

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. In 1999–2003, for Queensland, South Australia, Western Australia and the Northern Territory, where approximately 60% of the Indigenous population reside, the overall rates of mortality for Indigenous males and females were almost three times those for non-Indigenous males and females. Indigenous Australians also had higher rates of mortality from all major causes of death. While the difference 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 Aboriginal and Torres Strait Islander status on death records. This limitation restricts precise analysis of the data and presents difficulties for the monitoring of mortality trends over time. However, 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.

This chapter examines the mortality of the Aboriginal and Torres Strait Islander population. In the main, the analyses are based on data for the period 1999–2003. Mortality data for Queensland, South Australia, Western Australia and the Northern Territory have been used. These jurisdictions are considered to have the most complete coverage of Indigenous deaths for that period.

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 outcomes, may underestimate the actual mortality experience of Indigenous people in Australia.

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 Aboriginal and Torres Strait Islander population.

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. These jurisdictions are Queensland, South Australia, Western Australia and the Northern Territory, and their data have been combined for 1999–2003 for an analysis of Indigenous mortality. Longer term mortality trends discussed in this Chapter are based on an analysis of data from three jurisdictions—South Australia, Western Australia and the Northern Territory—being the only jurisdictions with 12 years of reasonable coverage of Indigenous deaths registrations.

DATA QUALITY AND
AVAILABILITY *continued*

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. Delays in registration can occur when deaths are subject to the findings of a coroner or when deaths occur in remote areas. Late deaths registrations are more common for Indigenous people than non-Indigenous people, and therefore have a greater impact on mortality statistics.

For example, 95% of deaths of non-Indigenous Australians that occurred in 2002 were registered in that year while 5% were registered in 2003. For Indigenous deaths, the corresponding figures were 86% in 2002 and 14% in 2003. The analyses of deaths reported in this chapter are based on year of occurrence of death for the period 1999–2002—the latest year for which year of occurrence data are available—augmented by year of registration of death for 2003—the latest year for which such data are available.

Causes of death statistics provided 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 'low series' ABS experimental population projections of the Indigenous population based on the 2001 Census.

LIFE EXPECTANCY

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 2004b). 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, 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.

In the period 1996–2001, using the Bhat method (ABS 2004c), the life expectancy at birth for Indigenous Australians was estimated to be 59.4 years for males and 64.8 years for females, compared with 76.6 years for all males and 82.0 years for all females for the period 1998–2000; a difference of approximately 17 years for both males and females. The Bhat method offers improvement over other indirect methods used earlier by the ABS to estimate life expectancy from incomplete data such as the Preston Hill method (Preston & Hill 1980). While the Bhat method allows for an adjustment for changes in identification to be taken into account in the estimation of life expectancy, it remains experimental and therefore more work needs to be done on such estimates as more robust methods become available.

DEATHS 1999–2003

For the period 1999–2003, there were 7,387 registered deaths identified as Indigenous (4,222 males and 3,165 females) for persons reported to have been usual residents of Queensland, South Australia, Western Australia and the Northern Territory. These deaths accounted for 3.2% of all deaths of usual residents in these four jurisdictions, and 71% of all identified Aboriginal and Torres Strait Islander deaths in Australia.

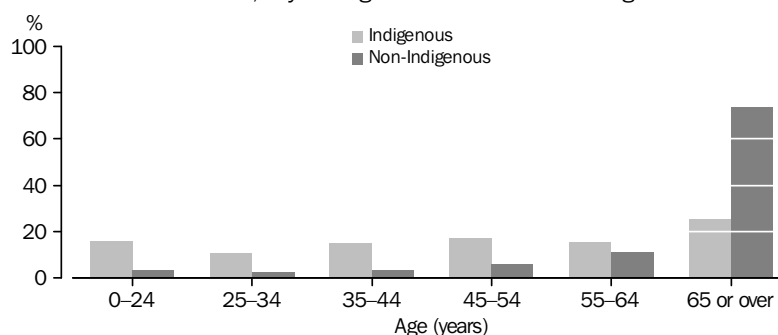
Age at death

In Queensland, South Australia, Western Australia and the Northern Territory, 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 who died were aged less than 65 years (graphs 9.1 and 9.2).

Infant deaths (deaths under one year) contribute to the younger age at death of the Indigenous population. For the period 1999–2003, Indigenous infant deaths represented 6.2% of total Indigenous male deaths and 6.5% 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 15% of total Indigenous male deaths compared with only 3% of total non-Indigenous male deaths, while the 45–54 year age group accounted for 16% of Indigenous female deaths compared with 4% of total non-Indigenous female deaths.

9.1 MALE DEATHS, by Indigenous status and age—1999–2003(a)

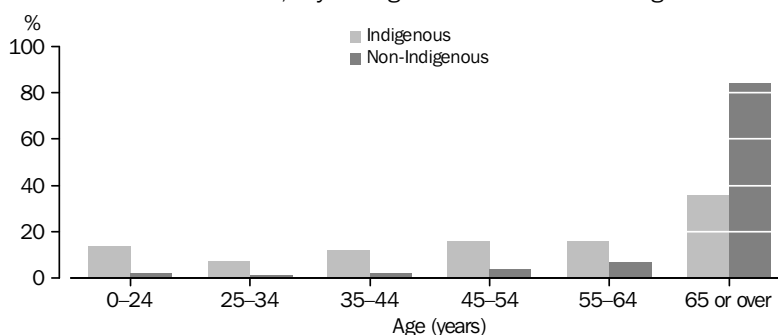


(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

Source: AIHW, National Mortality Database

Age at death continued

9.2 FEMALE DEATHS, by Indigenous status and age—1999–2003(a)



(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

Source: AIHW, National Mortality Database

Indigenous Australians were over-represented in almost every age group. Table 9.3 shows Indigenous deaths as a proportion of total deaths by age group in 1999–2003 and their respective proportions of the total population for the same period.

9.3 DEATHS OF INDIGENOUS PERSONS IN QLD, SA, WA AND NT(a)—1999–2003

Age (years)	NUMBER OF INDIGENOUS DEATHS (no.)		INDIGENOUS DEATHS AS A PROPORTION OF TOTAL DEATHS (%)		INDIGENOUS PERSONS AS A PROPORTION OF TOTAL POPULATION (%) (b)	
	Males	Females	Males	Females	Males	Females
Less than 1	263	206	19.0	19.3	7.6	7.7
1–4	48	45	13.7	19.6	7.3	7.5
5–14	56	43	13.8	14.2	6.8	6.7
15–24	306	133	12.1	14.9	4.9	5.2
25–34	462	226	13.2	16.6	4.0	4.4
35–44	636	380	13.7	14.3	2.9	3.1
45–54	723	490	9.1	9.9	2.0	2.2
55–64	651	509	4.7	6.5	1.4	1.7
65 or over	1 058	1 118	1.2	1.4	0.9	0.9
Total(c)	4 222	3 165	4.3	3.6	3.7	3.8

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Estimates of the Indigenous population for 1999–2003 are based on the 2001 Census.

(c) Includes deaths where age was not stated.

Source: AIHW, National Mortality Database

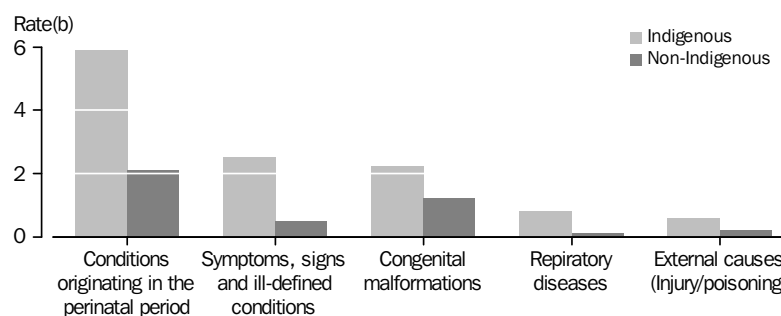
Infant deaths—main causes

Infant deaths are deaths of live-born children which occur before they reach their first birthday. In 1999–2003, for Indigenous infants, the mortality rate was three times that of non-Indigenous infants (table 9.5). Almost half (45%) 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 19% of

Infant deaths—main causes continued

infant deaths and congenital malformations accounted for 16%. For respiratory diseases (6%) and external causes (mainly accidents) (5%), the mortality rates for Indigenous infants were ten and four times, respectively, those of non-Indigenous infants (graph 9.4).

9.4 INFANT DEATHS, MAIN CAUSES (a), by Indigenous status—1999–2003



(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory combined. Based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Per 1,000 live births.

Source: AIHW, National Mortality Database

Age-specific death rates

In Queensland, South Australia, Western Australia and the Northern Territory, age-specific death rates for Indigenous males and females across almost all age groups were higher than the rates for non-Indigenous males and females in these jurisdictions. For all age groups below 65 years, the age-specific death rates for Indigenous Australians were at least twice those experienced by the non-Indigenous population. 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 times those recorded for non-Indigenous males and females (table 9.5).

9.5 AGE-SPECIFIC DEATH RATES (a), by sex and Indigenous status—1999–2003

Age (years)	MALES			FEMALES		
	Indigenous rate (b)	Non-Indigenous rate (b)	Rate ratio (c)	Indigenous rate (b)	Non-Indigenous rate (b)	Rate ratio (c)
Less than 1(d)	15	5	3.0	12	4	3.0
1–4	66	31	2.1	64	20	3.2
5–14	31	14	2.2	25	11	2.3
15–24	239	87	2.7	103	31	3.3
25–34	432	115	3.8	195	44	4.4
35–44	791	146	5.4	436	82	5.3
45–54	1 443	288	5.0	907	179	5.1
55–64	2 667	760	3.5	1 784	438	4.1
65 or over	6 273	4 534	1.4	5 093	3 763	1.4

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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

*Age-specific death rates
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 intentional self-harm are major causes of death (table 9.6). Indigenous males and females aged 35–54 years died from diabetes at 21 and 37 times the rates, and from influenza and pneumonia at 20 and 17 times the rates, of non-Indigenous males and females of the same age for these conditions. While some of these rates have been derived from a relatively small number of deaths—for example deaths caused by mental and behavioural disorders due to psychoactive substance use totalled only 11 deaths among Indigenous females over the five year period 1999–2003—differences between the two population groups are still striking.

9.6 AGE-SPECIFIC DEATH RATES BY MAJOR CAUSES (a)(b)—persons aged 35–54 years—1999–2003

	INDIGENOUS		NON-INDIGENOUS		RATE RATIO(c)	
	Males	Females	Males	Females	Males	Females
Ischaemic heart disease (I20–I25)	237.5	102.7	33.1	6.2	7.2	16.6
Diabetes (E10–E14)	73.6	56.7	3.5	1.5	21.2	37.3
Disease of liver (K70–K77)	69.0	45.3	8.3	3.1	8.3	14.7
Other forms of heart disease (I30–I52)	45.2	18.4	5.4	2.3	8.3	8.2
Intentional self harm (X60–X84)	45.2	7.8	27.6	7.9	1.6	1.0
Mental and behavioural disorders due to psychoactive substance use (F10–F19)	40.6	7.8	3.0	0.7	13.7	11.1
Malignant neoplasm of digestive organs (C15–C26)	36.8	15.6	19.2	12.5	1.9	1.2
Chronic lower respiratory disease (J40–J47)	35.2	26.2	2.5	2.7	13.9	9.7
Influenza and pneumonia (J10–J18)	32.2	12.0	1.6	0.7	19.9	16.7
Assault (X85–Y09)	31.4	12.7	1.9	1.0	17.0	12.4
Cerebrovascular disease (I60–I69)	30.6	27.6	5.8	5.1	5.3	5.4
Malignant neoplasm of respiratory and intrathoracic organs (C30–C39)	30.6	19.1	13.1	8.6	2.3	2.2
Ill-defined and unknown causes of mortality (R95–R99)	26.1	10.6	3.1	1.2	8.5	8.8
Car occupant injured in transport accident (V40–V49)	25.3	11.3	5.9	3.3	4.3	3.5
Pedestrian injured in transport accident (V01–V09)	20.7	12.0	1.6	0.3	13.0	38.7

(a) Per 100,000 population.

(b) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003. Disease groupings are based on three-digit groupings of ICD-10.

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

Source: AIHW, *National Mortality Database*

CAUSES OF DEATH

In 1999–2003, the three leading causes of death for Aboriginal and Torres Strait Islander peoples resident in Queensland, South Australia, Western Australia and the Northern Territory were diseases of the circulatory system, external causes of morbidity and mortality (predominantly accidents, intentional self-harm and assault) and neoplasms (cancer). Deaths due to these causes accounted for 58% of all Indigenous deaths (table 9.7) compared with 74% of deaths in the non-Indigenous population.

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.

CAUSES OF DEATH

continued

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

In 1999–2003, 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 7 and 11 times, respectively, the rates for non-Indigenous males and females (table 9.7).

9.7 INDIGENOUS DEATHS, MAIN CAUSES (a)—1999–2003

	MALES			FEMALES		
	Observed deaths	Expected deaths	SMR(b)	Observed deaths	Expected deaths	SMR(b)
	no.	no.	rate	no.	no.	rate
Diseases of the circulatory system (I00–I99)	1 134	388	2.9	882	347	2.5
External causes (V01–Y98)	842	306	2.7	356	111	3.2
Neoplasms (C00–D48)	592	407	1.5	502	345	1.5
Endocrine, nutritional and metabolic diseases (E00–E90)	303	41	7.5	372	35	10.5
Diseases of the respiratory system (J00–J99)	368	92	4.0	269	76	3.5
Diseases of the digestive system (K00–K93)	208	42	4.9	152	36	4.3
Diseases of the genitourinary system (N00–N99)	87	16	5.3	139	19	7.3
Symptoms, signs and ill-defined conditions (R00–R99)	136	24	5.8	88	15	5.7
Certain conditions originating in the perinatal period (P00–P96)	124	43	2.9	88	35	2.5
Diseases of the nervous system and sense organs (G00–G99)	111	41	2.7	70	41	1.7
Certain infectious and parasitic diseases (A00–B99)	97	20	5.0	80	14	5.8
Mental and behavioural disorders (F00–F99)	122	22	5.5	52	24	2.2
All causes	4 222	1 485	2.8	3 165	1 143	2.8

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Standardised mortality rate is the observed Indigenous deaths divided by expected Indigenous deaths, based on the age, sex and cause-specific rates for non-Indigenous Australians.

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. Diseases of the circulatory system accounted for the highest proportion of excess deaths. Other major causes of excess deaths were external causes, diseases of the respiratory system and endocrine, nutritional and metabolic diseases. Deaths due to these causes were responsible for around two-thirds of excess deaths among Indigenous males and females (table 9.8).

*Excess deaths continued***9.8** MAIN CAUSES OF EXCESS INDIGENOUS DEATHS (a)(b)—1999–2003

	<i>Indigenous males</i>	<i>Indigenous females</i>
	%	%
Diseases of the circulatory system (I00–I99)	27.3	26.5
External causes (V01–Y98)	19.6	12.1
Endocrine, nutritional and metabolic diseases (E00–E90)	9.6	16.6
Diseases of the respiratory system (J00–J99)	10.1	9.5
Neoplasms (C00–D48)	6.8	7.8
Diseases of the digestive system (K00–K93)	6.1	5.8
Diseases of the genitourinary system (N00–N99)	2.6	5.9
Symptoms, signs and ill-defined conditions (R00–R99)	4.1	3.6
Certain infectious and parasitic diseases (A00–B99)	2.8	3.3
Certain conditions originating in the perinatal period (P00–P96)	3.0	2.6
Mental and behavioural disorders (F00–F99)	3.6	1.4
All other causes	4.5	4.9
All causes	100.0	100.0

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) 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 Australians).

Source: AIHW, *National Mortality Database*

Main causes of Indigenous deaths

The following disease-specific analysis highlights the different patterns of mortality experienced by the Indigenous and non-Indigenous populations. The proportion of deaths due to any one disease or disease group is affected by the overall pattern of deaths within a given population. Therefore it is important to analyse the overall pattern of deaths when interpreting comparisons that are made of proportions due to one cause or a group of causes of deaths.

The diseases covered below, which include circulatory system diseases, diabetes, chronic kidney diseases, injuries, neoplasms and respiratory diseases, accounted for 77% and 86% of all deaths among Indigenous and non-Indigenous Australians respectively (table 9.9).

Main causes of Indigenous deaths *continued*

MAIN CAUSES OF DEATHS(a), by Indigenous status—1999–2003

9.9

	NUMBER OF DEATHS (no.)		PROPORTION OF TOTAL DEATHS (%)	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
Diseases of the circulatory system	2 016	85 339	27.3	38.2
External causes of mortality	1 198	14 480	16.2	6.5
Neoplasms	1 094	65 354	14.8	29.3
Respiratory diseases	637	19 011	8.6	8.5
Diabetes	603	5 012	8.2	2.2
Chronic kidney disease	277	3 729	3.7	1.7
Subtotal(b)	5 707	192 044	77.3	86.0
Total	7 387	223 384	100.0	100.0

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003. Disease groupings are based on ICD–10 chapter.

(b) Subtotal does not equal the sum of the separate diseases as chronic kidney disease overlaps other categories such as diseases of the circulatory system and diabetes.

Source: AIHW National Mortality Database

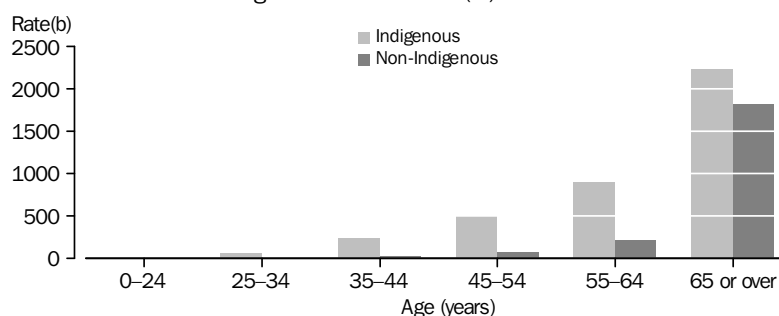
Circulatory diseases

Diseases of the circulatory system were responsible for 27% and 28% of total Indigenous male and female deaths, respectively, for the period 1999–2003. These rates were less than for non-Indigenous Australians, where these diseases accounted for 35% of male deaths and 41% of female deaths. Within circulatory system diseases, ischaemic heart diseases (heart attack, angina) were responsible for 63% of Indigenous male deaths and 50% of Indigenous female deaths, while cerebrovascular disease (stroke) accounted for 15% of male deaths and 20% of female deaths.

Compared to 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 10 times the rate for non-Indigenous males. Indigenous females recorded rates 12 to 13 times the rates for non-Indigenous females for the 35–44 and 45–54 year age groups (graphs 9.10 and 9.11).

9.10

MALE DEATH RATES, CIRCULATORY DISEASES, by Indigenous status and age—1999–2003(a)



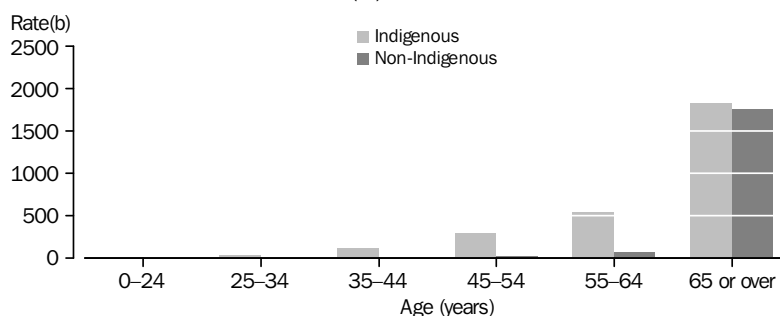
(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Per 100,000 population.

Source: AIHW, National Mortality Database

Circulatory diseases
continued

9.11 FEMALE DEATH RATES, CIRCULATORY DISEASES, by Indigenous status—1999–2003(a)



(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

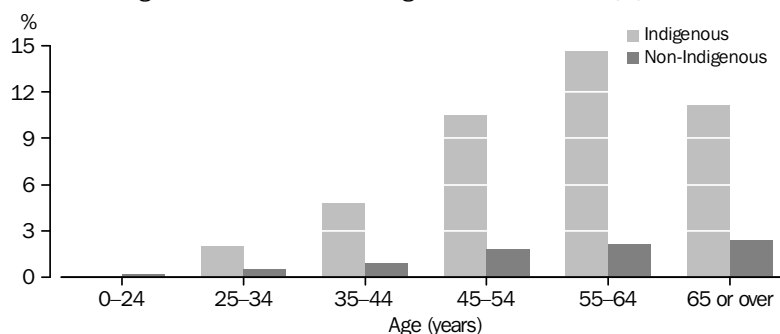
(b) Per 100,000 population.

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 1999–2003, 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 around 2% for all age groups from 45–54 years and over. For Indigenous Australians, diabetes was responsible for 10% of deaths in the 45–54 years age group and for 15% of total Indigenous deaths in the 55–64 year age group (graph 9.12).

9.12 DIABETES DEATHS AS A PROPORTION OF TOTAL DEATHS, by Indigenous status and age—1999–2003(a)



(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

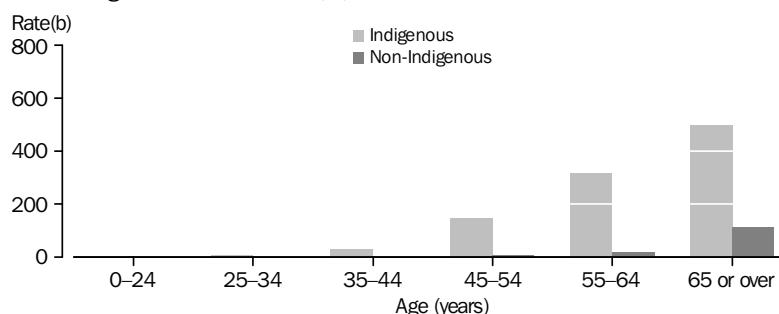
Source: AIHW, National Mortality Database

The earlier onset of diabetes experienced by the Indigenous population is reflected in the differences in age-specific death rates. For the period 1999–2003, Indigenous males in the 35–44 and 45–54 years age groups experienced age-specific death rates 23 and 25 times, respectively, the corresponding rates for non-Indigenous males (graph 9.13). For the same age groups, the rates experienced by Indigenous females were 37 and 43 times the corresponding non-Indigenous female rates (graph 9.14). The markedly higher death rates from diabetes in the Indigenous population are partly a reflection of the

Diabetes continued

earlier onset of diabetes in the Indigenous population compared to 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, particularly those living in rural and remote areas (Wood & Patterson 1999).

9.13 MALE DEATH RATES, DIABETES, by Indigenous status and age—1999–2003(a)

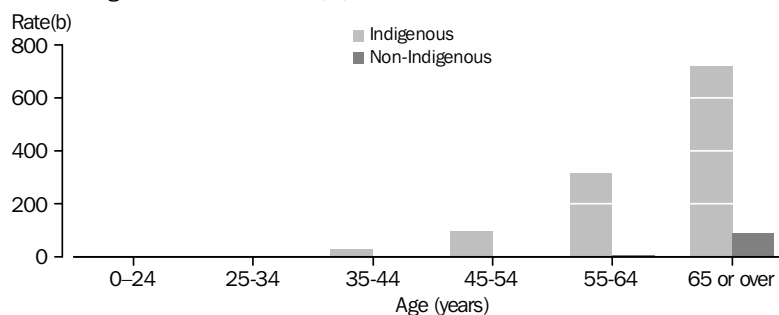


(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Per 100,000 population.

Source: AIHW, National Mortality Database

9.14 FEMALE DEATH RATES, DIABETES, by Indigenous status and age—1999–2003(a)



(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

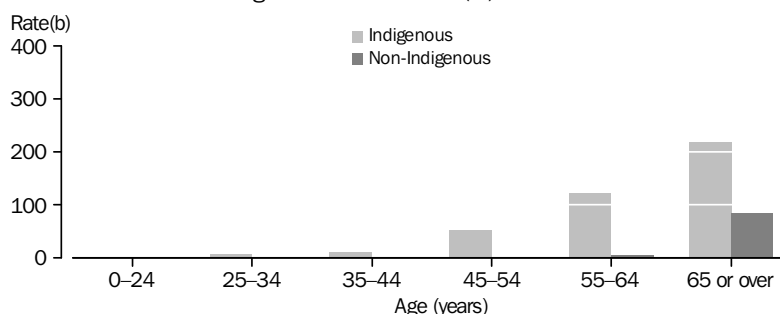
Chronic kidney disease

Chronic kidney disease was responsible for 3% and 5% of Indigenous male and female deaths, respectively, for the period 1999–2003. The overall death rates from chronic kidney disease were 7 and 10 times as high as the rates for non-Indigenous males and females. Among Indigenous deaths from chronic kidney diseases, chronic renal failure accounted for 43% of male deaths and 40% of female deaths, while diabetic nephropathy accounted for 23% (males) and 29% (females) respectively.

*Chronic kidney disease
continued*

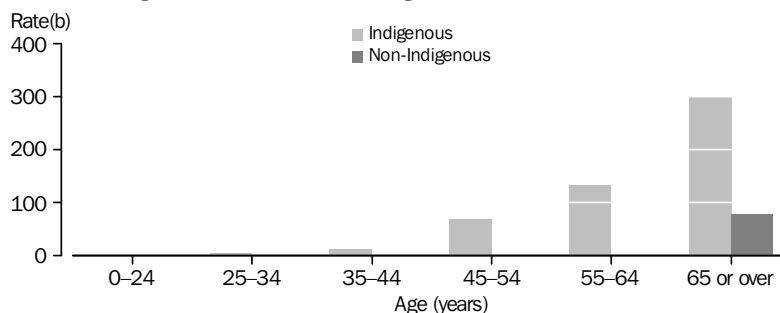
Both Indigenous males and females experienced markedly higher rates of mortality from chronic kidney disease after the age of 25 years. The greatest differences in age-specific death rates for males occurred in the 25–34 and 45–54 years age groups with Indigenous males recording rates 38 and 31 times the rates for non-Indigenous males (graph 9.15). Indigenous females recorded rates 57 and 48 times the rates for non-Indigenous females in the 45–54 and 55–64 years age groups (graph 9.16).

9.15 MALE DEATH RATES, CHRONIC KIDNEY DISEASE, by Indigenous status and age—1999–2003(a)



(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory 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.
Source: AIHW, National Mortality Database

9.16 FEMALE DEATH RATES, CHRONIC KIDNEY DISEASE, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.
Source: AIHW, National Mortality Database

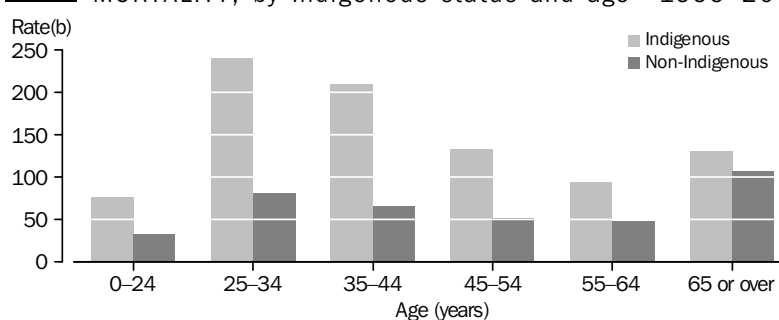
*External causes of
mortality*

For the period 1999–2003, 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 (34%), transport accidents (27%) and assault (11%), while for Indigenous females the leading causes were transport accidents (31%), assault (19%) and intentional self-harm (17%).

External causes of mortality continued

Over the period 1999–2003, 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 9.17). 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 four times that of non-Indigenous females (graph 9.18).

9.17 MALE DEATH RATES, EXTERNAL CAUSES OF MORBIDITY AND MORTALITY, by Indigenous status and age—1999–2003(a)

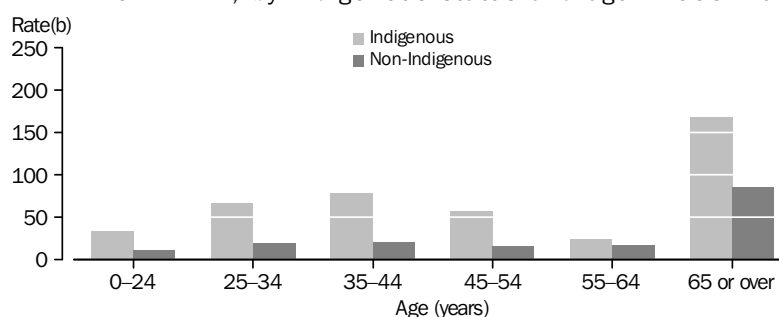


(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Per 100,000 population.

Source: AIHW, National Mortality Database

9.18 FEMALE DEATH RATES, EXTERNAL CAUSES OF MORBIDITY AND MORTALITY, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

INTENTIONAL SELF-HARM (INCLUDING SUICIDE)

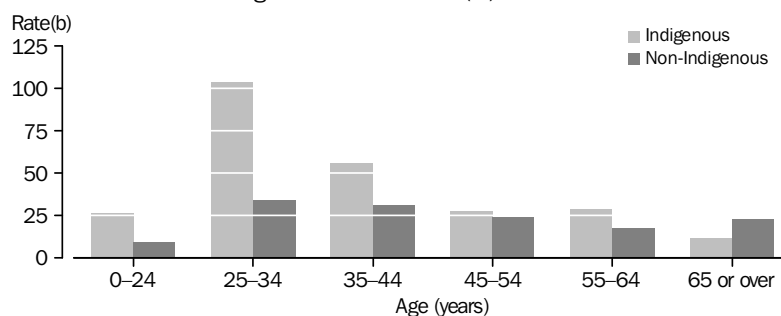
Intentional self-harm was the leading external cause of death for Indigenous males for the 1999–2003 period. The suicide rate was more than twice that for non-Indigenous males, with the major differences occurring in younger age groups. For Indigenous males aged 0–24 years and 25–34 years, the age-specific rates were three times the corresponding age-specific rates for non-Indigenous males (graph 9.19).

External causes of mortality *continued*

INTENTIONAL SELF-HARM (INCLUDING SUICIDE) *continued*

The suicide rate for Indigenous females aged 0–24 years was five times the corresponding age-specific rate for non-Indigenous females. For age groups 35–44 and over, age-specific rates for Indigenous females were similar to, or lower than, the corresponding rates for non-Indigenous females (graph 9.20).

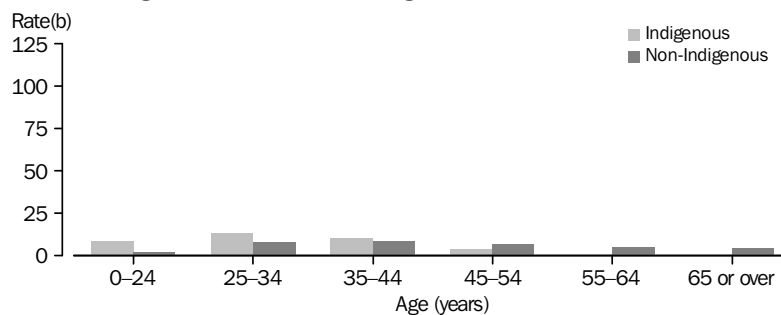
9.19 MALE DEATH RATES, INTENTIONAL SELF-HARM, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

9.20 FEMALE DEATH RATES, INTENTIONAL SELF-HARM, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

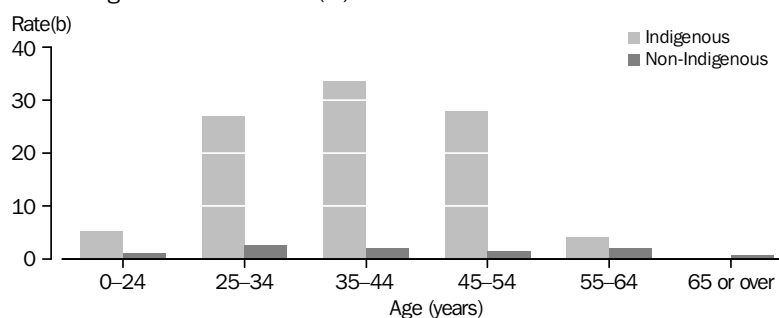
ASSAULT

Assault is a significant cause of death for both Indigenous males and females. Over the period 1999–2003, the Indigenous male age-specific death rates for ten-year age groups from 25 to 54 were between 10 and 18 times the corresponding age-specific rates for non-Indigenous males, while for females the rates ranged between 6 and 16 times the equivalent age-specific rates for non-Indigenous females (graphs 9.21 and 9.22).

External causes of
mortality continued

ASSAULT *continued*

9.21 MALE DEATH RATES, ASSAULT, by Indigenous status and age—1999–2003(a)

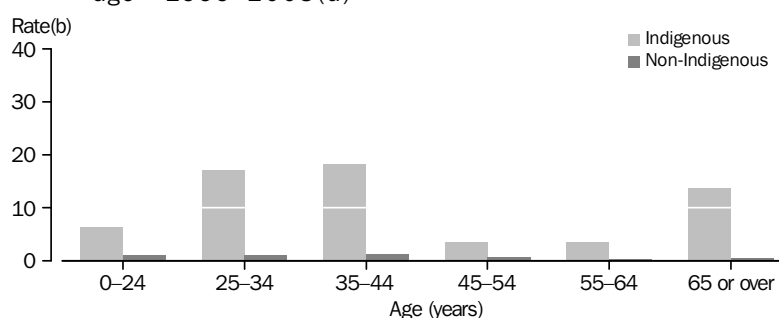


(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Per 100,000 population.

Source: AIHW, National Mortality Database

9.22 FEMALE DEATH RATES, ASSAULT, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

Neoplasms (cancers)

Neoplasms were responsible for 15% of total Indigenous deaths compared with 29% of total non-Indigenous deaths for the period 1999–2003. Indigenous people are over-represented in deaths from cancer compared with non-Indigenous Australians (the SMR for both males and females is 1.5), and more markedly so for some types of cancer. This apparent contradiction is due to very high death rates from other causes rather than low death rates from cancer. The major causes of cancer deaths for Indigenous males were malignant neoplasms of the respiratory and intrathoracic organs (32% of total), malignant neoplasms of the digestive organs (29%), and malignant neoplasms of lip, oral cavity and pharynx (7%). For Indigenous females the major causes were malignant neoplasms of the respiratory and intrathoracic organs (21% of total), malignant neoplasms of the digestive organs (19%), and malignant neoplasms of the female genital organs (16%).

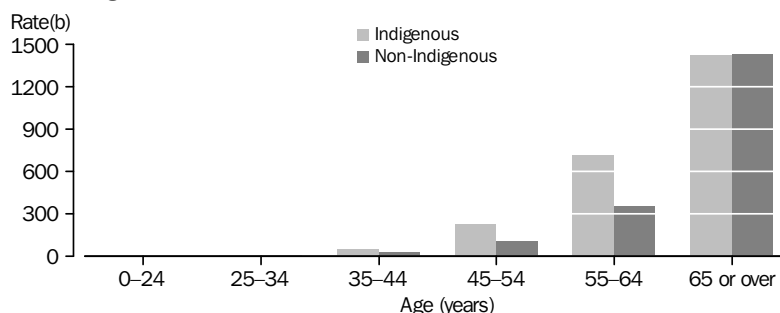
Neoplasms (cancers)
continued

Indigenous persons were over-represented in a number of cancer groups, including malignant neoplasms of lip, oral cavity and pharynx (6% of total Indigenous cancer deaths compared with 2% of non-Indigenous cancer deaths), malignant neoplasms of the respiratory and intrathoracic organs (27% Indigenous; 20% non-Indigenous) and malignant neoplasms of female genital organs (16% total Indigenous females; 9% non-Indigenous females).

Indigenous persons 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 (6% total Indigenous males, 13% non-Indigenous males).

The 1999–2003 age-specific death rates for neoplasms indicate that for age groups up to 25–34 years the rates for Indigenous males and females were closer to those for non-Indigenous males and females than for the older age groups 35–44, 45–54 and 55–64 years, where the rates for Indigenous males and females were up to twice the non-Indigenous rates (graphs 9.23 and 9.24).

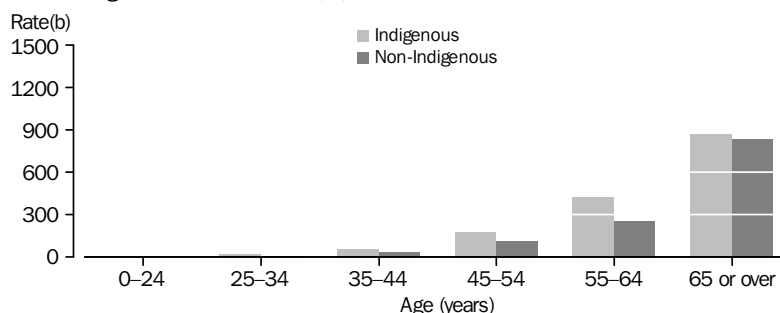
9.23 MALE DEATH RATES, NEOPLASMS, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

9.24 FEMALE DEATH RATES, NEOPLASMS, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

Source: AIHW, National Mortality Database

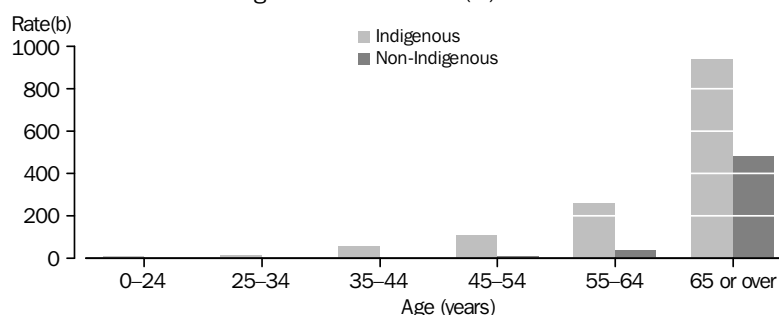
Neoplasms (cancers)
continued

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.

Respiratory diseases

Respiratory diseases, which include influenza, pneumonia and chronic lower respiratory diseases (including asthma, bronchitis and emphysema), were responsible for 9% of total Indigenous deaths for the period 1999–2003. Like diabetes, respiratory diseases affect the Indigenous population at younger ages 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 1999–2003, Indigenous males in the 35–44 year age group experienced age-specific death rates almost 18 times higher than the corresponding rate for non-Indigenous males, while the rate for Indigenous females in this age group was 14 times higher than the corresponding rate for non-Indigenous females (graphs 9.25 and 9.26).

9.25 MALE DEATH RATES, RESPIRATORY DISEASES, by Indigenous status and age—1999–2003(a)



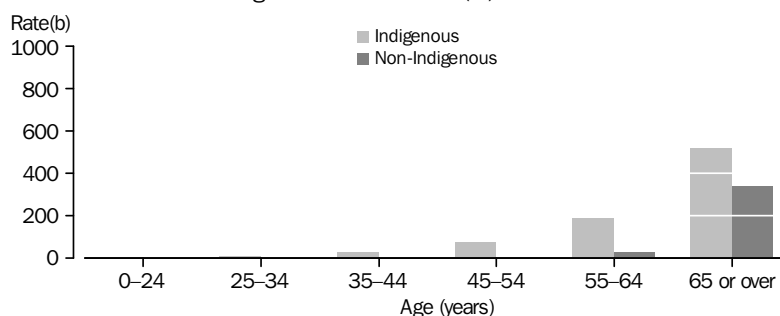
(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Per 100,000 population.

Source: AIHW, *National Mortality Database*

Respiratory diseases
continued

9.26 FEMALE DEATH RATES, RESPIRATORY DISEASES, by Indigenous status and age—1999–2003(a)



(a) Data for Queensland, South Australia, Western Australia and the Northern Territory 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.

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 the circumstances of injury and the nature of injury, as well as any other conditions reported on the death certificate.

For the 7,387 Indigenous deaths in 1999–2003 in Queensland, South Australia, Western Australia and the Northern Territory, there were a total of 22,747 causes reported, an average of three causes per death. Deaths where only a single cause was reported occurred in 16% of total Indigenous male deaths and 15% of total Indigenous female deaths, less than for non-Indigenous males (23%) and females (24%) (table 9.27). Deaths where multiple causes were reported were more common among Indigenous people. For example, 19% of deaths among Indigenous males and 21% of deaths among Indigenous females recorded five or more causes of death, compared with 14% and 13% of non-Indigenous male and female deaths respectively.

Multiple causes of death
continued

9.27 DEATHS BY NUMBER OF CAUSES REPORTED(a), by Indigenous status—1999–2003

Number of causes	NUMBER OF DEATHS		PROPORTION OF DEATHS (b)	
	Males no.	Females no.	Males %	Females %
INDIGENOUS				
One	695	508	16.3	14.8
Two	1 265	785	25.9	23.7
Three	958	685	24.4	23.5
Four	577	544	15.5	18.5
Five or more	727	643	19.3	21.4
Total(c)	4 222	3 165	100.0	100.0
NON-INDIGENOUS				
One	26 632	25 708	22.6	24.3
Two	32 585	28 397	27.7	26.9
Three	26 220	23 607	22.3	22.4
Four	16 236	14 321	13.8	13.6
Five or more	16 095	13 577	13.7	12.9
Total(c)	117 774	105 610	100.0	100.0

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are 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-and-sex-specific rates 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 9.28 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

9.28 UNDERLYING CAUSES OF DEATH(a), by selected associated causes—1999–2003

	INDIGENOUS(b)(c)		NON-INDIGENOUS(b)(c)	
	Males	Females	Males	Females
	%	%	%	%
Neoplasms (C00–D48)				
Reported alone	30.0	27.8	40.0	44.0
Reported with:				
Septicaemia	4.4	5.8	3.5	3.3
Diabetes mellitus	9.5	14.6	4.3	3.6
Ischaemic heart disease	5.8	9.3	8.1	5.4
Cerebrovascular diseases	3.1	3.3	3.5	3.5
Influenza and pneumonia	11.5	8.2	8.2	6.2
Renal failure	6.8	9.2	5.6	4.2
Chronic lower respiratory diseases	11.0	8.7	7.1	4.0
Diabetes mellitus (E10–E14)				
Reported alone	0.4	0.8	1.7	1.4
Reported with:				
Septicaemia	13.9	12.8	7.4	8.1
Ischaemic heart disease	50.8	43.6	58.3	50.5
Cerebrovascular diseases	14.3	17.9	20.7	24.1
Influenza and pneumonia	7.1	9.3	9.8	7.7
Renal failure	39.8	42.1	22.8	23.2
Chronic lower respiratory diseases	6.0	5.5	7.1	5.0
Ischaemic heart disease (I20–I25)				
Reported alone	19.5	13.2	15.8	14.0
Reported with:				
Diabetes mellitus	17.0	25.7	9.9	8.9
Cerebrovascular diseases	3.9	9.3	7.3	9.7
Influenza and pneumonia	4.1	4.2	4.6	5.1
Renal failure	7.3	17.7	9.9	9.1
Chronic lower respiratory diseases	9.8	12.6	11.5	7.5
Neoplasms	3.0	4.4	7.5	4.6
Renal failure (N17–N19)				
Reported alone	7.8	12.3	7.4	11.0
Reported with:				
Septicaemia	23.5	19.2	10.1	8.3
Diabetes mellitus	19.6	12.6	7.1	6.7
Ischaemic heart disease	31.4	15.5	30.7	23.8
Cerebrovascular diseases	5.9	5.6	6.8	6.6
Influenza and pneumonia	11.8	12.9	13.0	12.4
Chronic lower respiratory diseases	3.9	9.4	8.0	4.3

(a) Data are for Queensland, South Australia, Western Australia and the Northern Territory 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 Australians.

(c) Sum of components may exceed 100% as more than one associated cause can be recorded for each death.

Source: AIHW, National Mortality Database

Table 9.29 uses the recording of multiple causes of death to align the type and extent of injuries sustained by Indigenous people whose deaths were due to external causes. For the period 1999–2003, of all deaths from transport accidents, 40% involved injuries to multiple body parts, 36% involved injuries to the head and 20% involved injuries to the chest. For deaths from accidents other than transport accidents, 39% were for 'other and

Multiple causes of death continued unspecified effect', while injuries to the head and poisoning were each involved in 16% of the deaths from these accidents. Most deaths from intentional self-harm were for 'other and unspecified effects' (82%), while deaths from assault most commonly involved injuries to the head (33%) or chest (31%).

9.29 DEATHS DUE TO EXTERNAL CAUSES BY NATURE OF INJURY(a), Indigenous Australians—1999–2003

<i>Nature of injury</i>		<i>Transport accidents (V01–V99)</i>	<i>Other accidents (W00–X59)</i>	<i>Intentional self-harm (X60–X84)</i>	<i>Assault (X85–Y09)</i>	<i>Total (V01–Y98)</i>
Injuries to the head (S00–S09)	%	36.2	16.3	4.0	33.1	20.0
Injuries to the neck (S10–S19)	%	7.7	3.8	9.2	10.0	7.2
Injuries to the thorax (chest) (S20–S29)	%	20.2	1.9	1.4	31.3	11.0
Injuries to the abdomen, lower back, lumbar spine, pelvis, hip and thigh (S30–S39, S70–S79)	%	11.0	8.0	2.0	17.5	8.1
Injuries involving multiple body parts (T00–T07)	%	40.4	1.0	1.2	9.4	13.4
Injuries to unspecified part of trunk, limb or body region (T08–T14)	%	7.4	2.2	0.3	11.3	4.3
Effects of foreign body entering through natural orifice (T15–T19)	%	1.2	7.7	0.3	1.3	2.7
Burns and corrosions (T20–T32)	%	0.6	5.8	0.6	—	1.8
Poisoning by drugs, medicaments and biological substances (T36–T50)	%	—	16.3	3.8	—	5.6
Toxic effects of substances chiefly non-medicinal as to source (T51–T65)	%	3.9	14.1	8.4	4.4	7.8
Other and unspecified effects of external causes (T66–T78)	%	3.6	39.3	82.1	3.8	36.0
Other	%	4.5	6.4	1.4	8.1	6.5
Total deaths (V01–Y98)(b)	no.	337	313	346	160	1 198

— nil or rounded to zero (including null cells)

(a) Data for Queensland, South Australia, Western Australia and the Northern Territory combined. Deaths are based on year of occurrence of death for 1999–2002 and year of registration of death for 2003.

(b) Sum of components may exceed 100% as more than one injury can be recorded for each death.

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 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. The following sections of this chapter examine 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 each section.

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 Indigenous populations in other countries (Ring & Brown, 2003). However, the potential for analysis of long-term

TRENDS IN MORTALITY

continued

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, South Australia, Western 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 1991–2002 have been used for the analyses of Indigenous mortality in this chapter. Data for 2003 have not been used because they are still incomplete, owing to late registration of some deaths. Due to changes in the coding of cause of death in 1997, the analyses of cause-specific mortality have been based on two time periods—1991–1996 and 1997–2002.

It would be possible to undertake analyses of trends using data for each jurisdiction separately or for all three jurisdictions combined. An analysis based on data combined from the three jurisdictions has the benefit of being based on larger numbers of observations. On balance, however, because of differences between jurisdictions—different administrative procedures that generate deaths data, different rates of Indigenous coverage, different degrees of period-to-period variation in coverage and different mortality rates—the preferred method has been to analyse mortality trends in the jurisdictions separately. Analyses undertaken during the preparation of this report were based on both separate and combined datasets. The pattern derived from the combined analyses was dominated by the larger jurisdictions, with the patterns of the smaller jurisdictions being masked. While it is possible that there are differences in mortality patterns within each jurisdiction (as well as between jurisdictions), the data currently available do not support analyses of this type.

It is important to note, however, that in 2001 the combined Indigenous populations of Western Australia, South Australia and the Northern Territory 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 2002, annual deaths for South Australia, Western Australia and the Northern Territory averaged 120, 369 and 407 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 by examining the rate of change between the beginning and end years, 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 years, whereas the trends modelling takes account of all the

TRENDS IN MORTALITY

continued

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'; when it has a p-value of between 0.05 and 0.10, it is characterised as 'of borderline significance'.

The mortality trends analyses presented in the following sections of this chapter have not used age-standardised data. Testing with both the Indigenous and the total Australian reference populations showed that age standardisation made no systematic difference to the findings regarding mortality trends. There is an ongoing debate as to whether standardisation is necessary or even appropriate for this type of analysis because trends may not be the same in all age groups. Moreover, the age composition of the Indigenous population has changed very little over the relatively short time period examined (e.g. 3% of the population in both 1991 and 2002 were aged 65 years or over in the three jurisdictions). It is therefore appropriate to use crude mortality rates as the trends would be affected very little, if at all, by changes in age composition.

While information on changes in mortality among Indigenous Australians is important in its own right, and can inform the design and evaluation of policy and interventions, it is also important to develop an understanding of how this compares with changes in mortality among the non-Indigenous population. The current data analyses do not allow a definitive answer about the relative rates of improvement for the two populations but any discussion of trends in Indigenous mortality should be read in the context of changes in non-Indigenous mortality over the same period. It is well known that most gains in non-Indigenous adult and infant mortality have occurred earlier, so that during the 1990s only small gains were observed. For example, the mortality rates of non-Indigenous infants in South Australia, Western Australia and the Northern Territory declined from 5.0, 5.6 and 9.8 deaths per 1,000 live births in 1991 to 4.3, 3.2 and 7.8 deaths per 1,000 live births in 2002 in these jurisdictions respectively. The crude death rates for the non-Indigenous population in these three jurisdictions remained fairly stable over the same period. In 1991, crude death rates were 773, 563 and 318 deaths per 100,000 population in South Australia, Western Australia and the Northern Territory, respectively, while in 2002 the corresponding rates were 773, 576 and 312 deaths per 100,000 population.

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 coverage'.

In the period 1991–2002, there were significant declines in recorded mortality rates in Western Australia for both males and females (table 9.30). For males, the fitted trend for the crude death rate implies an average yearly decline in recorded deaths of around 17 deaths per 100,000 population—this is equivalent to a reduction in the crude death rate of around one-quarter during the period of analyses. For females, the fitted trend for the crude death rate implies an average yearly decline in recorded deaths of around 15 deaths per 100,000 population—this is equivalent to a decline in the crude death rate of around one-quarter over the same period.

All-cause mortality
continued

During the same period, the fitted trend for crude death rates in South Australia (males, females and persons) and the Northern Territory (females and persons) showed declines in recorded deaths but they were not statistically significant.

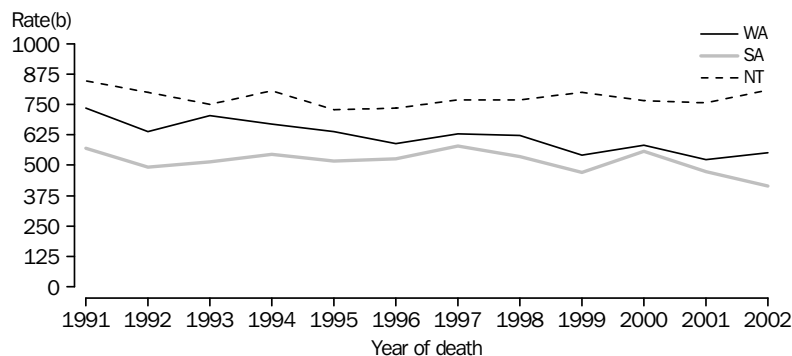
Graph 9.31 may suggest some differences between the levels of mortality between the three jurisdictions. It should be noted, however, that these differences may be partly an artefact of differences in coverage estimates. If, for example, the death rates for the most recent years were adjusted based on the ABS coverage estimate for 1999–2003 (South Australia (66%), Western Australia (72%) and the Northern Territory (95%)), then the death rates converge appreciably and the differences in death rates between jurisdictions are not statistically significant.

9.30 INDIGENOUS CRUDE DEATH RATES(a)(b), WA, SA and NT—1991–2002

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Western Australia												
Males	797	741	791	745	746	696	732	772	633	681	614	565
Females	670	534	611	589	527	481	524	474	448	482	430	537
Persons	734	638	702	668	637	589	628	623	541	581	522	551
South Australia												
Males	688	529	600	622	609	632	799	626	500	644	547	420
Females	449	455	426	469	423	422	362	445	443	473	402	409
Persons	569	493	513	546	516	526	579	535	471	558	474	415
Northern Territory												
Males	854	890	842	895	849	834	808	844	907	844	877	927
Females	837	710	655	714	604	634	732	694	689	686	634	694
Persons	846	800	749	805	727	735	770	769	798	765	756	810

(a) Deaths per 100,000 population.
 (b) Deaths are based on year of occurrence of death and state of usual residence.
 Source: AIHW, National Mortality Database

9.31 INDIGENOUS CRUDE DEATH RATES(a), WA, SA and NT—1991–2002



(a) Deaths are based on year of occurrence of death and state of usual residence.
 (b) Deaths per 100,000 population.
 Source: AIHW, National Mortality Database

Infant mortality rates

As with the 'all-cause mortality' analysis above, 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. However, Indigenous status on infant death registrations has generally been more comprehensively recorded than for deaths at older ages. See the later section 'The sensitivity of mortality trends to changes in coverage'.

There was a significant decline in recorded infant mortality in all three jurisdictions during the period 1991–2002 (table 9.32). In Western Australia, the fitted trend for the infant mortality rate implies an average yearly decline of around 0.6 deaths per 1,000 live births—this is equivalent to a reduction in the infant mortality rate of around one-third during the period of analysis. In South Australia, the fitted trend for the recorded infant mortality rate implies an average decline of around 0.9 deaths per 1,000 live births—this is equivalent to a decline in the infant mortality rate of around five-eighths during the same period. In the Northern Territory, the fitted trend line implies an average yearly decline of 0.9 deaths per 1,000 live births—this is equivalent to a decline in the infant mortality rate of two-fifths during the period 1991–2002.

9.32 INDIGENOUS INFANT MORTALITY RATES (a)(b), WA, SA and NT—1991–2002

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Western Australia(c)	20.8	22.8	16.3	20.3	22.1	18.9	19.0	17.0	16.7	13.9	16.9	15.5
South Australia	16.9	25.0	13.5	7.5	16.2	14.4	8.5	4.5	6.3	11.1	8.2	11.8
Northern Territory	25.5	28.1	25.8	21.7	17.0	24.6	23.8	21.0	28.2	17.0	16.0	13.0

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

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

(c) The average of births over 1993–1995 in Western Australia was used 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.

Source: AIHW, *National Mortality Database*, ABS 1999, 2004a

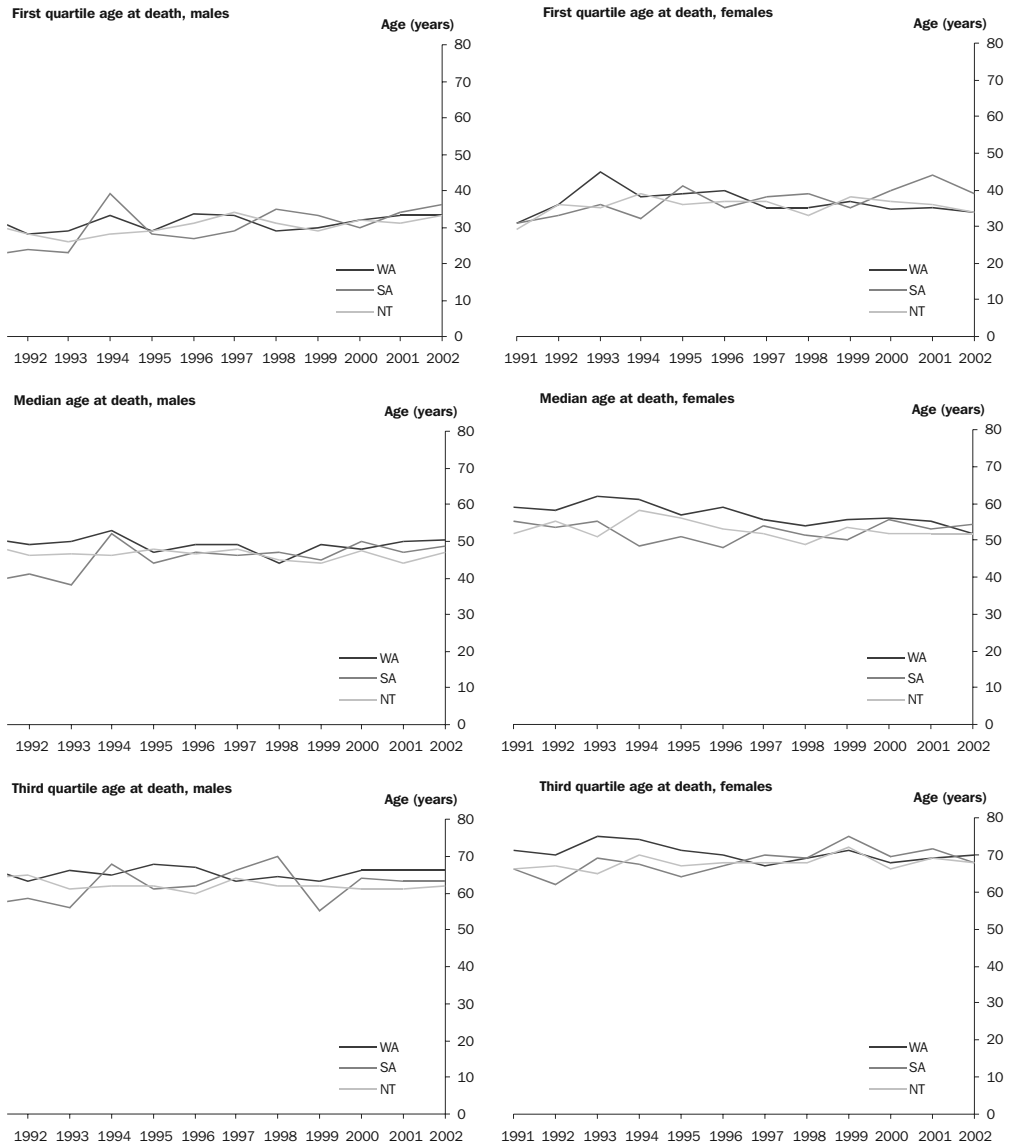
Quartiles of age at death

Another approach to the assessment of mortality trends, which was used in the 2003 edition of this report, is to examine changes in the age distribution of deaths. Total deaths can be partitioned into quartiles by age at death (the first quartile is the age below which 25% of all deaths occur, the median is the age below which 50% of all deaths occur, and the third quartile is the age below which 75% of all deaths occur). An analysis of this kind can reveal changes in patterns of mortality over time, such as an increase in the proportion of deaths occurring at older ages and a corresponding decrease in the proportion occurring at younger ages.

But any such changes must be interpreted with care before any inferences can be drawn regarding an improvement or deterioration in the mortality of Indigenous Australians. Moreover, the quartiles are affected by changes in the age distribution of the population resulting, for example, from changes in fertility—and therefore they support comparisons only if fertility rates remain constant over the period being analysed.

Nevertheless, the graphs at 9.33 suggest that, between 1991 to 2002, there has been some increase in the age at death for the first quartile in all jurisdictions. This is broadly consistent with other evidence such as the declines observed in infant mortality.

9.33 QUANTILES OF AGE AT DEATH FOR INDIGENOUS PEOPLE IN WA, SA AND NT—1999–2002



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 is 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—neoplasms; endocrine, nutritional and metabolic diseases; diseases of the circulatory system; diseases of the respiratory system; and external causes. Second, there have been changes in the classification and coding of causes of death over the period of the analyses from ICD-9 (1991 to 1996) to ICD-10 (1997 to 2002), and this affects the comparability of the data. Therefore, the

*Cause-specific mortality
continued*

analyses reported here have been done for two time periods—1991–1996 and 1997–2002. Third, when analysing five causes of death for three jurisdictions, for three population groups (persons, males and females) and for two periods, some individually statistically significant changes may arise by chance—so attention should be paid to those causes that show some consistency of pattern, not to individual differences or changes.

As for the analysis 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 later section 'The sensitivity of mortality trends to changes in coverage'.

Of the five causes examined, only diseases of the circulatory system showed somewhat consistent significant trends in recorded mortality.

In Western Australia, recorded mortality from diseases of the circulatory system showed declines during both time periods studied (tables 9.34 and 9.35). During 1991–1996, there was a decline of borderline significance for persons (with the fitted trend implying that the mortality rate at the end of the period was around three-quarters the rate at the beginning); this reflected a significant decline for females (to around three-fifths the mortality rate at the beginning of the period) and a smaller decline, not attaining statistical significance, for males.

9.34 INDIGENOUS CRUDE DEATH RATES, CIRCULATORY DISEASES (a) (b), Western Australia—1991–1996

	1991	1992	1993	1994	1995	1996
Western Australia						
Females	221	215	163	191	138	131
Persons	240	203	184	220	173	164

(a) Deaths per 100,000 population.

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

Source: AIHW National Mortality Database

During 1997–2002, there was a significant decline for persons in Western Australia (to around three-quarters the mortality rate at the beginning of the period). Broadly equivalent declines were implied by the fitted trends for males (of borderline significance) and for females (not attaining statistical significance).

In South Australia, recorded mortality from diseases of the circulatory system showed declines during the second period (1997–2002). The fitted trends implied significant declines for persons and males (to around three-quarters and two-fifths the mortality rates at the beginning of the period, respectively).

*Cause-specific mortality
continued*

In the Northern Territory too, recorded mortality from diseases of the circulatory system showed declines during the second period (1997–2002). The fitted trend implied a decline of borderline significance for persons to four-fifths the mortality rate at the beginning of the period; the recorded decline for males was significant, and that for females was not significant.

9.35 INDIGENOUS CRUDE DEATH RATES, CIRCULATORY DISEASES
(a)(b), WA, SA and NT—1997–2002

	1997	1998	1999	2000	2001	2002
Western Australia						
Males	220	209	170	142	182	155
Persons	173	172	150	150	133	130
South Australia						
Males	195	184	164	145	111	86
Persons	152	153	146	131	121	115
Northern Territory						
Males	274	274	237	247	228	228
Persons	249	229	199	208	181	206

- (a) Deaths per 100,000 population.
- (b) Deaths are based on year of occurrence of death and state of usual residence.

SOURCE: AIHW, NATIONAL MORTALITY DATABASE

*The sensitivity of mortality
trends to changes in
coverage*

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.

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 1999–2003).
- Under the increasing coverage scenario, deaths were adjusted by linearly increasing the coverage through the period under study—from 64% in 1991 to 71% in 2002 for Western Australia; from 60% to 66% for South Australia; and from 90% to 95% for the Northern Territory.
- Under the decreasing coverage scenario, deaths were adjusted by linearly decreasing the coverage—from 80% in 1991 to 73% for Western Australia; from 72% to 67% for South Australia; and from 100% to 95% for the Northern Territory.

The sensitivity of mortality trends to changes in coverage continued

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 all-cause mortality for males and persons in Western Australia during the period 1991–2002 remained significant under all three scenarios. For females, the significant decline became of borderline significance under the decreasing coverage scenario.

The declines in infant mortality during 1991–2002 in Western Australia and the Northern Territory remained significant under all three scenarios. For South Australia, the significant decline became of borderline significance under the decreasing coverage scenario.

The declines in mortality from diseases of the circulatory system—during 1991–96, for females in Western Australia; and during 1997–2002, for persons in Western Australia, for males and persons in South Australia, and for males in the Northern Territory—remained significant under all three scenarios.

Comparisons with other research

Condon et al. (2004b) have undertaken one of the most thorough analyses of Indigenous mortality in Australia. This work examined mortality for the Northern Territory only, but over a much longer period (1967–2000) than has been used in this Chapter.

Condon et al. (2004b) reported that Indigenous all-cause mortality rates in the Northern Territory declined overall and for all age groups that they examined. Declines were greater for females than males, and greater in younger and older age groups than in the early and middle adult years (25–64 years). They based their analyses on three broad disease groups—'communicable diseases' (defined to also include maternal, perinatal and nutritional conditions), 'non-communicable diseases' and injuries. As to cause-specific mortality, they reported declines for two disease groups—communicable diseases and injury—but no statistically significant trend for non-communicable diseases.

The analyses described by Condon et al. (2004b) have been replicated using the mortality data on which this chapter is based. The replicated analyses differ from Condon et al. in several ways—they are based on three jurisdictions (adding Western Australia and South Australia to the Northern Territory); the data refer to a much shorter time period (1991–2002); and using all ages for overall and cause-specific mortality (whereas Condon et al. used ages five years and over).

Mortality trends have been examined for Western Australia, South Australia and the Northern Territory and for the same age groupings as were reported by Condon et al.

The trends that were statistically significant are listed below:

- For Western Australia during 1991–2002, there were significant declines in Indigenous mortality rates in some age groupings. For persons, there were declines for ages 0–4 years, 45–64 years and 65 years and over. For males, there were declines for ages 0–4 years and 45–64 years. For females, there were declines for ages 45–64 years and 65 years and over.

Comparisons with other research continued

- For South Australia, there was a decline for persons aged 45–64 years.
- For the Northern Territory, there were declines in age-specific mortality for both persons and for females aged 45–64 years.

Trends in crude death rates have also been examined using the same broad cause-of-death groups as are reported by Condon et al. (2004b). Some of the results of these analyses are shown in table 9.36. In summary, the only statistically significant trends were:

- For Western Australia during 1991–2002, there were significant declines among persons, males and females for death from non-communicable diseases. There were also significant declines among males for death from communicable diseases. There were no significant trends for injury.
- For South Australia, there was one significant trend—a decline among males for death from communicable diseases.
- For the Northern Territory, there were significant declines for persons, males and females for death from communicable diseases. There was a significant increase for males for death from non-communicable diseases. For injury, there were no significant trends.

In summary, there is some agreement between the results of the shorter-period, three-jurisdiction analyses discussed above and those reported by Condon et al. (2004b) regarding the Northern Territory. It is not surprising that the analyses by Condon et al. (2004b), spanning a much longer time period back to the 1960s, showed a larger number of significant trends. With a much longer period of data for the analyses, there is greater chance for any systematic movement in mortality rates to dominate or emerge from the variable year-to-year data. There may also be real differences in the mortality trends experienced in the three jurisdictions studied. It may also be that the differing coverage rates in the three jurisdictions studied (with much higher coverage in the Northern Territory) mask similarities and differences in Indigenous mortality across these jurisdictions.

9.36 INDIGENOUS CRUDE DEATH RATES, CAUSE-SPECIFIC MORTALITY (a)(b), WA, SA and NT—1991–2002

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
COMMUNICABLE, MATERNAL, PERINATAL AND NUTRITIONAL CONDITIONS												
Western Australia												
Males	105	81	107	49	92	87	56	48	41	62	61	66
South Australia												
Males	78	104	74	36	35	35	68	25	33	32	56	16
Northern Territory												
Males	145	171	106	148	86	115	64	100	120	68	98	52
Females	137	118	66	121	99	77	72	78	81	83	49	59
Persons	141	145	86	135	92	96	68	89	100	75	74	55
NON-COMMUNICABLE DISEASES												
Western Australia												
Males	537	477	483	511	465	442	541	479	407	433	411	392
Females	502	415	474	441	382	400	369	368	344	355	324	359
Persons	520	446	479	476	424	421	455	423	375	394	367	375
Northern Territory												
Males	521	510	499	587	587	517	597	552	608	583	576	612

(a) Deaths per 100,000 population.

Source: AIHW, National Mortality Database

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

Comparisons with other research continued

9.37 MORTALITY TRENDS IN NEW SOUTH WALES AND QUEENSLAND

The short time series available for data from New South Wales and Queensland and the current coverage of data don't allow one to detect with confidence the kind of trends in mortality that have been detected in the other three jurisdictions. Preliminary analysis of mortality in New South Wales and Queensland did not contradict the findings in the three jurisdictions with better coverage. Therefore in a few years time, as the series with higher rates of coverage lengthens, it will be possible to draw conclusions on trends in mortality in these two additional jurisdictions.

SUMMARY

In the period 1996–2001, the life expectancy at birth for Indigenous Australians was estimated to be 59.4 years for males and 64.8 years for females, compared with 76.6 years for all males and 82.0 years for all females for the period 1998–2000, a difference of approximately 17 years for both males and females.

For the period 1999–2003, in Queensland, South Australia, Western Australia and the Northern Territory, 75% of recorded Indigenous male deaths and 65% of Indigenous female deaths occurred before the age of 65 years. This compared with 26% and 16%, respectively, of deaths of non-Indigenous males and females. For all age groups below 65 years, the age-specific death rates for persons identified as Indigenous in the selected jurisdictions were at least twice those for other Australians. The largest differences occurred at ages 35–44 and 45–54 years where the death rates for Indigenous Australians were five times those recorded for non-Indigenous Australians.

SUMMARY *continued*

Based on 1999–2002 year of occurrence of death and 2003 year of registration of death, the three leading causes of death for Aboriginal and Torres Strait Islander peoples in the four jurisdictions were diseases of the circulatory system, injury (predominantly accidents, intentional self-harm and assault) and cancer.

Over the period 1999–2003, Indigenous males and females died at almost three times the rate of non-Indigenous males and females. Indigenous Australians also had higher rates of mortality from all major causes of death. For example, mortality rates for Indigenous males and females for endocrine, nutritional and metabolic diseases (including diabetes) were around seven and 11 times, respectively, those for non-Indigenous males and females.

Deaths where multiple causes were reported were more common among Indigenous males and females. For example, 19% of deaths among Indigenous males and 21% of deaths among Indigenous females recorded five or more causes of death, compared with 14% and 13% of non-Indigenous male and female deaths respectively.

An analysis of trends in mortality showed that between 1991 and 2002 there were significant declines in recorded mortality in Western Australia for both males and females. There was also a significant decline in recorded infant mortality in Western Australia, South Australia and the Northern Territory over the same period. This is supported by an observed increase in the age at death in the first quartile in these jurisdictions. Of the five main causes of death examined—neoplasms; endocrine, nutritional and metabolic diseases; diseases of the circulatory system; diseases of the respiratory system; and injury—only mortality from diseases of the circulatory system showed a consistently significant decline.

While the analyses in this chapter support a conclusion that Indigenous mortality has declined, it is important to note that estimates of the magnitude of the trend could also reflect changes in reporting Indigenous status in deaths registrations.