Australian Bureau of Statistics

2012 (BASE) TO 2101

3222.0

# POPULATION PROJECTIONS AUSTRALIA

EMBARGO: 11.30AM (CANBERRA TIME) TUES 26 NOV 2013

## CONTENTS



## INQUIRIES


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# NOTES

## ABOUT THIS ISSUE

This publication contains projections of Australia's population by age and sex for the period 30 June 2013 to 2101, and projections of the states, territories and capital cities/balances of state for the period 30 June 2013 to 2061. Figures for 30 June 2012 are preliminary estimated resident population.

Three main series of projections (Series A, B and C) are presented in this publication for analysis and reporting. Detailed information for these and other series is available from the ABS web site <http://www.abs.gov.au>.

## CHANGES TO THIS ISSUE

These projections supercede the 2007-based series published in *Population Projections, Australia, 2006 to 2101* (cat. no. 3222.0) in September 2008.

## DATA NOTES

The projections presented are not intended to be predictions or forecasts, but are illustrations of growth and change in the population that would occur if assumptions made about future demographic trends were to prevail over the projection period.

While the assumptions are formulated on the basis of an assessment of past demographic trends, both in Australia and overseas, there is no certainty that any of the assumptions will be realised. In addition, no assessment has been made of possible future changes in non-demographic conditions.

## ROUNDING

Population estimates and projections in this publication have been rounded to the nearest hundred. Calculations of percentage and numeric change and proportions are based on unrounded data.

## ABBREVIATIONS

| | |
|---|---|
| ABS | Australian Bureau of Statistics |
| ACT | Australian Capital Territory |
| Aust. | Australia |
| Bal | Balance |
| DIBP | Australian Government Department of Immigration and Border Protection |
| ERP | estimated resident population |
| GCCSA | Greater Capital City Statistical Area |
| NIM | net interstate migration |
| NOM | net overseas migration |
| NSW | New South Wales |
| NT | Northern Territory |
| Qld | Queensland |
| SA | South Australia |
| Tas. | Tasmania |
| TFR | total fertility rate |
| Vic. | Victoria |
| WA | Western Australia |

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# CHAPTER 1 MAIN FEATURES

## INTRODUCTION

The population projections presented in this publication cover the period 2012 to 2101 for Australia and 2012 to 2061 for the states and territories, and capital cities and balance of state regions.

The projections are not predictions or forecasts, but are simply illustrations of the growth and change in population which would occur if certain assumptions about future levels of fertility, mortality, internal migration and overseas migration were to prevail over the projection period. The assumptions incorporate recent trends which indicate increasing levels of fertility and net overseas migration (NOM) for Australia.

This chapter discusses the projection results, in terms of population size and growth, and the changing age structure and distribution of the population. Three main series of projections (Series A, B and C) have been selected from a possible 24 individual combinations of the various national level assumptions. Series B largely reflects current trends in fertility, life expectancy at birth and NOM, whereas Series A and Series C are based on high and low assumptions for each of these variables respectively.

MAIN PROJECTION SERIES, Australia

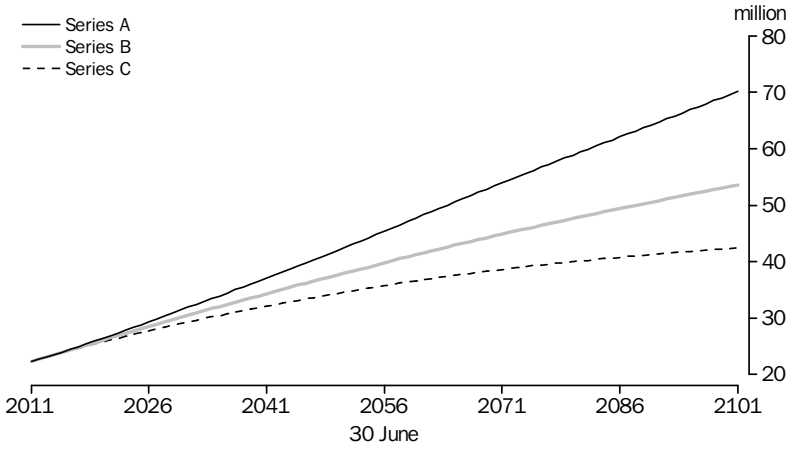
| | ASSUMPTIONS | | | | PROJECTED POPULATION AT 30 JUNE | |
|---|---|---|---|---|---|---|
| | | | *Life expectancy at birth*(a) | | | |
| | *Total fertility rate*(b) | *Net overseas migration*(c) | *Males* | *Females* | *2061* | *2101* |
| | babies per woman | persons | years | years | million | million |
| Series A | 2.0 | 280 000 | 92.1 | 93.6 | 48.3 | 70.1 |
| Series B | 1.8 | 240 000 | 85.2 | 88.3 | 41.5 | 53.6 |
| Series C | 1.6 | 200 000 | 85.2 | 88.3 | 36.8 | 42.4 |

(a) From 2061
(b) From 2026
(c) From 2021

## POPULATION SIZE AND GROWTH

Australia's estimated resident population (ERP) at 30 June 2012 of 22.7 million people is projected to increase to between 36.8 and 48.3 million people by 2061, and to between 42.4 and 70.1 million people by 2101. Series A projects the highest growth, while Series C projects the lowest growth.

PROJECTED POPULATION, Australia




In the 20 years to 30 June 2012, Australia's population increased by 1.3% per year on average, with just over half of this growth resulting from NOM and just under half from natural increase (the excess of births over deaths). In the last 2 years, Australia's population has increased by 1.6% per year on average, with the contribution of NOM growing to 56%, and natural increase decreasing to 44%. In the financial year 2011-12, there were 306,000 births and 147,200 deaths in Australia, resulting in natural increase of 158,800 people. During this same period, the contribution of NOM to population growth again increased to 58%, with natural increase decreasing to 42%.

In Series C, a state of natural decrease (deaths outnumbering births) will be reached in 2063. Despite this, Australia's population continues to increase slowly throughout the projection period, due to the contribution of NOM.

In contrast to the 2004-based set of ABS population projections released in November 2005, no series shows population decline for Australia before the end of the century.

## POPULATION AGEING

The ageing of Australia's population is expected to continue over the period. This is the result of sustained below replacement levels of fertility combined with increasing life expectancy at birth. The median age of Australia's population (37.3 years at 30 June 2012) is projected to increase to between 38.6 years and 40.5 years in 2031 (Series A and C respectively) and to between 41.0 years and 44.5 years in 2061 (Series A and C).

### *Series B*

In 2012 people aged 65 years and over made up 14% of Australia's population. This is projected to increase to 22% in 2061 and to 25% in 2101. The proportion of people aged less than 15 years is projected to decrease from 19% in 2012 to 17% in 2061, and 16% in 2101.

There were 420,300 people aged 85 years and over in Australia in 2012, making up 2% of the population. This group is projected to grow rapidly throughout the projection period, to 5% by 2061 and to 6% by 2101.

## STATES AND TERRITORIES

*Series B*

For the states and territories, further assumptions as to net population gains/losses due to interstate migration are required. For more information, see the *Net Interstate Migration* sections of *Chapter 2: Assumptions*.

Assuming the current trends, Series B projects continuing population growth for all states and territories except Tasmania between 2012 and 2061.

By 2061 the population of New South Wales is projected to reach 11.5 million people, an increase of 4.2 million people (or 57%) from 2012, while Victoria is projected to reach 10.3 million people, an increase of 4.7 million people (or 83%).

Queensland is projected to more than double over the projection period, from 4.6 million in 2012 to 9.3 million by 2061.

Western Australia is projected to experience the largest percentage increase in population between 2012 and 2061, more than doubling the 2012 population of 2.4 million to 6.4 million by 2061.

The Northern Territory's population is projected to increase by 217,800 people between 2012 and 2061, to 453,000 people. Although a smaller absolute increase than those projected for the larger states, this is a significant increase (93%) relative to the Northern Territory's population of 235,200 people in 2012.

The population of the Australian Capital Territory is projected to increase by 365,800 people (98%) between 2012 and 2061, reaching 740,900 people. By 2038, the Australian Capital Territory is projected to exceed Tasmania's population. Tasmania's population is projected to increase slowly before levelling at 569,200 people at 2046 and then decreasing marginally from 2047 onwards (565,700 people in 2061).

South Australia is projected to increase by 651,700 people (39%) to 2.3 million people in 2061.

## CAPITAL CITIES

Note: Throughout this publication the terms capital city and balance of state are used to refer to the Greater Capital City Statistical Areas of the ASGS 2011. For example the GCCSA unit called 'rest of state' is referred to as 'balance of state'.

In Series B, all capital cities except Darwin are projected to experience higher percentage growth than their respective state or territory balances, resulting in a further concentration of Australia's population within the capital cities. At 2012, 66% of Australians lived in a capital city. By 2061 this proportion is projected to increase to 74%.

### *Sydney and Melbourne*

Series C projects Sydney to remain the populous city in Australia, with 8.0 million people in 2061, followed by Melbourne with 7.6 million. However, in Series A and B Melbourne is projected to become the most populous, exceeding Sydney's population in 2030 and 2053, respectively. In 2061, Melbourne and Sydney are projected to reach a population of 8.6 and 8.5 million respectively (Series B).

Melbourne's population exceeding Sydney's in Series A and B is mainly due to larger levels of internal migration losses assumed for Sydney (a net loss of 38,700 and 22,700 people per year from 2015) compared to Melbourne (a net loss of 6,400 and 4,000 people per year from 2015) in the two series.

### *Other capital cities*

In Series B, Perth is projected to experience the highest percentage growth (187%) of Australia's capital cities, increasing from 1.9 million people at 30 June 2012 to 5.5 million in 2061. The population of Perth is projected to overtake that of Brisbane in around 15 years time, when they both reach 3 million people in 2028. The second highest percentage growth (118%) is projected for Brisbane, increasing from 2.2 million people to 4.8 million people. In 2061 Darwin is projected to increase from 131,900 people in 2012 to 225,900 in 2061 (71%).

# CHAPTER 2 ASSUMPTIONS

## INTRODUCTION

The Australian Bureau of Statistics (ABS) uses the cohort-component method for producing population projections. In this method, assumptions made about future levels of fertility, mortality, overseas migration and internal migration are applied to a base population (split by sex and single year of age) to obtain a projected population for the following year. The assumptions are then applied to this new (projected) population to obtain a projected population for the next year. This process is repeated until the end of the projection period is reached.

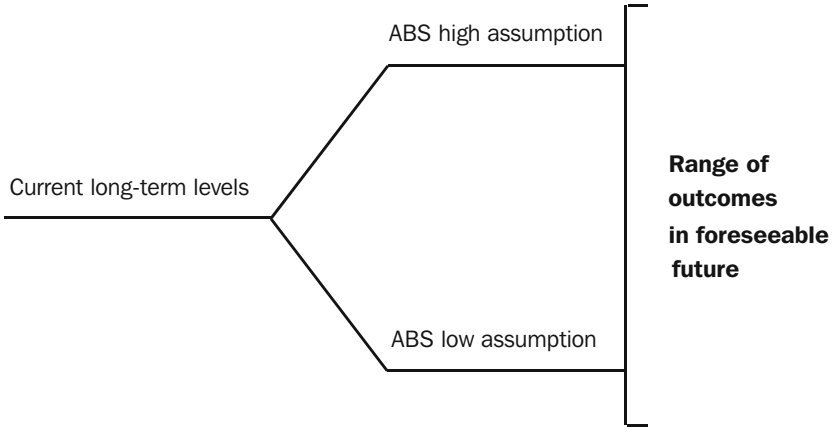
### *Span of projections*

From a base of 30 June 2012, the projections span the period 30 June 2013 to 30 June 2101 for Australia, and 30 June 2013 to 30 June 2061 for the states, territories, capital cities and balances of state. Estimated resident population (ERP) for 30 June 2012 for all above mentioned geographies have also been included in the data.

## SUMMARY OF ASSUMPTIONS

Assumptions have been formulated on the basis of demographic trends over the past decade and longer, both in Australia and overseas, in conjunction with consultation with experts at the national and state/territory level. They do not specifically attempt to allow for non-demographic factors (such as major government policy decisions, economic factors, catastrophes, wars, epidemics or significant health treatment improvements) which may affect future demographic behaviour or outcomes.

As future levels of fertility, mortality, overseas migration and internal migration are unpredictable, two or more assumptions have been made for each component. These are intended to illustrate a range of possible future outcomes, although there can be no certainty that any particular outcome will be realised, or that future outcomes will necessarily fall within these ranges.



## SUMMARY OF ASSUMPTIONS *continued*

The table below shows how recent demographic trends (an average of the last three years) relate to the proposed assumptions. The component which diverges from recent history the most is net overseas migration (NOM), and as a consequence, the last three years of average growth has been higher than the Department of Immigration and Border Protection's (DIBP) forecasts.

The projections will show a smooth transition from the most recently observed data to the long-range assumption. This 'phase-in' period is different for each component assumption and so the table also shows the year that each assumption will be phased in by.

### POPULATION PROJECTIONS, Summary of assumptions

| | *Observed average* | *Medium assumption* | *Phased in by* |
|---|---|---|---|
| Total fertility rate(a) | 1.9 | 1.8 | 2025-26 |
| Life expectancy at birth(b)(c) | | | |
| Male | 79.7 | 85.2 | 2060-61 |
| Female | 84.2 | 88.3 | 2060-61 |
| Net overseas migration(a) | 199 860 | 240 000 | 2020-21 |
| Average annual growth rate(a) | 1.6 | . . | . . |

. . not applicable
(a) Observed average of financial years 2010–2012.
(b) Observed average of calendar years 2009–2011.
(c) Note that the Australia level projections go out to 2101.

*Fertility*

For the fertility component, assumptions are made about future total fertility rates (TFRs), age-specific fertility rates (ASFRs) and the sex ratio at birth. Three long-term assumptions have been made about Australia's future levels of fertility:

- high: the TFR will reach 2.0 babies per woman by 2026, and then remain constant;
- medium: the TFR will decline to 1.8 babies per woman by 2026, and then remain constant; and
- low: the TFR will decline to 1.6 babies per woman by 2026, and then remain constant.

The trend towards older mothers at birth is assumed to continue to 2026, but at a slower rate than historical trends, and remain constant thereafter. The sex ratio at birth is assumed to be 105.5 male births per 100 female births for all years.

*Mortality*

For the mortality component, assumptions are made about future levels of life expectancy at birth for males and females. Two assumptions have been made:

- High life expectancy at birth (continued improvement) is assumed for male and female life expectancy, with increases from 2009-11 levels of 0.25 and 0.19 years respectively, until 2060-61. Based on this assumption, male life expectancy would reach 92.1 years in 2060-61 and female life expectancy would reach 93.6 years.
- Medium life expectancy at birth (declining improvement) is assumed for male and female life expectancy at birth, with increases of 2009-11 levels by 0.25 and 0.19 years respectively until 2015-16. After this, life expectancy will continue to increase at declining rates. Based on this assumption, male life expectancy at birth is expected to reach 85.2 years in 2060-61 and female life expectancy to reach 88.3 years.

Under both assumptions, the pattern of change in age-sex specific death rates has been assumed to continue until 2031. Thereafter, the age-specific death rates are uniformly scaled to conform to the assumed life expectancy at birth for future years.

*Overseas migration*

Three main assumptions and one 'what-if' assumption have been made about Australia's future levels of net overseas migration (NOM):

- high: NOM will increase to 280,000 people per year by 2020-21 and remain constant thereafter;
- medium: NOM will increase to 240,000 people per year by 2020-21 and remain constant thereafter; and
- low: NOM will increase to 200,000 people per year by 2020-21 and remain constant thereafter.
- A zero net overseas migration assumption has been included to facilitate analysis of the effect of overseas migration on Australia's future population.

*Interstate migration*

Three assumptions have been made about future net interstate migration levels:

- large interstate flows: relatively large net interstate migration gains for some states and territories, corresponding to relatively large losses for other states and territories;
- medium interstate flows: medium net interstate migration gains for some states and territories, and medium losses for others; and
- small interstate flows: relatively small net interstate migration gains for some states and territories, and small losses for others.

## BASE POPULATION

The base population is the preliminary estimated resident population (ERP) at 30 June 2012, which takes into account the 2011 Census of Population and Housing.

## PROJECTION SERIES

The above assumptions can be combined to create 54 sets of population projections. Three main series have been selected from these to provide a range, although not the full range, of projections for analysis and discussion in Chapter 3. These series are referred to as Series A, B and C. At times, to simplify the analysis, Series B has been chosen.

For some states, Series A and C do not depict the highest or lowest population outcomes. Where applicable, other series have been included in commentary.

The inclusion of a zero net overseas migration assumption increases the total number of available projections to 72 series, as presented on the following page. These extra series (Series 55 to 72) have not been considered for analysis in this publication but are included in data cubes attached to this publication.

## WHICH SERIES TO USE

Future uncertainty, along with the subjective nature of assessing current trends, means that using a range of possible outcomes rather than a single projection series give a more realistic view of the possible future size, distribution and age structure of Australia's population.

Different series, constructed from varying combinations of assumptions, are appropriate for different time horizons (shorter or longer term), the geographic region(s) considered, and any volatility in the components. All series are relatively insensitive to future levels of fertility and mortality, as both are fairly predictable. There is less certainty regarding future levels of overseas and interstate migration, due to their historical volatility. This volatility can be expected to continue due to future government policies and decision making, and economic, social and other determinants and influences in Australia and overseas.

The following table presents the 72 permutations of the various assumptions considered in developing the range of projections, with series A, B and C specifically identified.

*WHICH SERIES TO USE*

*continued*

PROJECTION SERIES, Assumptions used

| *Net overseas migration* | HIGH LIFE EXPECTANCY AT BIRTH | | | MEDIUM LIFE EXPECTANCY AT BIRTH | | |
|---|---|---|---|---|---|---|
| | *Net interstate migration (large flows)* (a) | *Net interstate migration (medium flows)* | *Net interstate migration (small flows)* (a) | *Net interstate migration (large flows)* (a) | *Net interstate migration (medium flows)* | *Net interstate migration (small flows)* (a) |
| | | | HIGH FERTILITY (2.0) | | | |
| 280 000 | 1(A) | 2 | 3 | 4 | 5 | 6 |
| 240 000 | 19 | 20 | 21 | 22 | 23 | 24 |
| 200 000 | 37 | 38 | 39 | 40 | 41 | 42 |
| 0 | 55 | 56 | 57 | 58 | 59 | 60 |
| | | | MEDIUM FERTILITY (1.8) | | | |
| 280 000 | 7 | 8 | 9 | 10 | 11 | 12 |
| 240 000 | 25 | 26 | 27 | 28 | 29(B) | 30 |
| 200 000 | 43 | 44 | 45 | 46 | 47 | 48 |
| 0 | 61 | 62 | 63 | 64 | 65 | 66 |
| | | | LOW FERTILITY (1.6) | | | |
| 280 000 | 13 | 14 | 15 | 16 | 17 | 18 |
| 240 000 | 31 | 32 | 33 | 34 | 35 | 36 |
| 200 000 | 49 | 50 | 51 | 52 | 53 | 54(C) |
| 0 | 67 | 68 | 69 | 70 | 71 | 72 |

(a) The large interstate flows assumption corresponds to large net interstate losses for New South Wales, South Australia and the Northern Territory, where the small interstate flows assumption yields greater population growth.

## FERTILITY ASSUMPTIONS

### *Summary*

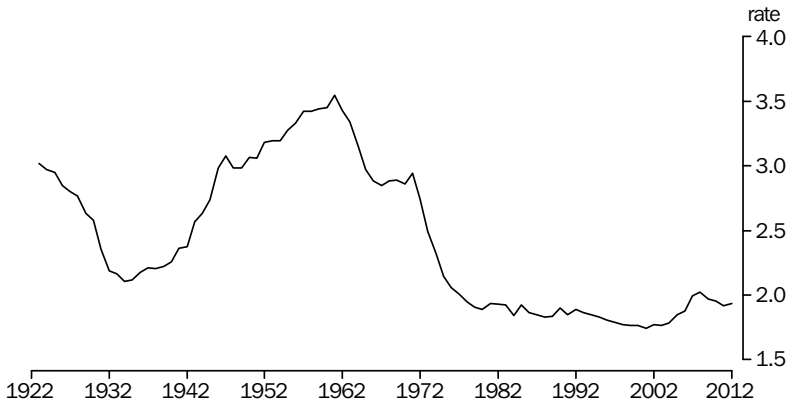
Future trends in fertility are an important determinant of Australia's future population size, structure and growth. To produce population projections using the cohort-component method, assumptions for each year of the projection period are required for age-specific fertility rates and the sex ratio at birth.

Three long-term assumptions have been made regarding Australia's future TFR: high fertility (a TFR of 2.0 babies per woman), medium fertility (1.8) and low fertility (1.6). Under all three assumptions, the trend towards older ages of mothers at birth of children is assumed to continue to 2026, but at a slower rate than historical trends, and remain constant thereafter. For all years, the sex ratio at birth is assumed to be 105.5 male births per 100 female births.

### *Trends in the total fertility rate*

In 1961, at the height of the 'baby boom', Australia's TFR peaked at 3.5 babies per woman. Since then fertility has declined, falling sharply during the early 1960s, before levelling out at around 2.9 babies per woman in the years 1966-1971. The TFR reached replacement level (2.1) in 1975, and continued to fall. Fertility stabilised somewhat during the 1980s, before resuming a more gradual decline during the 1990s. The TFR reached a low of 1.7 babies per woman in 2001 and has increased since then, to 1.9 babies per woman in 2011.

TOTAL FERTILITY RATE(a), Australia




(a) Babies per woman.

*Assumed total fertility rates*

The three assumptions for Australia's future fertility levels are made with regard to recent trends in the TFR, especially those of the last decade.

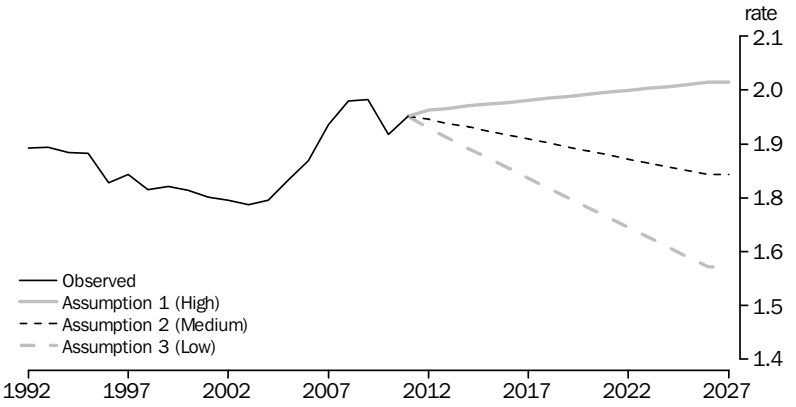
The high fertility scenario assumes that Australia's TFR will reach 2.0 babies per woman by 2026 and remain constant thereafter. This reflects levels of fertility recorded since 1977 of between 1.7 and 2.0 babies per woman, acknowledging the possibility that the TFR could increase more, especially in the short-term.

The medium scenario assumes a short-term continuation of the increase in fertility since 2001, with the TFR increasing to 1.9 babies per woman in 2013, then gradually decreasing to 1.8 by 2026 and remaining constant thereafter.

Under the low fertility assumption the TFR remains constant in 2013, followed by a decline at a faster rate, reaching 1.6 babies per woman by 2026 and remaining constant thereafter. Fertility rates have reached such levels in many European countries, and recent projections indicate this is considered a possibility in several others. Within Australia, fertility in the Australian Capital Territory and Victoria reached lows of 1.56 and 1.63 respectively in 2001.

Birth registrations processed up to December quarter 2011 present a continuation of the recent rise in fertility, however the size and duration of the rise is not possible to gauge. Recent government policy initiatives and public attention and discussion of the impacts of lower fertility may have an effect in mitigating any future declines in fertility.

TOTAL FERTILITY RATE(a), Australia—Observed and assumed




(a) Babies per woman.

*Trends in age-specific fertility rates*

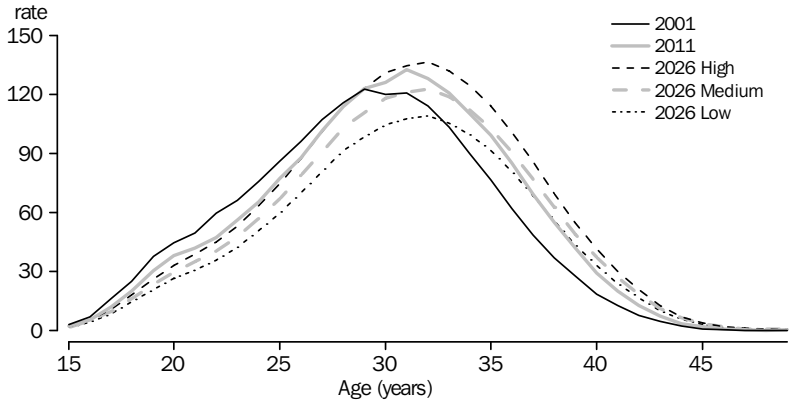
Population projections require assumptions about future age-specific fertility rates, which are derived from assumed TFRs and age distributions of fertility. These rates are applied to the projected female population in each year of the projection period in order to determine future numbers of births, and therefore the size of future projected populations.

Over the past 10 years, age-specific fertility rates have been declining for the younger age groups (women below age 30), whilst increasing among women aged 30 years and over, representing a gradual shift in fertility towards older ages.

The projected age distribution of fertility is based on average annual rates of change in age-specific fertility rates during the period 2007-2011. These historical trends are assumed to continue under all three fertility scenarios until 2026, after which the age pattern of fertility remains constant.

Linear interpolation is employed to obtain TFRs for each year 2012 to 2026 for all three scenarios. The assumption of continuing deferment of fertility is calculated by applying the average annual change in the percentage age distribution of fertility over the five year period, 2007-2011 to the base distribution, to obtain the assumed age distribution of fertility in a projection year. The assumed distribution is then applied to the assumed TFR for the corresponding projection year.

AGE-SPECIFIC FERTILITY RATES(a), Australia—Observed and assumed




(a) Babies per 1,000 women.

*Sex ratio at birth*

Projections require an assumed sex ratio at birth (the ratio of male to female births, multiplied by 100), so that total projected births can be split into male and female births.

The sex ratio fluctuates around 105 to 105.5 males births per 100 female births. The sex ratio was 105.3 for the year ended 30 June 2011, 105.1 in 2006, and 105.4 in 2001. A constant ratio of 105.5 male births per 100 female births has been used for the duration of the projection period.

*State/territory and capital city/balance of state fertility assumptions*

The table below shows the TFRs for all states and territories and Australia from 1991 to 2011. Some states have consistently been higher or lower than the national rate, while others have fluctuated over the past 20 years. In recent years, TFRs for Victoria, South Australia and the ACT have been lower than rates for Australia as a whole, while TFRs for the remaining states and territories, particularly Tasmania and the Northern Territory, have been higher.

STATE AND TERRITORY TOTAL FERTILITY RATES, Observed

| | *1991* | *1996* | *2001* | *2006* | *2011* |
|---|---|---|---|---|---|
| New South Wales | 1.93 | 1.80 | 1.79 | 1.80 | 1.97 |
| Victoria | 1.83 | 1.72 | 1.63 | 1.74 | 1.80 |
| Queensland | 1.90 | 1.83 | 1.84 | 1.94 | 2.02 |
| South Australia | 1.74 | 1.73 | 1.69 | 1.79 | 1.87 |
| Western Australia | 1.93 | 1.80 | 1.75 | 1.90 | 1.93 |
| Tasmania | 1.93 | 1.85 | 1.87 | 2.09 | 2.12 |
| Northern Territory | 2.30 | 2.19 | 2.20 | 2.23 | 2.12 |
| Australian Capital Territory | 1.82 | 1.62 | 1.56 | 1.66 | 1.74 |
| Australia | 1.88 | 1.78 | 1.75 | 1.83 | 1.93 |

The ratio of each state and territories' average TFR for the three years 2009-2011 to that of Australia is calculated, then applied to assumed future Australia-level TFRs. However, in some states these ratios have been adjusted to incorporate more recent data as it becomes available (for example, 2012 data). The resulting set of state to Australia fertility differentials are thus calibrated to give projected births that are consistent with latest historical levels and trends. These differentials are assumed to remain constant throughout the projection period.

TFRs for Australian capital cities are typically lower than TFRs for their respective states and territories, while TFRs for state balances are higher. In 2011, the TFR for Brisbane was 9% lower than the TFR for Queensland, while TFRs for Darwin, Sydney and Perth were 6-8% lower than their respective states. TFRs for Adelaide and Melbourne were 4-5% lower than South Australia and Victoria respective, while Hobart was less than 3% lower than Tasmania.

Assumed TFRs for the capital cities and state balances are derived by applying the average differential (for 2009-2011) between the region and its respective state/territory to that state/territory's assumed TFR. Similar to the state to Australia differentials, the capital city/balance of state to state/territory differentials were calibrated, where necessary, to ensure projected births were consistent with recent trends in numbers of births.

*State/territory and capital city/balance of state fertility assumptions continued*

## TOTAL FERTILITY RATES AND FERTILITY DIFFERENTIALS

| | TOTAL FERTILITY RATE(a)(b) | | | ASSUMED FERTILITY DIFFERENTIAL(c) | | |
|---|---|---|---|---|---|---|
| | *Capital city* | *Balance of state* | *Total* | *Capital city* | *Balance of state* | *Total* |
| | rate | rate | rate | % | % | % |
| New South Wales | 1.84 | 2.06 | 1.92 | 96.2 | 107.5 | 99.5 |
| Victoria | 1.74 | 2.08 | 1.81 | 96.2 | 114.8 | 93.9 |
| Queensland | 1.88 | 2.05 | 2.07 | 96.0 | 104.6 | 107.6 |
| South Australia | 1.77 | 2.20 | 1.90 | 93.1 | 115.9 | 98.6 |
| Western Australia | 1.83 | 2.18 | 1.95 | 93.9 | 111.6 | 101.2 |
| Tasmania | 2.03 | 2.12 | 2.12 | 95.9 | 100.3 | 109.9 |
| Northern Territory | 1.94 | 2.31 | 2.13 | 91.0 | 108.6 | 111.6 |
| Australian Capital Territory | . . | . . | 1.76 | . . | . . | 91.4 |
| **Australia**(d) | . . | . . | **1.97** | . . | . . | **100.0** |

. . not applicable
(a) Babies per woman.
(b) Average of 2009, 2010 and 2011 TFRs.
(c) Assumed fertility differentials show the relationship of the average TFR for 2009–2011 for each state/territory, capital cityand balance of state to the Austalian level. Includes adjustments to ensure projected births are consistent with recent trends in numbers of births.
(d) Includes Other Territories.

## ASSUMED TOTAL FERTILITY RATES(a), From 2026—States and territories

| | HIGH ASSUMPTION | | | MEDIUM ASSUMPTION | | | LOW ASSUMPTION | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Capital city* | *Balance of state* | *Total* | *Capital city* | *Balance of state* | *Total* | *Capital city* | *Balance of state* | *Total* |
| | rate | rate | rate | rate | rate | rate | rate | rate | rate |
| New South Wales | 1.92 | 2.14 | 1.99 | 1.72 | 1.93 | 1.79 | 1.53 | 1.71 | 1.59 |
| Victoria | 1.81 | 2.16 | 1.88 | 1.63 | 1.94 | 1.69 | 1.45 | 1.73 | 1.50 |
| Queensland | 2.07 | 2.25 | 2.15 | 1.86 | 2.03 | 1.94 | 1.65 | 1.80 | 1.72 |
| South Australia | 1.84 | 2.29 | 1.97 | 1.65 | 2.06 | 1.78 | 1.47 | 1.83 | 1.58 |
| Western Australia | 1.90 | 2.26 | 2.03 | 1.71 | 2.03 | 1.82 | 1.52 | 1.81 | 1.62 |
| Tasmania | 2.11 | 2.20 | 2.20 | 1.90 | 1.98 | 1.98 | 1.69 | 1.76 | 1.76 |
| Northern Territory | 2.03 | 2.42 | 2.23 | 1.83 | 2.18 | 2.01 | 1.62 | 1.94 | 1.79 |
| Australian Capital Territory | . . | . . | 1.83 | . . | . . | 1.65 | . . | . . | 1.46 |
| **Australia**(b) | . . | . . | **2.00** | . . | . . | **1.80** | . . | . . | **1.60** |

. . not applicable
(a) Babies per woman.
(b) Includes Other Territories.

*International context*

Fertility levels vary considerably between countries. There are many factors that can influence a country's fertility rate, such as differences in social and economic development and contraceptive prevalence. In general, developing countries have higher fertility rates while developed countries have lower fertility rates. According to the Population Reference Bureau (PRB) 2013 World Population Data Sheet, more-developed

*International context continued*

countries have an average TFR of 1.6 babies per woman, while less-developed countries have an average TFR of 2.6.

Australia's TFR for 2011 of 1.9 babies per woman is well below the PRB world average of 2.5 babies per woman. Compared to other developed countries, Australia's TFR is above the PRB average of 1.6. Fertility in Hong Kong is very low at 1.3 babies per woman. Other countries that have low fertility are Andorra (1.2) and Hungary, Poland, Spain and Taiwan (all with 1.3). In contrast, many African countries have very high fertility rates, with Niger (7.6) and Angola (6.3) among the highest.

International fertility rates provide a frame of reference for the three fertility assumptions made for Australia. A TFR of 2.0 as assumed under the high fertility scenario equates to the current fertility level in countries such as New Zealand, the United Kingdom and Iceland (all 2.0). The medium fertility scenario (a TFR of 1.8) would bring Australian fertility into line with current levels in countries such as Norway and Belgium. Australia's assumed TFR for the low fertility scenario (1.6) is the current average for the more developed countries.

## MORTALITY ASSUMPTIONS

### *Summary*

For the population projections in this issue, two assumptions on future life expectancy at birth, a key measure of mortality, have been made. Only two assumptions have been made because life expectancy has consistently shown an improving trend since Australian records began. This historical trend is linear at around 25 years of life expectancy improvement over the last hundred years. The international discussion among demographic experts on the future of mortality is focused on the two scenarios of this long-run historical trend of life expectancy improvement continuing or declining.

The high life expectancy at birth assumption assumes that life expectancy will continue to improve at the historical rate, resulting in assumed life expectancy at birth of 92.1 years for males and 93.6 years for females in 2061. The medium life expectancy at birth assumption assumes that life expectancy will continue to improve at the historical rate until 2016, and then gradually slow to result in assumed life expectancy at birth of 85.2 years for males and 88.3 years for females in 2061.

Assumptions for mortality at lower level geographical levels are based on 2009-2011 differentials between Australia and each state/territory, and between each state/territory and its capital city/balance of state. These differentials remain constant throughout the projection series.

### *Trends in life expectancy*

Australian life expectancy at birth has improved steadily for both men and women. Male life expectancy at birth increased from 55.2 years in the period 1901-1910 to 79.7 years in 2009-2011. Over the same period female life expectancy increased from 58.8 years to 84.2 years.

The past two decades have seen further improvements in life expectancy. These increases are due in part to lower infant mortality, fewer deaths among children and young adults from accidents and improvements in cardiovascular health among older men (AIHW 2013).

LIFE EXPECTANCY AT BIRTH, Australia

*Trends in life expectancy continued*

Between 1982 and 2009-2011, life expectancy at birth has improved on average by 0.3 years per year for males and 0.2 years per year for females. For both males and females, the smallest increase during this period was recorded between 2006-2008 (with male life expectancy increasing by 0.14 years and female life expectancy increasing by 0.04 years) while the largest growth was recorded between 1982 and 1983 (with male life expectancy increasing by 0.89 years and female life expectancy increasing by 0.52 years).

LIFE EXPECTANCY AT BIRTH, 1982 to 2009–2011

| | LIFE EXPECTANCY AT BIRTH | | INCREASE PER YEAR(a) | | *Difference between female and male life expectancy* |
|---|---|---|---|---|---|
| | *Males* | *Females* | *Males* | *Females* | |
| | years | years | years | years | years |
| 1982 | 71.25 | 78.26 | . . | . . | 7.0 |
| 1986 | 72.88 | 79.20 | 0.48 | 0.37 | 6.3 |
| 1991 | 74.40 | 80.41 | 0.53 | 0.33 | 6.0 |
| 1994–1996(b) | 75.22 | 81.05 | 0.27 | 0.21 | 5.8 |
| 1999–2001(b) | 77.03 | 82.41 | 0.47 | 0.37 | 5.4 |
| 2000–2002(b) | 77.40 | 82.59 | 0.37 | 0.18 | 5.2 |
| 2001–2003(b) | 77.76 | 82.84 | 0.36 | 0.25 | 5.1 |
| 2002–2004(b) | 78.08 | 83.03 | 0.32 | 0.19 | 4.9 |
| 2003–2005(b) | 78.47 | 83.34 | 0.39 | 0.32 | 4.9 |
| 2004–2006(b) | 78.71 | 83.48 | 0.24 | 0.14 | 4.8 |
| 2005–2007(b) | 79.02 | 83.69 | 0.31 | 0.20 | 4.7 |
| 2006–2008(b) | 79.16 | 83.73 | 0.14 | 0.04 | 4.6 |
| 2007–2009(b) | 79.34 | 83.89 | 0.17 | 0.16 | 4.5 |
| 2008–2010(b) | 79.51 | 84.03 | 0.17 | 0.14 | 4.5 |
| 2009–2011(b) | 79.75 | 84.21 | 0.24 | 0.18 | 4.5 |
| Average annual increase | . . | . . | 0.30 | 0.23 | . . |

. . not applicable
(a) Over previous period.
(b) Life expectancy calculated using three years of data

The faster increase in male life expectancy at birth has narrowed the gap between male and female expectation of life at birth. In 2009-2011 female life expectancy at birth exceeded male life expectancy at birth by 4.5 years, in contrast to the peak difference of 7.0 years in 1982.

*Assumed life expectancy at birth*

The high life expectancy assumption assumes male and female life expectancy at birth will increase from 2009-2011 levels by 0.25 and 0.19 years respectively until 2061. Based on this assumption, male life expectancy at birth would reach 92.1 years and female life expectancy at birth would reach 93.6 years in 2061.

The medium life expectancy assumption assumes male and female life expectancy at birth will increase from 2009-2011 levels by 0.25 and 0.19 years respectively until 2016. After this, life expectancy at birth is assumed to continue to increase over the projection period, but at declining rates. Based on this assumption, male life expectancy at birth would reach 85.2 years and female life expectancy at birth would reach 88.3 years in 2061.

*Assumed life expectancy at birth continued*

LIFE EXPECTANCY AT BIRTH, Assumed—from 2016

| | LIFE EXPECTANCY AT BIRTH | | INCREASE PER YEAR | | *Difference between female and male life expectancy* |
|---|---|---|---|---|---|
| | *Males* | *Females* | *Males* | *Females* | |
| *Period* | years | years | years | years | years |
| **DECLINING IMPROVEMENT IN LIFE EXPECTANCY (medium assumption)** | | | | | |
| 2015–16 | 80.83 | 85.06 | 0.25 | 0.19 | 4.23 |
| 2020–21 | 81.83 | 85.81 | 0.20 | 0.15 | 3.98 |
| 2025–26 | 82.58 | 86.36 | 0.15 | 0.11 | 3.78 |
| 2030–31 | 83.08 | 86.76 | 0.10 | 0.08 | 3.68 |
| 2060–61 | 85.18 | 88.26 | 0.07 | 0.05 | 3.08 |
| **CONSTANT IMPROVEMENT IN LIFE EXPECTANCY (high assumption)** | | | | | |
| 2015–16 | 80.83 | 85.06 | 0.25 | 0.19 | 4.23 |
| 2020–21 | 82.08 | 86.01 | 0.25 | 0.19 | 3.93 |
| 2025–26 | 83.33 | 86.96 | 0.25 | 0.19 | 3.63 |
| 2030–31 | 84.58 | 87.91 | 0.25 | 0.19 | 3.33 |
| 2060–61 | 92.08 | 93.61 | 0.25 | 0.19 | 1.53 |

*Trends in age-specific death rates*

The inputs of the mortality component into producing population projections are 'survivorship ratios' obtained from assumed future life tables. Life tables for each year in the projection period (i.e. 2012-2101) are calculated in two steps: (1) life expectancy at birth for each projection year is determined; and (2) a life table is generated which gives the desired life expectancy at birth and allows for a shift in the age curve of mortality over time.

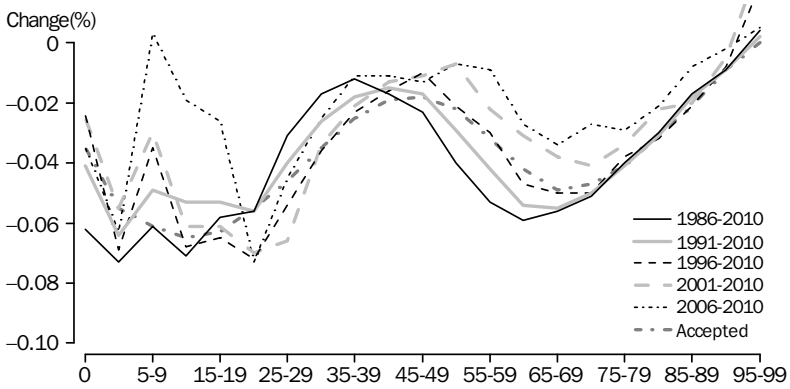
The shifting age curve of mortality over time should ideally represent current trends in age-sex differentials continued into the future. To achieve this, rates of change indicative of recent trends for each age-sex group are incorporated in the production of the assumed life tables. Determining assumed rates of change is achieved by observing historical patterns in age-specific death rates.

Between 1991 and 2011, males aged 10-29 experienced the fasted decline in age-specific deaths rates. Males aged 65-79, female infants and females aged 15-34 also experienced notable improvements in mortality. However, death rates of males aged 40-54 years and females aged 35-49 years showed little improvement. For both males and females, the age groups 95 and over showed no improvement. In recent times (2006-2011) the fastest declines in male mortality are for those aged 20-24 years and infants in female mortality.

*Rate of change in age-specific death rates*

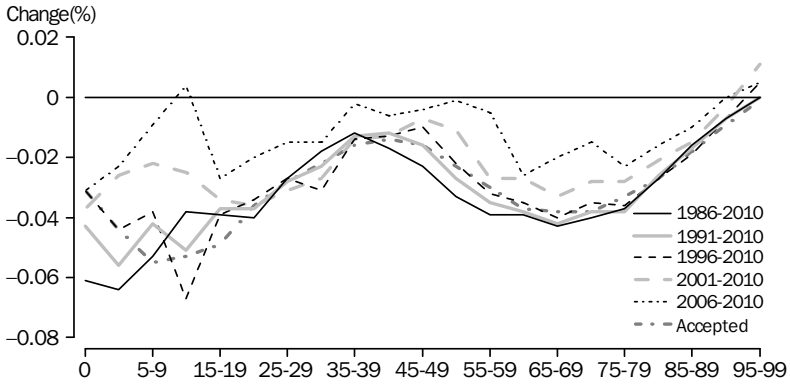
The rates of change identified as representative of recent trends in age-sex differentials, and used to generate the projected life tables, are mainly based on the 1996-2011 trend in age-specific death rates. If necessary, adjustments were made to prevent future age-specific death rates for females exceeding those for males. The assumed rates of change continue to 2025-26, after which age-specific death rates are scaled up or down to conform to the assumed life expectancy at birth for future years.

RATE OF CHANGE(a), Age-specific death rates—Males




(a) Rates of change are based on a linear trend fitted to age-specific death rates for each of the time periods shown.

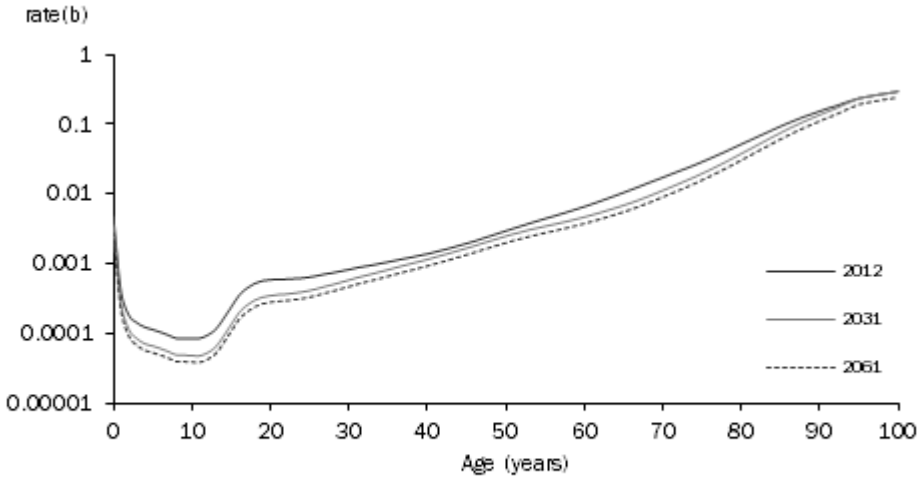
RATE OF CHANGE(a), Age-specific death rates—Females




(a) Rates of change are based on a linear trend fitted to age-specific death rates for each of the time periods shown.

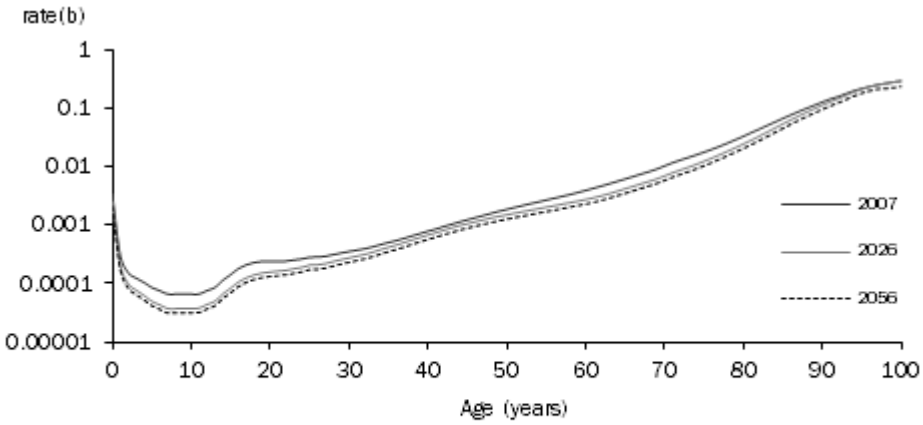
*Assumed age-specific mortality rates*

Age-specific mortality rates are assumed to decrease for all age groups for both males and females over the projection period. The smallest decreases are assumed to occur in the 40-54 and 85 years and over age groups for males, and the 35-49 and 85 years and over age groups for females.




(a) Mortal ty rates are the q(x) values from the life table developed for these assumptions.

(b) y-axis is on a logarithmic scale.




(a) Mortality rates are the q(x) values from the life table developed for these assumptions.

(b) y-axis is on a logarithmic scale.

*Assumed state/territory and capital city/balance of state mortality differentials*

Mortality differentials are based on an observed relationship of each state and territory and capital city/balance of state's life expectancy to the national life expectancy, calculated separately for males and females. The differentials shown here, take account of the most recent data (2009-2011). They are calculated for each of the states and territories, and between capital cities and their respective balances of state. It is assumed that the mortality differentials based on those observed during 2009-2011 between states/territories and Australia, and between capital city/balances of state/territories within states and territories will remain constant throughout the projection period.

MORTALITY DIFFERENTIALS(a), State/Territory and capital city/balance of state

| | LIFE EXPECTANCY AT BIRTH, 2009–2011 | | MALE MORTALITY DIFFERENTIALS | | | FEMALE MORTALITY DIFFERENTIALS | | |
|---|---|---|---|---|---|---|---|---|
| | *Males* | *Females* | *Capital city* | *Balance of state* | *State/ territory* | *Capital city* | *Balance of state* | *State/ territory* |
| | Years | Years | % | % | % | % | % | % |
| New South Wales | 79.8 | 84.2 | 101.5 | 99.1 | 100.0 | 101.0 | 99.4 | 100.0 |
| Victoria | 80.3 | 84.4 | 101.7 | 99.1 | 100.6 | 101.1 | 99.5 | 100.2 |
| Queensland | 79.5 | 84.1 | 100.5 | 99.2 | 99.7 | 100.3 | 99.7 | 99.9 |
| South Australia | 79.7 | 84.0 | 100.6 | 99.2 | 100.0 | 100.3 | 99.6 | 100.0 |
| Western Australia | 80.1 | 84.6 | 101.4 | 98.9 | 100.4 | 101.5 | 99.6 | 100.5 |
| Tasmania | 78.3 | 82.5 | 99.2 | 97.9 | 98.3 | 98.3 | 98.1 | 98.3 |
| Northern Territory | 74.9 | 80.5 | 96.1 | 89.9 | 92.8 | 97.3 | 89.0 | 94.0 |
| Australian Capital Territory | 81.0 | 84.8 | . . | . . | 101.7 | . . | . . | 100.7 |
| **Australia**(b) | **79.7** | **84.2** | . . | . . | **100.0** | . . | . . | **100.0** |

. . not applicable

(a) Mortality differentials based on the relationships of 2009–2011 life expectancies at birth for each state/territory, capital city and balance of state compared to the Australian level.

(b) Includes Other Territories.

*International comparison of projections*

Australian life expectancy is currently amongst the highest in the world. According to the Population Reference Bureau (PRB) 2013 World Population Data Sheet, the combined life expectancy at birth of males and females globally is 70 years. Australian life expectancy (estimated by the PRB to be 82 years for both males and females combined) is above that for countries such as the United States of America (79 years)), Greece and New Zealand (both 81 years), and Canada (81 years). Australia's current life expectancy of 82 years is similar to that of Spain, Sweden, Iceland, and slightly lower than Japan and Switzerland (83 years).

The United Nations (2013) projects global life expectancy at birth to reach 75.9 years by 2045-2050, with Australian life expectancy continuing to rank amongst the highest in the world (87.2 years in 2045-2050). Combined life expectancy at birth in this set of ABS population projections is assumed to be 86.7 years in 2061 under the medium assumption (similar to the United Nations estimate) and 92.8 years under the high assumption.

PROJECTED LIFE EXPECTANCY AT BIRTH(a), United Nations

| | 2005–2010 | | 2025–2030 | | 2055–2060 | | INCREASE 2005–2010 TO 2055–2060 | |
|---|---|---|---|---|---|---|---|---|
| | *Males* | *Females* | *Males* | *Females* | *Males* | *Females* | *Males* | *Females* |
| | years | years | years | years | years | years | years | years |
| Australia | 79.4 | 83.9 | 82.3 | 86.8 | 86.1 | 90.7 | 6.7 | 6.8 |
| Canada | 78.2 | 82.8 | 81.3 | 85.5 | 84.8 | 89.0 | 6.6 | 6.2 |
| China | 73.2 | 75.8 | 76.2 | 78.8 | 79.8 | 82.4 | 6.6 | 6.6 |
| France | 77.3 | 84.3 | 80.5 | 87.4 | 84.4 | 91.3 | 7.1 | 7.0 |
| Germany | 77.1 | 82.3 | 80.5 | 85.1 | 84.3 | 88.9 | 7.2 | 6.6 |
| Greece | 77.3 | 82.3 | 80.7 | 85.0 | 84.3 | 88.6 | 7.0 | 6.3 |
| Hong Kong (SAR of China) | 79.4 | 85.4 | 82.8 | 88.8 | 87.0 | 93.1 | 7.6 | 7.7 |
| India | 63.3 | 66.7 | 67.7 | 71.5 | 72.4 | 76.5 | 9.1 | 9.8 |
| Indonesia | 67.6 | 71.6 | 71.4 | 75.8 | 76.8 | 80.5 | 9.2 | 8.9 |
| Italy | 78.7 | 84.1 | 81.8 | 87.2 | 85.9 | 91.2 | 7.2 | 7.1 |
| Japan | 79.2 | 86.0 | 82.3 | 89.2 | 86.2 | 93.0 | 7.0 | 7.0 |
| Netherlands | 78.0 | 82.2 | 81.1 | 84.7 | 84.5 | 88.1 | 6.5 | 5.9 |
| New Zealand | 78.2 | 82.2 | 81.4 | 84.8 | 85.1 | 88.5 | 6.9 | 6.3 |
| Papua New Guinea | 59.5 | 63.7 | 62.2 | 66.7 | 65.5 | 70.3 | 6.0 | 6.6 |
| Spain | 78.0 | 84.4 | 81.0 | 87.4 | 84.8 | 91.3 | 6.8 | 6.9 |
| Sweden | 79.0 | 83.1 | 81.7 | 85.8 | 85.3 | 89.3 | 6.3 | 6.2 |
| United Kingdom | 77.5 | 81.7 | 80.9 | 84.3 | 84.4 | 87.8 | 6.9 | 6.1 |
| United States of America | 75.6 | 80.6 | 79.0 | 83.1 | 82.7 | 86.5 | 7.1 | 5.9 |
| Yemen | 60.8 | 63.4 | 64.0 | 66.9 | 67.5 | 70.8 | 6.7 | 7.4 |
| **World** | **66.5** | **71.0** | **70.6** | **75.1** | **75.1** | **79.5** | **8.6** | **8.5** |

(a) Only once variant of future mortality trends (median path) was used for each country.

*Source:* United Nations, Department of Economic and Social Affairs, Population Division 2013, World Population Prospects: The 2012 Revision, Volume 1: Comprehensive Tables.

## NET OVERSEAS MIGRATION

### *Summary*

Three assumptions have been made about Australia's future levels of net overseas migration (NOM):

- 280,000 people per year (high),
- 240,000 people per year (medium); and
- 200,000 people per year (low).

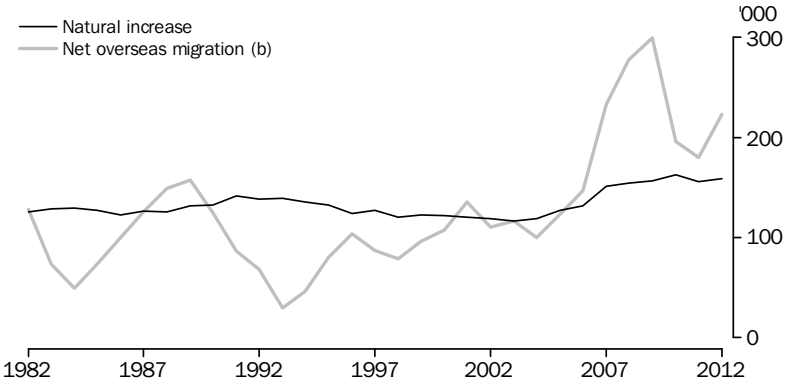
In addition, a zero net overseas migration assumption has been included to facilitate analysis of the effect of overseas migration on Australia's future population.

Assumptions of NOM in previous ABS population projections have been derived from an analysis of historical figures, taking into account information such as moving averages over time. For the first time, ABS projections have used the 'Outlook for Net Overseas Migration' forecast data produced by the Department of Immigration and Border Protection (DIBP) as an input into the NOM assumptions. DIBP is well placed to produce short term NOM assumptions, but beyond 2016-17 the ABS has placed more weight on established trends in NOM.

### *Trends*

Annual levels of NOM have fluctuated considerably in Australia over the past 25 years. For financial years, the level has been as low as 30,000 in 1992-93 to a high of 300,000 in 2008-09. NOM has also been increasing as a percentage of overall population growth in Australia. In 2000 its proportion of total population growth was less than half (the other population growth element is natural increase - the net of births minus deaths). It is currently about 60% of total population growth.

NET OVERSEAS MIGRATION AND NATURAL INCREASE, Australia (a)




(a) Year ending June
(b) Break in series in 2007 not shown in this graph

*Observed and assumed net overseas migration*

Three assumptions have been made about Australia's future levels of NOM: 280,000 people per year (high), 240,000 people per year (medium) and 200,000 people per year (low). The high and low assumptions are phased in from the current level of NOM up to 2021, and all assumptions are held constant from 2021 onwards.

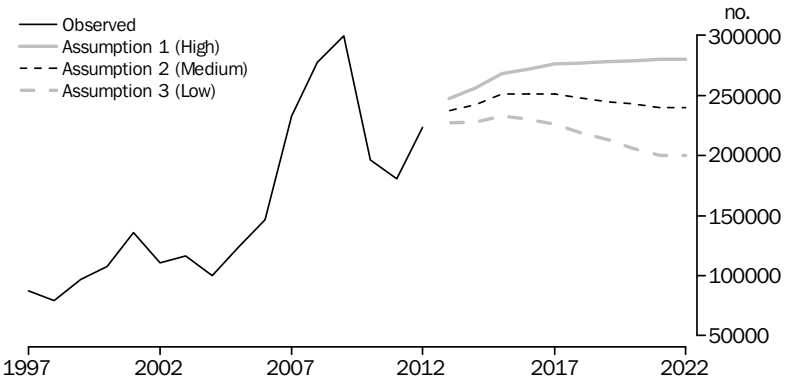
For the first five years of the projection period, where DIBP numbers will be used, the distance from the medium assumption and that of low or high assumptions will be 10,000 for 2012-13. After this, the gap will continue to increase until it reaches 40,000 by 2020-21 and will remain constant after that year.

Unlike births and deaths, NOM has fluctuated considerably over the years and the immigration component of NOM is not wholly set by the Federal Government at a set rate of the population (the emigration component has no controls placed upon it). Assumptions for NOM are therefore set at numeric levels rather than rates, in contrast to assumptions on fertility and mortality. NOM can be expected to continue to fluctuate in the future as demand for migrants will rise and fall and emigration patterns may change.

NET OVERSEAS MIGRATION, Observed and assumed

| Year ending 30 June | Low assumption | Medium assumption | High assumption |
|---|---|---|---|
| | no. | no. | no. |
| **OBSERVED** | | | |
| 2010 | 196 058 | 196 058 | 196 058 |
| 2011 | 180 372 | 180 372 | 180 372 |
| 2012 | 223 149 | 223 149 | 223 149 |
| **ASSUMED** | | | |
| 2013 | 227 000 | 237 000 | 247 000 |
| 2014 | 228 000 | 242 000 | 256 000 |
| 2015 | 233 000 | 251 000 | 268 000 |
| 2016 | 230 000 | 251 000 | 272 000 |
| 2017 | 226 000 | 251 000 | 276 000 |
| 2018 | 219 000 | 248 000 | 277 000 |
| 2019 | 213 000 | 245 000 | 278 000 |
| 2020 | 206 000 | 243 000 | 279 000 |
| 2021–2101 | 200 000 | 240 000 | 280 000 |

NET OVERSEAS MIGRATION, Australia—Observed and assumed




(a) Year ending June
(b) Break in series in 2007

*Observed and assumed net overseas migration continued*

In addition to the three main assumptions, a zero NOM scenario has been included. This is intended to facilitate analysis of population growth and provide an indication of the cumulative effect of varying levels of NOM over the projection period.

*Assumed state/territory and capital city/balance of state share of net overseas migration*

Each state and territory's proportion of NOM is based on an average of the last three years of NOM data. For all assumptions, NOM was allocated from 2013 as follows: New South Wales receives 27.6% of total NOM, Victoria 25.3%, Queensland 19.4%, South Australia 5.3%, Western Australia 19.7, Tasmania 0.6%, the Northern Territory 0.9% and the Australian Capital Territory 1.2%.

The table below shows the observed and assumed state/territory net overseas migration distribution:

ASSUMED NET OVERSEAS MIGRATION, State/territory share

| Year ended 30 June | NSW % | Vic. % | Qld % | SA % | WA % | Tas. % | NT % | ACT % |
|---|---|---|---|---|---|---|---|---|
| 2013 | 26.2 | 24.1 | 19.8 | 5.2 | 21.8 | 0.5 | 1.1 | 1.3 |
| 2014 | 26.6 | 24.5 | 19.7 | 5.2 | 21.1 | 0.5 | 1.1 | 1.3 |
| 2015 | 27.0 | 24.9 | 19.6 | 5.2 | 20.4 | 0.5 | 1.1 | 1.3 |
| 2016–2061 | 27.6 | 25.3 | 19.4 | 5.3 | 19.7 | 0.6 | 0.9 | 1.2 |

As NOM data are not currently available below the state/territory level, an indirect method to calculate the capital city/balance of state (CC/BoS) levels of NOM is used. NOM at this level is derived from the 2006 and 2011 Census questions on place of usual residence one year ago and five years ago. The process behind the assumptions involves:

- estimating CC/Bos shares of state/territory arrivals from Census data; that is, people resident overseas one year ago;
- estimating CC/Bos overseas departures data from the Census-a synthesis of the one and five years ago Census data; that is, CC/Bos data for those residing in Australia five years previously and who were overseas residents one year ago, but then were Australian residents again on Census night;
    - scaling this CC/Bos Census departure data to state/territory passenger card departures data by Australian and non-Australian citizenship (this is done as the Census data is biased towards estimating departures of Australian citizens, who have different residence patterns at the CC/Bos level to non-Australian citizens. Scaling to state/territory citizenship structures ensures that the CC/Bos departures data more accurately reflects the relative proportions of overseas departures from capital cities and balances of state); and
    - proportions of arrivals and departures to each CC/Bos were applied to the state/territory NOM arrivals and departures assumptions. These share-of-state proportions were held constant for the entire projection period.

Similar 2006 and 2011 Census tabulations are used to calculate CC/Bos shares of state/territory age/sex overseas arrivals and departures. These are applied to state/territory age/sex NOM arrivals and departures assumptions then constrained to the CC/Bos total arrivals and departures described above.

*Assumed state/territory and capital city/balance of state share of net overseas migration continued*

ASSUMED NET OVERSEAS MIGRATION, Capital city/balance of state—2021 onwards

| | *NSW* | *Vic.* | *Qld* | *SA* | *WA* | *Tas.* | *NT* | *ACT* | *Aust.*(a) |
|---|---|---|---|---|---|---|---|---|---|
| | no. | no. | no. | no. | no. | no. | no. | no. | no. |
| **HIGH ASSUMPTION** | | | | | | | | | |
| Capital city | 70 132 | 66 586 | 32 322 | 13 689 | 48 047 | 1 003 | 1 845 | 3 360 | 236 984 |
| Balance of state | 7 148 | 4 254 | 21 998 | 1 151 | 7 113 | 677 | 675 | . . | 43 016 |
| Total | 77 280 | 70 840 | 54 320 | 14 840 | 55 160 | 1 680 | 2 520 | 3 360 | 280 000 |
| **MEDIUM ASSUMPTION** | | | | | | | | | |
| Capital city | 60 921 | 57 556 | 27 955 | 11 808 | 41 293 | 866 | 1 625 | 2 880 | 204 904 |
| Balance of state | 5 319 | 3 164 | 18 605 | 912 | 5 987 | 574 | 535 | . . | 35 096 |
| Total | 66 240 | 60 720 | 46 560 | 12 720 | 47 280 | 1 440 | 2 160 | 2 880 | 240 000 |
| **LOW ASSUMPTION** | | | | | | | | | |
| Capital city | 51 710 | 48 524 | 23 588 | 9 927 | 34 539 | 730 | 1 406 | 2 400 | 172 824 |
| Balance of state | 3 490 | 2 076 | 15 212 | 673 | 4 861 | 470 | 394 | . . | 27 176 |
| Total | 55 200 | 50 600 | 38 800 | 10 600 | 39 400 | 1 200 | 1 800 | 2 400 | 200 000 |

. . not applicable

(a) Includes Other Territories.

*Assumed age structure of net overseas migration*

The assumed age/sex structure of NOM for the states and territories is derived from the 2010-2012 NOM. NOM arrivals and departures by state/territory, age and sex are simultaneously constrained to the total assumed NOM level for Australia and to the assumed state/territory shares of NOM. The assumed age/sex structures are held constant throughout the projection period.

For more information on the age structure of NOM, see *Migration, Australia, 2010–11* (cat. no. 3412.0).

## NET INTERSTATE MIGRATION

### *Summary*

Interstate migration, as an unrestricted and unregulated effect on population, is volatile and an unpredictable component in population estimation or projection. The movement of people between the states and territories of Australia is influenced by many factors such as varying economic opportunities, overseas immigration and settlement patterns, lifestyle choices and marketing campaigns targeting interstate movers by state/territory governments. As the effect of these factors cannot be anticipated, past net interstate migration trends are used as the basis for assuming future levels.

### *Historical data*

Net interstate migration estimates since 1994 are shown below. These are calculated using Medicare change of address records and Census data on usual residence one year ago and five years ago.

NET INTERSTATE MIGRATION—1994–2012

| *Year ending 30 June* | *NSW* '000 | *Vic.* '000 | *Qld* '000 | *SA* '000 | *WA* '000 | *Tas.* '000 | *NT* '000 | *ACT* '000 |
|---|---|---|---|---|---|---|---|---|
| 1994 | –12.2 | –29.2 | 44.9 | –4.0 | 3.8 | –2.1 | –0.9 | –0.4 |
| 1995 | –13.5 | –22.0 | 40.2 | –7.1 | 5.1 | –2.7 | 0.4 | –0.5 |
| 1996 | –14.8 | –12.8 | 32.6 | –6.2 | 4.1 | –2.6 | 0.3 | –0.7 |
| 1997 | –10.7 | –6.2 | 19.6 | –3.3 | 4.7 | –3.3 | 1.8 | –2.5 |
| 1998 | –12.2 | –0.3 | 17.4 | –2.0 | 3.2 | –3.6 | –0.5 | –2.0 |
| 1999 | –13.1 | 2.5 | 16.7 | –1.6 | 0.3 | –3.3 | –1.0 | –0.5 |
| 2000 | –14.3 | 5.2 | 18.5 | –3.5 | –2.2 | –2.6 | –0.9 | –0.1 |
| 2001 | –16.3 | 5.2 | 20.0 | –2.4 | –3.1 | –2.1 | –1.6 | 0.4 |
| 2002 | –25.1 | 3.6 | 30.0 | –1.3 | –3.6 | –1.4 | –2.0 | –0.2 |
| 2003 | –32.5 | –0.7 | 38.0 | –1.2 | –2.0 | 2.0 | –2.8 | –0.8 |
| 2004 | –31.1 | –3.1 | 35.5 | –2.9 | 2.1 | 2.6 | –1.5 | –1.6 |
| 2005 | –26.3 | –3.1 | 30.4 | –3.2 | 2.2 | 0.3 | 0.6 | –0.8 |
| 2006 | –25.6 | –1.8 | 26.6 | –2.7 | 3.9 | –0.1 | –0.6 | 0.3 |
| 2007 | –26.3 | –1.6 | 23.4 | –3.4 | 5.4 | –0.5 | 0.4 | 2.5 |
| 2008 | –20.8 | –1.9 | 19.4 | –4.2 | 5.0 | 0.7 | 1.4 | 0.3 |
| 2009 | –18.7 | 1.5 | 14.7 | –4.4 | 5.0 | 1.1 | 0.9 | –0.3 |
| 2010 | –9.5 | 3.3 | 6.2 | –2.7 | 2.1 | 0.7 | –0.7 | 0.4 |
| 2011 | –13.5 | 3.5 | 6.8 | –2.6 | 7.0 | — | –2.5 | 1.4 |
| 2012 | –18.4 | 1.2 | 11.8 | –2.4 | 11.1 | –2.6 | –1.5 | 0.7 |

— nil or rounded to zero (including null cells)

*Historical data continued*

New South Wales and South Australia have continued to experience net interstate losses, not recording a net interstate migration gain in the last 40 and 21 years, respectively. Queensland continues to be the largest beneficiary of net interstate migration since 1972, with Western Australia also recording gains in net interstate migration. Western Australia's net gain has been recorded for the past 9 years but has increased significantly in the last two years.

Victoria, Tasmania, the Northern Territory and the Australian Capital Territory have seen fluctuations in their net interstate migration. Victoria has returned to net migration gains after recording six years of losses. After experiencing positive or stable net migration from 2008 to 2011, Tasmania has recorded a net migration loss in 2012, returning to the long term trend for the state. The Northern Territory has returned to net interstate migration losses after gains from 2007 to 2009. Since 2006, the Australian Capital Territory has recorded gains except in 2009.

*State/territory and capital city/balance of state assumptions*

Levels of assumed net interstate migration were derived by analysing trends over the past 5 years and constraining them such that they sum to zero. The assumptions reflect the view that each State/Territory will trend towards their short term average. Three assumptions have been made about future net interstate migration levels:

Three assumptions have been made about future net interstate migration levels:

- large interstate flows: relatively large net interstate migration gains for some states and territories, corresponding to relatively large losses for other states and territories. For example, this equates to large net gains in Queensland and correspondingly large net losses in New South Wales and South Australia;
- medium interstate flows: medium net interstate migration gains for some states and territories, and medium losses for others; and
- small interstate flows: relatively small net interstate migration gains for some states and territories, and small losses for others.

The medium series assumptions are based on NIM averages for the states and territories in the period 2007–2012. The high and low assumptions were based on the minimum and maximum values of NIM. Adjustments were made to ensure that each State maintains the direction of interstate migration (established by trends), and that the overall NIM is zero.

It should be noted that for some states the large interstate flows assumption corresponds to large net interstate migration *losses*, therefore the small interstate flows assumption will yield greater population growth in such cases.

*State/territory and capital city/balance of state assumptions continued*

Net interstate migration assumptions for the states and territories are as follows:

ASSUMED NET INTERSTATE MIGRATION, 2013–2061

| Year ended 30 June | NSW '000 | Vic. '000 | Qld '000 | SA '000 | WA '000 | Tas. '000 | NT '000 | ACT '000 |
|---|---|---|---|---|---|---|---|---|
| **LARGE INTERSTATE FLOWS ASSUMPTION (a)** | | | | | | | | |
| 2013 | –22.0 | 2.0 | 14.0 | –3.0 | 11.0 | –1.5 | –1.5 | 1.0 |
| 2014 | –25.5 | 3.0 | 16.0 | –3.5 | 10.5 | — | –2.0 | 1.5 |
| 2015–2061 | –29.0 | 4.0 | 18.0 | –4.0 | 10.0 | 1.0 | –2.0 | 2.0 |
| **MEDIUM INTERSTATE FLOWS ASSUMPTION** | | | | | | | | |
| 2013 | –18.0 | 1.5 | 12.0 | –2.5 | 9.5 | –1.5 | –1.5 | 0.5 |
| 2014 | –17.5 | 2.0 | 12.0 | –3.0 | 7.5 | –1.0 | –1.0 | 1.0 |
| 2015–2061 | –17.0 | 2.0 | 12.0 | –3.0 | 6.0 | — | –1.0 | 1.0 |
| **SMALL INTERSTATE FLOWS ASSUMPTION (a)** | | | | | | | | |
| 2013 | –14.0 | 1.0 | 10.0 | –2.5 | 8.0 | –2.0 | –1.0 | 0.5 |
| 2014 | –9.5 | 0.5 | 8.0 | –2.0 | 5.0 | –1.5 | –0.5 | — |
| 2015–2061 | –5.0 | — | 6.0 | –2.0 | 2.0 | –1.0 | — | — |

— nil or rounded to zero (including null cells)

(a) The large interstate flows assumption corresponds to large net interstate losses for New South Wales, South Australia and the Northern Territory, where the small interstate flows assumption yields the greater population growth.

Internal migration assumptions for capital cities and balance of states were based on indirectly estimated historical trends of net internal migration. Net total migration (overseas and internal) for each capital city/balance of state was assumed to be the difference between population growth and natural increase for these regions. Net internal migration was then assumed to be the difference between net total migration and the synthetic NOM estimates for capital city and balance of state (for the derivation of these NOM estimates see the *Net Overseas Migration* section of *Chapter 2: Assumptions*).

*State/territory and capital city/balance of state assumptions continued*

## NET INTERNAL MIGRATION, Capital cities—Observed and assumed

| Year ended 30 June | Sydney '000 | Melbourne '000 | Brisbane '000 | Adelaide '000 | Perth '000 | Hobart '000 | Darwin '000 |
|---|---|---|---|---|---|---|---|
| | | | OBSERVED | | | | |
| 2002 | –42.9 | –1.3 | 13.5 | –1.1 | –1.0 | –0.6 | –1.0 |
| 2003 | –44.5 | –4.0 | 15.7 | –1.5 | 0.9 | 0.8 | –1.6 |
| 2004 | –28.5 | –3.6 | 13.2 | –3.0 | 5.1 | 0.9 | –0.9 |
| 2005 | –39.7 | –4.2 | 9.6 | –3.2 | 0.8 | 0.1 | 0.8 |
| 2006 | –35.2 | –4.7 | 6.7 | –2.6 | 2.9 | –0.1 | –0.1 |
| 2007 | –32.4 | –4.3 | 5.5 | –3.9 | 9.6 | –0.4 | 0.7 |
| 2008 | –29.2 | –5.7 | 3.1 | –4.4 | 3.7 | 0.2 | 1.2 |
| 2009 | –29.7 | –3.9 | 2.5 | –4.0 | 3.2 | 0.3 | 0.8 |
| 2010 | –26.2 | –5.4 | — | –3.0 | 1.3 | 0.5 | –0.2 |
| 2011 | –28.4 | –5.5 | 1.4 | –2.3 | 5.9 | 0.2 | –1.2 |
| 2012 | –26.1 | –3.7 | 0.4 | –2.8 | 8.9 | –0.9 | –0.6 |
| | | | LARGE INTERSTATE FLOWS ASSUMPTION (a) | | | | |
| 2013 | –20.2 | –1.7 | 1.1 | –2.5 | 8.9 | –1.3 | –1.0 |
| 2014 | –13.0 | –1.1 | 0.8 | –2.0 | 5.6 | –0.9 | –0.5 |
| 2015–2061 | –6.7 | — | 0.5 | –1.9 | 2.2 | –0.5 | — |
| | | | MEDIUM INTERSTATE FLOWS ASSUMPTION | | | | |
| 2013 | –25.9 | –2.6 | 1.4 | –2.5 | 10.5 | –1.0 | –1.4 |
| 2014 | –24.0 | –4.2 | 1.2 | –3.0 | 8.4 | –0.6 | –1.1 |
| 2015–2061 | –22.7 | –4.0 | 1.1 | –2.9 | 6.5 | — | –1.2 |
| | | | SMALL INTERSTATE FLOWS ASSUMPTION (a) | | | | |
| 2013 | –31.7 | –2.7 | 1.6 | –3.0 | 12.2 | –1.0 | –1.4 |
| 2014 | –35.0 | –5.1 | 1.7 | –3.5 | 11.7 | — | –2.1 |
| 2015–2061 | –38.7 | –6.4 | 1.6 | –3.9 | 10.9 | 0.5 | –2.4 |

— nil or rounded to zero (including null cells)

(a) The large interstate flows assumption corresponds to large net interstate losses for New South Wales, South Australia and the Northern Territory, where the small interstate flows assumption yields the greater population growth.

*State/territory and capital city/balance of state assumptions continued*

NET INTERNAL MIGRATION, Balance of state—observed and assumed

| Year ended 30 June | Balance of NSW '000 | Balance of Vic. '000 | Balance of Qld '000 | Balance of SA '000 | Balance of Wa '000 | Balance of Tas. '000 | Balance of NT '000 |
|---|---|---|---|---|---|---|---|
| **OBSERVED** | | | | | | | |
| 2002 | 17.8 | 4.9 | 16.5 | –0.2 | –2.5 | –0.8 | –1.0 |
| 2003 | 12.1 | 3.2 | 22.3 | 0.3 | –2.9 | 1.2 | –1.2 |
| 2004 | –2.6 | 0.5 | 22.3 | — | –3.0 | 1.6 | –0.6 |
| 2005 | 13.4 | 1.2 | 20.8 | –0.1 | 1.5 | 0.2 | –0.2 |
| 2006 | 9.6 | 2.9 | 19.9 | –0.1 | 1.1 | — | –0.4 |
| 2007 | 6.1 | 2.7 | 17.8 | 0.5 | –4.3 | –0.2 | –0.3 |
| 2008 | 8.4 | 3.7 | 16.3 | 0.2 | 1.2 | 0.5 | 0.2 |
| 2009 | 11.1 | 5.5 | 12.2 | –0.4 | 1.8 | 0.7 | 0.1 |
| 2010 | 16.7 | 8.7 | 6.2 | 0.3 | 0.8 | 0.1 | –0.4 |
| 2011 | 14.9 | 9.0 | 5.4 | –0.3 | 1.1 | –0.3 | –1.3 |
| 2012 | 7.7 | 4.9 | 11.4 | 0.5 | 2.2 | –1.6 | –0.9 |
| **LARGE INTERSTATE FLOWS ASSUMPTION (a)** | | | | | | | |
| 2013 | 6.2 | 2.7 | 8.9 | — | –0.9 | –0.7 | — |
| 2014 | 3.5 | 1.6 | 7.2 | — | –0.6 | –0.6 | — |
| 2015–2061 | 1.7 | — | 5.5 | –0.1 | –0.2 | –0.5 | — |
| **MEDIUM INTERSTATE FLOWS ASSUMPTION** | | | | | | | |
| 2013 | 7.9 | 4.1 | 10.6 | — | –1.0 | –0.5 | –0.1 |
| 2014 | 6.5 | 6.2 | 10.8 | — | –0.9 | –0.4 | 0.1 |
| 2015–2061 | 5.7 | 6.0 | 10.9 | –0.1 | –0.5 | — | 0.2 |
| **SMALL INTERSTATE FLOWS ASSUMPTION (a)** | | | | | | | |
| 2013 | 9.7 | 4.7 | 12.4 | — | –1.2 | –0.5 | –0.1 |
| 2014 | 9.5 | 8.1 | 14.3 | — | –1.2 | — | 0.1 |
| 2015–2061 | 9.7 | 10.4 | 16.4 | –0.1 | –0.9 | 0.5 | 0.4 |

— nil or rounded to zero (including null cells)

(a) The large interstate flows assumption corresponds to large net interstate losses for New South Wales, South Australia and the Northern Territory, where the small interstate flows assumption yields the greater population growth.

*Age/sex structure of interstate migration*

All assumptions are separated into arrivals and departures for each state/territory and capital city/balance of state. Rates for arrivals and departures for the states and territories are generated from movement data from recent Censuses to obtain age/sex levels. Further, 2006 and 2011 Census data are used to generate age/sex arrival and departure levels for each capital city/balance of state. As a result, all age/sex arrival and departure disaggregations sum to the net internal migration assumptions.

# CHAPTER 3 PROJECTION RESULTS — AUSTRALIA

## INTRODUCTION

The population projections presented in this release are not predictions or forecasts. They are an assessment of what would happen to Australia's population if the assumed levels of the components of population change-births, deaths and migration-were to occur over the next 50 to 100 years.

The projections reveal the size, structure and distribution of the future population under various assumptions on future levels of fertility, mortality and migration. These assumptions are based on long and short-term trends and future scenarios dictated by research in Australia and elsewhere.

## ASSUMPTIONS FOR SERIES A, B AND C

As described in Chapter 2, three assumptions have been made about Australia's future total fertility rates (TFR), two assumptions about future mortality, three assumptions about future levels of net overseas migration (NOM) and three main assumptions about net interstate migration.

In addition, a zero net overseas migration assumption has been included to illustrate the contribution of overseas migration to Australia's future population. From these assumptions, 72 projection series have been generated. Using the preliminary estimated resident population (ERP) at June 2012 as the base population for all projections, three main series (Series A, B and C) have been selected for presentation and analysis in this chapter:

- Series A—assumes the TFR will reach 2.0 babies per woman by 2026 and then remain constant, life expectancy at birth will continue to increase until 2061 (reaching 92.1 years for males and 93.6 years for females), NOM will reach 280,000 by 2021 and then remain constant, and large interstate migration flows.
- Series B—assumes the TFR will decrease to 1.8 babies per woman by 2026 and then remain constant, life expectancy at birth will continue to increase each year until 2061, though at a declining rate (reaching 85.2 years for males and 88.3 years for females), NOM will remain constant at 240,000 per year throughout the projection period, and medium interstate migration flows.
- Series C—assumes the TFR will decrease to 1.6 babies per woman by 2026 and then remain constant, life expectancy at birth will continue to increase each year until 2061, though at a declining rate (reaching 85.2 years for males and 88.3 years for females), NOM will reach 200,000 per year by 2021 and then remain constant, and small interstate migration flows.

Unless otherwise stated the following analysis uses Series A and C to depict a range of projected populations for Australia. At times, to simplify the analysis, Series B has been chosen.

## AUSTRALIA

### *Population size*

Australia's population at 30 June 2012 of 22.7 million is projected to increase to between 36.8 million and 48.3 million in 2061, and reach between 42.4 million and 70.1 million in 2101.

The three main series project continuing population growth throughout the projection period. In Series A, Australia experiences strong and consistent growth, reaching 48.3 million in 2061 and 70.1 million in 2101. In Series B, the population will reach 41.5 million in 2061 and 53.6 million in 2101. In Series C, growth is projected to be lower, with the population reaching 36.8 million in 2061 and 42.4 million in 2101.

### *Growth rates*

The growth rate of Australia's population reflects the interaction of the components of population change-natural increase (the excess of births over deaths) and NOM.

In the 10 years to June 2012, Australia's population increased by 1.5% per year on average. Growth rates are projected to decline over the long term in all three main series, remaining above 1.0% for the next eighteen years (Series C) to fifty-seven years (Series A).

The three main series project positive population growth throughout the projection period, although growth rates decline over time and at varying rates. In Series A, Australia's growth rate initially increases to 1.9% per year and remains above the 20 year average (1.3%) until the middle of the century. Over the second half of the century, growth rates gradually decline, reaching 1.0% in 2071 and 0.8% in 2101.

In Series B, Australia's annual growth rate decreases from 1.7% in 2012 to 1.0% in 2045, and to 0.5% in 2101.

In Series C, Australia's annual growth rate decreases at a faster rate, reaching 1.0% in 2031 and 0.2% in 2101.

### *Births*

There were 306,000 births and 147,200 deaths in Australia during 2011-12, resulting in a natural increase of 158,800 people. The three main series present quite different scenarios for projected births.

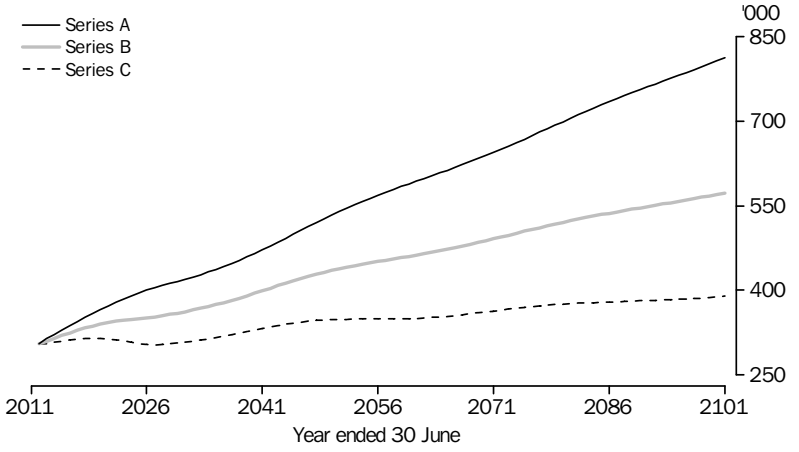
Series A projects strong and consistent increases in the numbers of births each year, due to the relatively high total fertility rate (2.0 births per woman assumed in this scenario). In 2061, Series A projects 593,400 births, increasing to around 811,500 births per year at the end of the century.

Numbers of births are also projected to increase in Series B, although at a slower rate than Series A. Series B projects 462,300 births in 2061 and 572,400 births in 2101.

In Series C the projected number of births declines from 2020 to 2027, then increases only slightly over the remainder of the century, reaching 389,300 in 2101.

*Births continued*

PROJECTED BIRTHS, Australia



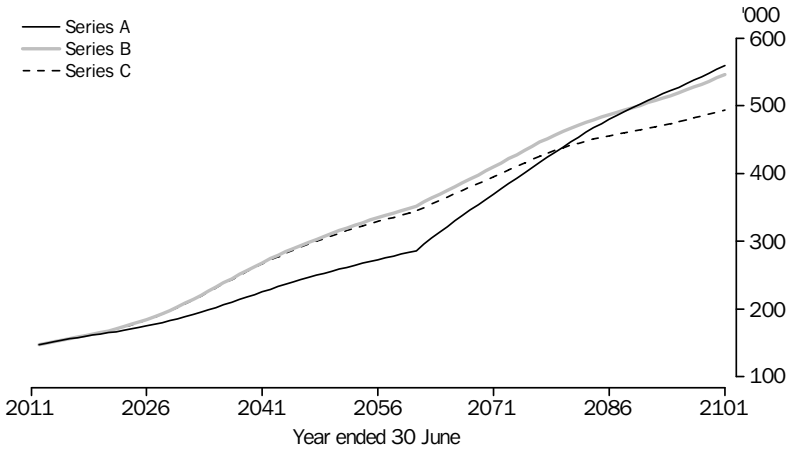

*Deaths*

The numbers of projected deaths in Series B and C remain similar until the middle of the century, as both series use the same mortality assumption. Initially deaths are projected to increase at rates of around 1.3% to 1.8% per year. Between 2022 and the early 2040s deaths are projected to increase more rapidly (up to 2.7% per year in 2032) as a result of the ageing of the population and in particular the progression of the large cohorts born during the post World War II 'baby boom', together with those former migrants born in 1947, into the older age groups. From the middle of the century onwards, the number of deaths generally increases at gradually declining rates.

From 147,200 deaths in 2011-12, Series B and C project deaths to more than double by 2061 (to 352,100 and 344,500 respectively), and reach between 545,400 and 493,400 respectively in 2101.

Series A assumes higher life expectancy at birth than Series B and C, therefore lower numbers of deaths are projected for the first 50 years of the projection period. The cessation of assumed improvements in life expectancy from 2062 onwards results in a rapid increase in deaths in Series A, compounded by the larger population size due to the combination of high fertility, low mortality and high net overseas migration assumptions used. Series A projects 286,000 deaths in 2061, increasing to 559,800 in 2101, the highest of all three main series.

PROJECTED DEATHS, Australia



*Natural increase*

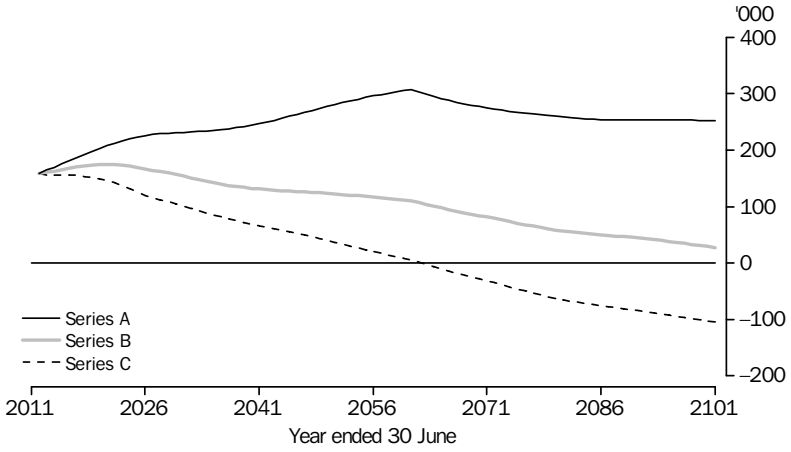
While the number of deaths in Australia are projected to increase in all three main series, the number of births are projected to vary widely. As a result, projected natural increase (births minus deaths) differs significantly for each of the three main series.

Natural increase in Series A is projected to initially increase, and then to remain at or above 200,000 from 2020 until 2101.

Series B projects a gradual decline in natural increase over the projection period, reaching 110,200 in 2061 and declining to 27,000 by the end of the century.

In Series C natural increase declines at a faster rate, reaching a state of natural decrease (where deaths outnumber births) from 2063 onwards. By 2101 Series C projects natural decrease of 104,100 per year. Despite this, Australia's population is projected to continue to increase, as the assumed level of net overseas migration in Series C (200,000 people per year) outweighs losses in population due to natural decrease.

PROJECTED NATURAL INCREASE, Australia



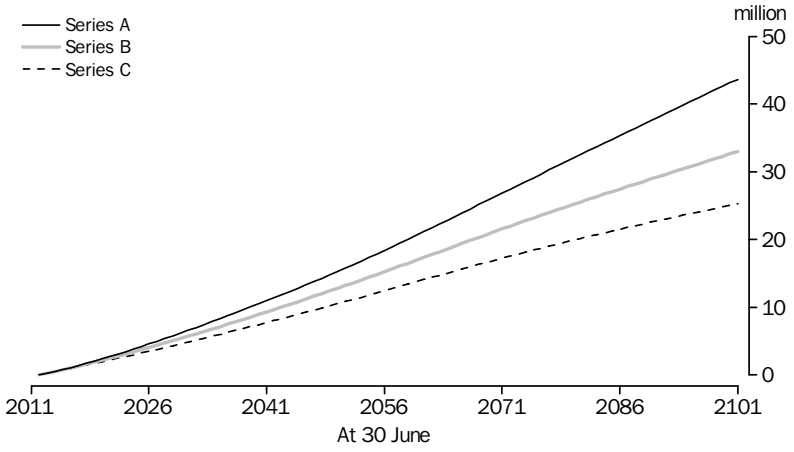

*Effect of net overseas migration*

In 2011-12 net overseas migration contributed 223,100 people to Australia's population. While changes in fertility have the biggest effect on the youngest ages of the population, and changes in mortality are felt predominantly in older age groups, NOM affects the population of all ages. Although the age structure of migrants at arrival in Australia is younger than the Australian population as a whole, migrants will age along with the rest of the population in the years following their arrival. Over time, changes in NOM therefore affect the size of the population more than the age distribution.

Net overseas migration contributes to population growth through both the levels of migration itself, and by children born to migrants to Australia. The effect of NOM can be determined by comparing the projected population of each of the three main series with the projected population resulting from an assumed NOM level of zero. In Series A, NOM contributes a total of 21.1 million people to Australia's population between 30 June 2012 and 2061, and 43.6 million people between 30 June 2012 and 2101. In Series B, NOM contributes fewer people to the population (17.3 million by 2061, and 33.0 million by 2101), while in Series C, NOM contributes the fewest people (14.1 million by 2061, and 25.3 million by 2101).

*Effect of net overseas migration continued*

CONTRIBUTION OF NOM TO THE PROJECTED POPULATION, Australia

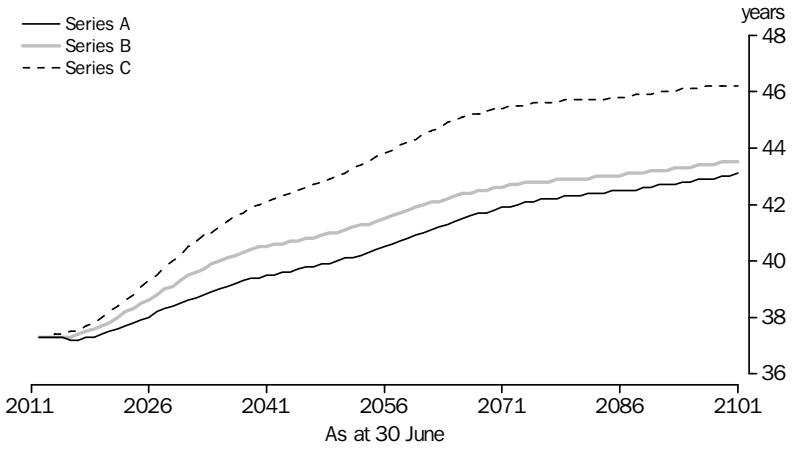


*Population ageing*

Of the changes projected to occur in Australia's population, ageing is generally considered to be the most dramatic, with significant changes to the age structure of the population, particularly over the next fifty years. Ageing of the population is a trend which has been evident over recent decades as a result of fertility remaining below replacement level and declining mortality rates. In all three series this trend is projected to continue.

Changes in Australia's age structure are reflected in the median age, which is projected to increase from 37.3 years in 30 June 2012 to between 38.6 years and 40.5 years in 2031, and between 41.0 years and 44.5 years in 2061. Over the second half of the century, the median age is projected to continue to increase, but at slower rates, to between 43.1 years and 46.2 years in 2101.

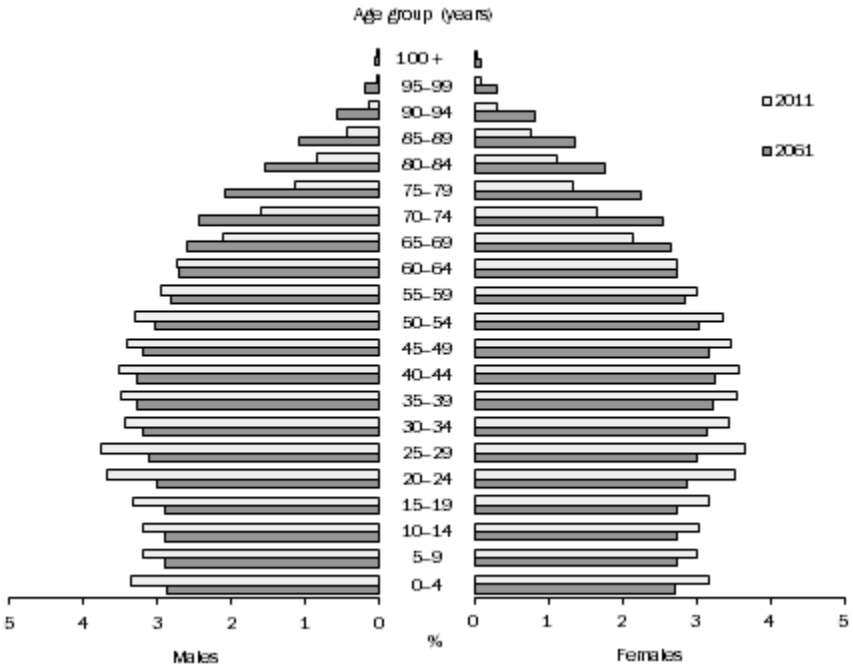
PROJECTED POPULATION, Median age—Australia




The proportion of the population aged under 15 years is projected to decrease from 19% of the population (4.3 million) at 30 June 2012 to between 15% and 18% (5.5 million and 8.7 million) in 2061, and to further decline to between 14% and 17% in 2101 (6.0 million and 12.0 million).

*Population ageing*

*continued*

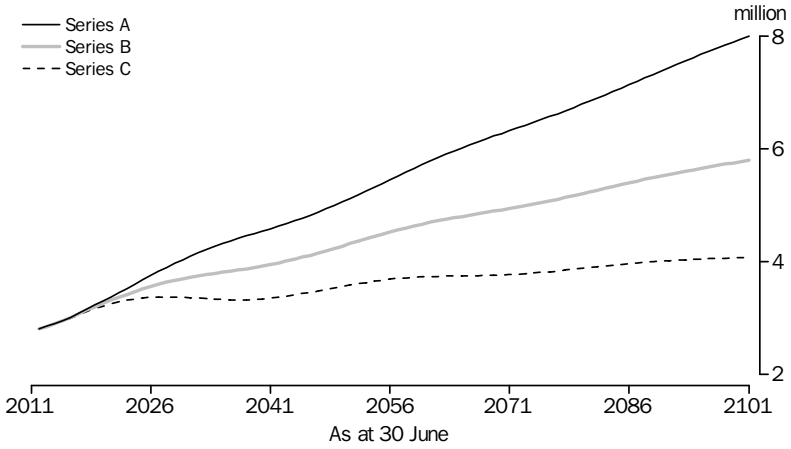


*Population aged 5–14 years*

Changes in the number of children aged 5-14 years, an age group closely aligned to compulsory ages for schooling, has implications for the provision of primary and secondary education.

Series A projects strong increases in the number of children in this age group, from 2.8 million at 30 June 2012 to 5.8 million in 2061 and 8.0 million at the end of the century. The number of children aged 5-14 are also projected to increase in Series B, although at a slower rate than Series A. Series B projects 4.7 million children aged 5-14 in 2061 and 5.8 million in 2101. In Series C the number of children aged 5-14 increases only slowly throughout the century, reaching 4.1 million in 2101.

PROJECTED POPULATION AGED 5–14 YEARS, Australia




While the number of children aged 5-14 are projected to increase in all three main series, their proportion will decline from 12% at 30 June 2012 to between 10% and 12% by 2061. Between 2061 and 2101 little change in this proportion is projected.

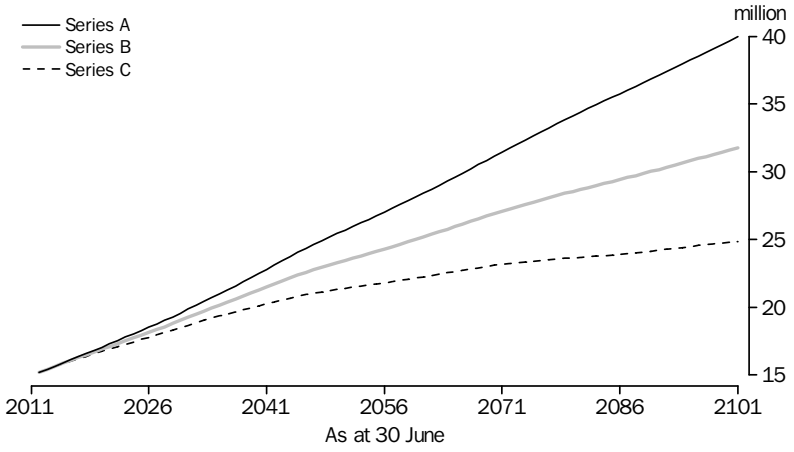
*Population aged 15–64 years*

The population aged 15-64 years, which encompasses what many Australians still consider to be 'the working-age population', was 15.2 million people at 30 June 2012, making up 67% of Australia's population. The three main series project this group to continue to increase throughout the projection period. Series A projects strong growth in the number of people aged 15-64 years, reaching 28.4 million in 2061 and 39.9 million in 2101. The number of people aged 15-64 is projected to increase in Series B, although at a slower rate than Series A. Series B projects 25.2 million people aged 15-64 in 2061 and 31.8 million in 2101. In Series C the projected number of people aged 15-64 reaches 22.2 million in 2061 and then increases slightly to 24.9 million in 2101.

Despite different outcomes in terms of population size, the proportion of the total population of 15-64 year olds will be similar for all three main series throughout the projection period. This proportion declines from 67% at 30 June 2012 to between 59%-61% in 2061 and 57%-59% in 2101.

*Population aged 15–64 years continued*

PROJECTED POPULATION AGED 15–64 YEARS, Australia




Within the 15-64 years age group ageing will occur in all three series. From 27% of people aged 15-64 at 30 June 2012, people aged 50-64 years are projected to increase to between 27% and 30% in 2061. From 2061 the proportion remains relatively stable.

Within the 15-64 age group, the proportion of people aged 15-29 years is projected to decline slightly in all three series, from 31% at 30 June 2012 to between 28% and 30% by 2061, and to remain at these levels until 2101. The proportion of people aged 30-49 years declines slightly over the century, reaching 42% in 2101.

*Population aged 65 years and over*

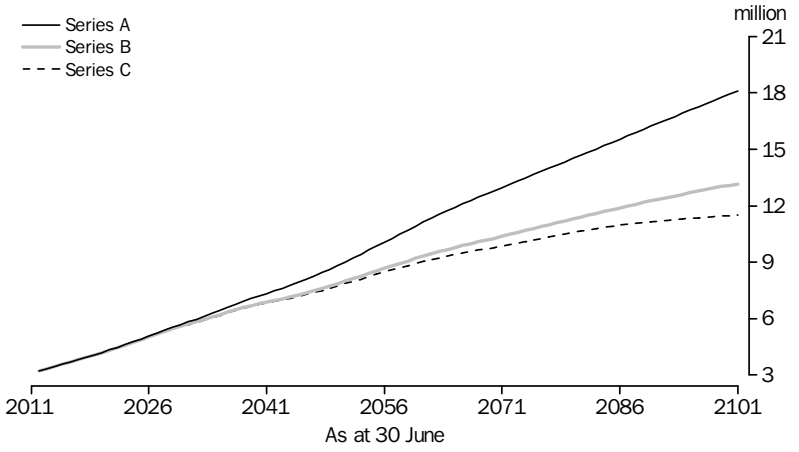
The population aged 65 years and over will increase rapidly throughout the first half of the projection period, in terms of both numbers and proportions of the total population, under all 3 series. This age group is projected to increase from 3.2 million at 30 June 2012 to between 5.7 million and 5.8 million in 2031, and to between 9.0 million and 11.1 million in 2061. By 2101 this age group is projected to reach between 11.5 million and 18.1 million.

As a proportion of the population, the population aged 65 years and over is projected to increase from 14% at 30 June 2012 to between 18.3% (Series A) and 19.4% (Series C) in 2031, 22.4% (Series B) and 24.5% (Series C) in 2061, and 24.6% (Series B) and 27.1% (Series C) in 2101. As can be seen from this, Series A does not necessarily reflect the highest value for all measures.

Among other considerations such as health and housing services, growth in this age group has particular implications for retirement income planning (Department of Treasury, 2010).

*Population aged 65 years and over continued*

PROJECTED POPULATION AGED 65 YEARS AND OVER, Australia




The annual growth rate for people aged 65 years and over was 4.2% in 2012, when the large cohort born in 1947, part of the post World War II 'baby boom', together with earlier migrants born in 1947, reach 65 years. Growth rates remain strong in Series A due to higher assumed life expectancy at birth, declining to 1.0% in 2093 and 0.9% by the end of the projection period. In Series B and C, growth rates decrease more quickly, reaching 1.0% in the early 2060s and declining to 0.6% and 0.2% respectively by 2101.

*Population aged 85 years and over*

The projected number of people aged 85 years and over has implications for the provision of health services and appropriate housing (Department of Treasury, 2010), given that non-private dwellings are currently the most common form of housing for people in this age group.

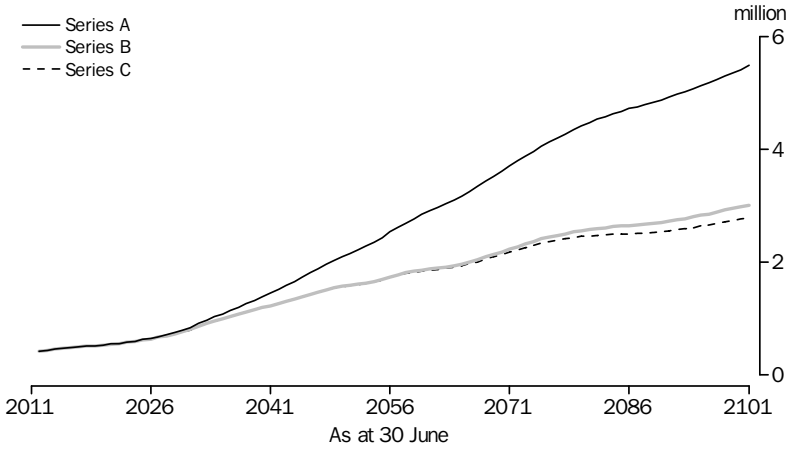
At 30 June 2012 there were 420,300 people aged 85 years and over in Australia. This age group is projected to increase rapidly throughout the projection period. In Series A, which uses the high life expectancy at birth assumption, the population is projected to more than double within 20 years (to 842,500 people in 2031), to double again by 2045 (1.7 million), and to double once more by 2069 (3.5 million). Over the second half of the century the number of people aged 85 and over will continue to grow strongly, reaching 5.5 million people by 2101.

Series B and C (which both use the medium life expectancy at birth assumption) also project high growth, though considerably less than Series A from around 2033 onwards. By 2061 the population aged 85 years and over is projected to be 1.9 million in both series, and between 2.8 and 3.0 million in 2101.

People aged 85 years and over made up 1.8% of Australia's population at 30 June 2012. This age group is projected to account for around 4.5% (Series B) to 6% (Series A) of the population in 2061, and 5.6% (Series B) to 7.8% (Series A) in 2101.

*Population aged 85 years and over continued*

PROJECTED POPULATION AGED 85 YEARS AND OVER, Australia




The population aged 85 years and over is projected to experience the highest growth rates of all age groups. Growth for this group will peak at between 7% and 8% in 2032. This peak is due to the large cohort of people born in 1947 reaching 85 years around this time.

A noticeable change within this age group is the increasing proportion of men due to the narrowing of the gap between male and female life expectancy. At 30 June 2012 men accounted for 35% of all people aged 85 years and over. This proportion is projected to increase to 42% in 2031, 43%-46% in 2061, and 44%-48% in 2101.

# EXPLANATORY NOTES

## INTRODUCTION

**1** This publication contains projections of Australia's population by age and sex for the period 2013 to 2101, and projections of the states, territories and capital cities/balances of state for the period 2013 to 2061. Capital city/balance of state projections were not generated for the Australian Capital Territory because under the new Australian Statistical Geography Standard, the Australian Capital Territory is not broken down into capital city/balance of state regions.

**2** Three main series of projections (Series A, B and C) are presented in this publication. These series have been selected to provide a range, although not the full range, of projections for analysis and discussion.

**3** For some states, Series A and C do not depict the highest or lowest population outcomes. Where applicable, other series have been included in commentary.

**4** These projections supercede the 2006-based series published in *Population Projections, Australia, 2006 to 2101* (cat. no. 3222.0) in September 2008.

**5** The projections for Australia include Other Territories, comprising Christmas Island, Cocos (Keeling) Islands and Jervis Bay Territory.

## OBJECTIVES

**6** The ABS publishes population projections following each five-yearly Census.

**7** The projections are not intended as predictions or forecasts, but are illustrations of growth and change in the population that would occur if assumptions made about future demographic trends were to prevail over the projection period.

**8** While the assumptions for the projections are formulated on the basis of an assessment of past demographic trends, both in Australia and overseas, there is no certainty that any of the assumptions will or will not be realised. In addition, no assessment has been made of changes in non-demographic conditions.

**9** Accordingly, alternative combinations of assumptions have been provided in recognition of this uncertainty and to provide users with a range of options.

## DEVELOPMENT

**10** The process of developing population projections involves research, analysis, consultation and computation. Analysis of demographic trends, research into the determinants of population growth and distribution, and consultation with various experts at the national and state levels are necessary to formulate the various assumptions and to ensure their general relevance for the projection period.

**11** A consultation process, involving expert academic and government demographers, occurred from July to September 2013, following which assumptions for the population projections were finalised by the Australian Bureau of Statistics (ABS). Three assumptions were used for fertility, two for mortality, three for net overseas migration and three for net interstate migration. In addition, a zero net overseas migration assumption has been included to illustrate the contribution of overseas migration to Australia.

## PROJECTION TECHNIQUES

**12** There are many techniques which may be used for population projections, such as simple extrapolations, probabilistic methods, broad economic, social and time-series analysis, and detailed component methods.

PROJECTION TECHNIQUES *continued*

**13** The ABS uses the cohort-component method, which begins with a base population for each sex by single year of age and advances it year by year by applying assumptions regarding future fertility, mortality and migration. This procedure is repeated for each year in the projection period for Australia and each state and territory, as well as each capital city and balance of state region in each state and territory. The resulting population projections for each year for the states and territories, by sex and single year of age, are adjusted to sum to the Australian results. Likewise, capital city and balance of state projections are adjusted to sum to their respective state and territory projections.

**14** The ABS recognises the increasing interest in stochastic methods among demographers. While such methods were not specifically used in compiling these projections, some limited applications of the methods were used in assessing some of the assumptions. The ABS welcomes further feedback in these emerging methodologies ahead of the next set of projections, in 2018.

ASSUMPTIONS

**15** Assumptions regarding future levels of fertility, mortality and migration used to produce the population projections, and how they were formulated, are discussed in Chapter 2—Assumptions.

ACKNOWLEDGMENT

**16** ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated; without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence as required by the *Census and Statistics Act 1905*.

RELATED PUBLICATION AND REFERENCES

**17** Users may also wish to refer to the following ABS products:

*Australian Demographic Statistics* (cat. no. 3101.0)
*Australian Historical Population Statistics* (cat. no. 3105.0.65.001)
*Births, Australia* (cat. no. 3301.0)
*Causes of Death, Australia* (cat. no. 3303.0)
*Deaths, Australia* (cat. no. 3302.0)
*Estimates of Aboriginal and Torres Strait Islander Australians, June 2011* (cat. no. 3238.0.55.001)
*Household and Family Projections, Australia, 2001 to 2026* (cat. no. 3236.0)
*Migration, Australia* (cat. no. 3412.0)
*Population Estimates: Concepts, Sources and Methods* (cat. no. 3228.0.55.001)

**18** ABS products and publications are available free of charge from the ABS web site <http://www.abs.gov.au>. Click on Statistics to gain access to the full range of ABS statistical and reference information.

ADDITIONAL STATISTICS AVAILABLE

**19** More detailed information for the three main series presented in this publication and other series can be obtained from the ABS web site in *Population Projections, Australia, 2012 (base) to 2101* (cat. no. 3222.0). Data cubes provided are:

- *Projected population, Australia, 2012 (base)–2101*— ABS.Stat and SuperTABLE format;
- *Projected population, capital city/balance of state, 2012 (base)–2061*—in Excel format for each state/ territory (3 main series);
- *Projected population, capital city/balance of state, 2012 (base)–2061*— ABS.Stat and SuperTABLE for capital city/balance of state (all series);
- *Projected population, components of change and summary statistics, 2012 (base)–2101*—in Excel format for Australia, state/territory and capital city/balance of state.
- A detailed Excel spreadsheet containing the assumed age-specific rates and tables of data used in the projections.

ADDITIONAL STATISTICS AVAILABLE *continued*

**20** Population projections for the three main series (Series A, B and C) for Australia and the states/territories are also available in Time Series Spreadsheet (Microsoft Excel) format from the ABS web site.

**21** As well as the statistics included in this and related publications, the ABS may have other relevant data available on request. Inquiries should be made to the National Information and Referral Service on 1300 135 070.

# GLOSSARY

**12/16 month rule**

A method for measuring an overseas traveller's duration of stay or absence which takes an approach to measure usual residence that does not have to be continuous, as opposed to the continuous approach used under a '12/12 month rule'. Under a '12/16 month rule', incoming overseas travellers (who are not currently counted in the population) must be resident in Australia for a total period of 12 months or more, during the 16 month follow-up period to then be included in the estimated resident population. Similarly, those travellers departing Australia (who are currently counted in the population) must be absent from Australia for a total of 12 months or more during the 16 month follow-up period to then be subtracted from the estimated resident population.

The 12/16 month rule therefore takes account of those persons who may have left Australia briefly and returned, while still being resident for 12 months out of 16. Similarly, it takes account of Australians who live most of the time overseas but periodically return to Australia for short periods.

**Age-dependency ratio**

The dependency ratio is a measure used to compare the size of the working age population to the size of the non-working age population, calculated as the sum of people aged 0-14 and 65 years and over (that is, 'dependents') divided by the number of people aged 15-64 years, multiplied by 100.

**Age-specific death rates**

Age-specific death rates, or *mx*, are the number of deaths (on either an occurred or registered basis) during the calendar year at a specified age per 1,000 of the estimated resident population of the same age at mid-point of the year (30 June). Pro rata adjustment is made in respect of deaths for which the age of the deceased is not given.

**Age-specific fertility rates**

Age-specific fertility rates in this publication are the number of live births (on either an occurred or registered basis) during the financial year, according to the age of the mother, per 1,000 of the female estimated resident population of the same age at 30 June. For calculating these rates, births to mothers under 15 years are included in the 15-19 years age group, and births to mothers aged 50 years and over are included in the 45-49 years age group.

**Average annual growth rate**

The average annual population growth rate, *r*, is calculated as a percentage using the formula:

$$r = \left[ \left( \frac{P_n}{P_o} \right)^{\frac{1}{n}} - 1 \right] \times 100$$

where $P_0$ is the population at the start of the period, $P_n$ is the population at the end of the period and $n$ is the length of the period between $P_n$ and $P_0$ in years.

**Baby boom**

Baby boom refers to the generation born between the end of World War II and the mid-1960s. Baby boomers are usually taken to be those born in the years 1946 to 1965 inclusive.

**Balance of State**

Within each state and territory, the area not defined as being part of the Greater Capital Statistical Area is represented by a Balance of state region. These are the same as 'Rest of state' in the GCCSA Structure of the Australian Statistical Geography Standard (ASGS). For more information, please refer to Australian Statistical Geography Standard (ASGS): Volume 1 - Main Structure and Greater Capital City Statistical Areas, July 2011 (cat. no. 1270.0.55.001).

**Birth**

The delivery of a child, irrespective of the duration of pregnancy, who, after being born, breathes or shows any evidence of life such as a heartbeat.

**Capital city** Refers to the Greater Capital City Statistical Areas of states and territories as defined in the Australian Statistical Geography Standard. For more information, please refer to Australian Statistical Geography Standard (ASGS): Volume 1 - Main Structure and Greater Capital City Statistical Areas, July 2011 (cat. no. 1270.0.55.001).

**Estimated resident population** The official measure of the population of Australia is based on the concept of residence. It refers to all people, regardless of nationality or citizenship or legal status, who usually live in Australia, with the exception of foreign diplomatic personnel and their families. It includes usual residents who are overseas for less than 12 months over a 16 month period. It excludes overseas visitors who are in Australia for less than 12 months over a 16 month period.

**Fertility schedule** A fertility schedule is a time series of age-specific fertility rates.

**Greater Capital City Statistical Area (GCCSA)** Represent the socioeconomic area of each of the eight state and territory capital cities. These boundaries are built from aggregations of whole Statistical Areas Level 4. GCCSA boundaries represent a broad socioeconomic definition of each capital city, they contain not only the urban area of the capital city, but also surrounding and non-urban areas where much of the population has strong links to the capital city, through for example, commuting to work.

**Infant mortality rate** The number of deaths of children under one year of age in a calendar year per 1,000 live births in the same calendar year.

**Internal migration** The difference between the number of persons who have changed their place of usual residence by moving into a defined geographical area and the number who have changed their place of usual residence by moving out of that defined geographical area during a specified time period. This difference may be either positive or negative.

**Life expectancy** Life expectancy refers to the average number of additional years a person of a given age and sex might expect to live if the age-specific death rates of the given period continued throughout his or her lifetime.

**Life Table** A life table is a statistical model used to represent the mortality experience of a population. In its simplest form, a life table is generated from age-specific death rates and the resulting values are used to measure mortality, survivorship and life expectancy. The life table functions relevant to population projections are:

- qx – the proportion of persons dying between exact age x and exact age x+1. It is the mortality rate, from which other functions of the life table are derived; and
- ex – life expectancy at age x.

**Median value** For any distribution the median value (age, duration, interval) is that value which divides the relevant population into two equal parts, half falling below the value, and half exceeding it. Where the value for a particular record has not been stated, that record is excluded from the calculation.

**Natural increase** The excess of births over deaths.

**Net interstate migration** The difference between the number of persons who have changed their place of usual residence by moving into a given state or territory and the number who have changed their place of usual residence by moving out of that state or territory during a specified time period. This difference can be either positive or negative.

**Net overseas migration (NOM)** Net overseas migration is the net gain or loss of population through immigration to Australia and emigration from Australia. Under the current method for estimating final net overseas migration this term is based on a traveller's actual duration of stay or absence using the '12/16 month rule'. Preliminary NOM estimates are modelled on patterns of traveller behaviours observed in final NOM estimates for the same period one year earlier. NOM is:

- based on an international travellers' duration of stay being in or out of Australia for 12 months or more over a 16 month period;
- the difference between:

**Net overseas migration (NOM)** *continued*

- the number of incoming travellers who stay in Australia for 12 months or more over a 16 month period, who are not currently counted within the population, and are then added to the population (NOM arrivals); and
- the number of outgoing international travellers who leave Australia for 12 months or more over a 16 month period, who are currently counted within the population, and are then subtracted from the population (NOM departures).

**NOM arrivals**

NOM arrivals are all overseas arrivals that contribute to net overseas migration (NOM). It is the number of incoming international travellers who stay in Australia for 12 months or more over a 16 month period, who are not currently counted within the population, and are then added to the population.

Under the current method for estimating final net overseas migration this term is based on a traveller's actual duration of stay using the '12/16 month rule'.

**NOM departures**

NOM departures are all overseas departures that contribute to net overseas migration (NOM). It is the number of outgoing international travellers who leave Australia for 12 months or more over a 16 month period, who are currently counted within the population, and are then subtracted from the population.

Under the current method for estimating net overseas migration this term is then based on a traveller's actual duration of stay or absence using the '12/16 month rule'.

**Other Territories**

Other Territories comprises Christmas Island, Cocos (Keeling) Islands and Jervis Bay Territory.

**Population growth**

For Australia, population growth is the sum of natural increase and net overseas migration. For states and territories, population growth also includes net interstate migration. After the census, intercensal population growth also includes an allowance for intercensal difference.

**Rate of population growth**

Population change over a period as a proportion (percentage) of the population at the beginning of the period.

**Replacement fertility**

Replacement level fertility is the number of babies a female would need to have over her reproductive life span to replace herself and her partner. Given the current mortality of females up to age 49 years, replacement fertility is estimated at 2.1 babies per female.

**Sex ratio**

The sex ratio relates to the number of males per 100 females. The sex ratio is defined for total population, at birth, at death and among age groups by appropriately selecting the numerator and denominator of the ratio.

**Standardised death rate**

Standardised death rates enable the comparison of death rates between populations with different age structures by relating them to a standard population. The current standard population is all persons in the Australian population at 30 June 2001 (19,413,240), as published prior to recasting the ERP series. SDRs are expressed per 1,000 or 100,000 persons. The direct standardisation method was used to calculate standardised death rates.

**Statistical Area Level 4 (SA4)**

An area defined in the Australian Statistical Geography Standard designed for the output of labour force data and to reflect labour markets. In rural areas SA4s generally represent aggregations of multiple small labour markets with socioeconomic connections or similar industry characteristics. Large regional city labour markets are generally defined by a single SA4. Within major metropolitan labour markets SA4s represent sub-labour markets. SA4s are built from whole Statistical Area Level 3 regions. They generally have a population over 100,000 people to enable accurate labour force survey data to be generated. There are 88 SA4s and they cover the whole of Australia without gaps or overlaps. For more information, please refer to Australian Statistical Geography Standard (ASGS): Volume 1 - Main Structure and Greater Capital City Statistical Areas, July 2011 (cat. no. 1270.0.55.001).

**Total fertility rate** The sum of age-specific fertility rates (live births at each age of mother per female population of that age) divided by 1,000. It represents the number of children a female would bear during her lifetime if she experienced current age-specific fertility rates at each age of her reproductive life (ages 15-49).

**Usual residence** Usual residence within Australia refers to that address at which the person has lived or intends to live for a total of six months or more in a given reference year.

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