

## 1.21 Sudden infant death syndrome

The number of Aboriginal and Torres Strait Islander infants aged less than 12 months who die from sudden infant death syndrome (SIDS), expressed as a rate (per 1,000 live births) for that period

### Data sources

Data for this measure come from the AIHW National Mortality Database.

The National Mortality Database is a national collection of de-identified information for all deaths in Australia and is maintained by the AIHW. Information on the characteristics and causes of death of the deceased is provided by the Registrars of Births, Deaths and Marriages and coded nationally by the ABS. Information on the cause of death is supplied by the medical practitioner certifying the death or by a coroner. The data are updated each calendar year.

Although the identification of Indigenous deaths is incomplete in all state and territory registration systems, four jurisdictions (Queensland, Western Australia, South Australia and the Northern Territory) have been assessed by the ABS and the AIHW as having adequate identification. These four jurisdictions represent approximately 60% of the Indigenous population of Australia. Data are presented by state/territory of usual residence rather than state/territory where death occurs.

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

Data have been combined for the 5-year period 2002–2006 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. Rates published in this report may therefore differ slightly from those published in the previous edition for comparable years of data.

## Analyses

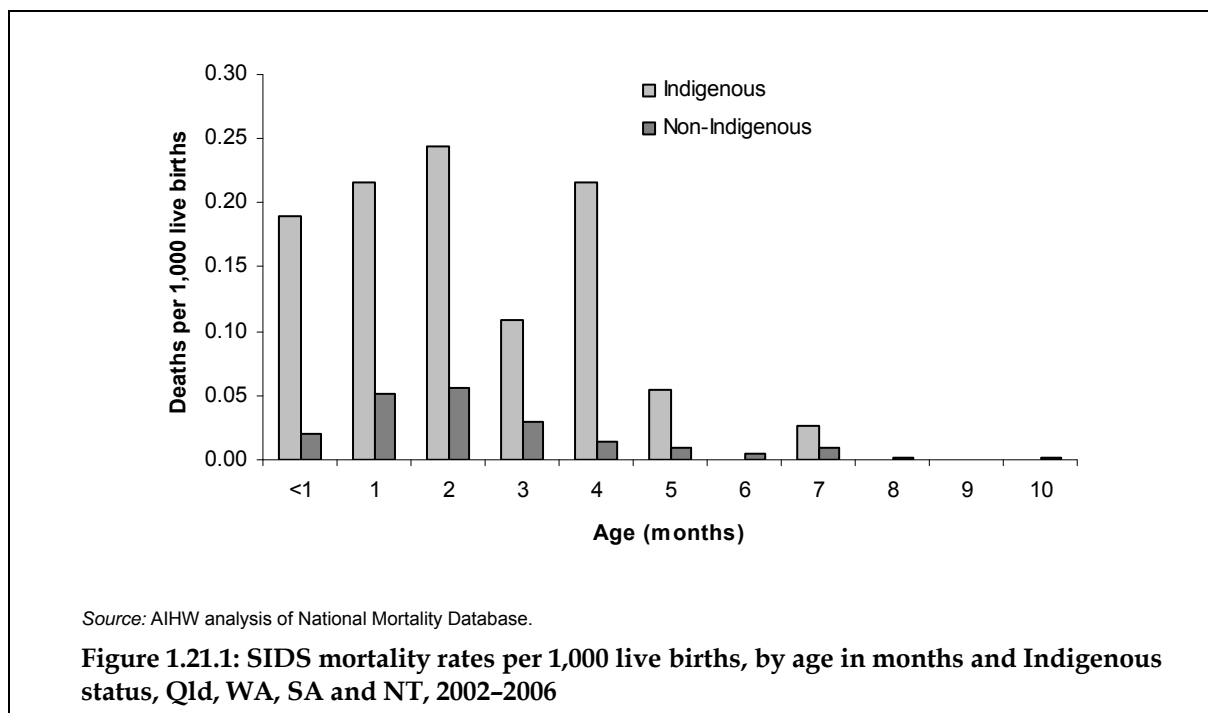
### Mortality

- For the period 2002–2006, there were 133 deaths from SIDS in Queensland, Western Australia, South Australia and the Northern Territory, 39 (29%) of which were deaths of Aboriginal and Torres Strait Islander infants; in 5% Indigenous status was not stated.
- SIDS represented approximately 11% of all deaths of Aboriginal and Torres Strait Islander infants Australia-wide.

### Mortality by age (months)

- For the period 2002–2006, the majority (62%) of all deaths from SIDS among Aboriginal and Torres Strait Islander infants in Queensland, Western Australia, South Australia and the Northern Territory combined occurred in the first 2 months of life.

- The highest mortality rates for SIDS occurred at around the age of 2–3 months for Indigenous and non-Indigenous infants (0.24 and 0.06 per 1,000 live births respectively) (Figure 1.21.1). Indigenous infants of this age died at over four times the rate of non-Indigenous infants.
- Mortality rate ratios between Indigenous and non-Indigenous infants were highest among those aged 4 months, where Indigenous infants died from SIDS at 16 times the rate of non-Indigenous infants.



### Mortality by state/territory

Table 1.21.1 presents SIDS deaths, mortality rates and ratios for Queensland, Western Australia, South Australia and the Northern Territory for the period 2002–2006.

- In the four jurisdictions where recording of Indigenous deaths is most complete, mortality rates for SIDS ranged from 0.3 per 1,000 live births in South Australia to 1.8 per 1,000 live births in the Northern Territory, but these rates were not significantly different from one another.
- In Queensland, Western Australia, South Australia and the Northern Territory combined, Indigenous infants died from SIDS at over five times the rate of non-Indigenous infants.

**Table 1.21.1: SIDS mortality rates per 1,000 live births, by Indigenous status, Qld, WA, SA and NT, 2002–2006<sup>(a)(b)(c)(d)(e)(f)</sup>**

	Indigenous				Non-Indigenous				Rate ratio <sup>(j)</sup>
	Deaths	Rate <sup>(g)</sup>	LCL 95% <sup>(h)</sup>	UCL 95% <sup>(i)</sup>	Deaths	Rate <sup>(g)</sup>	LCL 95% <sup>(h)</sup>	UCL 95% <sup>(i)</sup>	
Qld	20	1.2	0.6	1.7	62	0.3	0.2	0.3	4.3*
WA	n.p.	0.5	0.01	0.9	n.p.	0.1	0.03	0.1	6.2*
SA	n.p.	0.3	-0.3	0.9	14	0.2	0.1	0.3	1.8
NT	14	1.8	0.9	2.8	n.p.	0.3	-0.04	0.6	6.5*
<b>Qld, WA, SA &amp; NT</b>	<b>39</b>	<b>1.1</b>	<b>0.7</b>	<b>1.4</b>	<b>88</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>5.4*</b>

\* Represents results with statistically significant differences in the Indigenous/non-Indigenous comparisons at the  $p < 0.05$  level.

n.p. Not published where numbers are less than 5.

(a) ICD-10 code: R95.

(b) Data are reported for Queensland, Western Australia, South Australia and the Northern Territory only. These four jurisdictions are considered to have adequate levels of Indigenous identification in mortality data. They do not represent a quasi-Australian figure. The ABS calculated the completeness of identification of Indigenous deaths for the period 1999–2003 using population estimates as 51% for Queensland, 72% for Western Australia, 62% for South Australia and 90% for the Northern Territory. The completeness of Indigenous identification for SIDS may differ from the estimates for 'all causes'.

(c) Data exclude six registered infant deaths where Indigenous status was not stated over the period 2002–2006 in Queensland, Western Australia, South Australia and the Northern Territory combined.

(d) Data are presented in 5-year groupings because of small numbers each year.

(e) 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 infant deaths and, depending on the under-identification in births, may either underestimate or overestimate the rates.

(f) Deaths are by year of registration of death and state/territory of usual residence.

(g) No. per 1,000 live births.

(h) LCL = lower confidence limit.

(i) UCL = upper confidence limit.

(j) Rate ratio Indigenous:non-Indigenous.

Source: AIHW analysis of National Mortality Database.

## Time series analysis

Longer term mortality trend data are limited to three jurisdictions – Western Australia, South Australia and the Northern Territory, which have 10 years of adequate identification of Indigenous deaths in their recording systems.

There is a consistent time series of population estimates from 1991. Because of changes in the classification and coding of causes of death from ICD-9 (used until 1996) to ICD-10 (used from 1997 onwards) which affects the comparability of the data, the analysis reported for this indicator has been done for two time periods – 1991–1996 and 1997–2006. Data are presented in 3- to 4-year groupings because of low numbers of deaths from SIDS each year.

Because of the late inclusion of a 'not stated' category of Indigenous status in 1998 (before which 'not stated' responses were included with non-Indigenous deaths), Indigenous mortality rates have been compared with the mortality rates of other Australians (which include deaths of both non-Indigenous people and people for whom Indigenous status was not stated).

SIDS mortality rates, rate ratios and rate differences between Indigenous and other Australian mortality from SIDS over the period 1991–1993 to 1994–1996 and 1997–1999 to 2004–2006 are presented in Table 1.21.2 and Figure 1.21.2.

- Over the period 1991–1993 to 1994–1996, there were non-significant declines in mortality rates for SIDS for Indigenous infants in Western Australia, South Australia and the Northern Territory. Over the same period there were significant declines in mortality rates for SIDS for other infants (a decline of around 0.4 deaths per 1,000 live births) (Table 1.21.2).
- Over the period 1997–1999 to 2004–2006, there were significant declines in mortality rates for SIDS for both Indigenous and other infants in Western Australia, South Australia and the Northern Territory. The fitted trend implies an average yearly decline in the rate of around 0.5 per 1,000 births for Indigenous infants (equivalent to a 111% decline over the period) and 0.1 per 1,000 births for other infants (equivalent to a 105% decline) (Table 1.21.2).
- Over the same period, there was a significant decline in the mortality rate ratio between Indigenous and other infants of around 0.3 per 1,000 live births. There was also a significant decline in the mortality rate difference of around 0.4 per 1,000 live births.

Fluctuations in the level of Indigenous mortality over time partly reflect changing levels of identification of Indigenous deaths and population estimates. Given the variability in the measures of Indigenous mortality, caution should be exercised in assessing trends in Indigenous mortality over time and comparisons between jurisdictions and with the non-Indigenous population.

In addition, analysis of infant mortality data in Western Australia has found a shift away in recent years from a classification of 'SIDS' towards a classification of 'unascertainable', particularly for Aboriginal infants. This has implications for the analysis of trends in SIDS over time (Freemantle et al. 2005).

**Table 1.21.2: SIDS mortality rates, rate ratios and rate differences per 1,000 live births, by Indigenous status, WA, SA and NT, 1991–1993 to 1994–1996 and 1997–1999 to 2004–2006**

	Deaths		No. per 1,000 <sup>(a)</sup>		Rate ratio <sup>(c)</sup>	Rate difference <sup>(d)</sup>
	Indigenous	Other <sup>(b)</sup>	Indigenous	Other <sup>(b)</sup>		
<b>1991–1996</b>						
1991–1993	62	149	6	1.1	5.5	4.9
1994–1996	44	92	4.3	0.7	6.2	3.6
Difference in rates <sup>(e)</sup>	..	..	-1.8	-0.4*	..	..
<b>1997–2006</b>						
1997–1999	38	70	3.7	0.5	6.8	3.1
2000–2003	25	42	1.6	0.3	6.5	1.4
2004–2006	6	13	0.5	0.1	5	0.4
Annual change <sup>(f)</sup>	..	..	-0.5*	-0.1*	-0.3*	-0.4*
% change over period <sup>(g)</sup>	..	..	-111.1	-105.1	-33.2	-112.2

\* Represents statistically significant differences at the  $p < 0.05$  level over the period 1991–1993 to 1994–1996 and 1997–1999 to 2004–2006.

(a) Rates are per 1,000 live births.

(b) 'Other' includes deaths of non-Indigenous people and those for whom Indigenous status was not stated.

(c) Mortality rate for Indigenous Australians divided by the mortality rate for other Australians.

(d) Mortality rate for Indigenous Australians minus the mortality rate for other Australians.

(e) Mortality rate for 1994–1996 minus mortality rate for 1991–1993.

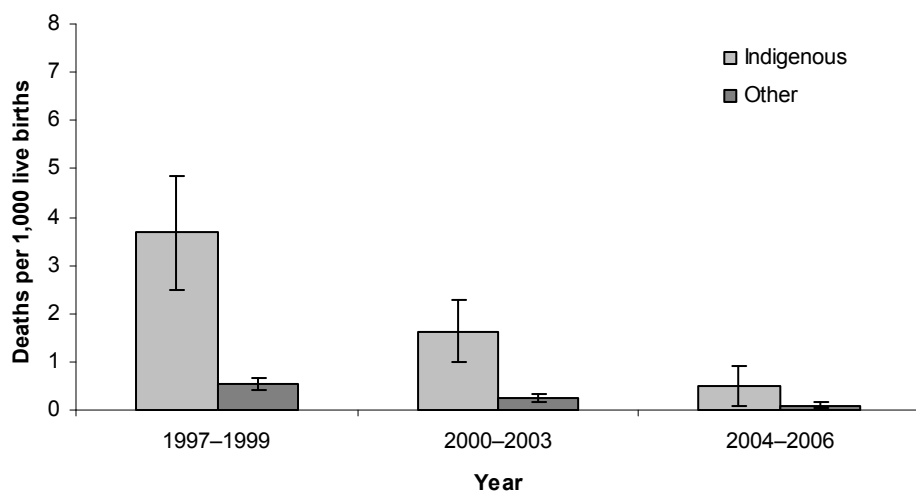
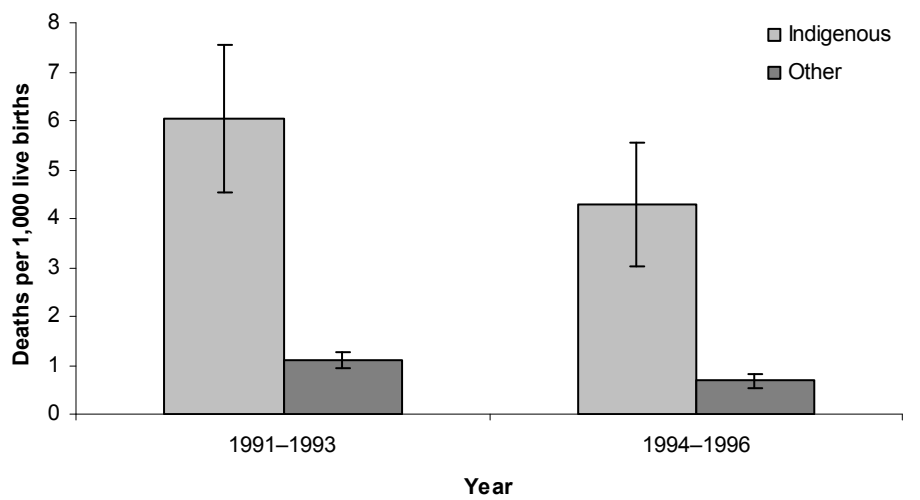
(f) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.

(g) Per cent change between 1997 and 2006 based on the average annual change over the period.

*Notes*

1. Data are presented in 3-year and 4-year groupings because of the small number of Indigenous deaths from SIDS each year.
2. The completeness of identification of Indigenous deaths can vary by age.
3. Deaths and rates presented in this table may differ from those presented in the 2006 edition of this report for comparable years because of a change from using year of occurrence of death to year of registration of death for mortality analyses.

Source: AIHW analysis of National Mortality Database.



Source: AIHW analysis of National Mortality Database.

**Figure 1.21.2: SIDS mortality rates per 1,000 live births, by Indigenous status, WA, SA and NT, 1991-1993 to 1994-1996 and 1997-1999 to 2004-2006**

Additional trends analysis has been presented for Queensland, Western Australia, South Australia and the Northern Territory combined from 1998 to 2006 for Indigenous and non-Indigenous Australians in Table 1.21.3 and Figure 1.21.3. Queensland has had adequate identification of Indigenous deaths in its recording systems since 1998, and these have been compared with those of non-Indigenous Australians (excluding deaths for which Indigenous status was not stated).

- Over the period 1998–1999 to 2004–2006, there were significant declines in mortality rates for SIDS for both Indigenous and non-Indigenous infants in Queensland, Western Australia, South Australia and the Northern Territory combined. The fitted trend implies an average yearly decline in the rate of around 0.3 per 1,000 births for Indigenous infants (equivalent to an 86% decline in the rate) and 0.1 per 1,000 births for non-Indigenous infants (equivalent to an 89% reduction in the rate) (Table 1.21.2).
- Over the same period, there was no significant change in the mortality rate ratios but there were significant declines in the mortality rate differences between Indigenous and non-Indigenous infants of around 85%.

**Table 1.21.3: SIDS mortality rates, rate ratios and rate differences per 1,000 live births, by Indigenous status, Qld, WA, SA and NT, 1998–1999 to 2004–2006<sup>(a)</sup>**

	1998–1999	2000–2001	2002–2003	2004–2006	Annual change <sup>(b)</sup>	% change over period <sup>(c)</sup>
<b>Deaths</b>						
Indigenous	37	24	24	15	..	..
Non-Indigenous	96	75	40	48	..	..
<b>Rate (number per 1,000)<sup>(d)</sup></b>						
Indigenous	2.8	1.7	1.7	0.7	–0.3*	–85.7
Non-Indigenous	0.6	0.4	0.2	0.2	–0.1*	–89.0
<b>Rate ratio<sup>(e)</sup></b>	<b>5.1</b>	<b>3.9</b>	<b>7.2</b>	<b>3.8</b>	<b>–0.1</b>	<b>–7.8</b>
<b>Rate difference<sup>(f)</sup></b>	<b>2.3</b>	<b>1.2</b>	<b>1.4</b>	<b>0.5</b>	<b>–0.2*</b>	<b>–84.9</b>

\* Represents statistically significant differences at the  $p < 0.05$  level over the period 1998–2006.

(a) Data exclude 13 registered infant deaths for which Indigenous status was not stated over the period 1998–2006 in Queensland, Western Australia, South Australia and the Northern Territory combined.

(b) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.

(c) Per cent change between 1998 and 2006 based on the average annual change over the period.

(d) Rates are per 1,000 live births.

(e) Mortality rate for Indigenous Australians divided by the mortality rate for other Australians.

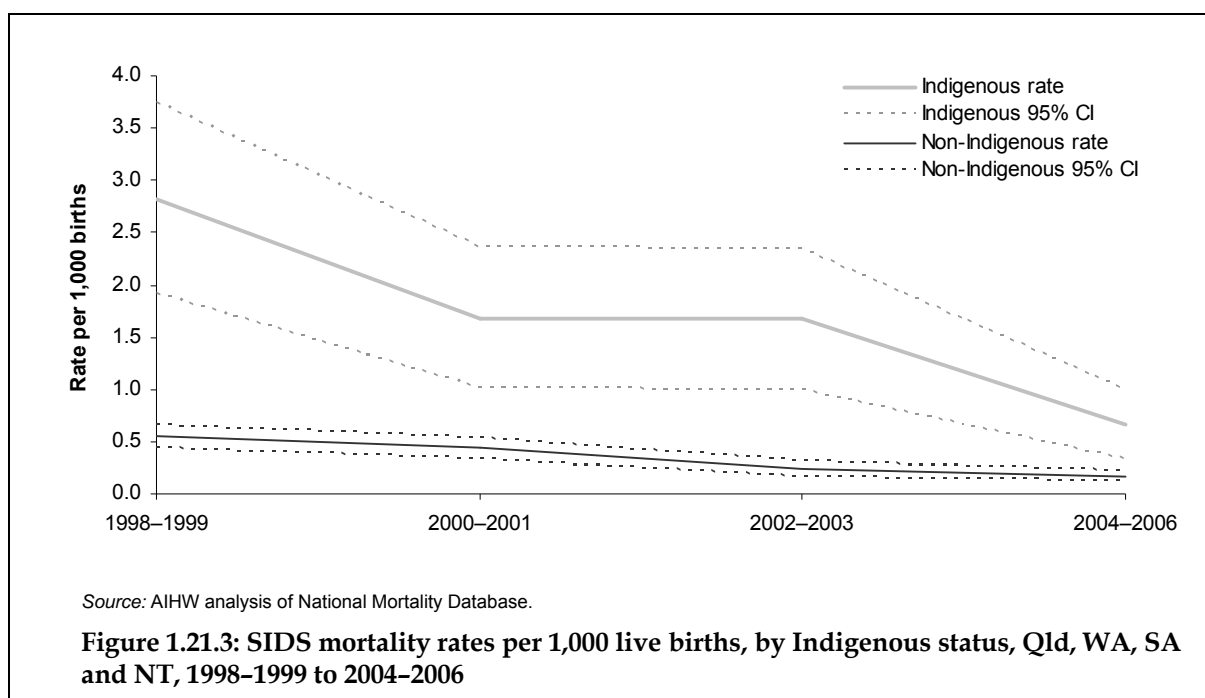
(f) Mortality rate for Indigenous Australians minus the mortality rate for other Australians.

*Notes*

1. Data are presented in 2-year and 3-year groupings because of the small number of Indigenous deaths from SIDS each year.

2. The completeness of identification of Indigenous deaths can vary by age.

Source: AIHW analysis of National Mortality Database.



## International comparisons

International indigenous mortality 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 value for the Indigenous population (mainly because of undercounting) and the lack of agreement over which population denominator values to use if they do exist (for example, whether to use single ethnic response groups or the 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 frequent changes in the census ethnicity question have led to difficulties in comparing mortality trends over time and have also produced difficulties in estimating population denominator counts between censuses.

The most important issue in relation to the quality of Indigenous mortality data is the undercounting of deaths (the numerator for mortality data). In each of the four countries, the undercounting of Indigenous deaths is likely to lead to an underestimation of the relative size of disparities that exist between Indigenous and non-Indigenous populations.

International statistics on infant mortality show that Indigenous infants in the United States have lower mortality rates for SIDS than other infants, and in New Zealand, Indigenous infants have higher mortality rates for SIDS than other infants, but the gap is not as great as for Aboriginal and Torres Strait Islander infants. The infant mortality rate for SIDS for Aboriginal and Torres Strait Islander infants is around five times that for non-Indigenous infants (1.1 per 1,000 live births compared with 0.2 per 1,000 live births). The latest available data from the United States and New Zealand are outlined below. Data are not provided for Canada, as information on the cause of death of infants is incomplete and not suitable for the calculation of rates. Note that the figures provided for Australia and New Zealand are based

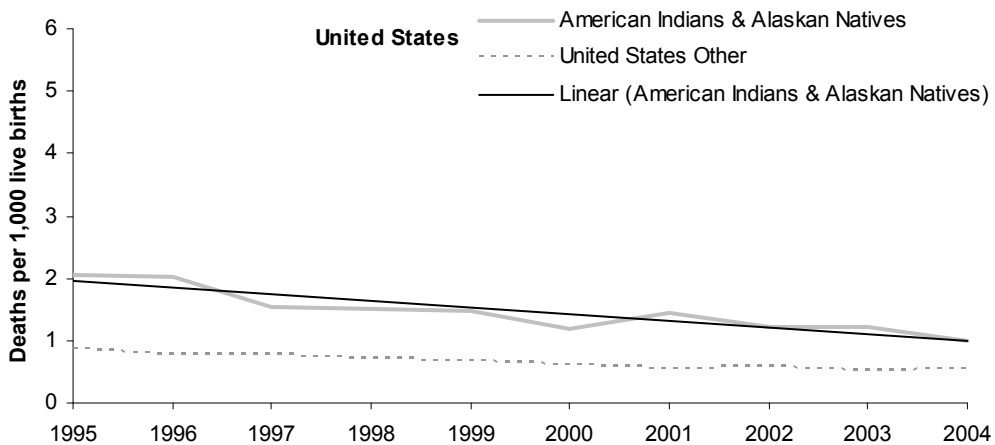
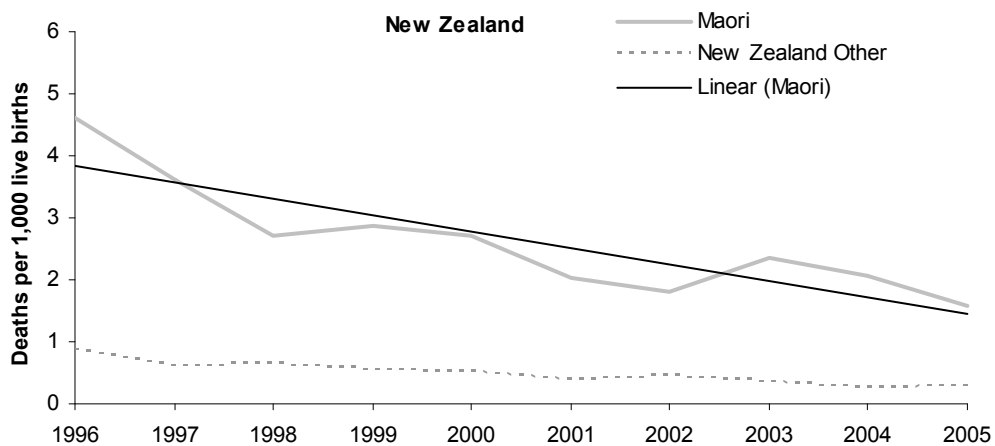
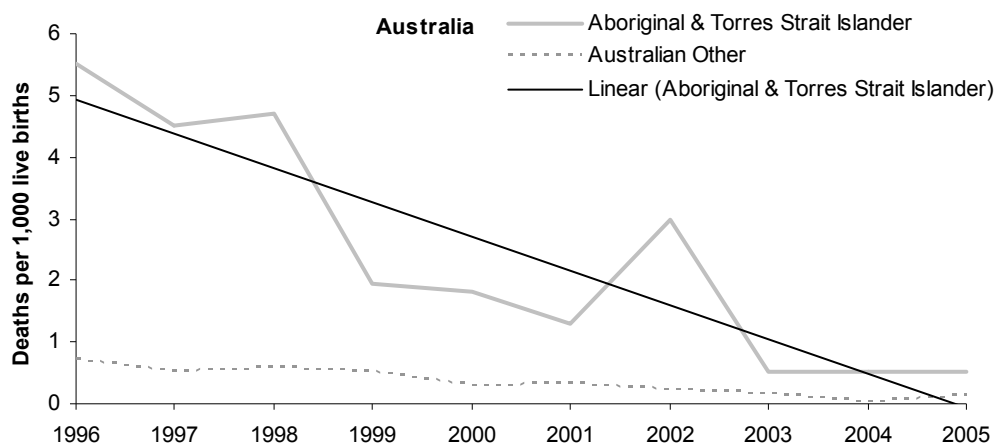
on births according to the race of the parents, whereas those provided for the United States are based on births according to the race of the mother.

- During the period 2002–2004, the death rate from SIDS was 1.2 per 1,000 live births among American Indians and Alaskan Natives compared with 0.5 per 1,000 live births for other people in the United States (United States Department of Health and Human Services unpublished data).
- For the period 2002–2005, the mortality rate for SIDS was 1.9 per 1,000 live births among New Zealand Maoris, compared with 0.3 per 1,000 live births among non-Indigenous people in New Zealand (Statistics New Zealand unpublished data).

### **Time series**

SIDS mortality data are available from 1996 to 2005 for the Maori population in New Zealand, and from 1995 to 2004 for the American Indian and Alaskan Native population in the United States. These data are presented in Figure 1.21.4 along with data for Australia for the period 1996–2005.

- In New Zealand between 1996 and 2005 there were significant declines in mortality from SIDS in the Maori population. The fitted trend implies an average yearly decline in the rate of around 0.3 per 1,000 live births, which is equivalent to a 52% reduction in the rate over this period. There were also significant declines in non-Indigenous SIDS mortality rates between 1996 and 2005 (a reduction of 60%) (Statistics New Zealand unpublished data).
- In the United States between 1995 and 2004 there were significant declines in mortality from SIDS in the American Indian and Alaskan Native population. The fitted trend implies an average yearly decline in the rate of around 0.1 per 1,000 live births which is equivalent to a 46% reduction in the rate over this period. There were also significant declines in SIDS mortality rates for other persons in the United States between 1995 and 2004 (a reduction of 39%) (United States Department of Health and Human Services unpublished data).



Note: Australia data are for Western Australia, South Australia and the Northern Territory combined.

Source: AIHW analysis of National Mortality Database; Statistics New Zealand; United States department of Health and Human Services.

**Figure 1.21.4: SIDS mortality rates per 1,000 live births, by Indigenous status, Australia (1996–2005), New Zealand (1996–2005) and the United States (1995–2004)**

## **Data quality issues**

### **Mortality data**

#### **Deaths**

*The mortality rate for Indigenous Australians can be influenced by late registration of deaths, identification of Indigenous 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.*

#### **Indigenous status question**

*All jurisdictions comply with the standard wording for the Indigenous status question and categories for their death registration forms. However, New South Wales, Victoria, South Australia, the Northern Territory and the Australian Capital Territory all have slightly different wording from 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 deaths in Australia are registered. However, the Indigenous status of the deceased is not always recorded or 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 1997). As a result, the observed differences between Indigenous and non-Indigenous mortality are underestimates of the true differences.*

*Although the identification of Indigenous deaths is incomplete in all state and territory registration systems, four jurisdictions (Queensland, Western Australia, South Australia and the Northern Territory) have been assessed by the ABS and the AIHW 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. 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%, the Northern Territory 90%, Tasmania and the Australian Capital Territory were not calculated because of small numbers, Australia 55% (ABS 2007a).*

*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).*

#### **Numerator and denominator**

*The perinatal mortality rate also relies on birth registration data. Unfortunately, as with deaths, some Indigenous births are not correctly identified as Indigenous. The estimated identification of births as Indigenous in 2002–06 was 95%. Identification for the states and territories ranged from 83% for the Australian Capital Territory to 107% for the Northern Territory (ABS 2007b). Given the identification is higher in births than deaths it is likely that Indigenous mortality rates are underestimated.*

*(continued)*

### **Data quality issues (continued)**

*The numerator and denominator are not based on the same collection or the same method of collection. Births are registered by the parents whereas death registration forms are completed by doctors and funeral directors. Therefore, there would be inconsistency of Indigenous identification between the numerator and denominator.*

#### **SIDS identification**

*In addition to the data quality problems outlined above common to all Indigenous mortality data, there is an additional problem with SIDS data in Australia and internationally. There have been numerous initiatives to standardise the definitions and practices to distinguish between SIDS and other causes of unexpected infant death. However, problems still exist in the accurate identification of SIDS and there is no consistency of definition used by clinicians, researchers or pathologists in Australia. Research in Australia has shown poor-quality pathological examination of infants who died unexpectedly with 65% of autopsies studied failing minimum quality standards and another study where infant autopsies had been performed by non-pathologists in isolated regions. Without adequate rigour there is the danger of misclassification of infant deaths (Byard 2001). At this stage it is unknown whether there are any variations by state/territory and by Indigenous status in these problems. A study in Western Australia has found an increase in the number of 'unascertainable' deaths with a corresponding decrease in 'SIDS' deaths suggesting a change in the categorisation of deaths over time. A scrutiny of the autopsy reports indicates that in previous years a number of these 'unascertainable' deaths would have been classified as SIDS.*

#### **International comparisons**

*International Indigenous data are available for New Zealand, the United States and Canada. Data quality is an important issue in all countries with small Indigenous populations. The mortality rates are therefore likely to be underestimated to some degree for each of the Indigenous groups. The scope of data collections in Canada and the United States is often limited to the registered or reserve Indigenous populations and therefore does not cover the whole Indigenous population. International comparisons need to take into account that the definition of Indigenous status is specific to each country.*

#### **Cause of death coding**

*Causes of death are based on the 10th revision of the International Classification of Diseases (ICD-10). Mortality coding using ICD-10 was introduced into Australia on 1 January 1997.*

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