

1.17 Life expectancy at birth

The life expectancy of Aboriginal and Torres Strait Islander males and females for a given period.

Data sources

Life expectancy estimates for the years 2005–2007 presented in this measure are from the Australian Bureau of Statistics (ABS) and are based on population estimates from the 2006 Census of Population and Housing.

The Australian Institute of Health and Welfare (AIHW) calculates data on potential years of life lost before age 65, derived from the AIHW National Mortality Database.

Life expectancy estimates

Life expectancy refers to the average number of years a person of a given age and sex can expect to live, if current age- and sex-specific death rates continue to apply throughout his or her lifetime.

Estimates of life expectancy are drawn from life tables. To construct a life table, data on total population, births and deaths are needed, and the accuracy of the life table depends on the completeness of these data. Because of uncertainty about the estimates of these components for Aboriginal and Torres Strait Islander peoples, experimental methods are used to calculate life expectancies for the Indigenous population. These life expectancies should only be used as an indicative summary measure of life expectancy of the Indigenous population.

The ABS used a direct demographic method to derive 2005–2007 life tables for the Indigenous population by adjusting death registrations data by identification rates obtained from the Census Data Enhancement (CDE) Indigenous Mortality Quality Study. The ABS previously used indirect methods (the Bhat method, with and without unexplained growth, and the Hill method) to derive experimental life tables for Indigenous Australians. These indirect methods require extensive assumptions and often produce implausible outcomes in relation to the apparent undercoverage measures over time. They are also sensitive to the accuracy of population estimates. After extensive consultation, the ABS adopted a direct demographic method for the compilation of Indigenous life tables (ABS 2009b).

Unlike the indirect method, the direct method of deriving Indigenous life tables for life expectancy estimates is not reliant on assumptions. That is, instead of relying on indirect and modelled estimates to derive coverage estimates of Indigenous deaths, the direct method enables the calculation of coverage rates by directly comparing the Indigenous status reported on death and Census data for linked records. This data linkage technique ensures consistency across collections and produces life expectancy estimates that are considered more plausible (ABS 2008b). There are however, limitations that must be noted.

The derived Indigenous deaths identification rates relate to a very restricted time frame of 11 months, and there remains a relatively high level of unlinked records for which Indigenous status is unknown (ABS 2008b).

Due to the small number of Indigenous deaths in Victoria, South Australia, Tasmania and the Australian Capital Territory, Indigenous life tables were not produced for these jurisdictions (ABS 2009b).

Because different methods of deriving Indigenous life tables were used in the 2006 and 2008 Health performance framework reports, comparisons should not be made and in no way should changes in life expectancy between these reports be interpreted as changes in life expectancy over time.

National Mortality Database

The National Mortality Database is a national collection of de-identified unit record level data. It comprises most of the information recorded on death registration forms and medical (cause of death) certificates, including Indigenous status. The AIHW maintains this database. The Registrars of Births, Deaths and Marriages provide information on the characteristics and causes of death of the deceased and the ABS codes this nationally. The medical practitioner certifying the death, or a coroner, supplies the required information on the cause of death. The data are updated each calendar year and are presented by state/territory of usual residence rather than state/territory where death occurs.

It is considered likely that most deaths of Aboriginal and Torres Strait Islander people are registered. However, a proportion of these deceased are not reported as Aboriginal or Torres Strait Islander by the family, health worker or funeral director during the death registration process. That is, while data is provided to the ABS for the Indigenous status question for 99% of all deaths, there are concerns regarding the accuracy of the data. The funeral director does not always directly ask the Indigenous status question of relatives and friends of the deceased. Detailed breakdowns of Aboriginal and Torres Strait Islander deaths are therefore only provided for five jurisdictions – New South Wales, Queensland, South Australia, Western Australia and the Northern Territory (AIHW 2010).

Deaths for which the Indigenous status of the deceased was not reported have been excluded from the analysis.

Additional revised 2007 and preliminary 2008 mortality data for this indicator was supplied by the Australian Bureau of Statistics (ABS) from the ABS Cause of Death database. For further information see *Causes of death, Australia, 2008* (ABS 2010).

Data have been combined for the 5-year period 2003–2008 because of the small number of deaths from some conditions each year. Data have been analysed using the year of registration of death for all years. Note that the 2006 edition of this report used year of occurrence of death for all years of analysis except for the latest year of available data for which year of registration of death was used. Data published in this report may therefore differ slightly from those published in the previous edition for comparable years of data.

Census of Population and Housing

The ABS conducts the Census of Population and Housing at 5-yearly intervals, with 2006 being the most recent, and it is designed to include all Australian households. The Census uses the ABS standard Indigenous status question and it is asked for each household member.

Although the Census data are adjusted for undercount at the person level to arrive at the estimated resident population, no such adjustment is done at the household level. This

affects the accuracy of the person counts at the household level to provide adjusted household estimates.

The 1996 and 2001 Census used the Australian Standard Classification of Occupations, but this was replaced by the Australian and New Zealand Standard Classification of Occupations for the 2006 Census.

Analyses

Life expectancy

- Over the period 2005–2007, the life expectancy at birth for Indigenous people was estimated to be around 67 years for males and 73 years for females. This is some 10 years lower than life expectancy estimates for the non-Indigenous population for the same period (79 years for males and 83 years for females) (Table 1.17.1 and Figure 1.17.1).
- Life expectancy was lowest for Indigenous males and females in the Northern Territory (62 years and 69 years, respectively).

A study of causes of the inequality in life expectancy between Indigenous and non-Indigenous Australians in the Northern Territory found that the main contributors to the gaps in life expectancy are non-communicable diseases including conditions such as respiratory diseases, cardiovascular diseases and diabetes. These conditions are more prevalent in ageing populations. The study also found that communicable diseases, maternal, perinatal and nutritional conditions and injury contributed far less to the life expectancy gap (Zhao & Dempsey 2006).

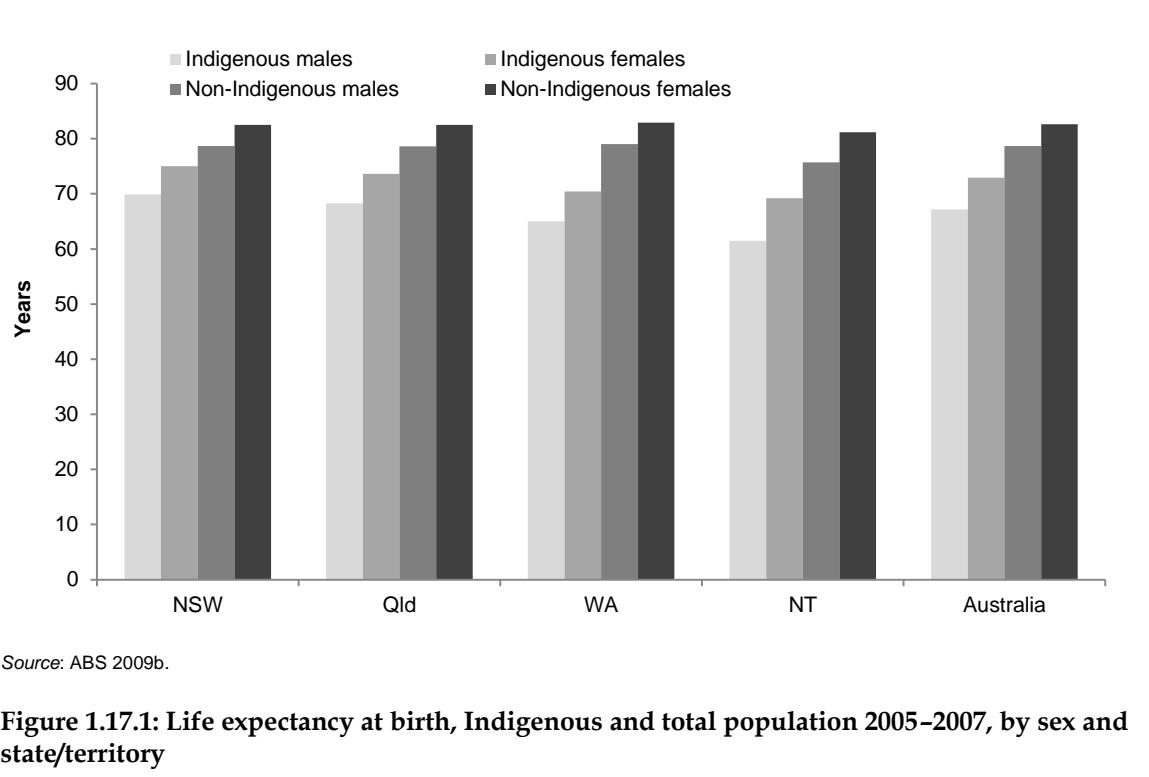
Table 1.17.1: Life expectancy at birth, by Indigenous status, sex and state/territory, 2005–2007^(a).

| | Males | Females |
|--------------------------------|--------------|----------------|
| Indigenous | | |
| New South Wales | 69.9 | 75.0 |
| Queensland | 68.3 | 73.6 |
| Western Australia | 65.0 | 70.4 |
| Northern Territory | 61.5 | 69.2 |
| Australia^(b) | 67.2 | 72.9 |
| Non-Indigenous | | |
| New South Wales | 78.7 | 82.5 |
| Queensland | 78.6 | 82.5 |
| Western Australia | 79.0 | 82.9 |
| Northern Territory | 75.7 | 81.2 |
| Australia^(b) | 78.7 | 82.6 |
| Total population | | |
| New South Wales | 78.5 | 82.4 |
| Queensland | 78.4 | 82.3 |
| Western Australia | 78.7 | 82.5 |
| Northern territory | 72.0 | 77.6 |
| Australia^(b) | 78.5 | 82.4 |

(a) Due to significant changes in methodology, estimates of life expectancy at birth for 2005–07 are not comparable to previously published estimates.

(b) Includes all states and territories.

Source: ABS 2009b.



International comparisons

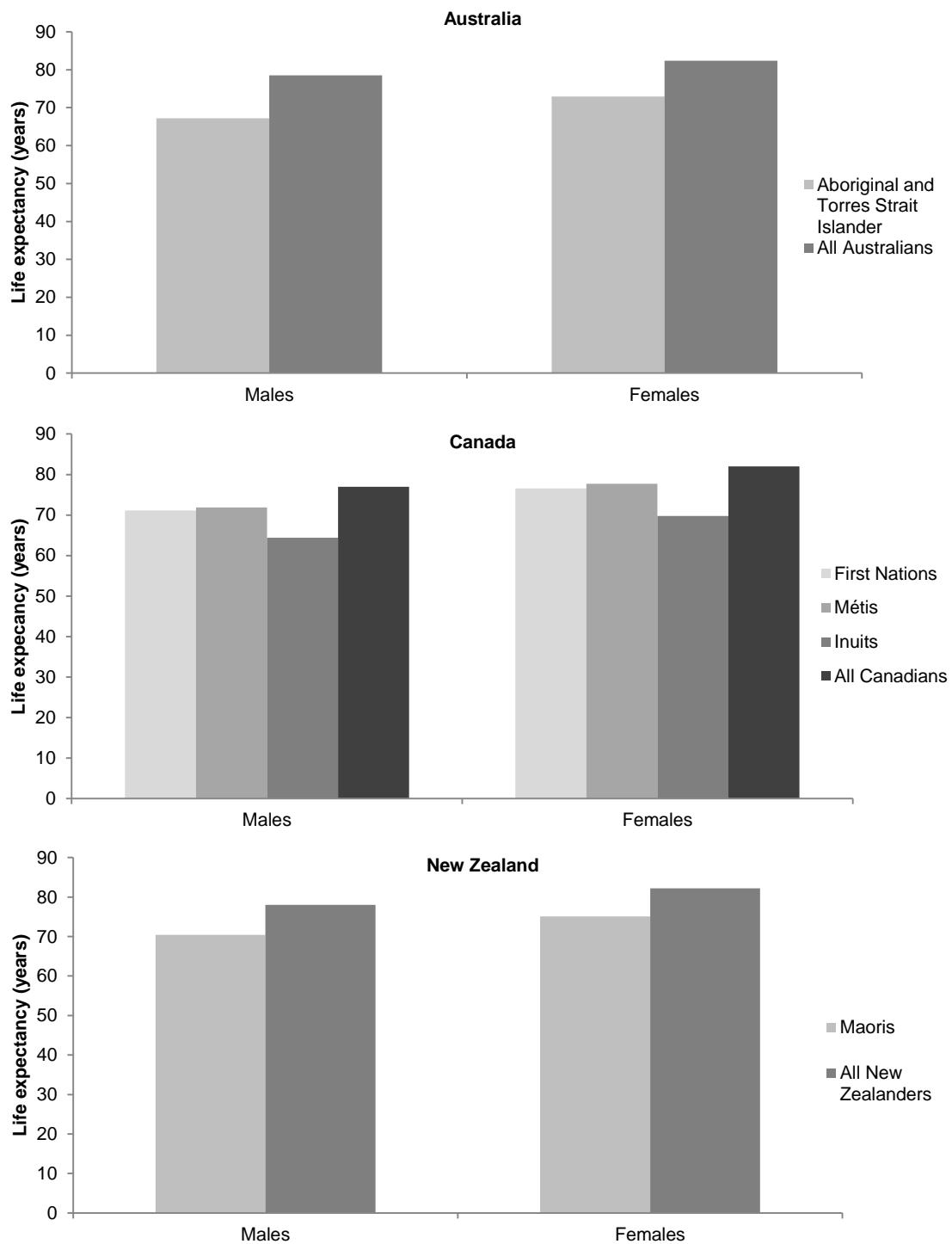
International indigenous data are available for New Zealand, the United States and Canada.

There are several common issues that adversely affect the quality of Indigenous mortality data in these three countries and Australia. These include the lack of an accurate denominator for the Indigenous population (mainly due to under-counting) and the lack of agreement over which is the best population denominator to use when they exist (for example, whether to use single ethnic response groups or multiple ethnic response groups). There are differences in how Indigenous status is defined in the different countries. There have also been frequent modifications to the ethnicity question recorded in the censuses in some of these countries. These changes in the census ethnicity question have led to difficulties in comparing mortality trends over time and have also produced difficulties in estimating inter-census population denominator counts.

An important issue in relation to the quality of Indigenous mortality data is the under-counting of deaths (the numerator for mortality data). In each of the four countries, the under-counting of Indigenous deaths is likely to lead to an underestimation of the relative size of disparities that exist between Indigenous and non-Indigenous populations. This will affect life expectancy estimates.

The life expectancy estimates presented below are not strictly comparable because of differences in the methods used to estimate life expectancy. Moreover, the populations covered by these estimates are variable across the three countries.

- The life expectancy for Maoris for 2005–07 was 70.4 years for males and 75.1 years for females (Statistics New Zealand 2008) (Table 1.17.2 and Figure 1.17.2).
- As of 2001, average life expectancy at birth for the First Nations population in Canada is estimated to be 71.1 years for males and 76.6 years for females. The Métis population is estimated to have a slightly higher life expectancy at 71.9 years for males and 77.7 years for females (INAC 2007). The Inuit population has the lowest life expectancy across all Aboriginal populations in Canada at 64.4 years for males and 69.8 years for females. In comparison, life expectancy for the Canadian population in general is 77.0 years for males and 82.0 years for females in 2001 (Wilkens et al. 2008).
- Life expectancy at birth is not readily available for American Indians in the United States. The most recent published data on the life expectancy of American Indians are projected life expectancies for 1999. In 1999, the projected life expectancy for American Indian males was 72.8 years compared with 74.0 years for total males, and 82.0 years for American Indian females compared with 79.7 years for total females (based on low series population estimates) (US Census Bureau 2000).



Notes

1. Life expectancy estimates for Aboriginal and Torres Strait Islander peoples and all Australians are for 2005–2007.
2. Life expectancy estimates for Canada are for 2001. First Nations refers to the total North American Indian population including both Registered Indians and Non-Status Indians. Registered Indians are individuals who are registered under the Indian Act. Métis refers to individuals with mixed Aboriginal and European ancestry. Inuit are the original inhabitants of Arctic Canada.
3. Life expectancy estimates for Maoris and the total New Zealand population are for 2005–2007.

Sources: ABS 2009b; INAC 2007; Wilkens et al. 2008; Statistics New Zealand 2008.

Figure 1.17.2: Life expectancy at birth for males and females in Australia, Canada and New Zealand, by Indigenous status, various years

Table 1.17.2: Life expectancy at birth (years of age) for males and females in Australia, Canada and New Zealand, by Indigenous status, various years

| Australia ^(a) | | Canada ^(b) | | | | New Zealand ^(c) | |
|---------------------------------------|-----------------|-----------------------|-------|--------|---------------|----------------------------|--------------------|
| Aboriginal and Torres Strait Islander | All Australians | First Nations | Métis | Inuits | All Canadians | Maoris | All New Zealanders |
| Males | 67.2 | 78.5 | 71.1 | 71.9 | 64.4 | 77.0 | 70.4 |
| Females | 72.9 | 82.4 | 76.6 | 77.7 | 69.8 | 82.0 | 75.1 |

(a) Life expectancy estimates for Aboriginal and Torres Strait Islander peoples and all Australians are for 2005–2007.

(b) Life expectancy estimates for Canada are for 2001. First Nations refers to the total North American Indian population including both Registered Indians and Non-Status Indians. Registered Indians are individuals who are registered under the Indian Act. Métis refers to individuals with mixed Aboriginal and European ancestry. Inuit are the original inhabitants of Arctic Canada.

(c) Life expectancy estimates for Maoris and the total New Zealand population are for 2005–2007.

Sources: ABS 2009b; INAC 2007; Wilkens et al. 2008; Statistics New Zealand 2008.

Potential years of life lost

Potential years of life lost (PYLL) is a measure of premature or untimely death. It represents the total number of years of life lost before a given age (for example, 65 years). If dying before the age of 65 is considered premature then a person dying at age 55 would have lost 10 years of potential life. This measure gives more importance to the causes of death that occurred at younger ages than those that occurred at older ages.

The PYLL due to death is calculated for each person who died before age 65. Deaths of people aged 65 years and over are not included in the calculation. Potential years of life lost correspond to the sum of the PYLL contributed for each individual. The rate is obtained by dividing total potential years of life lost by the total population less than 65 years of age.

Table 1.17.3 presents the number and rate of potential years of life lost for Indigenous and non-Indigenous Australians in Queensland, Western Australia, South Australia and the Northern Territory over the period 2004–2008.

Table 1.17.3: Potential years of life lost before age 65 years (PYLL), Qld, WA, SA & NT, 2004–2008^{(a)(b)(c)(d)}

| | Deaths aged under 65 years | | PYLL (65) | | |
|-----------------------|----------------------------|--------------------|-----------|---------------------------------|------------------------|
| | Number | Per cent of deaths | Number | Deaths per 1,000 ^(e) | Number years per death |
| Indigenous | | | | | |
| Males | 4,327 | 71.5 | 122,565 | 109.7 | 28.3 |
| Females | 2,852 | 59.6 | 73,020 | 65.4 | 25.6 |
| Non-Indigenous | | | | | |
| Males | 58,650 | 24.3 | 973,672 | 31.1 | 16.6 |
| Females | 33,114 | 14.7 | 539,134 | 17.5 | 16.3 |

- (a) Although most deaths of Indigenous Australians are registered, it is likely that some are not accurately identified as Indigenous. Therefore, these statistics are likely to underestimate the Indigenous PYLL.
(b) Data are reported for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory only. These jurisdictions are considered to have adequate levels of Indigenous identification in mortality data. They do not represent a quasi-Australian figure.
(c) Deaths prior to 2007 are by year of registration and state/territory of usual residence. Deaths from 2007 onwards are by reference year and state/territory of usual residence. Registration year prior to 2007 is equivalent to reference year from 2007 onwards.
(d) Data exclude registered deaths where the Indigenous status is not stated.
(e) Deaths per 1,000 population.

Source: AIHW analysis of National Mortality Database.

Additional information

Life expectancy in the Northern Territory

Wilson et al. (2007) undertook a study to assess the extent of changes in life expectancy at birth for Indigenous Australians living in the Northern Territory over the period 1967–2004. Life expectancy at birth figures were calculated via life table calculations using Indigenous mortality data and population data from the Northern Territory.

The study found that the life expectancy at birth of Indigenous Australians has risen considerably in the Northern Territory, increasing from 52 years for males and 54 years for females in the late 1960s to around 60 years for males and 68 years for females in 2004. The gap between Indigenous and total Australian female life expectancy in the Northern

Territory has narrowed between 1967 and 2004, but the gap between Indigenous and total Australian male life expectancy has remained the same.

Wilson et al. (2007) reported that declines in infant mortality accounted for a large amount of the increases in life expectancy for the Northern Territory Indigenous population between the late 1960s and mid 1980s, especially for males. A significant proportion of female life expectancy gains in this early period also came from other childhood and adult ages. From the mid 1980s to the early 2000s, declines in mortality at age 45 and over were responsible for the majority of life expectancy gains for both Indigenous males and females in the Northern Territory. For the total Australian population, improvements in middle age and older adult mortality were responsible for the vast majority of gains to Australian life expectancy over the entire period 1967–2004.

The gains in life expectancy for Indigenous males and females in the Northern Territory reported by Wilson et al. (2007) indicate that Indigenous health status has improved considerably in recent decades in the Northern Territory. There is still, however, substantial disparity between life expectancy measures of the Indigenous and non-Indigenous populations.

Data quality issues

Life expectancy estimates

Estimates of life expectancy are drawn from life tables. To construct a life table, data on total population, births and deaths are needed, and the accuracy of the life table depends on the completeness of these data. Because of uncertainty about the estimates of these components for Aboriginal and Torres Strait Islander peoples, experimental methods are used to calculate life expectancies for the Indigenous population. These experimental life expectancies should only be used as an indicative summary measure of life expectancy of the Indigenous population.

Although the direct demographic method to compile Indigenous life tables and life expectancy estimates is an improvement on indirect methods used earlier by the ABS in that it is data based and does not rely on assumption, there are still limitations to this method. That is, the derived Indigenous deaths identification rates relate to a very restricted time frame of 11 months, and there remains a relatively high level of unlinked records for which Indigenous status is unknown (ABS 2008a).

Births and deaths

Indigenous status question

All jurisdictions comply with the standard wording for the Indigenous status question and categories for their birth and death registration forms. However, New South Wales, Victoria, South Australia, the Northern Territory and the Australian Capital Territory all have slightly different wording to the national standard for the instruction on those with both Aboriginal and Torres Strait Islander origin (ABS & AIHW 2005). Although the wording is only slightly different, it would be ideal to have all jurisdictions asking the question in exactly the same way.

Under-identification

Almost all births and deaths in Australia are registered. However, the Indigenous status of the person is not always recorded/recoded correctly. The incompleteness of Indigenous identification means the number of births and deaths registered as Indigenous is an underestimate of births and deaths occurring in the Aboriginal and Torres Strait Islander population. As a result, the observed differences between Indigenous and non-Indigenous rates are underestimates of the true differences.

Although the identification of Indigenous deaths is incomplete in all state and territory registration systems, the ABS and the AIHW have assessed four jurisdictions (Queensland, Western Australia, South Australia and the Northern Territory) as having adequate identification. Longer term mortality trend data are limited to three jurisdictions (Western Australia, South Australia and the Northern Territory) with 10 years of adequate identification of Indigenous deaths in their recording systems. The quality of the time series data is also influenced by the late inclusion of a 'not stated' category for Indigenous status in 1998. Before this time, the 'not stated' responses were probably included with the non-Indigenous. Note that as the data quality improves, the states and territories to be included here should be reviewed.

The ABS calculated the implied coverage (identification) of Indigenous deaths for the period 2002–2006 using population estimates: New South Wales 45%, Victoria 32%, Queensland 51%, South Australia 62%, Western Australia 72%, Northern Territory 90%, Australia 55% (Tasmania and the Australian Capital Territory were not calculated because of small numbers) (ABS 2007).

Numerator and denominator

To calculate life expectancy estimates using a direct demographic method, it is important to ensure that the classification of records as Indigenous is consistent in both the numerator and denominator (ABS 2008a). However, because the numerator (deaths) and denominator (population) are based on different collections and different collection methods, there is an inconsistency of Indigenous identification between the two. The Census Data Enhancement (CDE) Indigenous Mortality Quality Improvement Study linked Census records with death registration records to examine these inconsistencies, and a method was developed to adjust death registration data by identification rates obtained through this study, to ensure consistency in the Indigenous identification of records across collections. This data linkage technique enables the direct calculation of identification rates with no assumptions necessary (ABS 2009b). There are, however, limitations that must still be noted.

That is, the derived Indigenous deaths identification rates relate to a very restricted time frame (11 months from early August 2006 to the end of June 2007) and the appropriateness of these rates for past or future periods is unknown. In addition, there remains a relatively high level (26%) of unlinked Indigenous death records which may introduce bias to the results if the characteristics or features of these records are different to linked records (ABS 2008a).

International comparisons

International Indigenous data are available for New Zealand, the United States and Canada. In New Zealand, research has been undertaken that attempts to adjust for this under-counting by a process of probabilistic record linkage of death registration data with census data. This research has produced estimates of the considerable extent of the under-counting of Maori deaths. This adjusted data could not be used in international comparisons unless the data in the other countries were also adjusted (Bramley et al. 2004).

In Canada the national mortality database that Statistics Canada administers does not contain ethnicity data. The regional offices of Health Canada collect mortality data for the indigenous, on-reserve, First Nations population. Via a series of partnerships with each provincial vital statistics registrar, First Nations-specific death certificate information is sent to the regional First Nations and Inuit Health Branch regional office. However, in a number of areas no such relationships exist (for example, the Atlantic, Ontario, and Quebec regions), and therefore data are obtained directly from the local communities, or not at all. The availability of Indigenous mortality data in Canada is further limited by the lack of information for off-reserve, or non-status, Indigenous peoples.

The varying degrees of completeness and accuracy of the Indigenous mortality databases that exist within the four countries are likely to affect the comparisons.

Mortality data

Deaths

The mortality rate for Indigenous Australians can be influenced by identification of Indigenous deaths, late registration of deaths, and changes to death forms and/or processing systems. Because of the small size of the Indigenous population, these factors can significantly affect trends over time and between jurisdictions. At present, there is considerable variation across the states and territories in the completeness of mortality and hospital data for Indigenous people.

Indigenous status question

All jurisdictions comply with the standard wording for the Indigenous status question and categories for their death registration forms. However, while data is provided to the ABS for the Indigenous status question for 99% of all deaths, there are concerns regarding the accuracy of the data. The Indigenous status question is not always directly asked. Detailed

breakdowns of Indigenous deaths are therefore only provided for five jurisdictions – New South Wales, Queensland, South Australia, Western Australia and the Northern Territory. Indigenous status information from the two sources are kept in the database, although these may not be consistent for an individual.

In 2004, a new range of codes were introduced as part of the effort to standardise and improve Indigenous identification in data collection nationally.

Indigenous Mortality Quality Study

The ABS conducted a number of quality studies based on the 2006 Census of Population and Housing and other data sets as part of the Census Data Enhancement (CDE) project (ABS 2008b). The CDE Indigenous Mortality Quality Study linked Census records with death registration records and examined differences in the reporting of Indigenous status across the two datasets.

There were 106,945 registered death records available to be linked in the study. Of these, 1,800 (1.7%) were identified as Indigenous on the death registration. Of the total registered deaths, 98,898 (92%) were linked to a Census record. However, a much lower linkage rate was achieved for Indigenous deaths, with more than one quarter of all Indigenous death registrations (26% or 473) unable to be linked to a Census record. As a result, Indigenous death records were over-represented in the unlinked death registrations.

As well as being over-represented in unlinked death registrations, unlinked Indigenous death records had different characteristics to linked Indigenous death registrations. Indigenous death records with older ages at death and from non-remote regions were more likely to be linked.

Under-identification

Almost all deaths in Australia are registered. However, the Indigenous status of the deceased is not always recorded/recorded correctly. The incompleteness of Indigenous identification means the number of deaths registered as Indigenous is an underestimate of deaths occurring in the Aboriginal and Torres Strait Islander population (ABS 2009a). As a result, the observed differences between Indigenous and non-Indigenous mortality are underestimates of the true differences.

Longer term mortality trend data are limited to three jurisdictions (Western Australia, South Australia and the Northern Territory) with 10 years of adequate identification of Indigenous deaths in their recording systems (ABS & AIHW 2005). The quality of the time series data is also influenced by the late inclusion of a 'not stated' category for Indigenous status in 1998. Before this time, the 'not stated' responses were probably included with the non-Indigenous.

The ABS calculated the implied coverage (identification) of Indigenous deaths for the period 2002–2006 using population estimates: New South Wales 45%, Victoria 32%, Queensland 51%, South Australia 62%, Western Australia 72%, Northern Territory 90%, Australia 55% (Tasmania and the Australian Capital Territory were not calculated because of small numbers) (ABS 2007).

Note that different causes may have levels of under-identification that differ from the all-cause coverage estimates. Note also that the quality of the cause of death data depends on every step of the process of recording and registering deaths (including the documentation available at each step of the process) from certification to coding of cause of death.

There are also current concerns about data quality for causes of death, especially relating to external causes of death of all Australians (not just Indigenous) (ABS 2006).

Problems associated with identification result in an underestimation of deaths and hospital separations for Indigenous people.

Numerator and denominator

Rate and ratio calculations rely on good numerator and denominator data. There are changes in the completeness of identification of Indigenous people in death records. These may take place at different rates from changes in the identification of Indigenous people in other administrative collections and population censuses. Denominators used here are sourced from *Experimental estimates and projections: Aboriginal and Torres Strait Islander Australians 1991 to 2021* (ABS 2009c).

Census of Population and Housing

The Census uses the National health data dictionary standard Indigenous status question and it is asked for each household member. Measures that are drawn from Census data are subject to broad data concerns relating to the unexplainable growth in the Aboriginal and Torres Strait Islander population since the 1991 Census, and the limitations of self-identification. Other Census data issues relate to the accuracy of the Census count itself, for example, whether people are counted more than once, or are undercounted (ABS 1996).

For the 2002 NATSISS, it was estimated that there were 165,700 Indigenous households compared with 144,700 enumerated in the 2001 Census. Although the Census data are adjusted for undercounts at the person level to arrive at the estimated resident population, no such adjustment is done at the household level. This affects the accuracy of the person counts at the household level to provide adjusted household estimates.

List of symbols used in tables

- n.a. not available
- rounded to zero (including null cells)
- 0 zero
- .. not applicable
- n.e.c. not elsewhere classified
- n.f.d. not further defined
- n.p. not available for publication but included in totals where applicable, unless otherwise indicated

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