born and overseas-born people moving internationally.

We use short-term forecasts from the Commonwealth Treasury as the starting point for the overseas migration assumptions. The forecasts are based on the latest data from the Department of Home Affairs on visa grants, past overseas migration flows by visa group, existing migration policy decisions and official economic outlooks. Age profiles are determined from ABS data on migration, including the 2016 Census. The long term overseas migration assumptions reflect the long term observed historical trend.

The places we anticipate people moving to in Sydney are also influenced by future housing development and current government policies.

What policies and projects are included in the 2019 population projections?

The population projections reflect announced policies and projects. Any policies which were yet to be announced, yet to go on exhibition or were on exhibition at the time of production have been explicitly excluded from the projections.

Examples of projects excluded from the projections include Special Activation Precincts (SAPs) at Parkes, Wagga Wagga and Snowy Mountains and unannounced locations of future metro stations in Greater Sydney.

Geographic base

The projections are based on LGAs as at 30 June 2019, with data based on the ABS ASGS 2019 approximation to these definitions. This means compared with data from the 2016 Census,

- Rockdale and Botany Bay have been collapsed into Bayside
- Western Plains Regional has been renamed to Dubbo Regional
- Gundagai has been renamed to Cootamundra-Gundagai

Inverell and Armidale Regional: The localities known as Tingha, Bassendean, Howell, Stanborough, Bundarra, Georges Creek, New Valley and The Basin (collectively referred to as Tingha), which comprise approximately 800 square kilometres, are included in projections for the Armidale Regional (A) LGA. The projections do not reflect the town's boundary change into Inverell (A) which came into effect 1 July 2019.

Who do we count in the population projections?

Temporary populations

The population projections estimate the number of people who will usually live in a location, over time. The definition used for 'usually live' means that the person will be in the location for six months or more out of a year. This is the same definition used by the ABS across Census and ERP resources.

This means some temporary populations are counted, and others are not. However, most temporary populations counted in the projections tend to live in some form of non-private dwelling arrangements, like boarding schools and prisons, for example.

Some temporary populations which are not counted in the projections include people on short holidays, and people working longer shifts on mining and other infrastructure projects (typically Fly-In-Fly-Out or Drive-In-Drive-Out workers).

Babies are counted at the mothers' place of usual residence

When we are calculating where births are likely to occur in the future (and where babies are likely to live), we project them where their mothers usually live, rather than where the birth occurred (i.e. the location of the hospital). This is particularly important to for projecting the future population of regional areas where mothers may need to travel elsewhere to access maternity services, and for capturing births occurring in other states to mothers who usually live in NSW.

How does changing housing supply impact the projected population?

For the Greater Sydney, Illawarra and Lower Hunter (including Newcastle) regions the cohort component method is complemented with a Housing Unit Method (HUM) approach.

The HUM is used to direct a share of overall population growth to areas that are forecast to see increased housing supply. The HUM is applied to anticipate future changes in net internal migration patterns over the projection horizon. For the Greater Sydney Region, the future pattern on housing supply is derived from the [Housing Supply Forecast](#) with additional strategic interventions identified by planning professionals. In the other regions future capacity has been assessed by the Department of Planning, Industry and Environment's regional planning teams.

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Appendix A

Low, Medium and High Population Projections Series Assumptions

Table 1: Demographic assumptions NSW medium series (Common Planning Assumption)

NSW medium growth demographic assumptions 2016-2041

Fertility rate	Trending from 1.81 births per woman to 1.85
Life expectancy at birth (Males)	Trending from 81.8 to 86.0 years
Life expectancy at birth (Females)	Trending from 85.8 to 88.9 years
Net interstate migration	Annual net losses going from -20,200 to -17,000
Net overseas migration	Annual net gains trending from 105,020 to 68,800

Table 2: Demographic assumptions for NSW low and high series(a)

NSW low growth demographic assumptions 2016-2041

Fertility rate	Trending from 1.81 births per woman to 1.65
Life expectancy at birth (Males)	Trending from 81.8 to 85.9 years
Life expectancy at birth (Females)	Trending from 85.8 to 86.0 years
Net interstate migration	Annual net losses staying between -20,200 and -20,000
Net overseas migration	Annual net gains trending from 105,020 to 63,000

NSW high growth demographic assumptions 2016-2041

Fertility rate	Trending from 1.81 births per woman to 1.95
Life expectancy at birth (Males)	Trending from 81.8 to 86.0 years
Life expectancy at birth (Females)	Trending from 85.8 to 88.9 years
Net interstate migration	Annual net losses going from -20,200 to -6,800
Net overseas migration	Annual net gains staying between 105,020 and 105,500

(a) Assumptions for the low and high growth series have been set using observed historical highs and lows or informed by high and low assumptions used by the ABS in its 2018 state-level projections, as well as the net overseas migration forecast in the 2019-20 Australian Government Budget.