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# A Statistical appendix

This appendix contains contextual information to assist the interpretation of the performance indicators presented in the Report. It also contains a discussion of the statistical concept of age standardisation and its application to Indigenous and all people's use of aged care services.

Most of the service areas covered by the *Report on Government Services 2009* (2009 Report) use population data from tables AA.1 and AA.2 (in the 2009 Report) for descriptive information (such as expenditure per person in the population) or performance indicators (such as participation rates for vocational education and training [VET]).

## **Indigenous data in the statistical appendix**

The statistical appendix in the 2009 Report contains the following data items on Indigenous people:

- persons by country of birth, August 2006 ('000)
- population profile, 30 June 2006
- proportion with weekly income of \$249 or less, August 2006
- proportion who had completed year 12 or equivalent, August 2006
- proportion who had attended higher education, August 2006
- crude and age standardised imprisonment rates, 2007-08
- deaths, main causes and standardised mortality ratios, 2001–2005.

### *Attachment tables*

Attachment tables for data within the statistical appendix of this compendium are contained in attachment A of the compendium. These tables are identified in references throughout this chapter by an 'AA' suffix (for example, table AA.3 is table 3 in the statistical appendix attachment). As the data are directly sourced from the 2009 Report, the compendium also notes where the original table, figure or text in the 2009 Report can be found. For example, where the compendium refers to '2009 Report, p. A.15' this is page 15 of the statistical appendix of the 2009 Report,

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and '2009 Report, table AA.2' is attachment table 2 of the statistical appendix attachment of the 2009 Report.

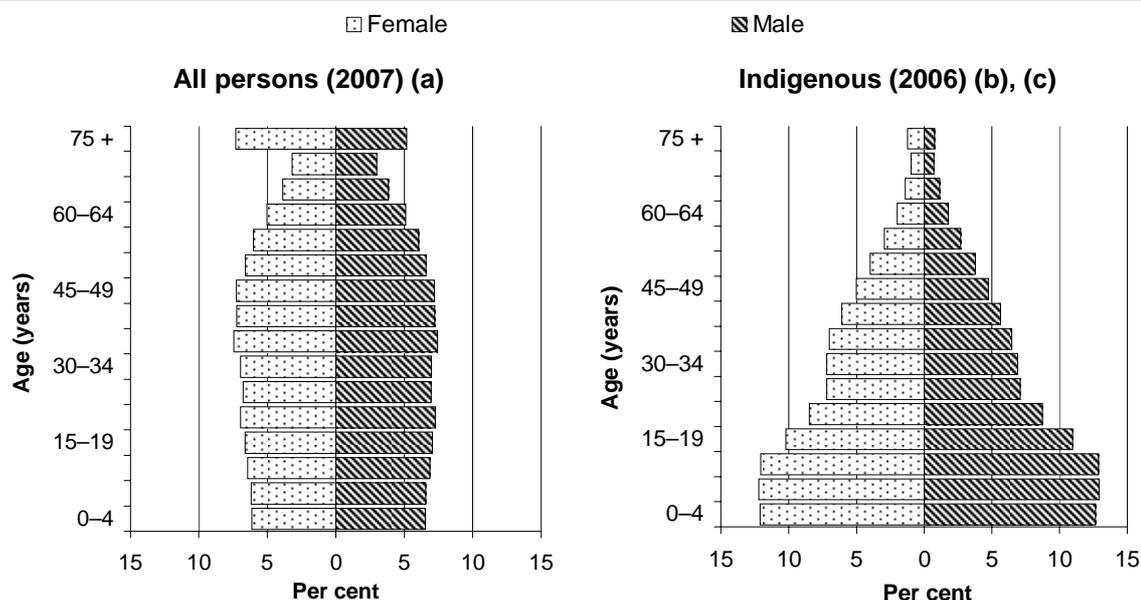
## Population

More than three quarters of Australia's 21.0 million people lived in the eastern mainland states as at 30 June 2007, with NSW, Victoria and Queensland accounting for 32.8 per cent, 24.8 per cent and 19.9 per cent, respectively, of the nation's population. Western Australia and SA accounted for a further 10.0 per cent and 7.5 per cent, respectively, of the population, while Tasmania, the ACT and the NT accounted for the remaining 2.3 per cent, 1.6 per cent and 1.0 per cent, respectively (2009 Report, table AA.1).

As in most other developed economies, greater life expectancy and declining fertility have contributed to an 'ageing' of Australia's population. However, the age distribution of Indigenous Australians is markedly different (figure A.1). At 30 June 2007, 9.3 per cent of Australia's population was aged 70 years or over, in contrast to 1.8 per cent of Australia's Indigenous population, as at 30 June 2006 (tables AA.3 and 2009 Report, tables AA.1). Across jurisdictions, the proportion of all people aged 70 years or over ranged from 11.1 per cent in SA to 2.7 per cent in the NT (2009 Report, tables AA.1).

Half of the population at June 2007 was female (50.3 per cent). This distribution was similar across all jurisdictions except the NT, which had a lower representation of women in its population (48.1 per cent) (2009 Report, table AA.1). The proportion of women in the population varies noticeably by age. Nationally, approximately 56.5 per cent of people aged 70 or over were female, compared with 48.7 per cent of people aged 14 years or younger (2009 Report, table AA.1).

Figure A.1 Population distribution, Australia, by age and sex, 30 June



**a** Totals may not add as a result of rounding. **b** Includes other territories. **c** Experimental estimates at 30 June 2006 are preliminary rebased estimates and are based on the 2006 Census of Population and Housing.

Source: ABS (2008), Population by Age and Sex, Australian States and Territories, June 2002-2007, Cat. no. 3201.0; ABS (2007), Australian Demographic Statistics, March Quarter 2007, Cat. no. 3101.0; table AA3 and 2009 Report, table AA.1; 2009 Report, figure A.1, p. A.3.

## Population, by ethnicity and proficiency in English

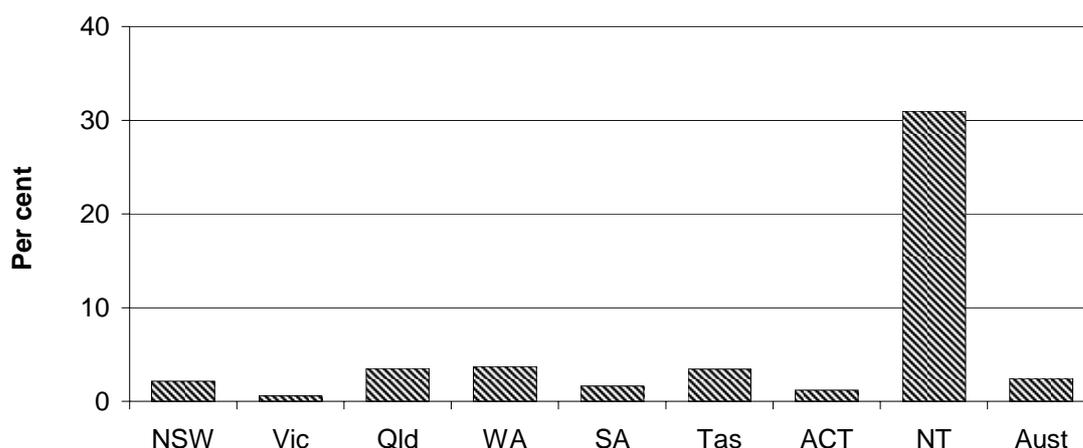
The most and least common languages other than English spoken in people's homes varied across jurisdictions in August 2006. The most extreme variation was in the NT, where 15.1 per cent of people spoke an Australian Indigenous language (65.3 per cent of the total persons in the NT who spoke a language other than English in their homes) (table AA.2).

### Indigenous population profile

There were an estimated 517 174 Indigenous people (259 693 female and 257 481 male) in Australia at 30 June 2006, accounting for approximately 2.5 per cent of the total population (table AA.3 and 2009 Report, table AA.2). The proportion of people who were Indigenous was significantly higher in the NT (31.0 per cent) than in any other jurisdiction. Across the other jurisdictions, the proportion ranged from 3.7 per cent in WA to 0.6 per cent in Victoria (figure A.2). Nationally, the Indigenous population is projected to grow to 528 645 people in 2009 (table AA.4).

The majority of Indigenous people (81.8 per cent) at August 2006 spoke only English at home, while a further 9.0 per cent spoke an Indigenous language and English very well or well. However, 2.2 per cent spoke English not well or not at all (up to 12.2 per cent in the NT). Nationally, 5.2 per cent of Indigenous people did not state their language proficiency (table AA.5).

Figure A.2 **Indigenous people as a proportion of the population, 30 June<sup>a</sup>,  
b, c**



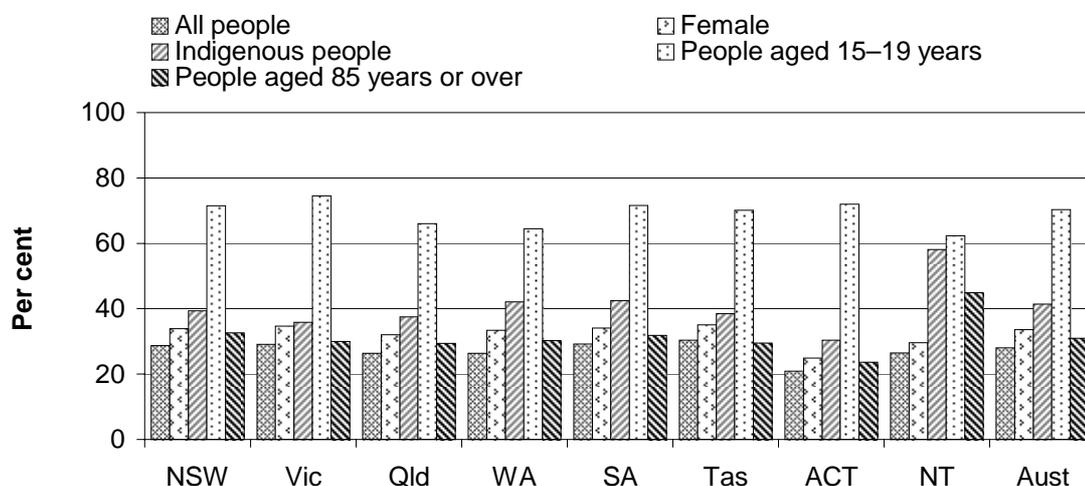
**a** 'Australia' includes other territories. **b** Experimental estimates of the Australian Indigenous population at 30 June 2006 are preliminary rebased estimates and are based on the *2006 Census of Population and Housing*. **c** The estimated resident population at 30 June 2007 is preliminary.

Source: ABS (2008), *Australian Demographic Statistics, December Quarter 2007*, Cat. no. 3101.0; ABS (2007), *Australian Demographic Statistics, March Quarter 2007*, Cat. no. 3101.0; table AA.3 and 2009 Report, table AA.2; 2009 Report, figure A.5, p. A.7.

## Income

Nationally, 28.0 per cent of people aged 15 years or over in August 2006 had a relatively low weekly individual income of \$249 or less (2009 Report, table AA.16). The proportion was considerably higher for younger people (70.3 per cent for people aged 15–19 years), Indigenous people (41.4 per cent), females (33.5 per cent) but similar for older people (30.9 per cent for people aged 85 years or over) (figure A.3).

Figure A.3 **Weekly individual income of \$249 or less, by sex, Indigenous status and age, August 2006<sup>a</sup>**



<sup>a</sup> 'Australia' includes other territories.

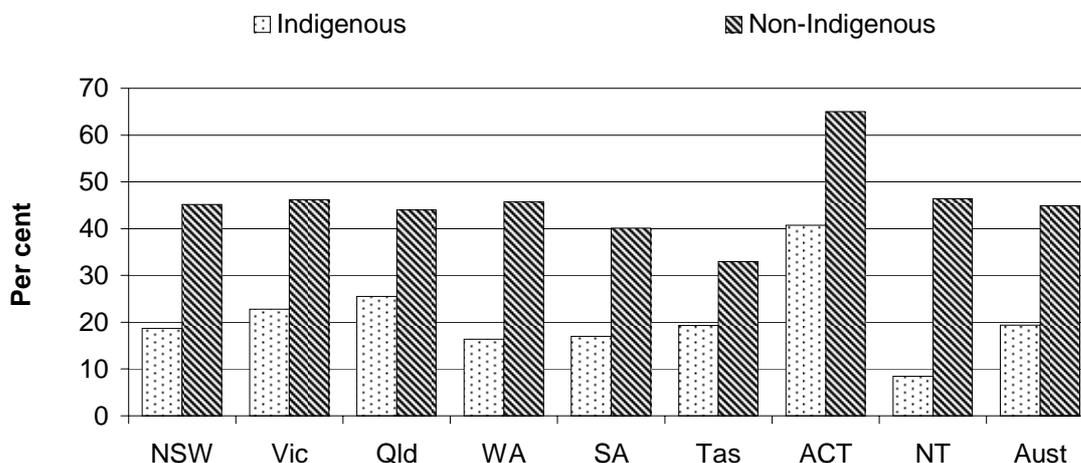
Source: ABS (2007), 2006 Census of Population and Housing, Cat. no. 2068.0; ABS (unpublished), derived from 2006 Census of Population and Housing; table AA.7 and 2009 Report, tables AA.16 and AA.18; 2009 Report, figure A.8, p. A.10.

## Educational attainment

Employment outcomes and income are closely linked to the education and skill levels of individuals. At August 2006, 42.2 per cent of people aged 15 years and over (approximately 6.7 million people) had completed year 12 or equivalent. A further 22.9 per cent (3.6 million people) had a highest level of schooling of year 10 or equivalent. Across jurisdictions, the proportion of people aged 15 years and over who had year 12 or equivalent schooling ranged from 62.1 per cent in the ACT to 31.3 per cent in Tasmania (2009 Report, figure A.10).

At August 2006, a much higher proportion of non-Indigenous people (44.9 per cent) aged 15 years or over had completed year 12 or equivalent as their highest year of school (this is the highest level of primary or secondary school a person has completed) than Indigenous people (19.4 per cent). Across jurisdictions, the proportion of Indigenous people aged 15 years or over who had completed year 12 or equivalent schooling ranged from 40.7 per cent in the ACT to 8.5 per cent in the NT. The proportion of non-Indigenous people who had completed year 12 or equivalent schooling was highest in the ACT (65.0 per cent) and lowest in Tasmania (33.0 per cent) (figure A.4).

**Figure A.4 People aged 15 years or over who had completed year 12 or equivalent as highest year of school, by Indigenous status, August 2006<sup>a</sup>**

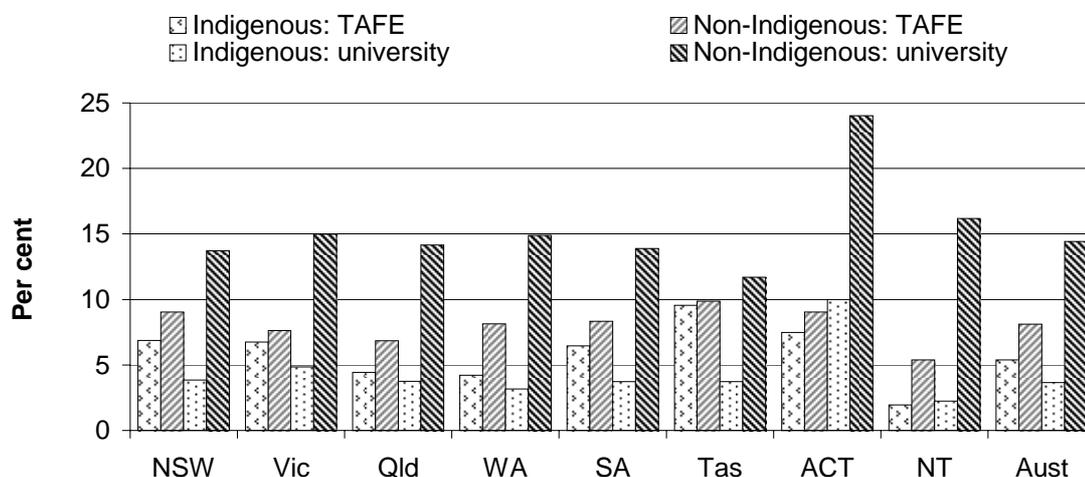


<sup>a</sup> 'Australia' includes other territories.

Source: ABS (2007), derived from 2006 Census of Population and Housing, Cat. no. 2068.0; table AA.8; 2009 Report, figure A.11, p. A.13.

In August 2006, the proportion of the Indigenous tertiary students who were attending TAFE was highest in Tasmania (9.5 per cent) and lowest in the NT (2.0 per cent). At August 2006, the proportion of non-Indigenous students (14.4 per cent) attending university was considerably higher than the proportion of Indigenous students (3.7 per cent). Across jurisdictions, the proportion of non-Indigenous students attending university ranged from 24.0 per cent in the ACT to 11.7 per cent in Tasmania. For Indigenous students the proportion ranged from 10.0 per cent in the ACT to 2.2 per cent in the NT (figure A.5).

Figure A.5 **Proportion of students attending tertiary education institutions, by Indigenous status, August 2006<sup>a, b, c</sup>**



<sup>a</sup> 'Australia' includes other territories. <sup>b</sup> Includes 'technical and further educational institution (including TAFE colleges)'. <sup>c</sup> Totals may not add as a result of rounding.

Source: ABS (2007), *2006 Census of Population and Housing*, Cat. no. 2068.0; table AA.9; 2009 Report, figure A.13, p. A.14.

## Statistical concepts used in the Report — age standardisation of data

### *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 are important because they 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). Using 'crude' (or unadjusted) rates across populations with different age profiles can lead to drawing erroneous conclusions about variables that are correlated with age. Age standardisation adjusts for the effect of variations in age profiles when comparing service usage, or rates, of particular events across different populations.

### *Calculating age standardised rates*

Age standardisation adjusts each of the comparison/study populations (for example, Indigenous or non-Indigenous) against a standard population (box A.1). The standard population generally used is the final 30 June estimated Australian resident

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total population for the most recent year ending in ‘1’ (for example, 1991 and 2001) (AIHW 2008). The result is a standardised estimate for each of the comparison/study populations.

The Review generally reports age-standardised rates that have been calculated using either one of two methods, as appropriate. The direct method is generally used for comparisons between study groups. The indirect method is recommended when the age-specific rates for the population being studied are not known (or are unreliable), but the total number of events is known (AIHW 2008).

- The *direct method* has three steps:

Step 1: Calculate the age-specific rate for each age group for the study/comparison group.

Step 2: Calculate the expected number of ‘events’ in each age group by multiplying the age-specific rates by the corresponding standard population.

Step 3: Sum the expected number of cases in each age group and divide by the total of the standard population (box A.1, equation A.1).

- The *indirect method* has four steps:

Step 1: Calculate the age-specific rates for each age group in the standard population.

Step 2: Apply the age-specific rates resulting from step 1 to the number in each age group of the study population and sum to derive the total ‘expected’ number of cases for the study population.

Step 3: Divide the observed number of events in the study population by the ‘expected’ number of cases for the study population derived in step 2.

Step 4: Multiply the result of step 3 by the crude rate in the standard population (box A.1, equation A.2.)

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**Box A.1 Technical concepts and formulas — direct and indirect age standardisation**

The formula for deriving the age standardised rate using the direct method is:

$$SR = \frac{\sum(r_i P_i)}{\sum P_i} \quad (\text{equation A.1})$$

The formula for deriving the age standardised rate using the indirect method is:

$$SR = \frac{C}{\sum(R_i p_i)} \times R \quad (\text{equation A.2})$$

The formula for deriving the age standardised ratio using the indirect method is:

$$SR_a = \frac{C}{\sum(R_i p_i)} \quad (\text{equation A.3})$$

Where:

$SR$  is the age-standardised rate for the population being studied

$SR_a$  is the standardised ratio for the population being studied

$r_i$  is the age-group specific rate for age group  $i$  in the population being studied

$P_i$  is the population of age group  $i$  in the standard population

$C$  is the observed number of events in the population being studied

$\sum(R_i p_i)$  is the expected number of events in the population being studied

$R_i$  is the age-group specific rate for age group  $i$  in the standard population

$p_i$  is the population for age group  $i$  in the population being studied

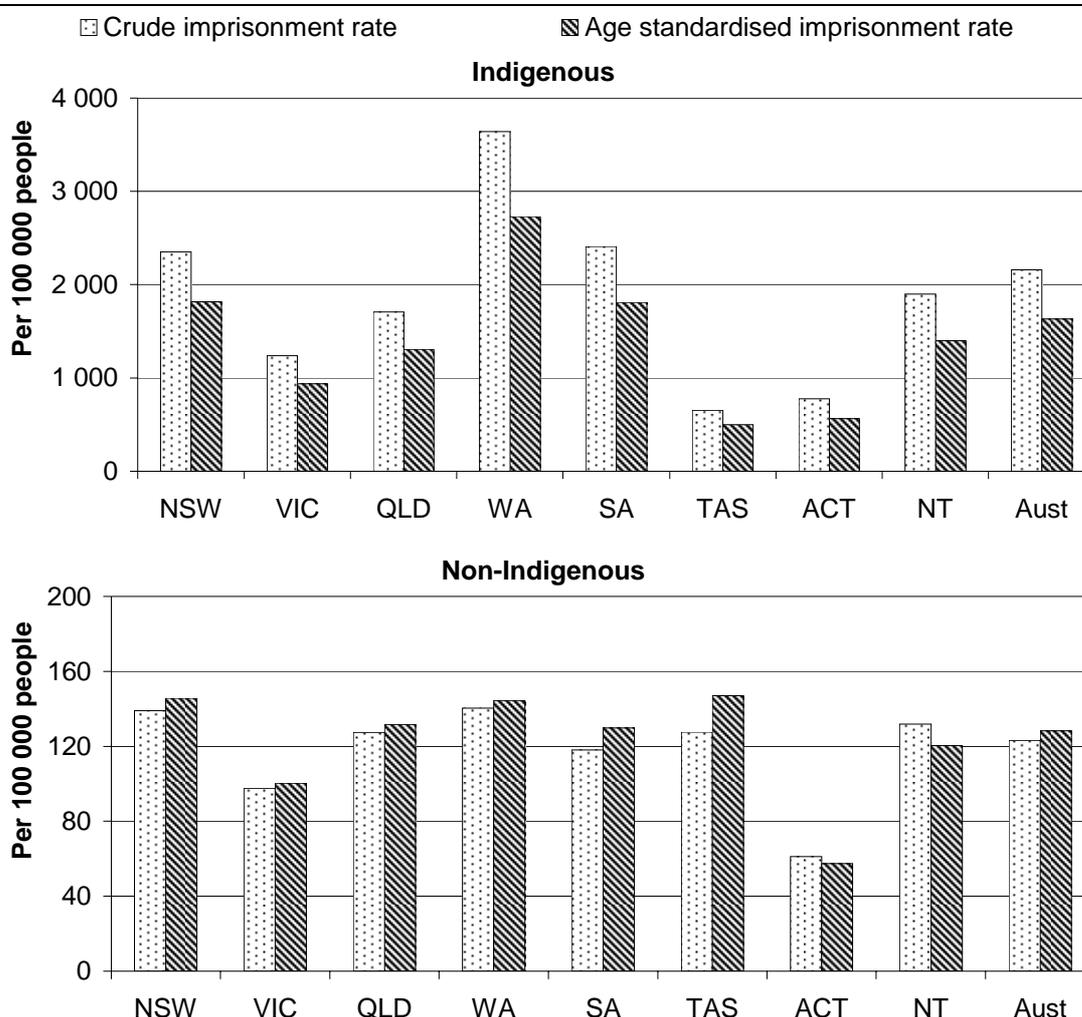
$R$  is the crude rate in the standard population.

Source: AIHW (2008).

Tables AA.12 and AA.13 in the attachment contain examples of the application of direct and indirect age standardisation, respectively. Standardised rates are generally multiplied by 1000 or 100 000 to avoid small decimal fractions. They are then reported as age standardised rates per 1000 or 100 000 population (AIHW 2008).

Figure A.6 compares crude imprisonment rates and imprisonment rates standardised against the age profile of the total Australian prisoner population for Indigenous and non-Indigenous people.

**Figure A.6 Indigenous and non-Indigenous crude and age standardised imprisonment rates, 2007-08<sup>a, b</sup>**



<sup>a</sup> For detailed notes relating to these figures, please see table 8A.3. <sup>b</sup> Rates are based on the indirect standardisation method, applying age-group imprisonment rates derived from Prison Census data.

Source: ABS (unpublished), derived from Australian Demographic Statistics, December Quarter 2007, Cat. no. 3101.0; ABS (unpublished), derived from Experimental Projections Aboriginal and Torres Strait Islander Population, Cat. no. 3231.0; ABS (unpublished), derived from Prisoners in Australia, Cat. no. 4517.0; State and Territory governments (unpublished); table 8A.3; table AA.13; 2009 Report, figure A.17, p. A.29.

### Calculating age standardised ratios

A variation of the *indirect method* is used to calculate age standardised ratios (box A.1). These ratios express the overall experience of a study population in terms of a standard population, where the standard population is the population to which the study population is being compared.

### Application of age standardised ratios

Standardised Mortality Ratios (SMRs) have been used to compare death rates between the Indigenous and non-Indigenous populations (table A.1). The SMR is the ratio between the observed number of deaths in the Indigenous population and the expected number of deaths that would have occurred if the Indigenous population experienced the same age-specific death rates as the non-Indigenous population. If the SMR is greater than 1.0, there were more deaths than expected; if the ratio is less than 1.0, there were fewer deaths than expected (ABS and AIHW 2008).

**Table A.1 Indigenous deaths, main causes and standardised mortality ratios, 2001–2005<sup>a, b</sup>**

	Male			Female		
	Observed	Expected	SMR	Observed	Expected	SMR
Diseases of the circulatory system	1 150	360	3.2	856	320	2.7
External causes	851	292	2.9	369	105	3.5
Neoplasms	592	406	1.5	547	351	1.6
Endocrine, nutritional and metabolic diseases	315	42	7.5	367	36	10.1
Diabetes	281	26	10.8	319	22	14.5
Diseases of the respiratory system	378	88	4.3	281	77	3.6
Diseases of the digestive system	251	43	5.8	182	36	5.1
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	169	28	6.0	85	19	4.6
Certain conditions originating in the perinatal period	126	44	2.9	82	36	2.3
Diseases of the genitourinary system	79	16	4.8	119	20	6.0
Diseases of the nervous system	122	42	2.9	69	44	1.6
Certain infectious and parasitic diseases	102	20	5.1	72	14	5.0
Mental and behavioural disorders	101	17	5.8	72	23	3.1
<b>All causes</b>	<b>4329</b>	<b>1438</b>	<b>3.0</b>	<b>3215</b>	<b>1123</b>	<b>2.9</b>

SMR = Standardised Mortality Ratio. <sup>a</sup> Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death. Disease groupings are based on ICD-10 chapter. <sup>b</sup> Standardised mortality ratio is the observed Indigenous deaths divided by expected Indigenous deaths, based on the age, sex and cause-specific rates for non-Indigenous persons.

Source: ABS and AIHW (2008), *Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples*, Cat. no. 4704.0, Canberra; 2009 Report, table A.3, p. A.31.

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## Attachment tables

Attachment tables for data within this chapter are contained in the attachment to the compendium. These tables are identified in references throughout this chapter by an 'AA' suffix (for example, table AA.3 is table 3 in the statistic appendix attachment). The tables included in the attachment are listed below.

### Population

- Table AA.1** Persons by country of birth, August 2006 ('000)
- Table AA.2** Persons by language spoken at home, August 2006 ('000)
- Table AA.3** Experimental estimated resident Australian Indigenous population, 30 June 2006
- Table AA.4** Experimental projection of the Indigenous population, 2000 to 2009 (number)
- Table AA.5** Language spoken at home by Indigenous people and proficiency in spoken English, by sex, August 2006 (number)

### Family and household

- Table AA.6** Families and persons in families in occupied private dwellings by Indigenous status and family/household composition, August 2006

### Income, education and employment

- Table AA.7** Persons aged 15 years and over by weekly individual income and Indigenous status, August 2006
- Table AA.8** People aged 15 years or over, by highest year of school completed and Indigenous status, August 2006 ('000)
- Table AA.9** Type of educational institution attending by Indigenous status, August 2006 ('000)

### General economic indicators

- Table AA.10** Gross State Product, 2002-03 to 2006-07, (2006-07 dollars)
- Table AA.11** Gross Domestic Product price deflator (index)

### Statistical concepts

- Table AA.12** Age standardisation of data using the direct method
- Table AA.13** Age standardisation of data using the indirect method

## References

ABS and AIHW 2008, *Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples*, Cat. no. 4704.0, Canberra.

AIHW 2008, Age-standardised rate, METeOR, <http://meteor.aihw.gov.au/content/index.phtml/itemId/327276>, accessed 10 September 2008.