# A Appendix — National Agreements

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| Attachment tables |
| Attachment tables are identified in references throughout this appendix by an ‘AA’ prefix (for example, table AA.3). A full list of attachment tables is provided at the end of this appendix. |
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## A.1 Introduction

This appendix contains contextual information to assist the COAG Reform Council to interpret the performance data presented in the reports on the:

* *National Healthcare Agreement*
* *National Affordable Housing Agreement*
* *National Disability Agreement*
* *National Indigenous Reform Agreement*
* *National Education Agreement*
* *National Agreement for Skills and Workforce Development* (the Reports).

The information provided in this appendix covers five themes:

* general population data
* Indigenous population data
* geography
* measuring socioeconomic status
* statistical concepts.

## A.2 Population data

There are many different ways to estimate population counts. The official population estimates are referred to as the Estimated Resident Population (ERP), and link people to a place of usual residence within Australia. However, there may be some instances where ERP data are not available for particular socio‑demographic groups or for required time periods. In these instances, population estimates are derived from other data collections or are projected based on a series of assumptions. Details on the different population counts used in the Reports are provided below.

### Estimated resident population

ERP data are derived from Census counts of usual residents (excluding overseas visitors) and adjusted for net Census undercount and Australian residents estimated to have been temporarily overseas at the time of the Census. ERP counts are generally higher than Census counts.

ERP data are updated quarterly by adjusting for the following changes for the relevant quarter:

* adding birth registrations
* subtracting death registrations
* adjusting for overseas migration (and interstate migration for State and Territory counts).

After each Census, estimates for the quarterly ERP in the preceding intercensal period are finalised by incorporating an additional adjustment (intercensal discrepancy) to ensure that the total intercensal change between the two Census dates (sum of quarterly ERP) aligns with the difference between the two Census dates.

‘Intercensal error’ refers to the difference between the latest preliminary Census based ERP figures for 30 June 2011 and the ERP figures based on the previous (2006) Census, which were estimated forward using births, deaths and migration data. In future, the ABS will refer to this as ‘intercensal difference’. ‘Intercensal discrepancy’ is determined after rebasing is complete and is the remaining unattributable portion after the intercensal error is adjusted for all revisions to component data (ABS 2013 Feature Article 1).

#### Estimated resident population for 2012-13 National Agreement reporting

For the 2012-13 National Healthcare Agreement (NHA), National Disability Agreement (NDA), and National Affordable Housing Agreement (NAHA) performance reports, where ERP data are required for performance indicators they are based on the 2011 Census (with the exception of ERP used for non-Indigenous comparisons, which is based on the 2006 Census for comparability with Indigenous population data).

Changes to the ERP this cycle include:

* final rebasing — the population estimates have been updated to produce final rebased population estimates back to 2007 and a final base ERP for 30 June 2011[[1]](#footnote-1).
* recasting — the final rebasing also included a one-off ‘recasting’ of ERP from June 2006 back to September 1991 to accommodate the impact of a methodological improvement in the 2011 estimates of Census undercount which resulted in a high intercensal error (the net undercount was 40 per cent less than previous methods have indicated)[[2]](#footnote-2).

The main impact of rebased population estimates on time series reporting of National Agreement performance indicators has been a reduction in population estimates (see table A.1). The proportionality of age groups, states and territories and sexes has not significantly changed as the result of recasting the ERP series (ABS 2013 Feature Article 2).

The Labour Force Survey (LFS) is the only ABS population and social survey (at this stage) which is being re-benchmarked to be consistent with the revised ERP. The LFS estimates revised from 1991 onwards are expected to be released in February 2014 (ABS 2013 Feature Article 4). Whilst a number of ABS population and social surveys are used for NA performance reporting, these do to not include the LFS (LFS data are only used for context). Therefore, the revised ERP do not affect ABS survey data used in the NA performance reports.

In order to provide the most up-to-date context, this Appendix uses the most recent available estimates (that is, ERP final to June 2011 and preliminary after June 2011, based on the 2011 Census). Relevant tables are clearly footnoted.

Table A.1 illustrates the intercensal discrepancy between the June 2011 ERP based on the 2006 Census and the final ERP based on the 2011 Census. The final rebasing of Australia’s population estimates using data from the 2011 Census reduced the previous estimate (based on the 2006 Census) by 77 700 people, bringing the total ERP as at June 2011 down to 22 340 000. The intercensal discrepancy ranged from minus 0.4 per cent of the population in the Northern Territory to plus 0.6 per cent of the population in New South Wales (table A.1).

Table A.1 ERP data, 30 June 2011, by Census base

|  |  |  |
| --- | --- | --- |
|  | **Final June 2011 ERP(2011 Census base)** | **Final Intercensal Discrepancy (2006-2011)**a |
|  | **‘000** | **‘000** | **Per cent** |
| New South Wales | 7 218.5 | 45.4 | 0.6 |
| Victoria | 5 537.8 | 24.4 | 0.4 |
| Queensland | 4 476.8 | 9.1 | 0.2 |
| Western Australia | 2 353.4 | -4.4 | -0.2 |
| South Australia | 1 639.6 | 3.4 | 0.2 |
| Tasmania | 511.5 | 0.3 | 0.1 |
| Australian Capital Territory | 368.0 | 0.4 | 0.1 |
| Northern Territory | 231.3 | -1.0 | -0.4 |
| Australia (b) | 22 340.0 | 77.7 | 0.3 |

a A negative number indicates that the 2006 based ERP (unrebased) for June 2011 was higher than the 2011 based ERP (final rebased) for June 2011. b Includes other territories.

*Source*: ABS (2013) *Australian Demographic Statistics, December 2012*, cat. no. 3101.0, Canberra.

### Population size and trends

Australia’s population is growing. At 31 December 2012, Australia’s total population was estimated as 22.9 million (table AA.1). By 2061 the total population is projected to reach 41.5 million people (ABS 2013d, Series B).

Nationally, the average annual growth rate[[3]](#footnote-3) (AAGR) of the population between December 2007 and December 2012 was approximately 1.7 per cent (table AA.1). Across jurisdictions, average annual population growth ranged from 0.7 per cent in Tasmania to 3.0 per cent in WA (table AA.1). The annual total population growth rate fell from 2.2 per cent in 2008 to 1.8 per cent in 2012 (table AA.3). Estimated resident population for 30 June and average annual growth rates for the financial year are presented in tables AA.4–AA.6.

More than three quarters of Australia’s population lived in the eastern mainland states as at 31 December 2012. New South Wales (32.1 per cent), Victoria (24.8 per cent) and Queensland (20.1 per cent) accounted for the largest shares of the population. Western Australia (10.8 per cent) and SA (7.3 per cent) accounted for significant shares of the population, while Tasmania (2.2 per cent), the ACT (1.7 per cent) and the NT (1.0 per cent) accounted for smaller shares (table AA.1).

Data for ERP, as at 31 December, for 2007 to 2011 are in table AA.2.

#### Population, by sex and age

As might be expected, half of the Australian population at 31 December 2012 were female (50.2 per cent) (table AA.1). This distribution was similar across all jurisdictions, ranging from 47.4 per cent in the NT to 50.5 per cent in Victoria and SA (table AA.1). However, the proportion of women in the population increases with age. Nationally, 57.6 per cent of people aged 75 years or over were female, compared with 48.7 per cent of people aged 14 years or younger (table AA.1).

Table A.2 provides data on selected target age groups for populations of interest in the NHA, NDA, NAHA and NIRA performance reports. Data are provided for 31 December 2012, as a mid-point for financial year reporting.

Table A.2 Proportion of population, by selected age groups, 31 December 2012 (per cent)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NSW | Vic | Qld | WA | SA | Tas | ACT | NT | Austa |
| 0–4 years | 6.5 | 6.4 | 6.8 | 6.7 | 6.0 | 6.1 | 6.7 | 7.9 | 6.5 |
| 5–14 years | 12.3 | 11.9 | 13.1 | 12.5 | 11.7 | 12.4 | 11.6 | 14.6 | 12.4 |
| 15–64 years | 66.1 | 67.2 | 66.7 | 68.4 | 65.7 | 64.4 | 70.5 | 71.4 | 66.8 |
| 65 years or over | 15.1 | 14.5 | 13.5 | 12.4 | 16.6 | 17.0 | 11.2 | 6.1 | 14.3 |

a ‘Aust’ includes other territories.

*Source*: ABS 2013 (unpublished) Australian Demographic Statistics data collection; table AA.1.

Table A.3 provides data on selected target age groups for populations of interest in the education and training NA reports. Data are provided for 30 June 2012, as a mid-point for the calendar year reporting for the National Education Agreement (NEA) and the National Agreement for Skills and Workforce Development (NASWD).

Table A.3 Proportion of population, by education and training target group, 30 June 2012 (per cent)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NSW | Vic | Qld | WA | SA | Tas | ACT | NT | Austa |
| 6–15 years | 12.3 | 11.9 | 13.1 | 12.5 | 11.8 | 12.5 | 11.5 | 14.5 | 12.3 |
| 17–24 years | 10.7 | 11.2 | 11.2 | 11.4 | 10.8 | 10.2 | 13.1 | 12.4 | 11.1 |
| 15–64 years | 66.2 | 67.3 | 66.8 | 68.4 | 65.9 | 64.6 | 70.7 | 71.4 | 66.9 |
| 20–64 years | 59.9 | 61.0 | 60.1 | 62.0 | 59.5 | 58.0 | 64.3 | 64.6 | 60.5 |

a ‘Aust’ includes other territories.

*Source*: ABS (2013) *Australian Demographic Statistics*, Cat. no. 3101.0; table AA.4.

#### Immigrant population

In relative terms, Australia is one of the most significant immigrant receiving countries in the developed world. People born outside Australia accounted for 24.6 per cent of the population in August 2011 (ABS 2012a). In August 2011, 42.5 per cent of the population born outside Australia spoke another language and spoke English well or very well (46.8 per cent spoke only English). Nationally, 9.7 per cent of the population born outside Australia reported they did not speak English well or at all (ABS 2012a).

#### People with disability

People with disability and their carers often experience low levels of income, educational attainment, employment, superannuation, health and wellbeing (PC 2011). The ABS Survey of Disability, Ageing and Carers (SDAC) provides the most complete measure of the prevalence of disability in Australia and is recommended when referring to prevalence rates. The SDAC does not include people living in very remote areas, which affects the comparability of the NT results. SDAC data for people with disability are presented in tables AA.8–AA.10. Data related to disability status are collected in other data collections (for example, the Census), but whilst these data can provide a guide to the differences in characteristics between people with and without disability, these data are not recommended for use as a measure of prevalence.

#### Geographical location of the population

The Australian Statistical Geography Standard (ASGS) has replaced the Australian Standard Geographical Classification (ASGC) from 1 July 2011. Where possible, sub-state population estimates for 30 June 2012 and prior years are available based on the new geography and have been used for this cycle of reporting where possible.

### Indigenous population data

Estimates of the population by Indigenous status are published after each Census. These estimates have historically been labelled ‘experimental’, as the standard approach to population estimation (as described for ERP above) was not possible because of data quality issues with the births, deaths and internal migration data, and volatility in the Census counts (ABS 2009). Population estimates by Indigenous status are produced for 30 June in each Census year. Final estimates of the Indigenous population based on the 2011 Census of Population and Housing and the results of the Post Enumeration Survey (PES) were released on 30 August 2013. Population estimates by Indigenous status as at 30 June 2011 are in tables AA.13 and AA.14 (by age and sex), and table AA.17 (by remoteness areas).

As population estimates for Indigenous people are currently only available on a five yearly basis, Indigenous population projections are used to provide more regular population counts. However, Indigenous population projections are supported by a complex method based on a set of assumptions, and should be used with caution. Indigenous population projections are currently based on the 2006 Census. It is anticipated that revised projections based on the 2011 Census will be available on 30 April 2014. Table 4 compares the final estimates of the Indigenous population based on the 2011 Census with the Indigenous population projections from the 2006 Census.

Table A.4 Indigenous population estimates and projections, 30 June 2011, by Census base

|  |  |  |  |
| --- | --- | --- | --- |
|  | **June 2011 final estimate(2011 Census base)** | **June 2011 projection (2006 Census base)** | **Difference(2006-2011)**a |
|  | **number** | **number** | **number** | **Per cent** |
| New South Wales | 208 476 |  168 773 | 39 703 | 19.0 |
| Victoria | 47 333 |  37 647 | 9 686 | 20.5 |
| Queensland | 188 954 |  164 883 | 24 071 | 12.7 |
| Western Australia | 88 270 |  77 694 | 10 576 | 12.0 |
| South Australia | 37 408 |  31 040 | 6 368 | 17.0 |
| Tasmania | 24 165 |  20 580 | 3 585 | 14.8 |
| Australian Capital Territory | 6 160 |  4 825 | 1 335 | 21.7 |
| Northern Territory | 68 850 |  69 855 | -1 005 | -1.5 |
| Australiab  | 669 881 | 575 552 | 94 329 | 14.1 |

a A negative number indicates that the 2006 based projection (unrebased) for June 2011 was higher than the 2011 based final estimate (rebased) for June 2011. b Includes other territories.

*Source*: ABS (2013) *Estimates of Aboriginal and Torres Strait Islander Australians, June 2011*, cat. no. 3238.0.5.001, Canberra; ABS (2009) *Experimental Estimates and Projections, Indigenous Australians, 1991 to 2021*, Cat. no. 3238.0; Data cube–Projected population, Aboriginal and Torres Strait Islander Australians, Australia, states and territories, 2006–2021.

Data for the projected Indigenous Australian population as at 30 June 2013 and 30 June 2012 (based on the 2006 Census) are provided in tables AA.15 and AA.16, respectively.

Data on selected socio-demographic characteristics of Indigenous people are sourced directly from the Census, with the most recent available data from the 2011 Census. Data on the languages spoken at home by Indigenous people are provided in table AA.18. Data on the composition of families in occupied private dwellings, and occupied dwellings by tenure and landlord type, are provided by Indigenous status in tables AA.19 and AA.20, respectively. These tables remain unchanged from the previous cycle of NA Appendix reporting.

## A.3 Geography

From 1 July 2011, the ABS replaced the Australian Standard Geographical Classification (ASGC) with the Australian Statistical Geography Standard (ASGS). The ASGS regions are designed to give the maximum geographic detail for improved analysis of population data. The population ranges within the ASGS regions are much narrower than their ASGC equivalents[[4]](#footnote-4).

The ABS structures are built from the Statistical Area Level 1 which is now the smallest geographic unit for the Census. Statistical Local Areas (SLAs) have been superseded by Statistical Area Level 2 (SA2s) which cover more ‘functional areas’ outside major urban areas and where possible are based on gazetted suburbs and localities with a more consistent population size than the previous SLAs.

#### Time series

The move from ASGC to ASGS does cause a break in time series for data based on Census Collection Districts, Statistical Local Areas, Statistical Subdivisions, Statistical Divisions and Labour Force Regions.

The change to ASGS has some impact on Remoteness Areas but is not expected to affect comparability over time[[5]](#footnote-5). However, where other geographic units (for example, SA2s in place of SLAs) are used to map to remoteness areas, a break in time series may occur.

## A.4 Measuring socioeconomic status

Common dimensions of socioeconomic status (SES) are employment, educational attainment and income, and these factors have positive associations with health, housing, disability and Indigenous outcomes. Data on each of these individual factors is available in tables AA.25–AA.31.

#### Socio-Economic Indexes for Areas (SEIFA)

When a single measure is required to represent SES an index can be created which incorporates multiple factors related to SES.

The ABS Socio-Economic Indexes for Areas (SEIFA) is an area based measure of SES, and ranks geographic areas across Australia according to the socioeconomic characteristics of the population. ABS produces area-based quantiles (the term used to collectively describe measures such as percentiles and deciles) which are calculated based on dividing the number of areas into equal groups (ABS 2011).

The SEIFA Index of Relative Socio-economic Disadvantage (SEIFA IRSD) is one of the four SEIFA indices. It is a general socioeconomic index that summarises a range of information about the economic and social resources of people and households within an area. The SEIFA IRSD focuses on relative disadvantage, whereas other SEIFA indices focus on other aspects of SES. SEIFA IRSD scores indicate average scores of all people living in an area and are useful for distinguishing between areas. A lower score indicates that an area is relatively disadvantaged compared to an area with a higher score — but it does not mean that everyone in the area is necessarily disadvantaged. Similarly, a high SEIFA score does not mean that there are no disadvantaged residents in that area (ABS 2006). SEIFA IRSD rankings can be grouped into quintiles, from the most disadvantaged areas (quintile 1) to the least disadvantaged areas (quintile 5).

SEIFA-based measures provide a snapshot of areas at a point in time. The SEIFA indices based on the 2011 Census were released on 28 March 2013 (tables AA.23 and AA.24). For the 2011 SEIFA IRSD, Indigenous status was removed as a data item. However, it is not anticipated to have a significant impact on SEIFA IRSD over time.

For the 2011 Census, changes to the underlying geographical classification also occurred (see section A.3 above). SEIFA 2011 is released according to a new geographical framework — the ASGS — a change from past versions of SEIFA, which used the ASGC. For this cycle of the Reports, changes to the approach to matching postcodes to the new geography has confounded the results for some administrative data, creating a break in the time series in some circumstances.

Where administrative data are available at the postcode level, the ABS previously provided a concordance between postcodes and the geographic unit of Statistical Local Area (SLA), with each SLA having an assigned 2006 SEIFA IRSD score. For this cycle of reporting, the ABS provides a concordance for postcode to the geographic unit of Statistical Area Level 2 (SA2), with each SA2 having an assigned 2011 SEIFA IRSD score. A change from using SLA to the smaller SA2 has led to different results (mainly for Quintile 1) and created a break in the time series. This issue may affect some administrative data for this current cycle of reporting where data series previously used SLA as the geographic unit for SEIFA IRSD. The AIHW has produced comparative tables for this appendix using the geographic areas of both SLA and SA2 to show any impact of changed geography on SEIFA IRSD results (tables AA.21 and AA.22).

The ABS does not recommend comparing SEIFA over time, but notes that if such comparisons are required (for SEIFA data produced on a comparable geography), the top or bottom quantiles (such as deciles or percentiles) should be compared (ABS 2008a, 2011).

#### Alternative approaches to measuring disadvantage

In the NAs all jurisdictions ‘are committed to addressing the issue of social inclusion, including responding to Indigenous disadvantage’ (for example, COAG 2012).

SEIFA IRSD (a measure of SES) provides one way of measuring disadvantage amongst the population. Other concepts that measure disadvantage include:

* social inclusion/social exclusion — the extent to which an individual participates in society
* poverty — lack of access to economic resources
* wellbeing — health and sufficiency in all aspects of life
* human development — capabilities created through access to basic health care and education (ABS 2012b).

A person who is socially included has the resources, opportunities and capabilities they need to learn, work, engage and have a voice. Multiple disadvantage may put people at risk of social exclusion. Social inclusion may be measured using a range of indicators (Australian Government 2012).

Additional data on the unemployment rate and participation rate are available in tables AA.32 and AA.33. Data have been revised back to 2009 to reflect changes to the ABS method for estimating short term population projections. (The ABS now projects the most recent ERP forward nine months, rather than projecting forward one year.) From 2014, benchmark revisions will be quarterly and apply to the previous 24 months. All data will be revised in January 2014 to reflect the recast ERP (see section A.2).

## A.5 Statistical concepts used in the Reports

A summary of the statistical concepts used in the Reports is provided in this section. For more details refer to the Statistical Appendix in the *Report on Government Services 2013* (SCRGSP 2013).

### Reliability of estimates

Data for some performance indicators in the Reports are based on samples, either from surveys or from a selection of observations from, for example, administrative databases. The potential for sampling error — that is, the error that occurs by chance because the data are obtained from a sample and not the entire population — means that the reported estimates may not accurately reflect the true value.

These Reports indicate the reliability of estimates based on samples by reporting either relative standard errors (RSEs) or confidence intervals (CIs). RSEs and CIs are calculated based on the standard error (SE). The larger the SE, RSE or CIs, the less reliable is the estimate as an indicator for the whole population (ABS 2010, 2008b).

#### Standard *e*rror

The SE measures the sampling error of an estimate. (There can also be non‑sampling error — for example, systematic biases — in the data.) There are several types of SE. A commonly used type of SE in these Reports is the SE of the mean (average). The SE measures how much the estimated mean value may differ from the true population mean value.

#### Relative standard error

The RSE is used to indicate the reliability of an estimate. The RSE shows the size of the error, relative to the estimate, and is derived by dividing the SE of the estimate, by the estimate.

The RSE is useful for comparing the size of the SE across different sample estimates. As with the SE, the higher the RSE, the less confidence there is that the estimate from the sample is close to the true value of the population mean.

A rule of thumb adopted in the Reports is that estimates with an RSE between 25 and 50 per cent are to be used with caution and estimates with an RSE greater than 50 per cent are considered too unreliable for general use.

#### Confidence intervals

Confidence intervals (CI) are used to indicate the reliability of an estimate. A CI is a specified interval, with the sample statistic at the centre, within which the corresponding population value can be said to lie with a given level of confidence (ABS 2008b). Increasing the desired confidence level will widen the CIs. CIs are useful because a range, rather than a single estimate, is more likely to encompass the real figure for the population value being estimated.

CIs are calculated from the population estimate and its associated SE. The most commonly used CI is calculated for 95 per cent levels of probability (where 95 per cent reflects that the estimate is within plus and minus approximately two times the SE). For example, if the estimate from a survey was that 628 300 people report having their needs fully met by a government service, and the associated SE of the estimate was 10 600 people, then the 95 per cent CI would be calculated by:

lower confidence limit = 628 300 – (2 x 10 600) = 628 300 – 21 200 = 607 100

upper confidence limit = 628 300 + (2 x 10 600) = 628 300 + 21 200 = 649 500

This indicates that, at the 95 per cent confidence level, the true number of people who perceive that their needs are met by a government service is between 607 100 and 649 500.

The smaller the SE of the estimate, the narrower the CIs and the closer the estimate can be expected to be to the true value.

Confidence intervals also test for statistical differences between sample results (ABS 2008b). For example, assume survey data estimated a result of 30 per cent of people for jurisdiction A who perceived that their needs were met by government services, with a 95 per cent CI of ± 5 per cent, and a result of 25 per cent for jurisdiction B, with a 95 per cent CI of ± 10 per cent. These results imply that we can be 95 per cent sure the true result for jurisdiction A lies between 25 and 35 per cent, and the true result for jurisdiction B people lies between 15 and 35 per cent. As these two ranges overlap, it cannot be said with confidence that the results for jurisdiction A and jurisdiction B are statistically different.

### Variability in administrative data

Rates derived from administrative data are not subject to sampling error but may still be subject to natural random variation, especially for small counts. A 95 per cent confidence interval for an estimate is a range of values which is very likely (95 times out of 100) to contain the true value. Where the confidence intervals of two estimates do not overlap, it can be concluded that there is a statistically significant difference between the two estimates.

Typically in the standard method (used in AIHW publications), the observed rate is assumed to have natural variability in the numerator count (for example, deaths, hospital visits) but not in the population denominator count. Also, the rate is assumed to have been generated from a normal distribution (‘Bell curve’). Random variation in the numerator count is assumed to be centred around the true value — that is, there is no systematic bias. More information on the standard method can be sourced from *Statistical methods in cancer research* by Breslow and Day (1987).

### Population measures

#### Representative time period

Many measures in the Reports are expressed per person (that is, as a proportion of the population). This is to make it easier to compare performance across jurisdictions where the different population size can influence performance.

The Reports include performance data that covers a full 12 month period. Population data are available quarterly. As the population changes over time, an issue arises as to which population figure to use — that at the start of the period, at the end of the period, or some average level. Most indicators in the Reports use mid-point population data (using the mid-point — second quarter for calendar year or fourth quarter for financial year — as a proxy for the average population level). However, some of the the indicators in the Reports use data from the beginning of the reference period (identified in the data sources for relevant tables).

#### Average Annual Growth Rate (AAGR)

The AAGR is the uniform growth rate that would need to have applied each year for the value in the first year to grow to the value in the final year of the period of analysis. This method is also called a compound annual growth rate, as it allows for the ‘cumulative’ effect of growth in later periods ‘compounding’ growth in earlier periods. The formula for calculating a compound annual growth rate is in box A.1.

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| --- |
| Box A.1 AAGR formula |
| The formula for calculating a compound annual growth rate (AAGR) is:where: is the value in the initial period is the value in the last period is the number of periods. |
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### Age standardisation of data

Until recently, the ABS and the AIHW have indicated that the standard population in Australia should be the Estimated Resident Population (Australia's official population estimate) for the years ending in ‘1’ (e.g. 2001 and 2011) and that it should be updated every 10 years.

In March 2013, the ABS and AIHW have recommended that the standard population be revised every 25 years instead of every 10 years, which would reduce the frequency of revisions without reducing the effectiveness of age-standardised comparisons. This would also align the revision cycle with what demographers generally consider to be the timespan of a generation. The next revision is anticipated to be in 2026 (ABS 2013e).

#### Rationale for age standardisation of data

The age profile of Australians varies across jurisdictions, periods of time, geographic areas and/or population sub-groups (for example, between Indigenous and non-Indigenous populations). Variations in age profiles can affect the likelihood of using a particular service (such as a public hospital) or particular ‘events’ occurring (such as death, incidence of disease or incarceration). Age standardisation adjusts for the effect of variations in age profiles when comparing service usage, or rates of particular events, across different populations.

While age standardised data are useful for making comparisons across populations, crude (non-adjusted) data are used when reporting on the current situation for a specific population, to reflect the actual levels or service usage or rates of events.

#### Calculating age-standardised rates and principles

The ABS and AIHW have agreed to a set of principles for undertaking
age-standardisation when reporting Indigenous data. All data in the Reports are age‑standardised using the direct method employing the principals set out below. For further information on how the principles have been applied to the data reported, please see the Data Quality Statements for relevant indicators.

The direct method has four steps:

1. calculate the age-specific rate for each age group
2. multiply the age-specific rate by the corresponding standard population for each age group
3. sum across the age groups and divide this sum by the total of the standard population to give the age-standardised rate
4. convert this to a rate per 1000 or per 100 000 as appropriate.

Before undertaking age-standardisation, analysts must investigate the data being used to understand the age-specific distribution and any limitations that may impact on the results.

Principle 1: The standard population used will now be contingent on the frequency of the standardisation.

Principle 2: If the denominator is less than 30 in any one age group, then do not attempt to produce age-standardised rates.

* Age groups may be collapsed to obtain a denominator of 30 or more (provided that this is in accordance with principle 3 and 4).

Principle 3: If the total number of Indigenous deaths is less than 20, then do not attempt to produce age-standardised rates.

* Combining several years of data, or aggregating jurisdictions should be considered to obtain a total of 20 or more deaths.
* If this does not meet the purpose (i.e. data are required for time series or jurisdictional comparisons), or does not result in greater than 20 deaths in total, then other measures and contextual information should be reported instead of age-standardised rates which could include total number of deaths, crude rates, age-specific rates, age-specific rate ratios and median age at death.

Principle 4: Age-standardised rates should be calculated using the five year age groupings of 0–4 to 75+ (provided Principles 2 and 3 for denominator and numerator are met).

* 10 year age groups may be used to overcome small numbers (20 year age groups are too wide and should not be used).

Principle 5: Additional contextual information (most importantly age-specific rates and ratios) should be provided in addition to age-standardised rates when:

1. the age standardised rates and rate ratios lie largely outside the range of the age-specific rates and rate ratios
2. the pattern of age specific rates of the Indigenous and non-Indigenous populations differ substantially (for example, deaths from a certain cause concentrate on younger ages for Indigenous population while for non‑Indigenous they may occur at older ages)
3. the age-specific death rates depart from the assumption of a uniform increase in death with age (for example, injury which peaks in the young adult to middle-ages and certain cancers amenable to treatment for some age groups)
4. the condition of interest is largely confined to a specific age range (for example, STIs, and women who give birth). In such instances, age‑standardisation could be restricted to include the age groups within this age range only.

Principle 6: For conditions restricted to a specific age group (for example, conditions originating in the perinatal period and SIDS), it is recommended to report the age-specific rate for the age group of interest instead of the age‑standardised rate.

Notes regarding the application of these principles:

1. Analysts should apply these principles keeping in mind that a consistent time series will need to be maintained and valid comparisons ensured. The guidelines should not result in a widely different methodology being used for data being compared across time or across jurisdictions. Analysts should make decisions regarding the application of these principles based on an assessment of the data from the outset of their analyses.
2. These principles may need to be reviewed at some point in the future in order to take into account any changes in Indigenous mortality and Indigenous population estimates. A sensible time for such a review would be to coincide with a change of standard population (that is, every 10 years).

#### Principles for calculating the top diagnoses and causes for hospital and mortality data

Causes or diagnoses are listed from highest to lowest Indigenous crude numbers for the most recent aggregate-year combined period (depending on the indicator specifications). The top 5 or 6 causes or diagnoses need to be re-assessed each reporting period. If a change is identified, data may be backcast to the baseline year for the most recent set of top 5 or 6 causes or diagnoses to ensure a consistent time series.

## A.6 References

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## A.7 Acronyms and abbreviations

AAGR Average Annual Growth Rate

ABS Australian Bureau of Statistics

ACT Australian Capital Territory

ASGC Australian Standard Geographical Classification

ASGS Australian Statistical Geography Standard

Aust Australia

CI confidence interval

COAG Council of Australian Governments

ERP estimated resident population

IRSD Index of Relative Social Disadvantage

na not available

np not published

NSW New South Wales

NT Northern Territory

Qld Queensland

RSE relative standard error

SA South Australia

SA2 Statistical Area Level 2

SDAC Survey of Disability, Ageing and Carers

SLA Statistical Local Area

SE standard error

SEIFA Socio-economic Indexes for Areas

SES socioeconomic status

Tas Tasmania

Vic Victoria

WA Western Australia

1. More information can be found in the ABS Feature Article 1: Final rebasing of Australia’s population estimates, September quarter 2006 – June quarter 2011, Cat. No. 3101.0. [↑](#footnote-ref-1)
2. See ABS Feature Article 2: Recasting 20 Years of ERP, Cat. No. 3101.0. [↑](#footnote-ref-2)
3. The calculation of AAGR is explained on page A.14. [↑](#footnote-ref-3)
4. For further information see ABS Statistical Geography Fact Sheet – Changes to geographic areas between Censuses http://www.abs.gov.au/websitedbs/D3310114.nsf/home/ASGS+Fact+Sheets , (accessed 11 September 2013) [↑](#footnote-ref-4)
5. For further information see ABS Statistical Geography Fact Sheet –Time Series (ibid). [↑](#footnote-ref-5)