CHAPTER 9 MORTALITY

INTRODUCTION

The Australian population enjoys good health by world standards, but Aboriginal and Torres Strait Islander people experience higher death rates than non-Indigenous Australians across all age groups, and from all major causes of death. The overall mortality rates for Indigenous males and females are almost three times those for non-Indigenous males and females. Conditions responsible for the majority of deaths among Aboriginal and Torres Strait Islander people include circulatory diseases, external causes, endocrine, metabolic and nutritional diseases, diseases of the respiratory system, and cancer.

This chapter examines the mortality of the Indigenous population. It begins by presenting information on data quality and availability and life expectancy. It then provides data on infant mortality, years of life lost and all-cause mortality, followed by an overview of major causes of death among Aboriginal and Torres Strait Islander peoples. Lastly, trends in mortality are presented for Indigenous and other Australians.

While the difference in mortality rates between the Indigenous and non-Indigenous populations is very large, the exact magnitude cannot be established at this time, because of the incomplete recording of Indigenous status on death records. While this limitation restricts precise analysis of the data and presents difficulties for the monitoring of mortality trends over time, it is still possible to provide some measures of Aboriginal and Torres Strait Islander mortality, and to make some comparisons with the mortality of non-Indigenous Australians.

DATA QUALITY AND AVAILABILITY

Almost all deaths in Australia are registered. However, Indigenous status is not always recorded, or recorded correctly. The incompleteness of Indigenous identification means that the number of deaths registered as Indigenous is an underestimate of the actual number of deaths which occur in the Indigenous population.

Coverage

The extent to which the identification of Indigenous Australians occurs in data collections is referred to as 'coverage' or 'completeness of coverage'. While there is incomplete coverage of Indigenous deaths in all state and territory registration systems, some jurisdictions have been assessed by the Australian Bureau of Statistics (ABS) as having a sufficient level of coverage to enable statistics on Aboriginal and Torres Strait Islander mortality to be produced. Table 9.1 presents the implied coverage of Indigenous deaths for each of the jurisdictions (except Tasmania and the Australian Capital Territory) for the period 2001–2005. Implied coverage is calculated by dividing the number of Indigenous deaths registered for the period 2001–2005 by the number of projected Indigenous deaths for the same period (ABS 2007c). The projected deaths are obtained from the low series of population projections in *Experimental Estimates and Projections, Aboriginal and Torres Strait Islander Australians 1991 to 2009* (ABS 2004c).

Coverage continued

9.1 INDIGENOUS DEATHS, implied coverage—2001–2005

	Deaths registered as Indigenous	*Projected Indigenous deaths*	*Implied coverage of Indigenous deaths*(a)
States/Territories	no.	no.	%
New South Wales	2 479	5 469	45
Victoria	364	1 182	31
Queensland	2 822	5 430	52
South Australia	642	1 011	64
Western Australia	1 860	2 658	70
Tasmania	123	(b). .	(b). .
Northern Territory	2 229	2 430	92
Australian Capital Territory	36	(b). .	(b). .
Australia(c)	**10 564**	**18 973**	**56**

. . not applicable
(a) Calculated as the ratio of deaths registered to projected Indigenous deaths.
(b) Not calculated due to small numbers.
(c) Includes Other Territories.
Source: ABS 2007c

The jurisdictions assessed as having a sufficient level of coverage are Queensland, Western Australia, South Australia and the Northern Territory. These data have been combined for 2001–2005 to enable an analysis of Indigenous mortality. The less than complete coverage of Indigenous deaths in these four jurisdictions means the aggregate analyses presented in this chapter, which compare Indigenous and non-Indigenous mortality statistics, will underestimate the actual mortality experience of Indigenous people.

Longer term mortality trends discussed in this chapter are based on an analysis of data from three jurisdictions—Western Australia, South Australia and the Northern Territory—the only jurisdictions with 15 years of reasonable coverage of Indigenous deaths registrations. Indigenous mortality rates have been compared with the mortality rates of 'other Australians' (which include deaths of non-Indigenous people and deaths for which Indigenous status was not stated). This is due to a late inclusion of a 'not stated' category of Indigenous status in 1998, before which 'not stated' responses were included with non-Indigenous deaths.

Year of registration or year of occurrence

Deaths can be analysed by year of occurrence of death or by year of registration of death. While the majority of deaths are registered in the year they occur, some of those registered in a given year occurred in previous years, and some which occurred in one year are not registered until subsequent years. Delays in registration can occur when deaths are subject to the findings of a coroner and are more common when the death occurs in a remote area. Late registrations are more common among deaths of Indigenous than non-Indigenous people. For example, in Queensland, Western Australia, South Australia and the Northern Territory for deaths of non-Indigenous Australians that occurred in 2004, 95% were registered in 2004 while 5% were registered in 2005. For Indigenous deaths, the corresponding figures were 88% in 2004 and 12% in 2005. The proportion of deaths that occurred and were registered in the same year has

Year of registration or year of occurrence continued

remained relatively stable over the period 1991–2004 for both Indigenous and other Australians (table 9.2).

While late registrations are more common among Indigenous Australians, table 9.2 shows that there is little difference between the number of deaths registered in a given year and the number of deaths that occurred in the same year for both Indigenous and other Australians. This is because for each year, the number of deaths that are not registered in the year they occur are offset by deaths that occurred in previous years but were registered late. This indicates that analysis of mortality data using year of registration of death will produce similar results to analysis using year of occurrence of death for the period of interest.

The analyses of deaths reported in this chapter are based on year of registration of death for the period 2001–2005 (1991 to 2005 for trends analysis). Year of registration of death was used so that deaths for the most recent year of data available can be included in the analysis and to be consistent with the publication of mortality statistics by the ABS. It should be noted that the 2005 edition of this publication 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.

9.2 PROPORTION OF DEATHS THAT WERE REGISTERED IN THE YEAR THEY OCCURRED(a)—1991–2004

	Indigenous	*Other*
	%	%
1991	84.5	95.3
1992	85.3	94.7
1993	85.9	95.0
1994	84.7	95.4
1995	86.8	94.3
1996	80.4	95.4
1997	84.3	95.1
1998	85.1	95.0
1999	83.3	95.0
2000	84.7	94.9
2001	84.2	94.4
2002	85.8	95.0
2003	86.2	95.3
2004	88.3	95.1

(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.

Source: AIHW National Mortality Database

Cause of death statistics in this chapter are based on the tenth revision of the International Classification of Diseases (ICD-10). Mortality coding using ICD-10 was introduced in Australia for deaths registered from 1 January 1997. All rates and ratios derived in this chapter are calculated using the ABS 2001 Census-based experimental Indigenous population projections (low series).

LIFE EXPECTANCY

Life expectancy refers to the average number of years a person of a given age and sex can expect to live, if current age-sex-specific death rates continue to apply throughout his or her lifetime. A 'life table' is created from age-specific death rates that are used to calculate values which measure mortality, survivorship and life expectancy. To construct a life table, data on total population, births and deaths are needed, and the accuracy of the life table depends upon the completeness of these data. Because of uncertainty about the estimates of these components for Aboriginal and Torres Strait Islander peoples, indirect 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 the level of mortality of the Indigenous population.

The estimates of life expectancy presented here are drawn from the Australian life tables, 1998–2000, and the Experimental Indigenous Abridged Life Tables, 1996–2001 (ABS 2006b) which use the Bhat method (ABS 2004b) to estimate life expectancy (see box 9.3 for information on the different methods used to estimate life expectancy). Life expectancy estimates are not available for the non-Indigenous population so estimates for the total Australian population have been used for comparison with estimates for the Indigenous population. The life expectancy estimates presented here are the same as those presented in the 2005 edition of this report. This is because at present, Indigenous life expectancy estimates have not been calculated for a later period than 1996–2001. Life expectancy estimates for the total Australian population are available for the period 2004–2006, however, for comparative purposes, 1998–2000 data for the Australian population have been used in this chapter.

In the period 1996–2001, the life expectancy at birth for Indigenous Australians was estimated to be 59 years for males and 65 years for females, compared with 77 years for all males and 82 years for all females for the period 1998–2000; a difference of approximately 17 years for both males and females.

9.3 METHODS USED TO CALCULATE LIFE EXPECTANCY

A number of different indirect methods have been used to estimate life expectancy of Indigenous Australians. All of these methods rely on different assumptions and subjective expert opinions (ABS 2004b) and there is no direct way of verifying the accuracy of the estimates derived from these methods. More work needs to be done on such estimates as more robust methods become available and data quality improves. Below is a description of the methods used.

Preston and Hill (1980)

The ABS first used a method proposed by Preston and Hill (1980) to estimate the completeness of recording of deaths of Indigenous Australians in the national mortality database relative to the number of Indigenous Australians recorded in the five-yearly Census of Population and Housing. The Preston-Hill method yields correction factors which adjust the counts of deaths recorded during the intercensal period so that the census population estimates at each end of the period are consistent with corrected intercensal death registration. In this method, net internal migration (by age, sex and state/territory) and net overseas migration (by age and sex) are assumed to be nil, and

LIFE EXPECTANCY *continued*

no adjustment is made for change in the extent to which people were identified as Indigenous in the census. In a review of the performance of the method, the ABS determined that the method was not appropriate for application to the Indigenous population because the method only allows for stable populations (ABS 2004a) which is not the case for the Indigenous population. The 1980 Preston-Hill method has been used extensively worldwide and was used by the ABS to estimate Indigenous mortality for the period 1991–1996. The ABS application of the Preston-Hill method produced estimates of life expectancies at birth of 57 years for Indigenous males and 62 years for Indigenous females for 1991–1996. Indigenous life expectancy estimates using the Preston-Hill method have also been calculated for the periods 1997–99 and 1999–2001, resulting in an estimated life expectancy for Indigenous males of 56 years and for Indigenous females of 62 years for both periods. These estimates are around 20 years lower than the life expectancy estimates derived for all Australian males and females.

Bhat (2002)

Following the 2001 census, the ABS shifted to a method proposed by Bhat (2002) that offers improvement over other indirect methods used earlier by the ABS to estimate life expectancy from incomplete data. The Bhat method has advantages over other methods in that it allows for an adjustment for 'migration' which is used to allow for the 'unexplained growth' of the Indigenous population which is attributed to a changing propensity to identify as Indigenous between censuses. However it should be noted that this method was primarily developed for population estimation and requires information about the rate of natural increase of the population and remains experimental. The application of the Bhat method, assuming 2.0% growth per annum during the 1996–2001 period, produced life expectancy estimates of 59 for Indigenous males and 65 years for Indigenous females, about 17 years lower than those estimated for all Australian males and females.

General Growth Balance Method (GGB) (2007)

The GGB method is similar to the Bhat method however it treats change in identification as change in census coverage without an additional adjustment for 'identification migration', i.e. assuming a population growth rate. The GGB method was used by the University of Queensland in the 2007 report 'The burden of disease and injury in Indigenous Australians, 2003'. This report estimated life expectancy at birth for Indigenous Australians around 13 years lower than that of the total Australian population (64 years for Indigenous males and 69 years for Indigenous females compared with 77 years for all males and 82 years for all females.)

DEATHS 2001–2005

For the period 2001–2005, there were 7,544 registered deaths identified as Indigenous (4,329 males and 3,215 females) for people reported to have been usual residents of Queensland, Western Australia, South Australia and the Northern Territory. These deaths accounted for 3.2% of all deaths of usual residents of these four jurisdictions.

DEATHS 2001–2005 *continued*

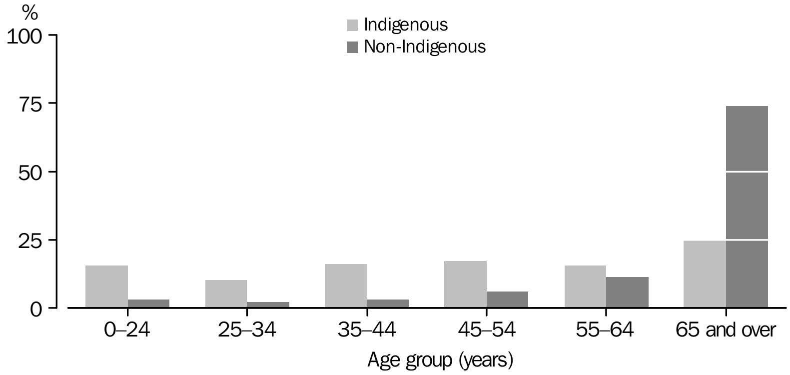
Age at death

In Queensland, Western Australia, South Australia and the Northern Territory combined, approximately 75% of Indigenous males and 65% of Indigenous females died before the age of 65 years. This is in stark contrast to the non-Indigenous population where only 26% of males and 16% of females died aged less than 65 years (graphs 9.4 and 9.5).

Infant deaths (deaths under one year) contribute to the younger age at death of the Indigenous population. For the period 2001–2005, Indigenous infant deaths represented 6.4% of total Indigenous male deaths and 5.7% of total Indigenous female deaths compared with 0.9% and 0.8% of the total for non-Indigenous male and female infant deaths.

The 35–44 year age group accounted for 16% of total Indigenous male deaths compared with only 3% of total non-Indigenous male deaths, while the 45–54 year age group accounted for 15% of Indigenous female deaths compared with 4% of total non-Indigenous female deaths.

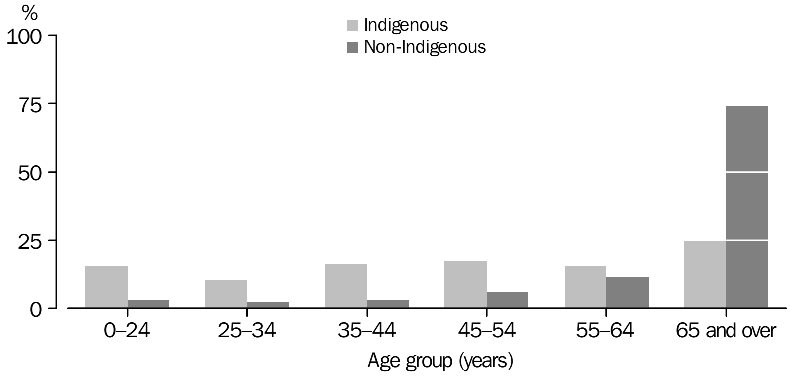
9.4 MALE DEATHS(a), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.

Source: AIHW National Mortality Database

9.5 FEMALE DEATHS(a), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.

Source: AIHW National Mortality Database

Age at death continued

For the four jurisdictions included in this analysis, Indigenous Australians were over-represented in mortality statistics, in almost every age group. Table 9.6 shows Indigenous deaths as a proportion of total deaths by age group in 2001–2005 and their respective proportions of the total population for the same period.

9.6 DEATHS OF INDIGENOUS PERSONS(a)—2001–2005

	NUMBER OF INDIGENOUS DEATHS		INDIGENOUS DEATHS AS A PROPORTION OF TOTAL DEATHS (%)		INDIGENOUS PERSONS AS A PROPORTION OF TOTAL POPULATION (%)(b)	
Age group (years)	*Males*	*Females*	*Males*	*Females*	*Males*	*Females*
Less than 1	277	182	20.3	17.2	7.7	7.7
1–4	54	50	16.2	21.3	7.3	7.5
5–14	54	40	13.5	14.5	6.9	6.8
15–24	285	130	12.4	15.3	5.1	5.4
25–34	452	218	13.8	17.4	4.1	4.4
35–44	695	435	15.0	16.6	3.0	3.3
45–54	742	498	9.1	10.0	2.1	2.3
55–64	671	523	4.6	6.4	1.4	1.6
65 and over	1 075	1 122	1.2	1.2	0.8	0.9
Total(c)	**4 329**	**3 215**	**3.5**	**2.8**	**3.8**	**3.9**

(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.

(b) Estimates of the Indigenous population for 2001–2005 are the Indigenous population projections, based on the 2001 Census of Population and Housing.

(c) Includes deaths where age was not stated.

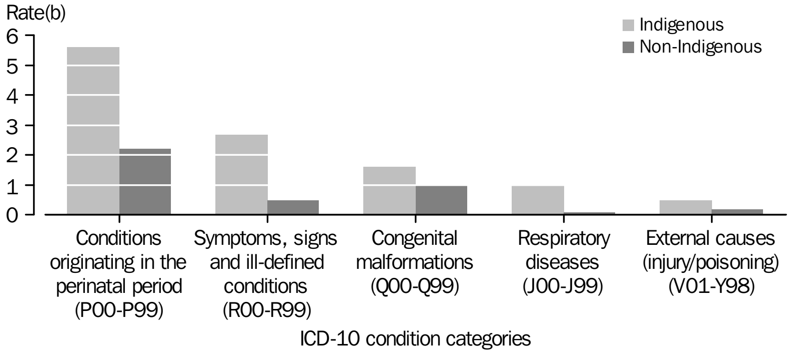
Source: AIHW National Mortality Database

Infant deaths

Infant deaths are deaths of live-born children which occur before they reach their first birthday. In 2001–2005, for Indigenous infants in Queensland, Western Australia, South Australia and the Northern Territory, the mortality rate for males and females was two to three times that for non-Indigenous male and female infants (table 9.8). Almost half (44%) of total infant deaths were due to conditions originating in the perinatal period—conditions related to the foetus and newborn affected by complications of pregnancy, labour and delivery, and disorders related to length of gestation and foetal growth. Symptoms, signs and ill-defined conditions, including Sudden Infant Death Syndrome (SIDS), were responsible for 22% of infant deaths, and congenital malformations accounted for 12%. For respiratory diseases and external causes (mainly accidents), which accounted for a further 8% and 4% of infant deaths, the mortality rates for Indigenous infants were 11 and 4 times those of non-Indigenous infants respectively (graph 9.7). Infectious and parasitic diseases were the sixth most common cause of death among Indigenous infants accounting for almost 4% of infant deaths. Indigenous infants died from infectious and parasitic diseases at around five times the rate of non-Indigenous infants. See Chapter 6 for further information on infant deaths.

Infant deaths continued

9.7 MAIN CAUSES OF INFANT DEATHS(a), by Indigenous status—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) Per 1,000 live births.

Source: AIHW National Mortality Database

Age-specific death rates

In Queensland, Western Australia, South Australia and the Northern Territory combined, age-specific death rates for Indigenous males and females across all age groups were higher than the rates for non-Indigenous males and females (table 9.8). The age-specific death rates for Indigenous Australians were at least twice those experienced by the non-Indigenous population in all age groups except those aged 65 years and over. The greatest differences occurred among those in the 35–44 and 45–54 year age groups, where the rates for Indigenous males and females were five to six times those recorded for non-Indigenous males and females (table 9.8).

9.8 AGE-SPECIFIC DEATH RATES(a)(b), by Indigenous status—2001–2005

	MALES			FEMALES		
Age group (years)	*Indigenous rate*	*Non-Indigenous rate*	*Rate ratio(c)*	*Indigenous rate*	*Non-Indigenous rate*	*Rate ratio(c)*
Less than 1(d)	14.3	4.6	3.1	9.5	3.9	2.4
1–4	74.1	29.2	2.5	70.8	20.4	3.5
5–14	29.3	13.6	2.2	23.1	9.7	2.4
15–24	207.0	76.4	2.7	95.0	28.5	3.3
25–34	415.5	106.6	3.9	185.9	39.8	4.7
35–44	824.2	141.5	5.8	468.8	77.4	6.1
45–54	1 384.7	285.3	4.9	847.8	173.3	4.9
55–64	2 530.7	715.0	3.5	1 711.7	411.6	4.2
65 and over	6 251.1	4 319.9	1.4	4 961.3	3 687.0	1.3

(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.
(b) Per 100,000 population.
(c) Rate for Indigenous Australians divided by the rate for non-Indigenous Australians.
(d) Per 1,000 live births.

Source: AIHW National Mortality Database

YEARS OF LIFE LOST (YLL)

Years of life lost is an indicator of premature mortality and is calculated by multiplying the number of deaths by the standard life expectancy (in years). A study on the burden of disease and injury in Aboriginal and Torres Strait Islander peoples found that in 2003, there were an estimated 51,475 years of life lost due to disease and injury for the Indigenous population. This represented around 4% of the total years of life lost due to disease and injury for the total Australian population (Begg et al 2007).

Cardiovascular disease was the leading cause of years of life lost (YLL) due to disease and injury for Indigenous Australians, responsible for 12,573 YLL, which accounted for around one-quarter (24%) of total YLL among Aboriginal and Torres Strait Islander peoples. Cancer was the next leading cause of YLL responsible for 14% of YLL, followed by unintentional injuries (11%), intentional injuries (9%) and diabetes (7%) (table 9.9).

9.9 YEARS OF LIFE LOST (YLL) FOR THE LEADING DISEASE AND INJURY CATEGORIES, Indigenous persons—2003

Cause	YLL no.	Percentage of total %
Cardiovascular disease	12 573	24.4
Cancers	7 351	14.3
Unintentional injuries	5 524	10.7
Intentional injuries	4 774	9.3
Diabetes	3 552	6.9
Chronic respiratory disease	2 771	5.4
Mental disorders	2 525	4.9
Neonatal causes	2 379	4.6
Infectious and parasitic diseases	2 114	4.1
Nervous system and sense organ disorders	1 485	2.9
Other	6 427	12.5
All causes	**51 475**	**100.0**

Source: 2007 Vos et al

Ischaemic heart disease was the leading specific cause of YLL due to disability and injury for both Indigenous males and females, accounting for 5,026 (17%) YLL for Indigenous males and 2,995 (13%) YLL for Indigenous females. Suicide and road traffic accidents were the second and third leading specific causes of YLL among Indigenous males, accounting for 2,628 (9%) and 1,786 (6%) of YLL. Type 2 Diabetes and road traffic accidents were the second and third leading causes of YLL among Indigenous females, accounting for 1,735 (8%) and 1,008 (5%) of YLL.

The Burden of Disease study also examined the health gap between Indigenous Australians and the general population. While 54% of the total burden of disease for Indigenous Australians (which included the burden of disease arising from disability), was due to mortality, two-thirds of the Indigenous health gap was due to mortality. This means that the mortality gap was considerably greater than the disability gap, and in part reflects a higher case fatality: when sick Indigenous Australians are more likely to die (Vos et al 2007).

CAUSE OF DEATH

In 2001–2005, the five leading causes of death for Aboriginal and Torres Strait Islander peoples resident in Queensland, Western Australia, South Australia and the Northern Territory were diseases of the circulatory system, external causes of morbidity and mortality (predominantly accidents, intentional self-harm and assault), neoplasms (cancer), endocrine, metabolic and nutritional disorders (mainly diabetes), and respiratory diseases (table 9.10). Deaths due to these causes accounted for around three-quarters of all Indigenous deaths. Circulatory diseases and neoplasms accounted for a higher proportion of all non-Indigenous deaths than Indigenous deaths (37% and 30% compared with 27% and 15% respectively). In contrast, external causes and endocrine, metabolic and nutritional disorders accounted for a higher proportion of all Indigenous deaths than non-Indigenous deaths (16% and 9% compared with 6% and 4% respectively).

Standardised mortality ratios (SMRs) have been used in this section to compare death rates between the Indigenous and non-Indigenous populations. 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.

While the overall undercoverage of the Indigenous deaths in the four jurisdictions used for this analysis may understate the SMRs for all causes and for all people, differential undercoverage by sex and by cause may also affect detailed analysis of SMRs.

In 2001–2005, for both Indigenous males and females, there were almost three times as many deaths from all causes as would be expected, based on the rates for non-Indigenous Australians. The highest SMRs for Indigenous males and females were for endocrine, nutritional and metabolic diseases, caused mainly by diabetes mellitus. The rates for Indigenous males and females for these diseases were 8 and 10 times the rates for non-Indigenous males and females (table 9.10). There were also large disparities between Indigenous and non-Indigenous mortality rates for diseases of the digestive system, diseases of the genitourinary system, symptoms, signs and abnormal findings and certain infectious and parasitic diseases (SMRs of between 5 and 6 for males and females). Indigenous males were six times as likely, and Indigenous females three times as likely, to die from mental and behavioural disorders as non-Indigenous males and females respectively.

9.10 INDIGENOUS DEATHS(a), main causes—2001–2005

	MALES			FEMALES			PERCENTAGE OF TOTAL DEATHS	
	Observed deaths	*Expected deaths*	*SMR*(b)	*Observed deaths*	*Expected deaths*	*SMR*(b)	*Indigenous*	*Non-Indigenous*
Diseases of the circulatory system (I00–I99)	1 150	360	3.2	856	320	2.7	26.6	36.8
External causes (V01–Y98)	851	292	2.9	369	105	3.5	16.2	6.3
Neoplasms (C00–D48)	592	406	1.5	547	351	1.6	15.1	29.7
Endocrine, nutritional and metabolic diseases (E00–E90)	315	42	7.5	367	36	10.1	9.0	3.5
Diabetes (E10–E14)	281	26	10.8	319	22	14.5	8.0	2.4
Diseases of the respiratory system (J00–J99)	378	88	4.3	281	77	3.6	8.7	8.7
Diseases of the digestive system (K00–K93)	251	43	5.8	182	36	5.1	5.7	3.3
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00–R99)	169	28	6.0	85	19	4.6	3.4	0.7
Certain conditions originating in the perinatal period (P00–P96)	126	44	2.9	82	36	2.3	2.8	0.4
Diseases of the genitourinary system (N00–N99)	79	16	4.8	119	20	6.0	2.6	2.2
Diseases of the nervous system (G00–G99)	122	42	2.9	69	44	1.6	2.5	3.3
Certain infectious and parasitic diseases (A00–B99)	102	20	5.1	72	14	5.0	2.3	1.2
Mental and behavioural disorders (F00–F99)	101	17	5.8	72	23	3.1	2.3	2.3
All causes	**4 329**	**1 438**	**3.0**	**3 215**	**1 123**	**2.9**	**100.0**	**100.0**

(a) 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.

(b) 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: AIHW National Mortality Database

CAUSE OF DEATH *continued*

In the age groups in which differences in death rates between Indigenous and non-Indigenous populations are greatest (35–54 years), ischaemic heart disease, diseases of the liver (i.e. alcoholic liver disease and cirrhosis of the liver), diabetes and other forms of heart disease are major causes of death (table 9.11). Indigenous males and females aged 35–54 years died from diabetes at 23 and 37 times the rates, and from influenza and pneumonia at 18 and 27 times the rates, of non-Indigenous males and females of the same age for these conditions. There were also large discrepancies between Indigenous and non-Indigenous mortality rates for assault (ratios of 16 and 12 for males and females respectively); chronic lower respiratory diseases (ratios of 14 and 12); mental and behavioural disorders due to psychoactive substance use (ratios of 12 and 19) and pedestrian injured in transport accident (ratios of 18 and 67). While some of these rates have been derived from a relatively small number of deaths—for example assault and pedestrian injured in transport accident among Indigenous women (17 and 23 deaths respectively)—differences between the two population groups are still striking.

9.11 AGE-SPECIFIC DEATH RATES, MAIN CAUSES(a), Persons aged 35–54 years—2001–2005

	INDIGENOUS(b)		NON-INDIGENOUS(b)		RATE RATIO(c)	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
Ischaemic heart disease (I20–I25)	227.7	87.1	32.3	6.1	7.0	14.2
Disease of the liver (K70–K77)	75.4	50.8	8.8	3.6	8.6	14.0
Diabetes (E10–E14)	74.7	51.5	3.2	1.4	23.1	37.2
Other selected forms of heart disease (I30–I52)	45.7	21.8	5.6	2.0	8.1	10.8
Malignant neoplasm of the digestive organs (C15–C26)	40.6	19.1	20.1	12.3	2.0	1.6
Chronic lower respiratory disease (J40–J47)	32.6	25.1	2.4	2.1	13.6	11.7
Intentional self harm (X60–X84)	46.4	9.9	26.1	7.1	1.8	1.4
Malignant neoplasm of the respiratory and intrathoracic organs (C30–C39)	31.9	21.1	12.2	8.1	2.6	2.6
Cerebrovascular disease (I60–I69)	28.3	24.4	5.5	4.7	5.1	5.2
Influenza and pneumonia (J10–J18)	30.5	21.1	1.7	0.8	18.4	26.5
Pedestrian injured in a transport accident (V01–V09)	23.9	15.2	1.4	0.2	17.7	(d)66.7
Ill-defined and unknown causes of mortality (R95–R99)	30.5	8.6	4.0	2.2	7.6	3.8
Car occupant injured in a transport accident (V40–V49)	23.2	11.9	5.7	2.9	4.1	4.0
Mental and behavioural disorders due to psychoactive substance use (F10–F19)	24.7	9.9	2.1	0.5	11.8	19.3
Assault (X85–Y09)	23.2	11.2	1.5	0.9	15.6	12.3

(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of year of registration of death. Disease groupings are based on 3-digit groupings of ICD-10.

(b) Age-specific rate per 100,000 population aged 35–54 years.

(c) Rate for Indigenous persons divided by the rate for non-Indigenous persons.

(d) The confidence intervals for this ratio are quite large (46.2–96.3) due to the small number of deaths recorded.

Source: AIHW National Mortality Database

Excess deaths

Deaths higher than the expected number are referred to as 'excess deaths'. Excess deaths are calculated by subtracting the number of expected Indigenous deaths based on the age, sex and cause-specific rates of non-Indigenous Australians, from the number of actual deaths in the Indigenous population.

Over the period 2001–2005 there were 2,891 excess deaths among Indigenous males and 2,092 excess deaths among Indigenous females in Queensland, Western Australia, South Australia and the Northern Territory. Diseases of the circulatory system accounted for the highest proportion of excess deaths (2,006 deaths in total, 1,326 of which were excess deaths). Other major causes of excess deaths were external causes, endocrine, nutritional and metabolic diseases and diseases of the respiratory system. Deaths due to these causes were responsible for around two-thirds of excess deaths among Indigenous males and females (2,561 deaths in total, 1,921 of which were excess deaths) (table 9.12).

9.12 MAIN CAUSES OF EXCESS INDIGENOUS DEATHS(a)(b)—2001–2005

	NUMBER		PROPORTION (%)	
	Indigenous males	*Indigenous females*	*Indigenous males*	*Indigenous females*
Diseases of the circulatory system (I00–I99)	790	536	27.3	25.6
External causes (V01–Y98)	559	264	19.3	12.6
Endocrine, nutritional and metabolic diseases (E00–E90)	273	331	9.5	15.8
Diseases of the respiratory system (J00–J99)	290	204	10.0	9.7
Neoplasms (C00–D48)	186	196	6.4	9.4
Diseases of the digestive system (K00–K93)	208	146	7.2	7.0
Symptoms, signs and abnormal clinical and laboratory findings, n.e.c. (R00–R99)	141	66	4.9	3.2
Diseases of the genitourinary system (N00–N99)	63	99	2.2	4.7
Certain infectious and parasitic diseases (A00–B99)	82	58	2.8	2.8
Mental and behavioural disorders (F00–F99)	84	49	2.9	2.3
Certain conditions originating in the perinatal period (P00–P96)	82	46	2.8	2.2
All other causes	134	97	4.6	4.6
All causes	**2 891**	**2 092**	**100.0**	**100.0**

(a) Excess deaths are equal to the observed Indigenous deaths minus expected Indigenous deaths (based on the 1999–2003 age, sex and cause-specific rates for non-Indigenous persons).

(b) 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.

Source: AIHW National Mortality Database

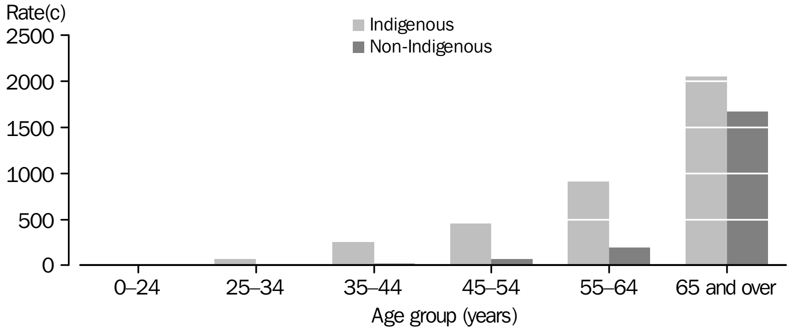
Diseases of the circulatory system

Diseases of the circulatory system were responsible for around 27% of total Indigenous male and female deaths for the period 2001–2005. In comparison, these diseases accounted for 34% of all male deaths and 40% of all female deaths for non-Indigenous Australians. Within circulatory system diseases, ischaemic heart diseases (heart attack, angina) were responsible for 64% of Indigenous male deaths and 49% of Indigenous female deaths, while cerebrovascular disease (stroke) accounted for 14% of male deaths and 19% of female deaths.

Compared with non-Indigenous Australians, Indigenous males and females experienced higher rates of mortality from diseases of the circulatory system in every age group. The greatest differences in age-specific death rates for males occurred in the age groups 25–34 and 35–44 years, with Indigenous males recording a rate 9 to 11 times the rate for non-Indigenous males (rates of around 69 and 251 per 100,000 for Indigenous males compared with 7 and 23 per 100,000 for non-Indigenous males). Indigenous females recorded rates of around 12 times the rates for non-Indigenous females for the 35–44 and 45–54 year age groups (rates of 32 and 122 per 100,000 for Indigenous females compared with 4 and 10 per 100,000 for non-Indigenous females) (graphs 9.13 and 9.14).

Diseases of the circulatory system continued

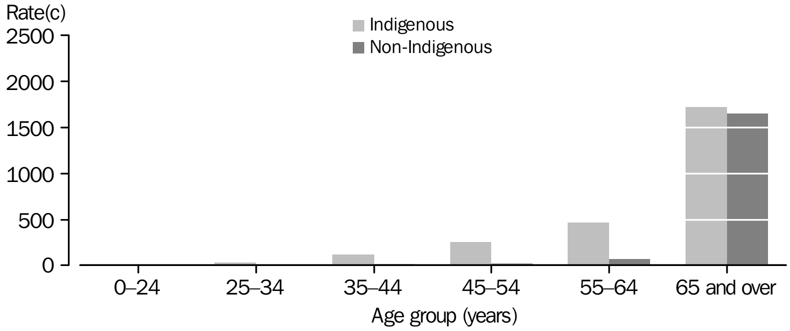
9.13 MALE DEATH RATES(a), CIRCULATORY DISEASES(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA. SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes I00-I99.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

9.14 FEMALE DEATH RATES(a), CIRCULATORY DISEASES(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes I00-I99.
(c) Per 100,000 population.

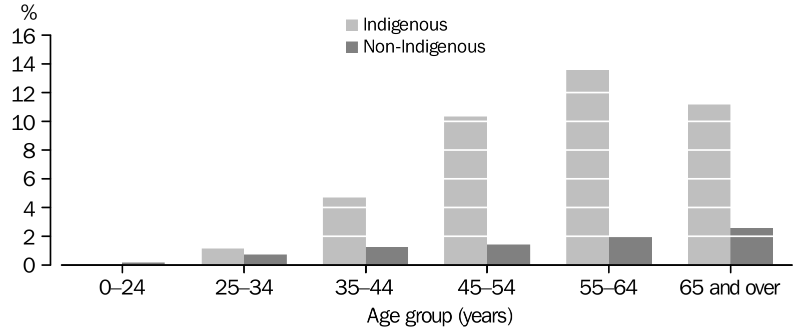
Source: AIHW National Mortality Database

Diabetes

The major cause of Indigenous deaths within the endocrine disease category is diabetes. Diabetes has a far greater impact on mortality for the Indigenous population than for the non-Indigenous population. For the period 2001–2005, diabetes was responsible for 8% of total Indigenous deaths compared with 2% of non-Indigenous deaths. For non-Indigenous Australians, the proportion of total deaths caused by diabetes was 1% to 3% for all age groups from 25–34 years and over. For Indigenous Australians, diabetes was responsible for 10% of deaths in the 45–54 years age group and for 14% of total Indigenous deaths in the 55–64 year age group (graph 9.15).

Diabetes continued

9.15 DIABETES DEATHS(a) AS A PROPORTION OF TOTAL DEATHS(b)(c), by Indigenous status and age—2001–2005

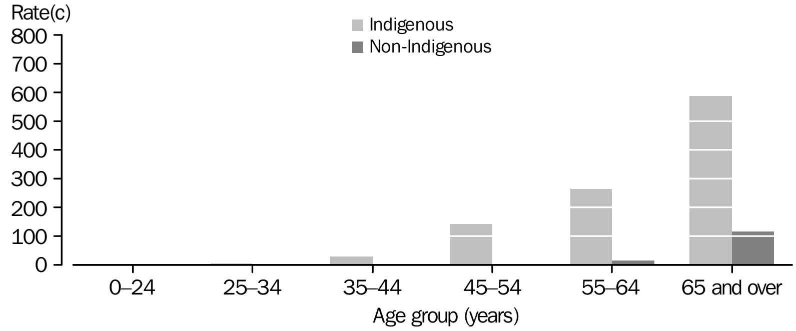


(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes E10-E14
(c) Underlying cause of death.

Source: AIHW National Mortality Database

The earlier onset of diabetes experienced by the Indigenous population is reflected in the differences in age-specific death rates. For the period 2001–2005, Indigenous males in the 35–44 and 45–54 years age groups experienced age-specific death rates 16 and 31 times, respectively, the corresponding rates for non-Indigenous males (rates of 31 and 144 per 100,000 for Indigenous males compared with 2 and 5 per 100,000 for non-Indigenous males) (graph 9.16). For the same age groups, the rates experienced by Indigenous females were 32 and 46 times the corresponding non-Indigenous female rates (graph 9.17) (rates of 29 and 87 per 100,000 for Indigenous females compared with 1 and 2 per 100,000 for non-Indigenous females). The markedly higher death rates from diabetes in the Indigenous population are partly a reflection of the earlier onset of diabetes in this population compared with the non-Indigenous population combined with a high prevalence of some of the risk factors associated with diabetes such as smoking, hypertension and obesity. Higher death rates from diabetes may also reflect poorer management of diabetes among Indigenous people, in particular those living in rural and remote areas (Wood & Patterson 1999).

9.16 MALE DEATH RATES(a), DIABETES(b), by Indigenous status and age—2001–2005

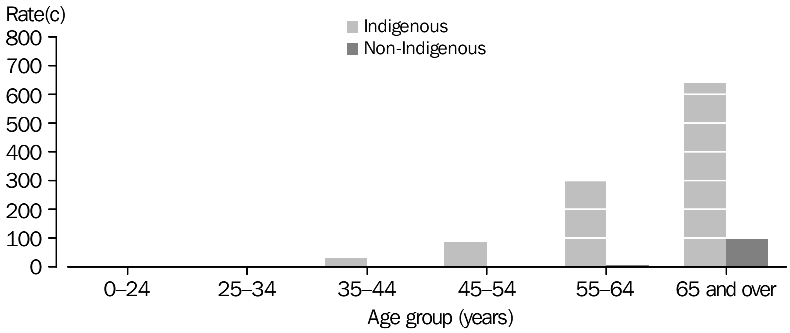


(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes E10-E14
(c) Per 100,000 population.

Source: AIHW National Mortality Database

Diabetes continued

9.17 FEMALE DEATH RATES(a), DIABETES(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes E10-E14
(c) Per 100,000 population.

Source: AIHW National Mortality Database

Chronic kidney disease

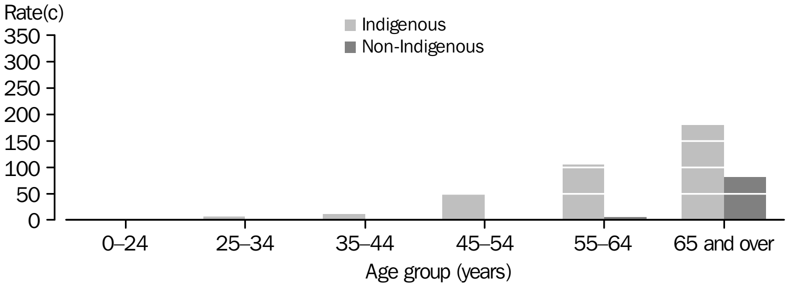
Chronic kidney disease includes diabetic nephropathy, hypertensive renal disease, glomerular disease and chronic renal failure and end-stage renal disease (ESRD). ESRD results when the kidneys cease functioning almost entirely, leading to a build up of waste products and excess water in the body causing progressively worse illness (AHMAC 2006). This is the last and most debilitating stage of chronic kidney disease in which dialysis or kidney transplantation is necessary to maintain life.

Chronic kidney disease was responsible for 2% and 5% of Indigenous male and female deaths respectively for the period 2001–2005. The overall death rates from chronic kidney disease were 7 and 9 times as high as the rates for non-Indigenous males and females respectively. Among Indigenous deaths from chronic kidney diseases, chronic renal failure accounted for 43% of male deaths and 37% of female deaths, while diabetic nephropathy accounted for 23% (males) and 25% (females) respectively.

Both Indigenous males and females experienced markedly higher rates of mortality from chronic kidney disease after the age of 25 years. The greatest differences in age-specific death rates for males occurred in the 45–54 year age group with Indigenous males recording a rate 31 times the rate for non-Indigenous males (50 compared with 2 deaths per 100,000) (graph 9.18). For females, the greatest difference in age-specific death rates also occurred in the 45–54 year age group with Indigenous females recording a rate 51 times that for non-Indigenous females (56 compared with 1 per 100,000) (graph 9.19).

Chronic kidney disease continued

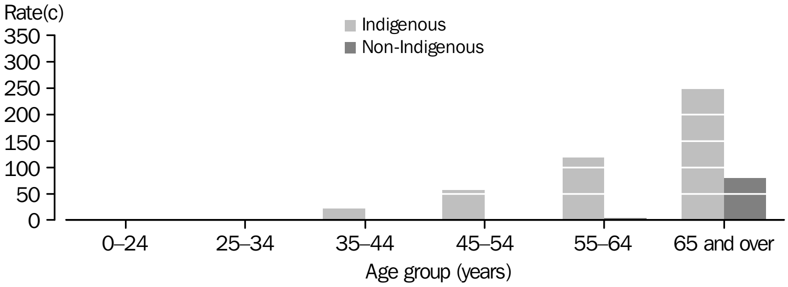
9.18 MALE DEATH RATES(a) CHRONIC KIDNEY DISEASE(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes: B520, B650, D593, E102, E112, E122, E132, E142, E851, M300, M321, I12, I13, I150, I151, N00, N01, N02, N03, N04, N05, N06, N07, N11, N12, N14, N15, N18, N19, N25, N26, N27, N28, N391, N392, Q60, Q61, Q62, Q63, T824, T861.
(b) Per 100,000 population.

Source: AIHW National Mortality Database

9.19 FEMALE DEATH RATES(a), CHRONIC KIDNEY DISEASE(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b)ICD-10 codes: B520, B650, D593, E102, E112, E122, E132, E142, E851, M300, M310, M321, I12, I13, I150, I151, N00, N01, N02, N03, N04, N05, N06, N07, N11, N12, N14, N18, N19, N25, N26, N27, N28, N391, N392, Q60, Q61, Q62, Q63, T824, T861.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

External causes of mortality

The quality of external causes of death data is affected by differences in the way that coronial deaths are reported across the various jurisdictions and in procedures around reportable deaths (i.e. deaths reported to a coroner). In addition, statistics on suicide deaths are dependent on coronial processes to determine the intent of a death (whether intentional self-harm, accidental, homicide or undetermined intent) as this information is required for the correct ICD-10 coding of cause of death. The timing of data compilation can therefore be affected by the length of coronial processes. For more information on data quality issues pertaining to external causes of death data, see ABS *Information Paper: External Causes of Death, Data Quality, 2005* (ABS 2007e).

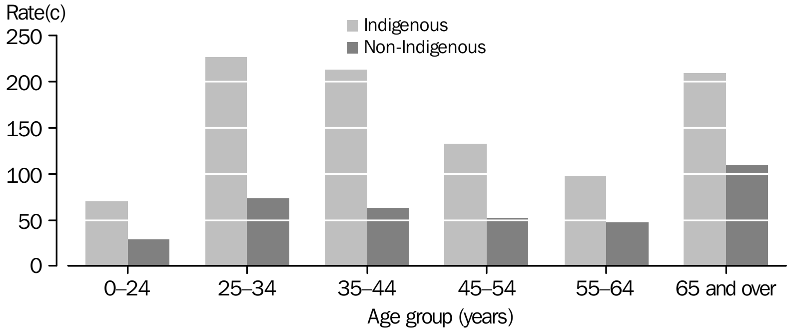
For the period 2001–2005, deaths due to external causes, such as accidents, intentional self-harm (suicide) and assault accounted for 16% of all Indigenous deaths, compared with 6% of all deaths among non-Indigenous Australians. For both populations, males accounted for around 70% of the total deaths due to external causes. For Indigenous males, the leading causes of death from external causes were intentional self-harm (35%), transport accidents (27%) and assault (8%), while for Indigenous females the

External causes of mortality continued

leading causes of death were transport accidents (30%), intentional self-harm (18%) and assault (16%).

Over the period 2001–2005, for most age groups the age-specific death rates for Indigenous males were two to three times the corresponding rates for non-Indigenous males (graph 9.20). Indigenous females experienced higher age-specific death rates than non-Indigenous females in every age group, with the greatest difference occurring in the 35–44 year age group. In this age group, Indigenous females recorded a rate almost five times that of non-Indigenous females (87 deaths per 100,000 compared with 18 per 100,000) (graph 9.21).

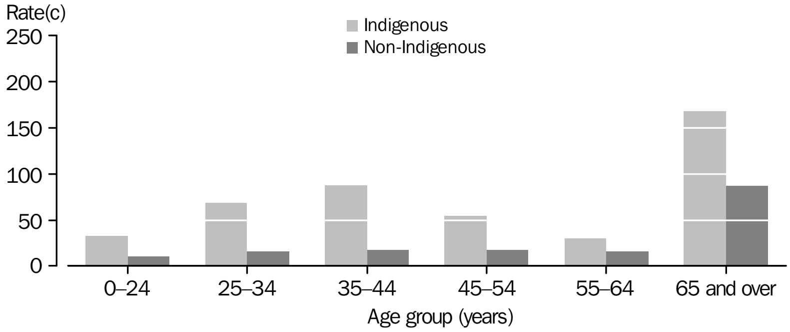
9.20 MALE DEATH RATES(a), EXTERNAL CAUSES OF MORBIDITY AND MORTALITY(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes V01-Y98
(c) Per 100,000 population.

Source: AIHW National Mortality Database

9.21 FEMALE DEATH RATES(a), EXTERNAL CAUSES OF MORBIDITY AND MORTALITY(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes V01-Y98
(c) Per 100,000 population.

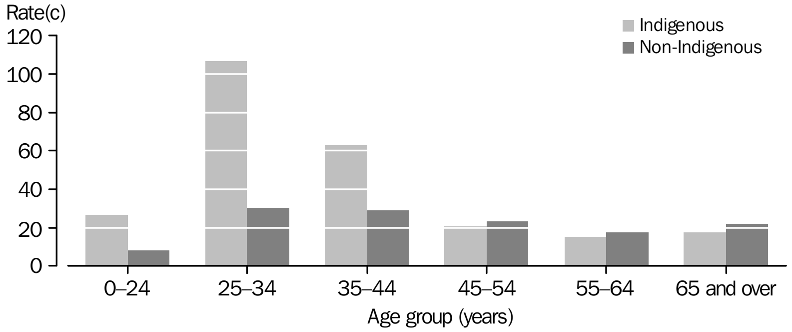
Source: AIHW National Mortality Database

External causes of mortality continued

INTENTIONAL SELF-HARM (SUICIDE)

Intentional self-harm was the leading cause of death from external causes for Indigenous males for the 2001–2005 year period. The suicide rate was almost three times that for non-Indigenous males, with the major differences occurring in younger age groups. For Indigenous males aged 0–24 years and 25–34 years, the age-specific rates were three and four times the corresponding age-specific rates for non-Indigenous males respectively (graph 9.22).

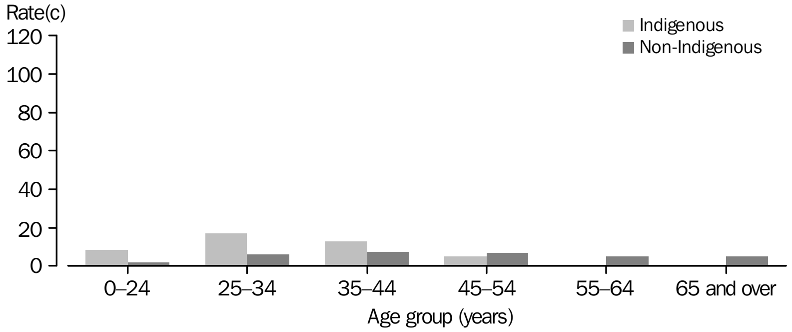
9.22 MALE DEATH RATES(a), INTENTIONAL SELF-HARM(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes X60-X84.
(c) Per 100,000 population.
Source: AIHW National Mortality Database

The suicide rate for Indigenous females aged 0–24 years was five times the corresponding age-specific rates for non-Indigenous females. For age groups 45–54 years and over, age-specific rates for Indigenous females were similar to, or lower than the corresponding rates for non-Indigenous females (graph 9.23).

9.23 FEMALE DEATH RATES(a), INTENTIONAL SELF-HARM(b), by Indigenous status and age—2001–2005



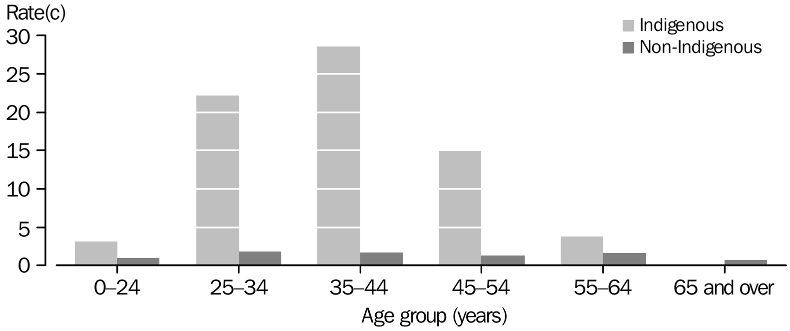
(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes X60-X84.
(c) Per 100,000 population.
Source: AIHW National Mortality Database

External causes of mortality continued

ASSAULT

Assault is a significant cause of death for both Indigenous males and females. Over the period 2001–2005, the Indigenous male age-specific death rates for ten year age groups from 25 through to 54 were between 11 and 17 times the corresponding age-specific rate for non-Indigenous males, while for females the rates ranged between 9 and 23 times the equivalent age-specific rates for non-Indigenous females (graphs 9.24 and 9.25).

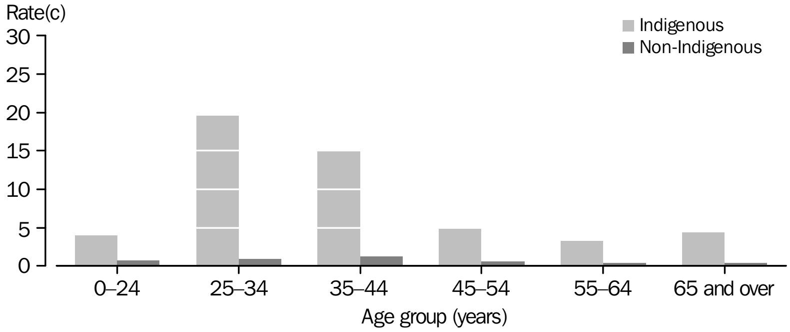
9.24 MALE DEATH RATES(a), ASSAULT(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes X85-Y09.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

9.25 FEMALE DEATH RATES(a), ASSAULT(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes X85-Y09.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

Neoplasms (cancer)

Neoplasms were responsible for 15% of total Indigenous deaths compared with 30% of total non-Indigenous deaths for the period 2001–2005. Nevertheless, Indigenous people are over-represented in deaths from cancer compared with non-Indigenous Australians (the SMR for males and females is 1.4 and 1.5 respectively). This apparent contradiction is due to high numbers of deaths for other causes in the Indigenous population as well as high mortality rates from neoplasms for Indigenous Australians in the middle age groups. The major causes of cancer deaths for Indigenous males were malignant neoplasms of the digestive organs (30% of total), malignant neoplasms of the respiratory and intrathoracic organs (30%), and malignant neoplasms of lip, oral cavity and pharynx (9%). For Indigenous females the major causes were malignant neoplasms of the respiratory and intrathoracic organs (21% of total), malignant neoplasms of the digestive organs (21%), and malignant neoplasms of the female genital organs (14%).

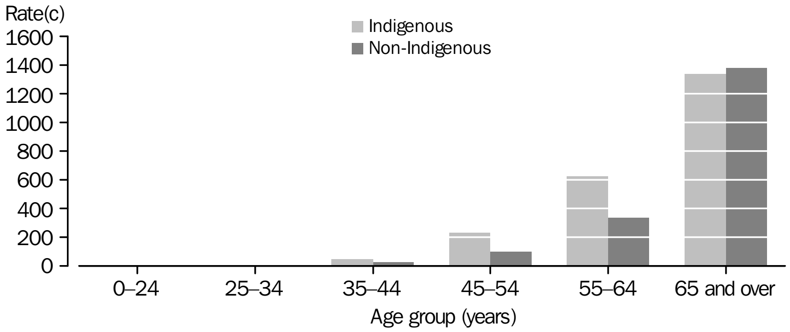
Indigenous people were over-represented in a number of cancer groups, including malignant neoplasms of the lip, oral cavity and pharynx (7% of total Indigenous cancer deaths compared with 2% of non-Indigenous cancer deaths), malignant neoplasms of the respiratory and intrathoracic organs (26% Indigenous, 20% non-Indigenous) and malignant neoplasms of the female genital organs, which includes cervical cancer (14% total Indigenous females, 9% non-Indigenous females). Most of these cancers are smoking-related which is a reflection of the higher prevalence of smoking among the Indigenous population. Cervical cancer is also preventable through Pap Smear screening.

Indigenous people were under-represented in other cancer groups, including melanoma and other malignant neoplasms of skin (1% of total Indigenous cancer deaths compared with 4% of non-Indigenous cancer deaths), and malignant neoplasms of male genital organs, which includes prostate cancer (4% of total Indigenous males, 13% of non-Indigenous males).

The 2001–2005 age-specific death rates for neoplasms indicate that for age groups 0–24 years and 65 years and over, the rates for Indigenous males and females were similar to those for non-Indigenous males and females. For the age groups 35–44, 45–54 and 55–64 years, the rates for Indigenous males and females were about twice the non-Indigenous rates (graphs 9.26 and 9.27).

Neoplasms (cancer) continued

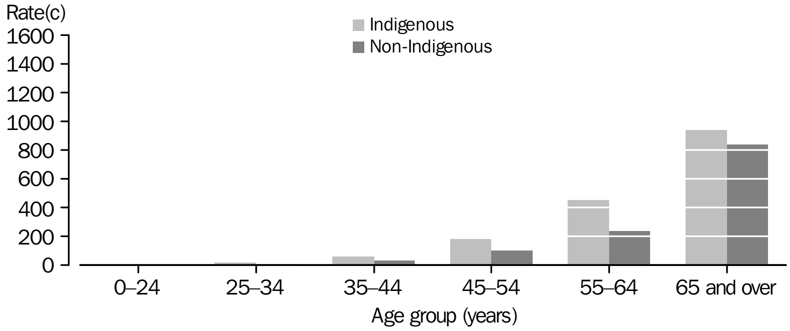
9.26 MALE DEATH RATES(a), NEOPLASMS(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes C00-D48.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

9.27 FEMALE DEATH RATES(a), NEOPLASMS(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA, and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes C00-D48.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

Cancer mortality of the Northern Territory Indigenous population has been compared with that of the Australian population for 1977–2000 (Condon et al 2004). The cancer mortality rate among Indigenous people was higher than the total Australian rate for cancers of the liver, lungs, uterus, cervix and thyroid, and, in younger people only, for cancers of the oropharynx, oesophagus and pancreas. Northern Territory cancer mortality rates for Indigenous Australians were lower than the total Australian rates for renal cancers and melanoma, and, in older people only, for cancers of the prostate and bowel. Over the period 1977–2000, there were increases in death rates for cancers of the oropharynx, pancreas and lung; all three are smoking-related cancers.

Neoplasms (cancer) continued

A study by Condon et al (2005) compared people diagnosed with cancer in Western Australia and Tasmania with Indigenous people diagnosed with cancer in the Northern Territory over the period 1991–2001. The study found that Northern Territory Indigenous patients had poorer survival rates for most cancers and the relative risk of death was higher for cancers of the oropharynx, colon and rectum, pancreas, lung, uterus, cervix, vulva, lymphoma, breast and leukaemia. Survival rates are the proportion of all cancer patients alive at the beginning of the period who are still alive at the end of the period. It was concluded that for cancers of the liver, lung and oesophagus, higher Northern Territory Indigenous mortality rates were due mostly to higher cancer incidence rates. For other cancers that have better survival rates in all Australians, such as cancer of the thyroid and cervix, high Indigenous mortality rates were due to both higher incidence and lower survival.

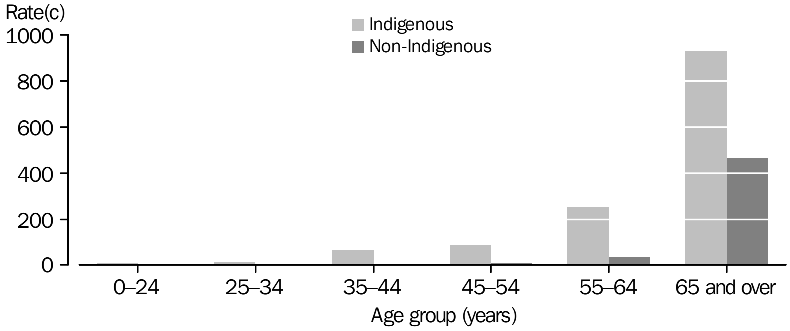
Respiratory diseases

Respiratory diseases, which include 'influenza' and 'pneumonia' and 'chronic lower respiratory diseases' (including asthma, bronchitis and emphysema), were responsible for 9% of total Indigenous deaths for the period 2001–2005. Like diabetes, respiratory diseases affect the Indigenous population at younger age groups than is the case for the non-Indigenous population, and this is reflected in the differences in age-specific death rates from these diseases. For the period 2001–2005, Indigenous males in the 35–44 years age group experienced age-specific death rates 22 times higher than the corresponding rate for non-Indigenous males (63 per 100,000 compared with 3 per 100,000), while the rate for Indigenous females in this age group was 20 times higher

Respiratory diseases continued

than that for the corresponding rate for non-Indigenous females (37 per 100,000 compared with 2 per 100,000) (graphs 9.28 and 9.29).

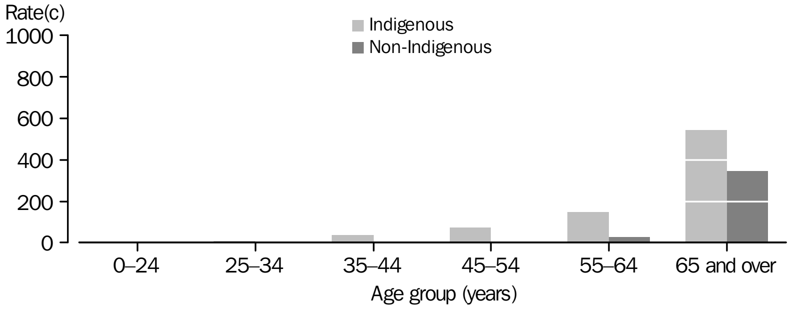
9.28 MALE DEATH RATES(a), RESPIRATORY DISEASES(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes J00-J99.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

9.29 FEMALE DEATH RATES(a), RESPIRATORY DISEASES(b), by Indigenous status and age—2001–2005



(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) ICD-10 codes J00-J99.
(c) Per 100,000 population.

Source: AIHW National Mortality Database

Multiple causes of death

Multiple causes of death include all causes and conditions reported on the death certificate. Since 1997, the ABS has coded all causes of death reported on each death certificate, including the underlying, immediate and other associated causes of death. While only one cause can be recorded as the underlying cause of death, many deaths due to chronic diseases, such as heart disease, kidney disease and diabetes often occur with concurrent or co-existing conditions. It is useful, therefore, to describe the extent to which any or all of these conditions have been reported. For deaths where the underlying cause was identified as an external cause, multiple causes include circumstances of injury, the nature of injury as well as any other conditions reported on the death certificate.

For the 7,544 Indigenous deaths in 2001–2005 in Queensland, Western Australia, South Australia and the Northern Territory, there was a total of 23,977 causes reported, an

Multiple causes of death continued

average of three causes per death. Deaths where only a single cause was reported occurred in 15% of total Indigenous male deaths and 12% of total Indigenous female deaths, less than for non-Indigenous males (22%) and females (24%) (table 9.30). Correspondingly, deaths where multiple causes were reported were more common among Indigenous people. For example, 27% of deaths among Indigenous males and 29% of deaths among Indigenous females recorded five or more causes of death, compared with 15% of non-Indigenous male and female deaths.

9.30 DEATHS(a), by number of causes reported, Indigenous status and sex—2001–2005

	NUMBER OF DEATHS		PROPORTION OF DEATHS (%)(b)	
	Males	*Females*	*Males*	*Females*
	no.	no.	%	%
Indigenous				
1	732	496	15.1	12.0
2	1 217	751	22.0	21.4
3	920	685	24.5	25.7
4	613	546	18.8	21.1
5 or more	847	737	26.9	28.6
Total(c)	**4 329**	**3 215**	**100.0**	**100.0**
Non-Indigenous				
1	26 681	25 558	22.4	23.6
2	31 596	27 499	26.5	25.4
3	25 727	23 838	21.6	22.0
4	17 087	15 526	14.3	14.4
5 or more	18 120	15 764	15.2	14.6
Total(c)	**119 211**	**108 185**	**100.0**	**100.0**

(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.
(b) Proportions have been indirectly age standardised using the age and sex specific proportions for non-Indigenous Australians. Components may not add to total when indirect age standardisation is used.
(c) Includes deaths for which no cause of death was recorded.
Source: AIHW National Mortality Database

Table 9.31 shows the relationships between a number of underlying causes of death and associated causes for Indigenous and non-Indigenous Australians. For deaths from ischaemic heart disease, diabetes was reported as an associated cause of death among Indigenous males and females at two to three times the rates of non-Indigenous males and females. For deaths from diabetes, renal failure was reported as an associated cause of death among Indigenous males and females at almost twice the rates of non-Indigenous males and females.

Multiple causes of death continued

9.31 UNDERLYING CAUSES OF DEATH(a)(b)(c), by selected associated causes and Indigenous status—2001–2005

	INDIGENOUS		NON-INDIGENOUS	
	Males	*Females*	*Males*	*Females*
	%	%	%	%
Neoplasms (C00–D48)				
Reported alone	26.5	27.4	39.4	43.7
Reported with				
Septicaemia	4.5	5.6	3.6	3.3
Diabetes mellitus	11.9	20.2	4.7	3.9
Ischaemic heart disease	10.2	12.8	8.5	5.8
Cerebrovascular diseases	4.8	3.2	3.7	3.6
Influenza and pneumonia	10.6	9.4	7.8	5.9
Renal failure	11.2	11.2	5.9	4.5
Chronic lower respiratory diseases	15.8	8.2	7.0	4.2
Diabetes mellitus (E10–D14)				
Reported alone	0.1	0.6	1.5	1.6
Reported with				
Septicaemia	13.5	9.9	7.2	7.7
Ischaemic heart disease	48.6	45.5	58.5	50.7
Cerebrovascular diseases	23.9	26.9	21.0	24.3
Influenza and pneumonia	11.6	12.0	8.8	7.5
Renal failure	37.5	39.1	24.0	23.3
Chronic lower respiratory diseases	6.0	3.8	7.5	4.9
Ischaemic heart disease (I20–I25)				
Reported alone	9.1	6.5	15.5	12.4
Reported with				
Diabetes mellitus	19.2	22.0	10.2	9.0
Cerebrovascular diseases	10.1	12.0	7.9	10.1
Influenza and pneumonia	9.1	5.6	4.8	5.2
Renal failure	14.9	26.0	10.8	9.6
Chronic lower respiratory diseases	19.9	12.7	11.5	7.6
Neoplasms	8.4	5.5	7.8	5.0
Renal failure (N17–N19)				
Reported alone	12.8	8.7	8.6	13.4
Reported with				
Septicaemia	21.3	18.4	13.0	10.1
Diabetes mellitus	10.9	12.5	9.1	9.3
Ischaemic heart disease	45.7	17.9	37.2	29.8
Cerebrovascular diseases	17.5	2.5	9.5	8.0
Influenza and pneumonia	11.7	11.0	15.1	14.2
Chronic lower respiratory diseases	11.5	7.9	10.5	5.4

(a) Data are for Qld, WA, SA and NT combined. Deaths based on year of occurrence of death for 1999-2002 and year of registration of death for 2003.

(b) Proportions have been indirectly age standardised using the age, sex and cause-specific proportions of non-Indigenous persons.

(c) Totals may add to more than 100% as more than one associated cause can be recorded for each death.

Source: AIHW National Mortality Database

Table 9.32 uses the recording of multiple causes of death to associate the category of external cause of death with the nature of the injury sustained by Indigenous people. For the period 2001–2005, of all deaths from transport accidents, 42% involved injuries to multiple body parts, 38% involved injuries to the head and 17% involved injuries to the chest. For deaths from accidents other than transport accidents, 33% were for 'other and unspecified effect', while injuries to the head involved 15% of deaths and poisoning

Multiple causes of death *continued*

involved 13% of deaths from these accidents. Most deaths from intentional self-harm were for 'other and unspecified effects' (which includes suffocation and drowning) (85%), while deaths from assault most commonly involved injuries to the head (27%) or to the chest (32%).

9.32 INDIGENOUS DEATHS DUE TO EXTERNAL CAUSES(a), by nature of injury—2001–2005

Nature of injury	*Transport accidents*	*Other accidents*	*Intentional self-harm*	*Assault*	*Total*
Injuries to the head	37.6	15.4	3.6	26.9	18.7
Injuries to the neck	7.7	3.6	6.0	11.9	6.3
Injuries to the thorax (chest)	17.2	1.8	1.9	32.1	9.6
Injuries to the abdomen, lower back, lumbar spine, pelvis, hip and thigh	10.9	11.1	1.4	20.1	8.9
Injuries involving multiple body parts	42.3	1.8	0.8	8.2	13.5
Injuries to unspecified part of trunk, limb or body region	10.4	4.8	0.5	13.4	5.8
Effects of foreign body entering through natural orifice	1.2	6.6	0.5	3.0	2.6
Burns and corrosions	0.9	5.7	0.8	—	2.0
Poisoning by drugs, medicaments and biological substances	—	13.3	3.6	—	4.8
Toxic effects of substances chiefly non-medicinal as to source	3.0	13.3	9.0	4.5	7.8
Other and unspecified effects of external causes	3.3	32.8	85.0	4.5	36.2
Other	4.1	7.8	1.4	8.2	6.9
Total deaths (V01–Y98)(b)	**338**	**332**	**366**	**134**	**1 220**

— nil or rounded to zero (including null cells)

(a) Data for Qld, WA, SA and NT combined. Deaths are based on year of registration of death.

(b) Components add to more than 100% as more than one injury can be recorded for each death from external causes.

Source: AIHW National Mortality Database

TRENDS IN MORTALITY

Analyses of trends in Indigenous mortality must be undertaken with care, because of the limited understanding of the ways in which changes in the recording of Indigenous status on death registrations have affected the recorded numbers of deaths.

Various statistical measures may be used to assess trends in mortality over time. A measure derived from comprehensive life tables—such as life expectancy at birth—is generally to be preferred as it takes into account age-sex specific death rates (and any shifts in those rates) across all ages. However, the construction of such a measure depends on the availability of an accurate series of age-sex specific population estimates together with an accurate series of age-sex specific counts of deaths. Recent work by the ABS has improved the demographic estimates available to support trend analyses, but those estimates are still regarded as experimental. Any discussion of Indigenous mortality trends should therefore be based on a range of analytical measures to provide a broader understanding of possible trends than can be obtained from any one measure.

This section examines changes over time in all-cause mortality rates, infant mortality rates, age at death and cause-specific mortality rates. Each of these measures has advantages and limitations for understanding trends. These are discussed in the relevant sections of the chapter.

The mortality patterns observed among Australia's Indigenous people are slow moving, and therefore trends are best detected over long periods of time. There is some evidence of more rapid progress in reducing mortality among the Indigenous population in other countries (Ring & Brown 2003). However, the potential for analysis of long-term trends in Indigenous mortality in Australia is greatly constrained by the availability of consistently accurate data over time. When assessed in terms of consistency over time in the number of recorded deaths identified as Indigenous, Western Australia, South

TRENDS IN MORTALITY *continued*

Australia and the Northern Territory are each judged to have had reasonably high and reasonably stable coverage of Indigenous deaths since around 1989, although the level of coverage is different in each of those jurisdictions. To test whether the observed trends would have differed if the analyses had been based on a different time window, several different time periods were tested. While the estimated rate of changes differed, there was no change in the direction of trends or their significance. As there is a consistent time series of population estimates from 1991, data for Western Australia, South Australia and the Northern Territory for the period 1991–2005 have been used for the analyses of Indigenous all-cause and infant mortality in this chapter. Due to changes in the coding of cause of death in 1997, the analyses of cause-specific mortality have been based on the period 1997–2005.

It is important to note, that in 2001, the Indigenous populations of Western Australia, South Australia and the Northern Territory together represented 32% of the total estimated Indigenous population in Australia (14% in Western Australia, 6% in South Australia and 12% in the Northern Territory). As a consequence, any statement about the possible detection of trends in mortality in these jurisdictions can give, at best, a partial account of trends in Indigenous mortality in Australia as a whole.

A further constraint in assessing time series trends in Indigenous mortality is the relatively small size of the Indigenous population which means that, even with the high mortality rates being experienced, the absolute numbers of deaths of Indigenous people recorded each year in each jurisdiction have, for statistical purposes, been quite small. Between 1991 and 2005, annual deaths for Western Australia, South Australia and the Northern Territory averaged 125, 373 and 415 respectively. Thus, the year to year fluctuations in the numbers of deaths can be quite large relative to any gradual underlying trend, and it is not meaningful to look at changes in mortality from one year to the next. Longer term changes have been analysed in several ways—examining the rate of change between the beginning and end year, and modelling trends throughout the period. A limitation of the first method is that the results are affected by the particular choice of the start and end year, whereas the trends modelling takes account of all the observations throughout the period. In this chapter, statements about the broad pace of change occurring over a number of years have been based on the fitted trends. When the trend has an estimated p-value of less than 0.05, it is characterised in subsequent text as 'significant'.

The mortality trends analyses presented in this chapter differ from analyses presented in the 2005 edition of this report. While the 2005 edition presented crude Indigenous mortality rates only, in this edition mortality rates for both Indigenous and other Australians are presented using age standardised data. While there is an ongoing debate as to whether standardisation is necessary or even appropriate for this type of analyses because trends may not be the same in all age groups, directly age standardised rates have been used to enable comparisons to be made between mortality trends for Indigenous and other Australians. Due to the 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 deaths for which Indigenous status was not stated).

TRENDS IN MORTALITY *continued*

While data about changes in mortality among Indigenous Australians are important in their own right, and can inform the design and evaluation of policy and interventions, it is also important to develop an understanding of how these changes in mortality compare with those for other Australians. Mortality rate ratios have therefore been added to this section since the 2005 edition to give an indication of whether the differences between mortality rates for Indigenous and other Australians are lessening over time. Any discussion of trends in Indigenous mortality should be read in the context of changes in mortality for other Australians over the same period.

All-cause mortality

The results presented in this section are for recorded deaths, and assume no change in the rate at which Indigenous status is reported on death registrations. The impact of such changes in recording on the robustness of the conclusions is provided in the later section 'The sensitivity of mortality trends to changes in Indigenous identification'.

Between 1991 and 2005, there was a significant decline in recorded mortality rates in Western Australia, for Indigenous Australians (table 9.33). Over this period there was an average yearly decline in recorded deaths of around 23 deaths per 100,000 population for Indigenous people—this is equivalent to a reduction in the death rate of around 20% during the period of analyses. Significant declines in mortality were observed for both Indigenous males and females in Western Australia. In the Northern Territory, there was a significant decline in recorded mortality rates for Indigenous females only. Over the period, there was an average yearly decline in recorded deaths of around 20 deaths per 100,000 population for Indigenous females—this is equivalent to a reduction in the death rate of around 15% between 1991 and 2005.

Over the same period, there were significant declines in recorded mortality rates for other Australians in Western Australia, South Australia and the Northern Territory. In Western Australia there was an average yearly decline in the rate of around 15 per 100,000 for other Australians (equivalent to a reduction in the death rate of around 26% during the period of analyses); in South Australia there was an average yearly decline in the rate of around 14 per 100,000 for other Australians (equivalent to a reduction in the death rate of around 25% during the period of analyses); and in the Northern Territory there was an average yearly decline in the rate of around 43 per 100,000 for other Australians (equivalent to a reduction in the death rate of around 49% during the period of analyses).

Despite declines in Indigenous mortality in recent years, the mortality rate ratio between Indigenous and other Australians for all causes of death increased significantly in South Australia and the Northern Territory over the period 1991 to 2005, while in Western Australia there was an increase in the rate ratio for males only.

9.33 AGE STANDARDISED DEATH RATES(a)(b), by Indigenous status—1991–2005

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
INDIGENOUS RATE PER 100,000															
WA															
Males	1 799	1 568	1 789	1 672	1 785	1 731	1 522	1 702	1 522	1 697	1 639	1 274	1 422	1 651	1 512
Females	1 523	1 299	1 466	1 517	1 394	1 197	1 095	1 109	1 043	1 183	861	1 155	899	1 389	1 293
Persons	1 661	1 433	1 628	1 597	1 583	1 452	1 299	1 387	1 270	1 419	1 211	1 206	1 139	1 518	1 397
SA															
Males	1 420	1 054	1 157	1 597	1 473	1 363	2 006	1 675	1 077	1 511	1 399	1 060	1 522	1 168	1 392
Females	1 077	956	1 058	1 055	984	967	848	1 013	1 095	1 233	1 041	893	780	1 218	841
Persons	1 255	1 010	1 105	1 301	1 210	1 164	1 355	1 294	1 111	1 354	1 219	970	1 121	1 197	1 096
NT															
Males	2 075	2 484	1 955	2 138	2 154	1 756	2 630	2 021	1 978	2 068	2 127	2 065	2 105	1 896	1 874
Females	1 831	1 634	1 499	1 604	1 473	1 166	1 818	1 490	1 601	1 688	1 341	1 449	1 311	1 477	1 321
Persons	1 947	1 985	1 697	1 839	1 776	1 460	2 091	1 725	1 786	1 866	1 695	1 731	1 666	1 675	1 574
OTHER RATE PER 100,000(c)															
WA															
Males	979	955	975	975	916	933	887	860	826	811	778	770	758	757	757
Females	629	623	641	625	604	616	600	576	556	548	548	552	540	532	525
Persons	783	769	789	779	743	757	729	704	678	667	653	651	640	634	631
SA															
Males	934	938	963	939	906	940	874	835	825	777	746	739	723	686	674
Females	598	617	622	608	596	616	593	560	556	526	526	544	526	501	484
Persons	746	758	773	753	734	760	719	684	678	639	627	635	617	587	573
NT															
Males	1 764	1 259	1 434	1 357	1 235	1 064	1 104	879	875	995	838	811	764	714	802
Females	722	952	801	839	768	701	648	717	644	495	610	514	565	450	494
Persons	1 231	1 117	1 104	1 100	1 002	893	879	814	774	762	738	676	673	596	666
RATE RATIO(d)															
WA															
Males	1.9	1.8	1.8	1.8	2.0	1.8	2.2	2.1	1.9	2.2	2.3	2.0	2.2	2.3	2.3
Females	2.0	1.8	1.8	1.9	1.8	1.5	1.8	1.8	1.9	2.1	1.6	1.9	1.6	2.3	2.0
Persons	2.2	2.0	2.0	2.1	2.1	1.9	2.2	2.1	2.1	2.4	2.1	2.1	2.1	2.5	2.4
SA															
Males	1.4	1.1	1.2	1.6	1.6	1.5	2.3	1.9	1.3	1.8	1.7	1.3	1.9	1.6	1.9
Females	1.3	1.2	1.3	1.3	1.3	1.3	1.2	1.4	1.6	1.8	1.5	1.3	1.2	2.0	1.3
Persons	1.6	1.3	1.4	1.6	1.6	1.6	1.9	1.8	1.6	2.0	1.8	1.5	1.7	1.9	1.8
NT															
Males	1.2	2.0	1.4	1.6	1.7	1.7	2.4	2.3	2.3	2.1	2.5	2.5	2.8	2.7	2.3
Females	1.5	1.5	1.4	1.5	1.5	1.3	2.1	1.8	2.1	2.2	1.8	2.1	1.9	2.5	2.0
Persons	1.6	1.8	1.5	1.7	1.8	1.6	2.4	2.1	2.3	2.4	2.3	2.6	2.5	2.8	2.4

(a) Deaths are based on year of registration of death.

(b) Rates have been directly age standardised using the 2001 Australian standard population.

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

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

Source: AIHW National Mortality Database

Infant mortality rates

Consistent with the all-cause mortality analyses, the results presented in this section are also for recorded deaths, and assume no change in the rate at which Indigenous status is reported on infant deaths registrations. Indigenous status on infant death registrations has generally been more comprehensively recorded than for deaths at older ages.

There was a significant decline in recorded mortality for Indigenous infants in Western Australia, South Australia and the Northern Territory during the period

Infant mortality rates continued

1991–2005 (table 9.34). The average yearly decline in infant mortality was around 0.8 deaths per 1,000 live births in each of the three jurisdictions—equivalent to a reduction in the infant mortality rate of around 41% in Western Australia, 58% in South Australia and 46% in the Northern Territory.

Over the same period, there was a significant decline in recorded infant mortality for other Australian infants in Western Australia and South Australia—an average yearly decline of around 0.2 deaths per 1,000 live births in Western Australia (equivalent to a reduction in the infant mortality rate of around 39%) and an average yearly decline of around 0.1 deaths per 1,000 live births in South Australia (equivalent to a reduction in the infant mortality rate of around 26%).

The relative difference between Indigenous and other infant mortality rates significantly declined over the period 1991–2005. The rate ratio, which is the Indigenous rate divided by the rate for other Australians, declined significantly in South Australia and the Northern Territory by an average of 0.1 per year in South Australia (from around 4.0 in 1991 to 2.0 in 2005) and by an average of 0.04 per year in the Northern Territory (from around 1.9 in 1991 to 1.5 in 2005). The rate difference, which is the Indigenous rate minus the rate for other Australians, declined significantly in Western Australia, South Australia and the Northern Territory (from around 20 per 1,000 births to 8 per 1,000 births in Western Australia and from around 11 per 1,000 births to 5 per 1,000 births in the Northern Territory) and by an average of 0.8 per 1,000 per year in South Australia (from around 15 per 1,000 births to 5 per 1,000 births).

9.34 INFANT MORTALITY RATES(a)(b), by Indigenous status—1991–2005

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
INDIGENOUS															
WA	(c)26.1	(c)24.1	16.3	19.6	18.1	24.1	13.6	17.0	16.7	16.9	16.3	16.2	15.4	11.1	11.9
SA	20.2	23.2	17.3	7.5	16.2	12.6	8.5	4.5	7.8	11.1	4.9	14.7	6.9	6.1	9.7
NT	24.7	28.1	29.4	18.7	18.5	19.4	29.4	22.6	19.0	22.9	16.0	15.6	12.9	17.9	16.2
OTHER(d)															
WA	(c)6.0	(c)5.9	5.2	4.6	4.3	5.3	4.8	4.2	3.9	3.4	4.3	3.5	3.3	3.4	4.0
SA	5.1	5.5	4.9	4.7	5.5	4.7	4.6	4.0	4.2	4.4	4.6	4.7	3.6	3.0	4.9
NT	13.2	15.9	17.8	10.9	10.4	11.7	15.9	12.3	12.5	16.2	12.7	11.0	9.7	13.2	11.0
RATE RATIO(e)															
WA	(c)4.4	(c)4.1	3.1	4.2	4.2	4.5	2.8	4.0	4.3	4.9	3.8	4.6	4.7	3.3	2.9
SA	4.0	4.2	3.6	1.6	3.0	2.7	1.8	1.1	1.9	2.5	1.1	3.1	1.9	2.0	2.0
NT	1.9	1.8	1.7	1.7	1.8	1.7	1.8	1.8	1.5	1.4	1.3	1.4	1.3	1.4	1.5
RATE DIFFERENCE(f)															
WA	(c)20.1	(c)18.2	11.1	15.0	13.8	18.8	8.8	12.8	12.8	13.4	12.0	12.7	12.1	7.7	7.9
SA	15.1	17.6	12.5	2.9	10.8	7.9	3.8	0.6	3.6	6.7	0.3	10.0	3.3	3.1	4.8
NT	11.4	12.2	11.6	7.8	8.1	7.6	13.5	10.3	6.5	6.6	3.3	4.6	3.2	4.7	5.1

(a) Infant deaths per 1,000 live births.

(b) Deaths are based on year of registration of death and state of usual residence. Births are based on year of registration.

(c) The average of births over 1993–1995 in Western Australia was used to as the denominator for the estimates of the infant mortality rates for 1991 and 1992 to correct for errors in births recorded for 1991 and 1992.

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

(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.

Source: AIHW National Mortality Database

Cause-specific mortality

Another potentially informative approach to assessing mortality trends is to examine changes in the pattern of deaths, by specific causes of death. These analyses have the advantage that they may reveal trends that are disguised by the more heterogeneous aggregate of mortality figures. But the available data constrain the analyses that can be done, and caution must be exercised when interpreting changes. First, the numbers of deaths that underlie the analysis diminish when the data are disaggregated to specific causes and the finer the disaggregation, the smaller the numbers and the larger the fluctuations relative to any underlying trend. The analyses undertaken for this report have been confined to five main causes of death—diseases of the circulatory system; diseases of the respiratory system; external causes; endocrine, nutritional and metabolic diseases; and neoplasms. Second, there was a change in the classification and coding of causes of death between 1996 and 1997. ICD-9 was used to classify causes of death prior to 1997 and ICD-10 has been used to classify causes of death from 1997 onwards. As these changes affect the comparability of the data for the two periods, the analyses reported here are for the period 1997–2005. Third, when analysing five causes of death for three jurisdictions and for three population groups (persons, males and females), some statistically significant changes may arise by chance—attention should therefore be paid to those causes that show some consistency of pattern, not to individual differences or changes.

Cause-specific mortality continued

Consistent with the analyses of all-cause mortality, the results presented in this section are for recorded deaths and assume no change in the rate at which Indigenous status is reported on deaths registrations, including no changes in rates of recording Indigenous status by specific causes of death. The impact of such changes in recording on the robustness of the conclusions is provided in the latter section 'The sensitivity of mortality trends to changes in Indigenous identification'.

Of the five causes examined, only diseases of the circulatory system showed consistently significant changes in recorded mortality (table 9.35).

9.35 CAUSE-SPECIFIC AGE STANDARDISED MORTALITY RATES(a)(b)(c), by Indigenous status—1997–2005

	1997	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*
	rate	rate	rate	rate	rate	rate	rate	rate	rate
CIRCULATORY DISEASES (I00-I99)									
Indigenous rate(b)	606.0	539.4	510.4	505.0	415.6	396.3	406.9	502.4	435.5
Other rate(b)(d)	297.6	285.0	267.3	251.6	245.2	235.9	228.6	220.5	217.8
Rate ratio(e)	2.0	1.9	1.9	2.0	1.7	1.7	1.8	2.3	2.0
RESPIRATORY DISEASES (J00-J99)									
Indigenous rate(b)	152.9	193.2	143.5	164.2	164.8	162.1	142.7	199.2	144.2
Other rate(b)(d)	63.3	57.6	54.2	60.1	57.5	62.9	62.0	57.6	52.8
Rate ratio(e)	2.4	3.4	2.6	2.7	2.9	2.6	2.3	3.5	2.7
EXTERNAL CAUSES (V01-Y98)									
Indigenous rate(b)	110.8	139.1	105.3	130.6	127.1	124.4	123.8	121.1	157.8
Other rate(b)(d)	41.8	47.7	41.8	43.8	41.1	38.8	39.9	38.9	41.0
Rate ratio(e)	2.6	2.9	2.5	3.0	3.1	3.2	3.1	3.1	3.9
ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES (E00-E89)									
Indigenous rate(b)	158.1	112.6	137.1	171.0	174.7	151.4	128.0	160.9	166.6
Other rate(b)(d)	23.1	21.1	21.6	21.4	22.2	22.2	22.0	24.8	24.0
Rate ratio(e)	6.8	5.3	6.3	8.0	7.9	6.8	5.8	6.5	6.9
NEOPLASMS (C00-D48)									
Indigenous rate(b)	245.9	224.4	196.9	263.4	214.9	233.2	247.3	260.2	243.0
Other rate(b)(d)	203.2	194.4	195.3	192.4	190.4	191.0	187.1	189.8	188.7
Rate ratio(e)	1.2	1.2	1.0	1.4	1.1	1.2	1.3	1.4	1.3

(a) Deaths are based on year of registration of death and state of usual residence.
(b) Directly age standardised rate per 100,000 population using the 2001 estimated resident population.
(c) Data for WA, SA and NT combined
(d) Comprises deaths of non-Indigenous persons and those for whom Indigenous status was not stated.
(e) Mortality rate for Indigenous persons divided by the mortality rate for other persons.
Source: AIHW National Mortality Database

Over the period 1997–2005, there were significant declines in recorded mortality from circulatory diseases for Indigenous people in Western Australia, South Australia and the Northern Territory (the mortality in 2005 was around three-quarters the rate in 1997). This was mainly due to a significant decline for males (a reduction in the mortality rate of around 32% during the period of analysis).

Cause-specific mortality continued

Over the same period, there were also significant declines in recorded mortality from circulatory diseases for other Australians (the mortality rate in 2005 being around three-quarters of the 1997 rate).

For external causes and neoplasms, there were significant declines in recorded mortality for other Australians over the period 1997–2005 however there were corresponding significant changes in the mortality rates for Indigenous Australians for these causes of death.

There was a significant increase in the rate ratio between Indigenous and other Australian mortality rates for external causes of death (from around 3 in 1997 to 4 in 2005).

The sensitivity of mortality trends to changes in Indigenous identification

When analysing trends in recorded Indigenous mortality, it is important to try to distinguish changes that arise because of real changes in mortality from those that arise because of changes in the reporting of Indigenous status on deaths registrations. But only broad, indicative estimates of changes in coverage are available, so it is not possible to definitively dissect observed changes in recorded mortality into the real and reporting effects.

In the absence of such a definitive dissection, the fitted trends discussed earlier in this chapter have been examined for their sensitivity to changes in Indigenous coverage. If those trends were to persist under a range of plausible assumptions regarding coverage, that would add to the confidence that the trends reflect some real alteration in mortality and are not just artefacts of changes in coverage.

The same approach as was used in the 2005 edition of this report has been used here. Three scenarios for coverage were posed—constant coverage, increasing coverage and decreasing coverage.

- Under the constant coverage scenario, the numbers of deaths for the entire period under study were adjusted using coverage estimates derived from the most recent ABS analyses (relating to the period 2001–2005). These estimates are: Western Australia—70%; South Australia—64% and the Northern Territory—92%.
- Under the increasing coverage scenario, deaths were adjusted by linearly increasing the coverage through the period under study—from 63% in 1991 to 70% in 2005 for Western Australia; from 58% to 64% for South Australia; and from 87% to 92% for the Northern Territory.
- Under the decreasing coverage scenario, deaths were adjusted by linearly decreasing the coverage—from 77% in 1991 to 70% in 2005 for Western Australia; from 70% to 64% for South Australia; and from 97% to 92% for the Northern Territory.

The adjustments in the latter two scenarios were based on judgments about the largest plausible shifts in coverage during the decade. Of course, if any actual shift in coverage were more extreme than has been posed under these scenarios, then the observed trends in mortality might not persist. For all three scenarios, the population figures (used as denominators in the calculation of mortality rates) were re-estimated to reflect the altered number of deaths implied by each scenario.

- The declines in infant mortality rates for Indigenous Australians in Western Australia, South Australia and the Northern Territory during the period 1991–2005 remained statistically significant under all three identification coverage scenarios.

The sensitivity of mortality trends to changes in Indigenous identification continued

- The declines in mortality rates from diseases of the circulatory system during the period 1997–2005 remained significant under all three identification scenarios for Indigenous males and remained significant under the increasing identification scenario (which is the most likely scenario) for Indigenous people.

Other research and analyses

CHRONIC DISEASES

Another recent study also undertaken in the Northern Territory looked at long-term mortality trends in Indigenous deaths from chronic diseases (Thomas et al 2006). Trends in rates of mortality from six chronic diseases were analysed over the period 1977–2001 comparing Indigenous Australians in the Northern Territory with the total Australian population. The chronic diseases analysed were ischaemic heart disease (IHD), chronic obstructive pulmonary disease (COPD), cerebrovascular disease, diabetes mellitus, renal failure and rheumatic heart disease (RHD). Results found that over the 25 years examined, Northern Territory Indigenous mortality rates increased significantly for IHD and diabetes mellitus, however the rate of increase slowed significantly after 1990. For COPD, mortality increased before 1990, however significantly decreased thereafter. For RHD, the Indigenous mortality rate decreased for those aged less than 50 years and increased for those aged 50 years and over. The ratio of Indigenous mortality rates in the Northern Territory to total Australian mortality rates increased for all six chronic diseases. This increase was statistically significant for all diseases except COPD.

LIFE EXPECTANCY IN THE NORTHERN TERRITORY

A recent study was undertaken in 2007 by Wilson, Condon and Barnes 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 recent years. The gap between Indigenous and total Australian female life expectancy in the Northern Territory has narrowed between 1967 and 2004, while the gap between Indigenous and total Australian male life expectancy has remained the same.

Wilson, Condon and Barnes 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 ages 45 years 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 to 2004.

Other research and analyses continued

LIFE EXPECTANCY IN THE NORTHERN TERRITORY *continued*

The gains in life expectancy for Indigenous males and females in the Northern Territory reported by Wilson, Condon and Barnes 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.

SUMMARY

Overall, all-cause mortality for Indigenous Australians in Western Australia declined by 20% between 1991 and 2005. Despite this decline, all-cause mortality for other Australians in Western Australia declined by 26% over the period and the difference between Indigenous and other Australian mortality is widening in South Australia and the Northern territory. For the period 2001–2005, in Queensland, Western Australia, South Australia and the Northern Territory, the mortality rates for Indigenous males and females were almost three times those for non-Indigenous males and females.

There have been significant declines in recorded infant mortality for Indigenous Australians in recent years and the gap between Indigenous and other Australians has narrowed. Despite these improvements, the infant mortality rate for Indigenous Australians is still three times the rate for non-Indigenous Australians.

Over the period 2001–2005, in Queensland, South Australia, Western Australia and the Northern Territory, for all age groups below 65 years, the age-specific death rates for people identified as Indigenous were at least twice those for non-Indigenous Australians. The largest differences occurred in the middle age groups (35–54 years) where the death rates for Indigenous males and females were five to six times those recorded for non-Indigenous Australians.

The five leading causes of death for Aboriginal and Torres Strait Islander peoples over the period 2001–2005 in the four jurisdictions were diseases of the circulatory system, injury (predominantly accidents, intentional self-harm and assault), cancer, endocrine, metabolic and nutritional disorders and respiratory diseases, representing around three-quarters of all deaths of Aboriginal and Torres Strait Islander people. Indigenous Australians had much higher rates of mortality than non-Indigenous Australians from these major causes of death (SMRs of between 2 and 8 for males and 2 and 10 for females). The difference between Indigenous and non-Indigenous mortality appears to be widening for all of these causes of death, however the increase is only statistically significant for external causes of death.

Deaths of Indigenous people involve higher rates of co-morbidity than deaths of non-Indigenous people. For the period 2001–2005, deaths where multiple causes were reported were more common among Indigenous people than non-Indigenous people. For example, 27% of deaths among Indigenous males and 29% of deaths among Indigenous females recorded five or more causes of death, compared with 15% of non-Indigenous male and female deaths. For deaths from certain diseases such as ischaemic heart disease, renal failure and cancer, diabetes was reported as an associated cause of death among Indigenous males and females at more than twice the rate among non-Indigenous males and females.