

Queensland Government population projections, 2023 edition: Methodology and assumptions

Specifications

The Queensland Government produces projections of the total population by age and sex, aiming to provide a view of the possible future size, distribution and age structure of the population of Queensland and its regions.

The Queensland Government population projections do not attempt to directly measure any future changes in economic, social and policy conditions that may influence future population change and distribution.

These projections represent usual resident populations only and exclude visitors and temporary residents.

Data are released for the following geographic boundaries:

- the State of Queensland
- Greater Brisbane Greater Capital City Statistical Area (GCCSA)
- statistical areas level 4 (SA4)
- statistical areas level 2 (SA2)
- local government areas (LGA).

Projections were generated for these geographical boundaries, as sourced from Edition 3 of the Australian Statistical Geography Standard (ASGS)¹ and defined by the Australian Bureau of Statistics (ABS). The 2021 version of boundaries for LGAs is used.

The previous, 2018 edition of the Queensland Government population projections were generated for geographical boundaries from the 2016 edition of the ASGS, which differ from Edition 3 at the SA2 and LGA levels for some regions within Queensland. [Maps of individual regions](#) under Edition 3 and the 2016 edition of the ASGS are available on the Queensland Government Statistician's Office website.

The 2023 edition uses the 2021 preliminary rebased estimated resident population as the base population, with time horizons to 2071 for Queensland and 2046 for sub-state areas. Projections are as at 30 June of each year of the projections horizon.

Population projections for the state of Queensland are available for single year intervals, by sex (male and female), and single year of age for persons aged 0–84 years and aggregated for persons aged 85 years or older. Projections for Greater Brisbane GCCSA and the 10 remaining Queensland SA4s are available as per the same specifications as at the state level, except by age which are presented by five-year age groups between 0–4 and 80–84 years and aggregated for persons aged 85 years or older. The SA2 and LGA-level projections are available for five-year projection intervals (i.e., 2026, 2031, 2036, 2041 and 2046), by sex, and five-year age groups (similar to Greater Brisbane GCCSA).

Projection specifications for the 2023 edition of the population projections are summarised in Table 1.

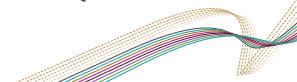
Table 1 Specifications of population projections released publicly by geography^(a)

Geography	Series	Projection horizon	Projection intervals	Age disaggregation
State of Queensland	Low, medium and high	2021 to 2071	Annual	Single year of age for 0–84 years, 85+ years
Greater Brisbane GCCSA and 10 remaining SA4s	Low, medium and high	2021 to 2046	Five-year	Five-year age groups for 0–4 to 80–84 years, 85+ years
SA2s	Medium			
LGAs ^(b)	Low, medium and high			

(a) Each of these projection sets is available by sex (male and female), except for low and high series LGA projections.

(b) Total population projections for LGAs are available for all three series, but projections disaggregated by age groups and/or sex are only available for the medium series.

¹ ABS *Australian Statistical Geography Standard (ASGS) Edition 3, July 2021 – June 2026*; (abs.gov.au)



Uncertainty and low, medium and high projection series

The Queensland Government population projections should not be interpreted as precise point estimate forecasts or predictions. Rather, the projections reflect the outcomes of applying a set of assumptions about the future to a base population. As a result, the accuracy of these projections is dependent on the extent to which the underlying assumptions eventuate.

The population projections for the state, Greater Brisbane GCCSA and the 10 remaining Queensland SA4s are based on trends and assumptions around fertility, mortality and migration. Projections for SA2s are primarily informed by anticipated future housing supply sourced from local government planning schemes and datasets, as well as historical population trends. LGA projections are generated based on historical population trends, constrained by the SA2 and/or SA4 projections. Future levels of fertility, mortality, migration and dwelling stock can be unpredictable, and historical population trends may not continue, which introduces uncertainty into the projections of the future population.

To account for this uncertainty, three projection series (low, medium and high) have been developed for the state, Greater Brisbane GCCSA and the 10 remaining SA4s, as well as LGAs to illustrate a range of possible future outcomes. However, given there is uncertainty in the future housing supply, only a medium series projection is generated at the SA2 level, using future housing supply information drawn from local government planning schemes and datasets.

Each of the low, medium and high series reflects a unique combination of assumptions about demographic components and other factors impacting population change and is one of many possible scenarios for future population change in Queensland and its sub-state regions.

At the state level, the high series assumption for each component of population change reflects the greatest magnitude of population growth of the three series in the long-term (i.e., the highest fertility level, lowest mortality rates, and greatest net interstate and net overseas migration), and the low series the least growth. For more detail on the range of state-level component assumptions, see pages 6 and 7.

Each projection series for Greater Brisbane GCCSA and the 10 remaining SA4s is underpinned by region-specific assumptions for the components, relative to the state-level assumptions.

For SA2s and LGAs, the projections at higher geographical levels are combined with assumptions about future dwelling supply and occupancy constraints, as well as the continuation of recent trends in population change, to spatially distribute population change at this lower geographical level. The low and high series projections for LGAs reflect there is uncertainty in the availability of future dwelling supply and the spatial distribution of the population, especially as demographic trends vary at the state or Greater Brisbane GCCSA/SA4 level.

Users should exercise caution in the interpretation and use of population projections, particularly sub-state level projections where there is a much greater degree of uncertainty. The uncertainty in future population change increases the further from the base year into the future. Users are advised to consider the combination of assumptions underpinning each series when using the population projections, as outlined in this report.

Impacts of the COVID-19 pandemic

The 2023 edition of the Queensland Government population projections incorporated the most up-to-date and relevant data available at the time of production and aims to reflect the latest population outcomes and trends in the available data. There was still a considerable level of uncertainty around some future demographic impacts due to the COVID-19 pandemic.

The World Health Organization declared the novel coronavirus (COVID-19) a worldwide pandemic on 11 March 2020. The pandemic and associated response measures and restrictions enacted by different levels of government both within Australia and internationally, have impacted population growth in Australia since early 2020. Most restrictions and associated health measures were eased incrementally in Australia during 2022, however some demographic impacts of the COVID-19 pandemic were still apparent at the time of production of the 2023 edition projections. Queensland's population is expected to be smaller and slightly older than what was anticipated prior to the COVID-19 pandemic.

While past and current trends provide background to the possible demographic outlook for Queensland, there is uncertainty around how these trends will evolve over a 50-year projection horizon for Queensland and a 25-year projection horizon at the sub-state level. For an overview of recent population growth in Queensland, and how this has varied from historical trends since the onset of the COVID-19 pandemic in early 2020, see the [Queensland Government population projections: Background research paper](#).

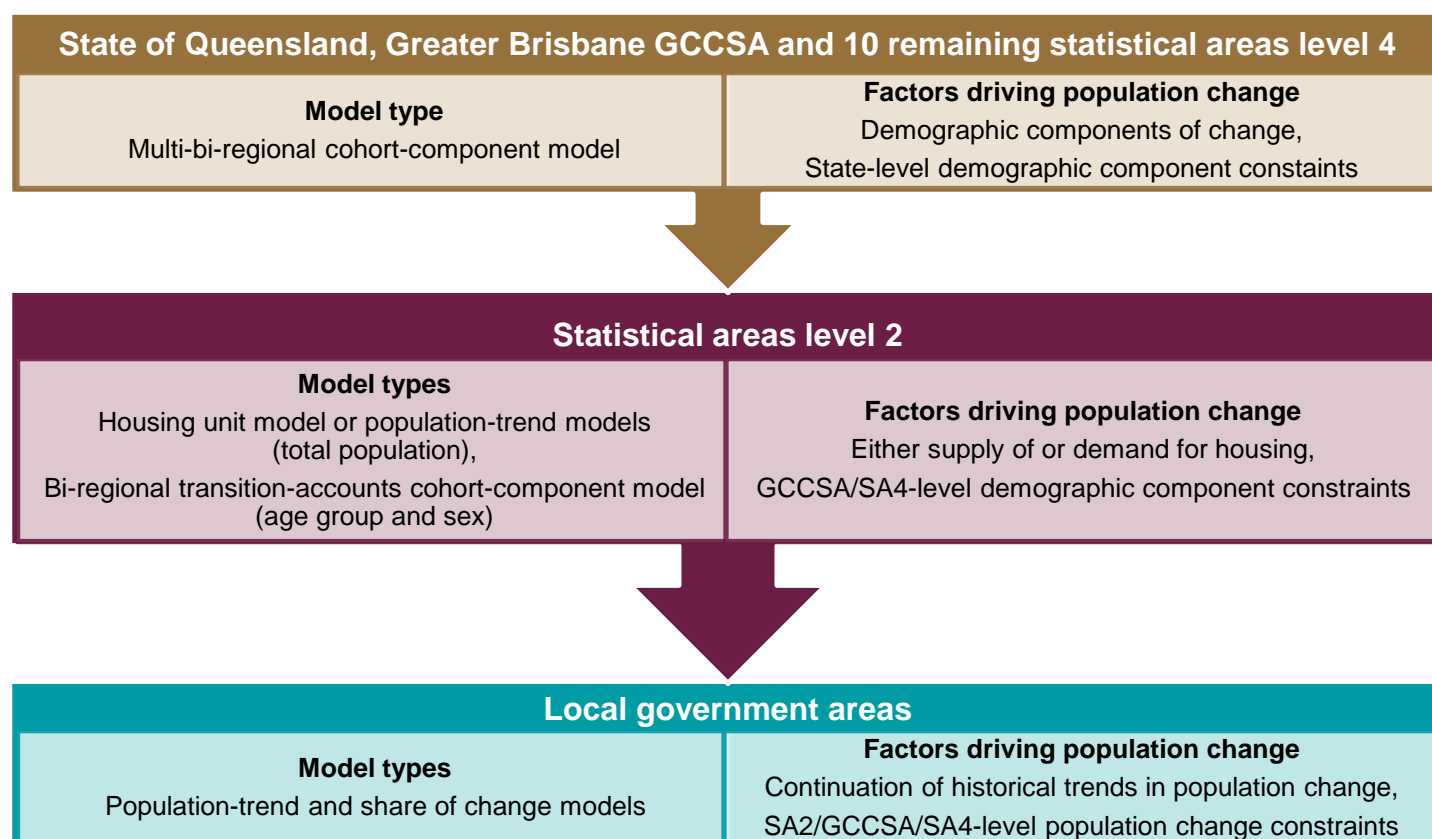
Model methodologies

Queensland's state and sub-state population projections are generated in sequential stages, using several different models. The choice of methodology and techniques applied for different geographical areas and different geographical levels considered issues such as:

- assumptions about the components of population change (fertility and mortality rates, and overseas, interstate and intrastate migration)
- the principal determinants of population change (demand for housing versus supply of dwellings)
- data reliability and availability
- the rate of population change
- a region's share of overall state population.

Figure 1 summarises the sequential stages of modelling, types of models used and factors driving projected population change at different geographical levels, which are further explained in this report.

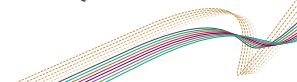
Figure 1 Sequential stages of modelling, model type and factors driving population change at different geographical levels



State, Greater Brisbane Greater Capital City Statistical Area and statistical areas level 4

Demographic component assumptions are the main drivers of population change and the future size, distribution and age structure of the population in the projections for the State of Queensland, Greater Brisbane GCCSA and the 10 remaining SA4s.

Projections were generated for Greater Brisbane GCCSA rather than for each of the nine individual SA4s within this area (Brisbane - East, Brisbane - North, Brisbane - South, Brisbane - West, Brisbane Inner City, Ipswich, Logan - Beaudesert, Moreton Bay - North, Moreton Bay - South). This approach was taken as future population change in a number of these SA4s is expected to be principally driven by dwelling supply availability and constraints (which is considered at the SA2 level), rather than demographic factors alone.



Population projections for the State of Queensland, Greater Brisbane GCCSA and the 10 remaining SA4s were generated using a multi-bi-regional cohort-component model. This methodology ages population cohorts over time to the successive age groups, accounting for births and deaths, as well as inward and outward migration for each region.

Assumptions about the future levels of fertility, mortality, net overseas migration, net interstate migration and net intrastate migration are used to calculate the number of births, deaths and migrant flows by type. A summary of the Queensland-level component assumptions is provided on pages 6 and 7.

Each projection series for Greater Brisbane GCCSA and the 10 remaining SA4s is underpinned by regionally-specific assumptions for each of the components, relative to the state-level assumption. Different fertility rates and life expectancies are used for each sub-state region, accounting for recent historical differentials between each region and Queensland. However, the projected numbers of births, deaths, and net overseas migration and net interstate migration for Greater Brisbane GCCSA and SA4s are scaled to the Queensland level, with projected net intrastate migration constrained to zero by definition.

Fertility and mortality

For these regions, the number of births each year is calculated by applying assumed age-specific fertility rates to the population of women of child-bearing age (15–49 years old for the purposes of the model). The set of age-specific fertility rates is consistent with the assumed total fertility rate for that annual period and region.

The number of deaths in each region is derived by applying age and sex-specific mortality rates to the population on an annual basis. For each sex and annual period, the corresponding set of age-specific rates is informed by the assumed life-expectancy at birth used, and a precalculated set of age and sex-specific mortality rates spanning different life-expectancies at birth that reflect historical and plausible future mortality age patterns (a mortality surface).

Migration

Net migration (inflows minus outflows) shares and/or levels for each of the migration components (overseas, interstate and, if sub-state, intrastate) were estimated for each region based on the relevant data sources. Regionally-specific migration profiles, reflecting migration propensities by sex and single year of age, were modelled to determine the sex and age-pattern of inflows and outflows of overseas, interstate, and intrastate migrants for each region.

A range of data sources and information were used to inform intrastate, interstate, and overseas migration shares/levels and their respective age profiles for these regions:

- 2011 and 2016 Census of Population and Housing data published by the ABS
- Regional Internal Migration Estimates prepared by the ABS²
- immigration and emigration estimates in the paper 'Methods for Estimating Sub-State International Migration: The Case of Australia'³
- methods in the paper 'Modelling Age Patterns of Internal Migration at the Highest Ages'⁴.

The assumed future overseas and interstate migration profiles were based on combining estimated resident population data and historical regional migration estimates by age and sex produced by the ABS. Future intrastate migration profiles were calculated based on data from the 2011 and 2016 Censuses.

Data from the 2021 Census were not incorporated into migration profiles as, due to the timing of the Census (August 2021), they reflect contemporaneous impacts of the COVID-19 pandemic, which included significant short-term disruptions to typical traveller behaviour and residential mobility, both domestically and internationally.

Migration shares/levels and profiles were constructed for each region and annual period. For years early in the projection horizon, these inputs reflect recent observed outcomes, and incorporate anticipated impacts of the COVID-19 pandemic. In successive years, these inputs were transitioned to constant longer-term shares/levels and profiles, reflective of a return to established, typical pre-pandemic trends.

² Published and unpublished data from ABS [Overseas Migration, 2020–21](#), ([abs.gov.au](#))

³ Tom Wilson, *Spatial Demography*, 5, 171-192, 2017

⁴ Tom Wilson, *Spatial Demography*, 8, 175-192, 2020



Statistical areas level 2

Future population change at the SA2 level is not modelled primarily as the result of demographic factors, as it is at higher geographical levels. Instead, projected population change for each SA2 (categorised as either 'urban' or 'rural') is considered to be primarily driven by either the future supply of, or demand for, housing:

- In the case of future housing supply, population change is considered a function of available dwelling supply and occupancy constraints, and anticipated consequent dwelling construction.
- In the case of future housing demand, population change is informed by population trend-based models that reflect the demand for housing. Additional dwelling supply is not considered the chief limiting factor in population change.

A bi-regional transition-accounts cohort-component model is used to produce age-sex disaggregated projections for each SA2, incorporating further modelling dependent on the 'urban' or 'rural' categorisation of the SA2. Transition-accounts refers to how migration is conceptualised, where it is modelled as a change in the SA2 of usual residence between successive points in time, rather than as migration movements over a SA2 boundary during a period of time (movement-accounts). SA2 population projections are constrained to those for Greater Brisbane GCCSA and the 10 remaining SA4s.

'Urban' statistical areas level 2

Population change in some SA2s (usually urban in nature) is considered a function of available dwelling supply and occupancy constraints, and future changes to this. For example, construction of many dwellings is projected to result in significant future population growth in SA2s such as Ripley, Rosewood, Springfield Lakes and Caloundra West - Baringa.

A housing unit model (HUM) has been used to project the populations in such SA2s (categorised as 'urban'), where future dwelling supply data were available from local government councils. For SA2s with their population projected using the HUM, projected population change in Greater Brisbane GCCSA and each of 10 remaining SA4s is distributed using the anticipated supply of dwellings (i.e., existing dwelling stock plus projected new dwellings) and assumptions about future occupancy rates at the SA2 level.

The HUM uses dwelling supply capacities to project the number of detached and attached dwellings, and the resulting population occupying those dwellings based on:

- the number of vacant lots (without dwellings)
- recent dwelling construction activity
- assumed future timing of availability of detached and attached dwellings
- assumed future occupancy rates in detached and attached dwellings
- assumed number of people resident in non-private dwellings (such as nursing homes, residential colleges, or prisons) or temporary dwellings (such as caravans, houseboats or tents).

The spatial and temporal distribution of dwelling supply arises from local government planning schemes and datasets. These are subject to future change and may have been revised from similar information used to inform the 2018 edition of the Queensland Government population projections. The rate at which the available dwelling supply is taken up in future is contingent upon economic conditions and decisions made by the business community, and is subject to uncertainty.

The 2023 edition also incorporates information on estimated dwelling yields for a number of Priority Development Areas (PDAs), formerly known as Urban Development Areas, across Queensland. PDAs are parcels of land within Queensland that have been identified for specific accelerated development with a focus on economic growth. Data on PDAs were provided by Economic Development Queensland.

'Rural' statistical areas level 2

Trend-based models were used to project the population for SA2s (usually non-urban or rural in nature) where dwelling supply and occupancy constraints are not considered to be the main drivers of future population change, or where future dwelling supply data were not available. These SA2s were categorised as 'rural'.

The population in 'rural' SA2s was projected as the weighted average of a constant share of the state's projected population, relative to the base year, and a variable share of the state's projected population growth, based on an exponential growth model.

Local government area

Components of population change are not explicitly modelled for LGAs. Instead, population change at the LGA level is calculated as the aggregation of changes in areas at a lower geographical level that make up the LGA.

Medium series LGA projections are constructed from the medium series of the SA2 projections. Low and high series LGA projections are produced by scaling change at a lower geographical level to the regional level (Greater Brisbane GCCSA and 10 remaining SA4s) and aggregating this change to the LGA level. LGA populations are constrained to those at the regional level.

State-level component assumptions

Summary table of assumptions – Queensland^(a)

Series	Fertility (total fertility rate ^(b))	Mortality (life expectancy at birth)	Interstate migration	Overseas migration
Low	Queensland total fertility rate decreasing to 1.40 by 2031–32, then remaining constant.	For females: <ul style="list-style-type: none"> Life expectancy to reach 85.9 years over 50 years, with annual improvement slowing from 0.01 to 0.00 years by 2070–71. For males: <ul style="list-style-type: none"> Life expectancy to reach 82.7 years over 50 years, with annual improvement slowing from 0.11 to 0.00 years by 2070–71. 	Net interstate migration decreasing to 13,000 persons per annum by 2026–27, then remaining constant.	Net overseas migration for Australia increasing to 185,000 persons per annum by 2023–24, then remaining constant. Queensland's annual share increasing to 14.0% by 2030–31, then remaining constant.
Medium	Queensland total fertility rate decreasing to 1.65 by 2031–32, then remaining constant.	For females: <ul style="list-style-type: none"> Life expectancy to reach 91.7 years over 50 years, with annual improvement slowing from 0.13 to 0.12 years by 2070–71. For males: <ul style="list-style-type: none"> Life expectancy to reach 88.1 years over 50 years, with annual improvement slowing from 0.22 to 0.11 years by 2070–71. 	Net interstate migration decreasing to 20,000 persons per annum by 2026–27, then remaining constant.	Net overseas migration for Australia increasing to 235,000 persons per annum by 2023–24, then remaining constant. Queensland's annual share increasing to 17.0% by 2030–31, then remaining constant.
High	Queensland total fertility rate increasing to 1.80 by 2031–32, then remaining constant.	For females: <ul style="list-style-type: none"> Life expectancy to reach 98.9 years over 50 years, with annual improvement slowing from 0.27 to 0.26 years by 2070–71. For males: <ul style="list-style-type: none"> Life expectancy to reach 97.2 years over 50 years, with annual improvement slowing from 0.38 to 0.30 years by 2070–71. 	Net interstate migration decreasing to 27,000 persons per annum by 2026–27, then remaining constant.	Net overseas migration for Australia increasing to 285,000 persons per annum by 2023–24, then remaining constant. Queensland's annual share increasing to 20.0% by 2030–31, then remaining constant.

(a) Projections for Greater Brisbane GCCSA and the 10 remaining SA4s have been prepared using regionally-specific assumptions. However, projected births, deaths, net overseas migration and net interstate migration for these regions are constrained to the Queensland level, with projected intrastate migration constrained to zero by definition.

(b) The average number of babies that would be born to a woman if she were to live to at least the end of her child-bearing years and gave birth to babies in alignment with the age-specific fertility rates that comprise that total fertility rate.

Demographic component assumptions – Queensland

Figure 2 Fertility: Assumed total fertility rate, by projection series, Queensland

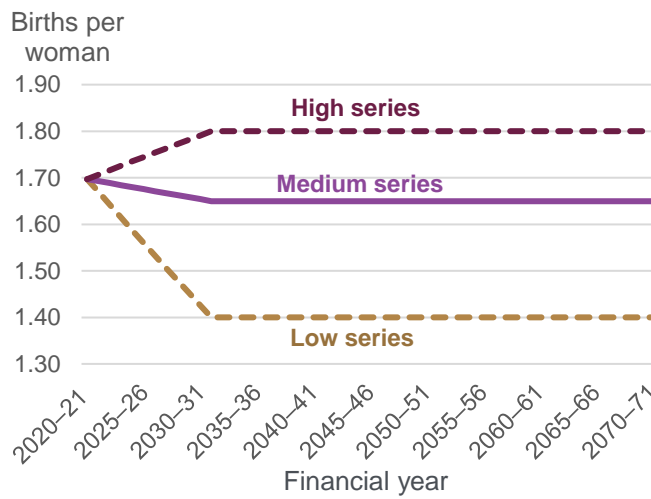


Figure 3 Mortality: Assumed life expectancy at birth, by projection series and sex, Queensland

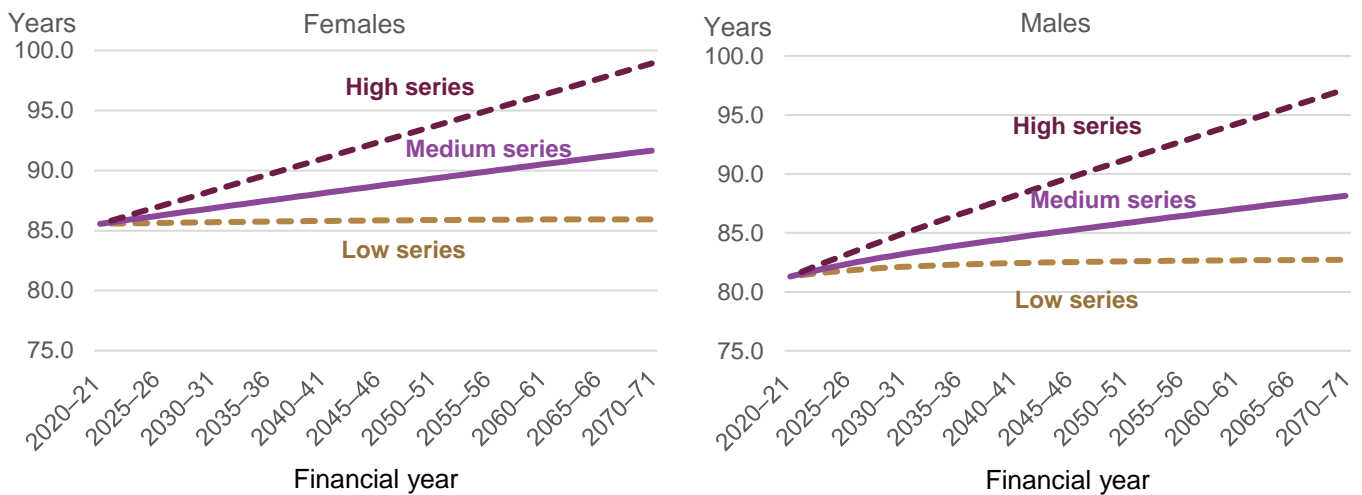


Figure 4 Migration: Assumed net migration, by projection series and migration type, Queensland

