Australian Indigenous HealthInfoNet

Overview of the health of Indigenous people in Western Australia 2011

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Australian Indigenous Health*InfoNet*

The Australian Indigenous Health*InfoNet*'s mission is to contribute to improvements in Indigenous health by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians, researchers and the general community.

The Health*InfoNet* addresses this mission by undertaking research into various aspects of Indigenous health and disseminating the results (and other relevant knowledge and information) mainly via its Internet site (www.healthinfonet.ecu.edu.au). The *HealthInfoNet*'s research mainly involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources.

The Health*InfoNet*'s work in translational research aims at transferring the results of pure and applied research into policy and practice. In this research, the Health*InfoNet* addresses the knowledge needs of a wide range of potential users. These include policy makers, health service providers, program managers, clinicians and other health professionals (including Indigenous health workers), and researchers. The Health*InfoNet* also provides easy-to-read and summarised material for students and the general community.

Director: Professor Neil Thomson

Address: Australian Indigenous Health*InfoNet*

Kurongkurl Katitjin, Centre for Indigenous Australian Education and Research

Edith Cowan University

2 Bradford Street

Mount Lawley, WA 6050

Telephone: (08) 9370 6336

Facsimile: (08) 9370 6022

Email: healthinfonet@ecu.edu.au

Web address: http://www.healthinfonet.ecu.edu.au

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Sasha Stumpers

Neil Thomson

and

Jasmina Brankovich

Jane Burns

Michelle Catto

Caitlin Gray

Caitlin Maling

Christine Potter

Kathy Ride

Belinda Urquhart

June 2011

Australian Indigenous Health*InfoNet*

Perth, Western Australia

Contents

Preface

This overview of the health of Indigenous people in Western Australia has been prepared by the Australian Indigenous Health*InfoNet* as a part of our efforts to contribute to improvements in Indigenous health by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians, researchers and the general community.

Its preparation was undertaken as a part of the development within the Health*InfoNet* site of a specific section devoted to Indigenous health in Western Australia. Development of the section, the first of a planned series for all States and Territories, has been enabled with the provision of separate funds from the Western Australian Department of Health's Office of Aboriginal Health. The Health*InfoNet* is grateful for this support.

Preparation of the overview involved the collection, collation, and analysis of a wide range of relevant information, including both published and unpublished material. Sources included government reports, articles in journals and other periodicals, books and book chapters, and reports from specific studies and projects.

The overview draws on information from the main administrative data collections (such as the birth and death registration systems and the hospital inpatient collections) and surveys. Information from these sources has been published mainly in government reports, particularly those produced by the Australian Bureau of Statistics (ABS) and the Australian Institute of Health and Welfare (AIHW).

Importantly, the overview draws also on a wide variety of other information sources, including registers for specific diseases and other conditions, regional and local surveys, and numerous epidemiological and other studies examining particular diseases, conditions, and health determinants. Information from these sources is disseminated mainly through journals and similar periodicals, or in special reports (such as the annual reports of the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA)).

A number of sections include the results of the Health*InfoNet*'s own analyses of data obtained from a variety of sources. For example, estimates of the age-adjusted incidence of end-stage renal disease (ESRD) were made using notification data provided by ANZDATA.

The initial sections provide information about the Indigenous population, the context of Indigenous health, and various measures of population health status. Most sections about specific health conditions comprise a brief summary about the condition and evidence of the current burden of the condition among Indigenous people in Western Australia.

Further information about the aspects summarised in this overview are included in the corresponding sections of the Health*InfoNet*'s website (www.healthinfonet.ecu.edu.au).

We welcome your comments and feedback about the overview.

Neil Thomson, Director, on behalf of the Health*InfoNet* team

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- other staff of the Australian Indigenous Health*InfoNet* for their support and encouragement in the preparation of this overview.

Introduction

This overview draws largely on published information, some of which has been re-analysed to provide clearer comparisons between Indigenous and non-Indigenous people (for more details of statistics and methods, readers should refer to the original sources)[1].

Limitations of the sources of Indigenous health information

Indigenous health information is limited by relatively low levels of identification of Indigenous people in the vital statistics and administrative data collections, except those relating to births for which the identification of Indigenous mothers and fathers is considered good [1, 2]. As noted below, reasonably reliable information is available for Western Australia (WA) for some other administrative collections, but there is substantial room for improvement:

- the estimated coverage of Indigenous births in WA was 94% for the period 2000-2004 [3]
- the coverage of Indigenous people in death registrations in WA is likely to be between ABS's estimate of 72% for the period 2000-2004 [3] and their estimate of 92% based on a study linking deaths in 2006-2007 with 2006 census information [4]
- assessment of the quality of identification of Indigenous people in data from 26 hospitals in WA, in 2000, found that the official statistics understated the actual number of Indigenous people admitted as patients and the level of accuracy varied between regions [5]. The areas with the highest proportion of Indigenous people had the highest level of accuracy in the recording of Indigenous status.

The need for information at a community level was identified in consultations undertaken for the development of the *National Aboriginal and Torres Strait Islander information plan* [6], but there are no reliable data routinely available at this level. Survey information, particularly that collected nationally by the Australian Bureau of Statistics (ABS), such as the *2004-05 National Aboriginal and Torres Strait Islander health survey* (NATSIHS), is valuable, but it is limited at a regional level by the relatively small number of Indigenous people surveyed. It is also difficult to compare survey findings because of differing sample sizes, methodologies and seasonal variations in some health conditions. On the other hand, very good data about various aspects of the health of Indigenous children in WA is available from the *Western Australian Aboriginal child health survey* (WAACHS).

Statistics on hospitalisation provide some insights into ill-health in the population. They are, however, quite a poor reflection of the extent and patterns of treatable illness in the community, since they represent only illness that is serious enough to require hospitalisation. Even then, hospital statistics relate to episodes of hospitalisation, with the result that each admission of an individual for a specific condition will be counted. This has a major impact on the numbers of admissions for aspects like renal dialysis, for which some people may be admitted many times in a year.

As well, the comparability of hospitalisation statistics is limited by many factors, including regional variations in admission practices, and differential geographic accessibility of hospitals.

Importantly, the incompleteness of Indigenous identification in most jurisdictions means that comparisons of Indigenous and non-Indigenous hospitalisation, including those presented in this overview, under-estimate the true difference.

1 The term 'Indigenous' is used in this overview to refer generally to the two Indigenous populations of Australia – Australian Aboriginal people and Torres Strait Islanders.

Population structure

There were approximately 39,114 Indigenous males and 38,493 Indigenous females living in WA at 30 June 2011 according to ABS projections (based on the numbers of Aboriginal and Torres Strait Islander people counted in the 2006 Census of Housing and Population) [7].

The WA Indigenous population represents around 3.3% of the total WA population and 13.5% of the total Australian Indigenous population (estimated to be 574,874 at 30 June 2011). Figures from the 2006 census reveal that over one-third of WA's Indigenous people live in the Perth metropolitan area, where they comprise 1.5% of the total population (Table 1) [7]. The next most populous geographical region is Narrogin, where 14.5% of the State's Indigenous population live and comprise 2.6% of the total population of that region. The geographical region of Derby had the highest proportion of Indigenous people (63% of the population of the jurisdiction [8]. More than two-fifths (41%) of the Indigenous population of WA lived in remote or very remote areas at 30 June 2006 compared with only 6.8% of the total population [8, 9][2].

Table 1. Resident Western Australian Indigenous population by geographical region (30 June 2006)

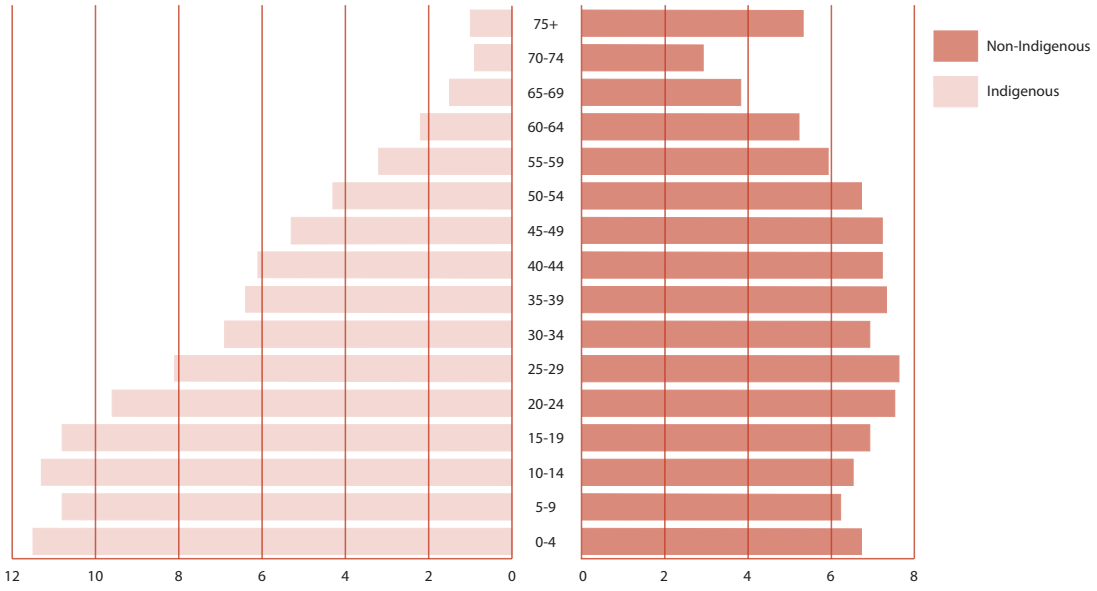
Region	Indigenous population (no.)	Proportion of total Indigenous population of WA (%)	Proportion of total population of jurisdiction (%)	Proportion of population status unknown (%)
Perth metropolitan	21,321	37	1.5	6.1
Narrogin	8,456	14.5	2.6	5.9
South Hedland	5,660	9.7	13.1	16.3
Geraldton	5,496	9.4	10.1	7.7
Kalgoorlie	5,220	8.9	9.9	8.8
Derby	4,431	7.6	63.3	7.0
Kununurra	4,336	7.4	46.9	12.2
Broome	3,560	6.1	27.3	14.2

Source: Derived from ABS (2007) [8].

Notes: 1. This table presents raw census count numbers and as such likely underestimates the population of Indigenous people in each jurisdiction. For this reason the status unknown column is included

2. The regions are those used by the ABS for aggregation of population estimates

Figure 1. Population pyramid of Indigenous and non-Indigenous populations in WA, 2011



Source: Derived from ABS, 2009 [7], ABS, 2008 [10] and [11].

2 Based on the Accessibility/Remoteness Index of Australia (ARIA), the five categories of remoteness used by the ABS are: 'major cities' (Census collection districts (CDs) with an average ARIA value of 0-0.2); 'inner regional' (average ARIA value > 0.2 and <= 2.4); 'outer regional' (average ARIA value > 2.4 and <= 5.92); 'remote' (average ARIA value > 5.92 and <= 10.53); and 'very remote' (average ARIA value > 10.53). The latter two categories are characterised by 'very little or very restricted access to goods and services and opportunities for social interaction'.

Births and pregnancy outcome

In 2009, there were 2,416 births registered in WA (1,236 males and 1,180 females) with one or both parents identified as Indigenous (7.8% of all births registered) [12]. (Implied coverage of Indigenous births in WA for 2002-2006 is estimated at 95% on 2001 Census-based projections). Both parents were identified as Indigenous in 46% of the 2,416 births, with only the mother in 33% (including births where paternity was not acknowledged – 14%), and only the father in 21% [12].

Age of mothers

In 2009, Indigenous women in WA tended to have more babies and to have them at younger ages than did non-Indigenous women [12]. The median age of Indigenous mothers was 24.5 years compared with 30.6 years for all mothers. In 2009, the highest age-specific fertility rates were for the 20-24 years age group for Indigenous women and in the 30-34 years age group for all women (Table 2). The fertility rate of Western Australian teenage Indigenous women (103 babies per 1,000 women) was more than four times that for all teenage women in WA (20 babies per 1,000 women).

Table 2. Age-specific fertility rates, by Indigenous status of mother, Western Australia and Australia, 2009

Age group	Western Australia		Australia	
	Indigenous	All mothers	Indigenous	All mothers
15-19	103	20	79	17
20-24	187	61	152	54
25-29	157	107	132	102
30-34	106	125	94	124
35-39	46	65	47	69
40-44	11	13	11	14
45-49	1	1	0	1

Source: Derived from ABS, [12].

Notes: 1. Rates per 1,000 women in each age group.

2. Includes births to mothers aged less than 15 years.

3. Includes births to mothers aged 50 years and over.

Total fertility rates

In 2009, the total fertility rate for Indigenous women living in WA was 3.06 births per 1,000 compared with 1.96 per 1,000 for all Western Australian women [12]. (The total fertility rate for Indigenous women in Australia was 2.58 births per 1,000 compared with 1.90 births per 1,000 for all Australian women.)

Method of birth

In 2008, Indigenous mothers in WA were more likely than non-Indigenous mothers to have a non-instrument vaginal (including breech) birth (70% compared with 52%) and less likely to have assisted instrumental vaginal deliveries (forceps or vacuum extraction) (6% compared with 14%) [13]. Indigenous mothers in WA also had a lower rate of caesarean section (24% compared with 34%).

Birthweights

In 2008, the average weight of babies born to Indigenous mothers living in WA was 3,113 grams, which is 243 grams lighter than the average for babies born to all Western Australian mothers, 3,357 grams [13]. Babies born to Indigenous women in WA in 2008 were more than twice as likely to be of low birthweight (LBW) than were those born to all women in WA (14.8% compared with 6.2%). (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of illness and death in infancy and of other health problems).

Risk factors for LBW include socioeconomic disadvantage, the size and age of the mother, the number of babies previously born, the mother's nutritional status, illness during pregnancy, the duration of the pregnancy, and mother's alcohol consumption and use of tobacco and other drugs during pregnancy [13, 14]. According to the WAACHS, infants born to mothers who used tobacco during pregnancy had a significantly lower average birth weight (3,110 grams) than did infants born to mothers who had not used tobacco

during pregnancy (3,310 grams) [15]. Lowest average birthweights were for infants whose mothers used marijuana with tobacco (3,000 grams) or with both tobacco and alcohol (2,940 grams).

Mortality

In 2009, 444 of the 12,566 deaths registered in WA were identified as being of an Indigenous person [16]. Based on the under-identification of Indigenous people in death registrations, the actual number of Indigenous deaths is likely to be between 480 and 620 (see above) [3, 4].

The following summary measures of mortality are based on the numbers of registered deaths, so some caution should be exercised in their interpretation.

Expectation of life

In 2005-2007, after adjustment for the incompleteness of identification of Indigenous people in death registrations, the ABS estimates that Indigenous males born in WA could be expected to live to 65.0 years, 14 years less than the 79.0 years expected for non-Indigenous males [16] (Life expectancy at birth is the number of years a person born in the reference year can expect to live if they experience the current age-specific death rates. (Estimates were not available for WA and South Australia (SA) separately). In 2005-2007, the expectation of life at birth of 70.4 years for Indigenous females born in WA was almost 13 years less than the expectation of 82.9 years for non-Indigenous females born in WA. For the same time period, the estimates for Indigenous people nation-wide were 67.2 years for males and 72.9 years for females [16].

Age at death

In 2009, the median age at death for Indigenous males in WA was 50.6 years, which was 26.7 years less than for non-Indigenous males (77.3 years)[3] [16]. The median age at death for WA Indigenous females was 58.7 years, 24.9 years less than for WA non-Indigenous females (83.6 years).

In 2005-2009, death rates in WA were higher for Indigenous people than for non-Indigenous people across all age groups, with rate ratios highest in the middle adult years[4] (Table 3) [16]. (These ratios, being based on the numbers of deaths registered, are likely to underestimate the true differences between death rates for Indigenous people and the total population by 10-30%.) The greatest difference occurred among females and males aged 35-44 with rates nearly eight times those recorded for non-Indigenous males and females.

Table 3. Age-specific death rates and rate ratios for all causes, by sex, WA, 2005-2009

Age group	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0	11	3	3.5	8	3	2.4
1-4	113	23	4.9	60	12	4.9
5-14	33	9	3.8	19	8	2.5
15-24	247	66	3.7	126	26	4.8
25-34	446	90	5.0	248	40	6.3
35-44	898	122	7.4	530	68	7.8
45-54	1511	260	5.8	944	156	6.0
55-64	2786	602	4.6	2027	349	5.8
65 and over	7765	3913	2.0	6924	3455	2.0

Source: AIHW, 2010 [16].

Notes: 1. Rates are per 100,000 population, except age 0.

2. Rate ratio is the rate for Indigenous people divided by the rate for non-Indigenous people.

3. Deaths for which Indigenous status was not stated were excluded from the calculation of rates.

3 The median age at death is the age below which 50% of people die. The measure partly reflects the age structures of the respective populations, so it is a less precise measure than age-specific death rates.

4 Rate ratios are the Indigenous rate divided by the non-Indigenous rate for each age group.

Infant mortality

In 2007-2009, the infant mortality rate of 7.7 infant deaths per 1,000 live births for Indigenous people in WA was nearly three times the rate of 2.7 per 1,000 for non-Indigenous Western Australians [16]. (The infant mortality rate is the number of deaths of children under one year of age in a calendar year per 1,000 live births in the same calendar year.) The rate of 10.3 per 1,000 for Indigenous males was higher than the rate of 5.1 per 1,000 for Indigenous females.

Causes of death

In 2009, the most common causes of death for Indigenous people in WA were ischaemic heart disease and diabetes, which were responsible for 14.4% and 8.4% respectively of all Indigenous deaths[5] (Table 4).

Table 4. Underlying cause of death, selected causes, Indigenous status, by sex, WA, 2009

Cause of death	Males (no.)	Females (no.)	Proportion of all Indigenous deaths (%)
Ischaemic heart disease	40	24	64
Diabetes	14	23	37
Land transport accidents	19	7	26
Intentional self-harm (suicide)	19	5	24
Malignant neoplasm (cancer) of trachea, bronchus and lung	14	5	19
Diseases of the urinary system	8	11	19
Cerebrovascular disease	10	7	17
Chronic lower respiratory disease	8	9	17
Other causes	107	114	221
All causes	239	205	444

Source: Derived from ABS 2011 [17].

The most recent valid data for comparing causes of death for Indigenous and non-Indigenous people reveal that the standardised mortality ratios (SMR) for cardiovascular disease (also known as 'diseases of the circulatory system' for males and females living in Queensland (Qld), WA, SA and the Northern Territory (NT) in 2001-2005 were 3.2 and 2.7 respectively (Table 5). For Indigenous males in 2001-2005, the next most frequent causes of death were injuries (including transport accidents, intentional self-harm and assault) (2.9 times the number expected from rates for the total male population of Qld, WA, SA and the NT), malignant neoplasms (cancers) (1.5); diseases of the respiratory system (4.3); and endocrine, nutritional and metabolic disorders (mainly diabetes) (7.5). For Indigenous females, the most frequent causes of death after cardiovascular disease was malignant neoplasms (1.6); injuries (3.5); endocrine, nutritional and metabolic disorders (10.1); and diseases of the respiratory system (3.6) [3].

5 Data available for 2009 do not enable a valid comparison of causes of death for Indigenous and non-Indigenous people, which would involve examination of standardised rates.

Table 5. Numbers of Indigenous deaths, by cause and sex, and Indigenous standardised mortality ratios, Qld, WA, SA and the NT, 2001-2005

Cause of death	Males		Females	
	Number	SMR	Number	SMR
Circulatory	1150	3.2	856	2.7
External causes (inc. Injuries)	851	2.9	369	3.5
Neoplasms (inc. Cancer)	592	1.5	547	1.6
Respiratory	378	4.3	281	3.6
Endocrine, nutritional and metabolic	315	7.5	367	10.1
Digestive	251	5.8	182	5.1
Mental and behavioural disorders	101	5.8	72	3.1
Nervous system	122	2.9	69	1.6
Infectious/ parasitic	102	5.1	72	5.0
Genitourinary	79	4.8	119	6.0
Perinatal	126	2.9	82	2.3
Other	169	6	85	4.6

Source: AIHW, 2008 [18].

Notes: 1. The standardised mortality ratio (SMR) is the ratio of the number of Indigenous deaths occurring to the number expected if the age, sex and cause-specific rates of the total population applied to the Indigenous population.

2. Due to under-identification of Indigenous deaths, these numbers and SMRs are likely to underestimate the true differences between the Indigenous and total populations by around 30%.

Hospitalisation

Separation rates

During 2009-10, there were 825,607 hospital separations in WA, of which 61,602 (7.5%) were identified as Indigenous [19]. The age-standardised separation rate of 1,314 separations per 1,000 for the Indigenous population was more than three times the rate of 375 per 1,000 for the non-Indigenous population. There were 334,845 overnight hospital stays recorded in WA during 2009-10, of which 21,693 (6.5%) were identified as involving Indigenous people. The age-standardised separation rate of 361 per 1,000 for overnight stays for Indigenous people was more than two times the rate of 153 for non-Indigenous people. (Information about Indigenous status in hospital records is regarded as being of acceptable quality by the Western Australian Department of Health, but data for metropolitan hospitals are considered less accurate than data from remote areas [20].) Overall, it is likely that the Australia-wide numbers and rates for Indigenous hospitalisation could be up to 25% higher.)

Age-specific separation rates

Separate detailed data are not available for WA, but for Australia in 2009-10, separation rates were higher for Indigenous people than for non-Indigenous people for virtually all age groups, with the highest differences occurring in the middle adult years (Table 6) [19].

Table 6. *Age-specific hospital separation rates, by Indigenous status and sex, and Indigenous: non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2009-10*

Age group	Males			Females		
	Indigenous rate	Non-Indigenous rate	Rate ratio	Indigenous rate	Non-Indigenous rate	Rate ratio
0-4	390	271	1.4	307	207	1.5
5-9	127	101	1.3	94	78	1.2
10-14	1018	83	1.2	94	69	1.4
15-19	155	134	1.2	330	184	1.8
20-24	230	143	1.6	575	276	2.1
25-29	281	157	1.8	616	373	1.7
30-34	379	160	2.4	656	396	1.7
35-39	714	205	3.5	695	385	1.8
40-44	950	230	4.1	989	314	3.2
45-49	1276	296	4.3	1415	334	4.2
50-54	1614	390	4.1	1842	408	4.5
55-59	2197	501	4.4	2399	467	5.1
60-64	2581	802	3.2	3281	673	4.9
65+	1822	1367	1.3	1522	1037	1.5

Source: Derived from AIHW, 2011 [19].

Notes: 1. Numbers include separations for which Indigenous status was not stated.

2. Rates are expressed as separations per 1,000 population.

3. Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

4. The rates have not been adjusted for likely under-identification of Indigenous separations, so it is likely that the Indigenous rates, and hence the rate ratios, could be 25-30% higher.

Causes of hospitalisation

Separate detailed data are not available for WA, but for NSW, Vic, Qld, WA, SA and the NT combined, the most common reason of hospitalisation for Indigenous people in 2009-10 was 'factors influencing health status and contact with health services' (largely dialysis related) accounting for 48% of Indigenous separations (145,881 separations) [19]. (Many of these separations involved repeat admissions for the same people, some on an almost daily basis.) The international classification of diseases (ICD) group 'injury and other consequences of external causes' (including motor vehicle accidents, assaults, self-inflicted harm and falls) was the next most common cause of hospitalisation for Indigenous people, responsible for 14.3% of separations (22,701 separations) [21]. The next leading causes of hospitalisation for Indigenous people (excluding pregnancy-related conditions, most of which involved normal deliveries) were for respiratory conditions responsible for 11.5% of separations (more than 18,000) (excluding those for dialysis).

The most recent comparative information indicates that Indigenous people were hospitalised in 2007-08 at higher rates than non-Indigenous people for all major causes (Table 7). Other recent data for 2008-09, for Qld, WA, SA and public hospitals in the NT, indicate similar findings for age-standardised rates by type of long term condition (Table 8).

Table 7. *Numbers and proportions of Indigenous hospital separations, by principal diagnosis (excluding dialysis), and Indigenous: non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2007-08*

Principal diagnosis	Number of Indigenous separations	Proportion of Indigenous separations (excl. dialysis) (%)	Rate ratio
Injury/poisoning	19,919	12.8	2.0
Pregnancy related	19,333	12.4	1.4
Respiratory diseases	16,601	10.6	2.9
Digestive diseases	14325	9.2	1.0
Symptoms, signs not elsewhere classified	11,875	7.6	1.6
Mental & behavioural disorders	11,283	7.2	1.9
Circulatory diseases	8,522	5.5	1.8
Genitourinary conditions	6,533	4.2	1.2
Diseases of the skin & subcutaneous tissue	6,372	4.1	2.6
Endocrine (incl. diabetes)	5,443	3.5	3.2
Infectious/parasitic diseases	5,418	3.5	2.6
Other	30,357	19.5	-
All causes (excluding dialysis)	156,011	100.0	1.4

Source: Derived from AIHW, 2009 [22].

Notes: 1. Excludes hospitalisation for dialysis.

2. Ratios are the standardised separation rates for Indigenous people divided by the standardised separation rates for non-Indigenous people.

3. Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates by 20-25%.

Table 8. *Age-standardised separation rates and rate ratios, by Indigenous status and type of chronic disease, Qld, WA, SA and the NT, 2008-09*

Type of long term health condition	Separation rate (per 1,000)		
	Indigenous	Non-Indigenous	Rate ratio
Angina	5.7	1.2	4.8
Asthma	4.8	1.2	4.0
Chronic obstructive pulmonary disease	11.2	2.1	5.3
Congestive heart failure	7.6	1.8	4.2
Diabetes complications	38	5.9	6.5
Hypertension	0.5	0.2	2.5
Iron deficiency anaemia	1.9	1.3	1.5
Rheumatic heart disease	0.6	0.1	6.0
Total	63	13.0	4.8

Source: [23].

Notes: 1. Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

2. Data for Indigenous people and for non-Indigenous people exclude separations with a principal diagnosis of renal dialysis and an additional diagnosis of diabetes.

3. Total may not sum to the individual categories as more than one chronic condition can be reported for a separation.

4. Data for the NT are for public hospitals only.

Earlier information on hospital rates for male and female Indigenous Australians is available for Qld, WA, SA and the NT combined. In 2004-05, the age-standardised rate of hospitalisation was higher for Indigenous males and females than non-Indigenous males and females for all chronic diseases, except for cancer (Table 9) [24]. For end-stage renal disease (ESRD) the rates for Indigenous males and females were 10.9 and 21.4 times higher than the rates for non-Indigenous males and females, respectively.

Table 9. *Age-standardised hospitalisation rate ratios of Indigenous to non-Indigenous people, by type of chronic disease and sex, Qld, WA, SA and public hospitals in the NT, 2004-05*

Type of long term health condition	Males	Females
Cancer	0.6	0.6
Lung cancer	1.6	1.6
Cervical cancer	-	3.4
Mental & behavioural disorders	2.1	1.4
Circulatory diseases	1.6	2.2
Ischaemic heart diseases	1.8	3.0
Stroke	1.6	2.8
Hypertension	3.6	4.2
Rheumatic heart diseases	3.9	6.8
Other		
Diabetes	4.2	6.2
End-stage renal diseases	10.9	21.4
Chronic obstructive pulmonary diseases	4.9	5.9

Source: [24].

Notes:
1. The rate ratio is calculated by dividing the Indigenous age-standardised rate by the non-Indigenous age-standardised rate.
2. Rate ratios were calculated using 2001 Australian population data.
3. Indigenous hospitalisation data are reported for Qld, WA, SA and the NT only. These four jurisdictions are considered to have the highest level of accuracy of Indigenous identification, although the level of accuracy varies by jurisdiction and hospital.
4. Non-Indigenous data includes hospitalisations of people identified as not Indigenous as well as those with a 'not stated' Indigenous status.

Selected health conditions

Cardiovascular disease

Cardiovascular disease, particularly coronary heart disease (often resulting in heart attacks) and stroke, presents a significant burden for Indigenous people in terms of prevalence, hospitalisation, and mortality [25, 26]. Rheumatic heart disease, although a rare form of cardiovascular disease among non-Indigenous people, is still an important cause of morbidity and mortality among some Indigenous people.

Factors contributing to the development of cardiovascular disease include age, social and other circumstances, family history, physical inactivity, tobacco smoking, poor nutrition, and related physiological factors (high blood pressure, high blood cholesterol, overweight and obesity, and diabetes) [27]. A combination of these factors and rural and remote dwelling contribute to higher levels of heart, stroke, and vascular disease among Indigenous people. Immediate treatment and care of cardiovascular conditions for many Indigenous people are limited because of distance to health services, the availability of transport to access services, and language and cultural differences [28].

In 2009, cardiovascular disease (also known as disease of the circulatory system) accounted for 26% of all Indigenous deaths across Australia; ischaemic heart disease (which includes angina, blocked arteries of the heart and heart attacks) was the underlying cause of death for 15% of Indigenous people and 16% of non-Indigenous people [17].

Extent of cardiovascular disease among Indigenous people in WA

Data from the NATSIHS revealed that in WA for the period 2004-05, Indigenous people reported having disease of the heart and circulatory system at a rate 1.2 times that of non-Indigenous people (21% and 17% respectively) [29]. Indigenous females reported the highest level (24%) at a rate 1.4 times that of non-Indigenous females (17%). Indigenous and non-Indigenous males reported similar proportions of 16%.

In 2002-2003, Indigenous people living in in Qld, WA, SA and the NT were far more likely to experience a major coronary event than their non-Indigenous counterparts combined (Table 10) [30].

Table 10. Rates of major coronary events, by Indigenous status, and Indigenous:non-Indigenous rate ratios, Qld, WA, SA and NT, 2002-2003

Age group (years)	Indigenous rate (per 100,000)	Non-Indigenous rate (per 100,000)	Rate ratio
25-34	74	8	9.3
35-44	360	46	7.8
45-54	814	159	5.1
55-64	1,128	358	3.2
65-74	1,524	796	1.9
75+	2,034	2,646	0.8
ASR	n/a	n/a	3.0

Source: derived from AIHW [30].

Note: 1. ASR refers to indirectly age-standardised using 'other Australians' population as the standard population.

Hospitalisation

The most recent hospitalisation data specific to WA are for the period 2002-03 to 2003-04, when:

- the age-standardised hospitalisation rate of 45 per 1,000 for Indigenous males aged less than 75 years for all cardiovascular disease was almost three times the rate of 16 per 1,000 for non-Indigenous males; the rate of 33 per 1,000 for Indigenous females was more than three times the rate of 9.7 per 1,000 for non-Indigenous females [25]

- the age-standardised hospitalisation rate of 23 per 1,000 for Indigenous males aged less than 75 years for coronary heart disease was nearly three times the rate of 6.6 per 1,000 for non-Indigenous males; the rate of 17 per 1,000 for Indigenous females was 5.0 times the rate of 2.5 per 1,000 for non-Indigenous females [25], and

- the age-standardised hospitalisation rate of 1.0 per 1,000 for Indigenous males aged less than 75 years for rheumatic fever and rheumatic heart disease was more than 13 times the rate of 0.1 per 1,000 for non-Indigenous males; the rate of 1.7 per 1,000 for Indigenous females was 16 times the rate of 0.1 per 1,000 for non-Indigenous females [25].

Mortality

Deaths of Indigenous people from cardiovascular disease occur at younger ages than they do for non-Indigenous people. For the period 2004-2008, the age-standardised death rate of 700 per 100,000 for Indigenous people in WA aged less than 75 years for all circulatory disease was almost four times the rate of 190 per 100,000 for their non-Indigenous counterparts [23]. Overall in Australia in 2000-2002, 62% of Indigenous deaths occurred prior to the age of 65 years compared with 10% of deaths for other Australians [28].

More detailed data available for the three-year period 2001 to 2003 showed that:

- the age-standardised death rate of 378 per 100,000 for Indigenous males aged less than 75 years for all circulatory disease was over four times the rate of 72 per 100,000 for non-Indigenous males; the rate of 168 per 100,000 for Indigenous females was four times the rate of 32 per 100,000 for non-Indigenous females [25]

- the age-standardised death rate of 218 per 100,000 for Indigenous males aged less than 75 years for coronary heart disease was four times the rate of 49 per 100,000 for non-Indigenous males; the rate of 95 per 100,000 for Indigenous females was more nearly five times the rate of 17 per 100,000 for non-Indigenous females [25], and

- the age-standardised death rate of 8.7 per 100,000 for Indigenous people aged less than 75 years for rheumatic heart disease was higher than the rate of 0.4 per 100,000 for non-Indigenous people [25].

Cancer

The impact of cancer on Indigenous people often attracts much less attention than it deserves, for two main reasons. First, the level of identification of Indigenous people in cancer notifications is known to be poor [31, 32]. There are currently no national data on cancer incidence in Indigenous people due to poor data quality in several jurisdictions [33]. Compared with other States and Territories reasonable incidence data are available for WA (and SA and the NT [34] and Qld) [33]. For those Indigenous patients who are registered, there is concern that not all are correctly identified as Indigenous [32]. Identification of Indigenous people is not yet included on pathology forms, but Indigenous identification in the registries has been improving [14, 35]. The extent to which Indigenous cancer patients are identified in hospital inpatient statistics also varies across Australia [36]. Second, the fact that cancer has often been reported in terms of the proportions of deaths it causes (20% of Indigenous deaths compared with 30% of non-Indigenous deaths in Australia [17]) rather than by rates, has tended to give the erroneous impression that cancer does not have a great impact among Indigenous people. Analysis of rates – rather than simple comparison of proportions – reveals that cancer deaths are around 45% more common among Indigenous people than among non-Indigenous people [3, 31]. Many of the cancers affecting Indigenous people are preventable – for example, cancers related to tobacco use, to which Indigenous people are particularly prone due to high levels of smoking [34, 37, 38] (see 'tobacco smoking' in the section on 'factors contributing to health'.)

Extent of cancer among Indigenous people in WA

According to the 2004-2005 NATSIHS, 1.1% of Indigenous people living in WA reported suffering from neoplasms/cancer compared with 2.1% of non-Indigenous people [29]. In 2007, the incidence rates of lung cancer and cervical cancer for Indigenous people in WA were 1.6 and 3.2 times higher than the rates for their non-Indigenous counterparts[6] [23]. Information on cervical cancer in WA in 1996-2005 revealed that incidence rates for Indigenous women aged 20-69 years were 1.9 times higher and mortality rates 3.5 times higher for Indigenous women compared with non-Indigenous women [39].

After adjusting for differences in the age structures of the Indigenous and non-Indigenous populations in WA for the period 2002-2006, the incidence rate of cancer overall for Indigenous people was slightly lower than the rate for non-Indigenous people (395 per

6 Non-Indigenous also comprises unknown Indigenous status.

100,000 compared with 514 per 100,000 respectively) (Table 11) [34]. (Caution must be exercised in the interpretation of these rates due to the likely under-identification of Indigenous status in cancer incidence and death data[7]). Even with under-reporting, age-standardised incidence rates were higher for lung cancer, cancers of the mouth and throat, liver, pancreas and cancer of unknown primary site for Indigenous people than for their non-Indigenous counterparts and the most common specific cancers among Indigenous people were breast cancer (in females), prostate cancer (in males), and lung cancer [34]. High rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat, and the high incidence of cancers of unknown primary site is likely to be associated with late diagnosis [35].

Table 11. Age-standardised incidence rates for selected cancers, by Indigenous status, and rate ratios, in WA, 2002-2006

Cancer type	Indigenous	Non-Indigenous	Rate ratio
Lung	68	50	1.4
Unknown primary	42	16	2.7
Female breast	35	64	0.5
Lip/mouth/pharynx	27	15	1.8
Colorectal	31	62	0.5
Prostate	22	81	0.3
Pancreas	16	11	1.5
Liver	11	4.5	2.5
Non-Hodgkins lymphoma (NHL)	7.7	19	0.4
Uterus	7.2	7.9	0.9
Bladder	6.1	11	0.5
Cervix	6.7	4.0	1.7
Stomach	6.8	8.9	0.8
Melanoma	2.1	55	0.04
All types	395	514	0.77

Source: Derived from [34].

Note: 1. Age-standardised rates are per 100,000 people and were calculated using direct standardisation with the Australian 2001 population.

Mortality

Indigenous incidence rates may be lower than non-Indigenous rates for most cancers, but Indigenous mortality rates tend to be higher than non-Indigenous rates [34]. For Indigenous people living in WA in 2004-2008, the age-standardised mortality rate for cancer was 1.9 times the rate for non-Indigenous people [23]. This rate was the highest recorded across the reporting jurisdictions (NSW, Qld, SA and the NT).

In 2002-2006, the age-standardised death rate for all cancers of 235 per 100,000 for Indigenous Australians living in WA aged less than 75 years was 1.2 times higher than the rate of 196 for non-Indigenous Australians (Table 12) [34]. After lung cancer, other leading causes of death from cancer included cancers of unknown primary site, colorectal cancer, pancreas cancer, and breast cancer (for females).

7 Under-ascertainment of cancer cases among Indigenous people can occur because of the under-ascertainment of Indigenous status as well as the under-ascertainment of Indigenous cancers. With the best estimates of under-ascertainment from both causes made in the past coming from cancer mortality, it is important to note that the under reporting of Indigenous cancer mortality in WA is likely to be in the range of 25-30%.

Table 12. Age-standardised mortality rates for selected cancers, by Indigenous status, and rate ratios, in WA, 2002-2006

Cancer type	Indigenous	Non-Indigenous	Rate ratio
Lung	60	41	1.5
Unknown primary	34	11	3.2
Colorectal	18	24	0.8
Lip/Mouth/Pharynx	13	3.6	3.6
Female breast	17	13	1.3
Pancreas	18	10	1.8
Liver	11	3.4	3.3
Stomach	6.8	6.7	1.0
Non-Hodgkin Lymphoma (NHL)	2.7	6.9	0.4
Bladder	2.9	4.7	0.6
Cervix	5.9	1.3	4.5
Prostate	8.3	13	0.6
Brain	0.6	5.9	0.1
Melanoma	0.0	6.6	0.0
Kidney	4.8	4.7	1.0
Uterus	3.3	1.7	1.9
All types	235	196	1.2

Source: Derived from, [34].

Note: 1. Age–standardised rates are per 100,000 people and were calculated using direct standardisation with the Australian 2001 population.

The patterns of Indigenous cancer incidence and mortality are largely explained by the higher prevalence of risk factors, most notably tobacco use. The different relativities of incidence and death rates for Indigenous and non-Indigenous peoples could be due to higher case-fatality rates among Indigenous people (due to higher proportions of cancers with high case-fatality rates), to a more advanced stage of cancer at the time of diagnosis, or differences in treatment outcomes by stage of diagnosis [32, 35, 40, 41]. From the available information it can be concluded that Indigenous people are less likely to have some types of cancer than other Australians, but they are: significantly more likely to have cancers that have a poor prognosis; usually diagnosed with cancer at a later stage; less likely to receive adequate treatment; and are more likely to die from cancers than other Australians [32].

Diabetes

Diabetes is an important contributor to the health inequity between Indigenous and non-Indigenous Australians [42]. In 2004-05, after adjusting for age differences between the Indigenous and non-Indigenous populations, Indigenous people were over three times as likely to report having diabetes [35]. In 2003, diabetes was responsible for 8.9% of disease burden in Indigenous Australians (for which type 2 diabetes accounted for 93%), a rate over five times higher than the rate for non-Indigenous Australians (17.9 per 1,000 and 3.5 per 1,000 respectively) [43].

Type 2 diabetes is the most common form of diabetes worldwide, and has been recognised as one of the most significant health problems facing Indigenous people in Australia [25, 35]. Risk factors for the development and onset of type 2 diabetes include non-modifiable risk factors such as, family history, race/ethnicity, and increasing age as well as modifiable risk factors including obesity, poor diet, inactivity, and high blood pressure [25, 35, 44-46]. Although possessing any number of risk factors increases the likelihood of developing type 2 diabetes, two thirds of the diabetes burden is due to a high body mass index and physical inactivity [43].

Extent of diabetes among Indigenous people in WA

According to the 2004-2005 National NATSIHS, diabetes/high sugar levels were reported by almost 9% of Indigenous people living in WA with similar rates recorded for Indigenous people living in remote and non-remote areas [29]. This figure was higher than for

any other state or territory and higher than the national figure of 6% [44]. The proportions represent a slight, but not statistically significant, increase from those reported in the *2001 National health survey* (NHS). After adjusting for differences in the age structures of the two populations, diabetes/high sugar levels were 3.7 times more common for Indigenous people than for non-Indigenous people living in WA [29].

Recent information from Australia's National Diabetes Register (NDR)[8] reveals that in 2005-2007, 5.6% of Western Australians who began using insulin to treat their diabetes, were Indigenous [47]. This figure was higher than the national percentage (2.9%), and lower only than the NT (38.9%) and Qld (6.3%)[9].

Hospitalisation

In 2005-06, the age-standardised hospitalisation rate for diabetes related problems in WA was 17 times higher for Aboriginal females and 10 times higher for Aboriginal males compared with their non-Indigenous counterparts [48].

In WA, for the two-year period 2002-03 and 2003-04:

- the age-standardised hospitalisation rate of 14 per 1,000 for Indigenous males aged less than 75 years with a principal diagnosis of diabetes was more than the rate of 2.1 per 1,000 for non-Indigenous males; the rate of 17 per 1,000 for Indigenous females was also higher than the rate of 2.1 per 1,000 for non-Indigenous females [25], and

- the age-standardised hospitalisation rate of 115 per 1,000 for Indigenous males aged less than 75 years with an associated diagnosis of diabetes was markedly higher than the rate of 9.7 per 1,000 for non-Indigenous males; the rate of 123 per 1,000 for Indigenous females was also markedly higher than the rate of 8.5 per 1,000 for non-Indigenous females [25].

More recent information on hospitalisation rates is available for Qld, SA, WA, NSW, Vic and public hospitals in the NT combined [49]. In 2006-07:

- hospitalisation rates for Indigenous people with type 2 diabetes as a principal diagnosis were 5.2 times as high as the rates for non-Indigenous people (14.40 per 1,000 compared to 2.77 per 1,000, respectively), with hospitalisations for complications of diabetes accounting for 89% of hospitalisations for potentially preventable chronic conditions [49]

- hospitalisation rates for Indigenous people with diabetes complications (includes type 1, type 2 and gestational diabetes) were 7.95 times higher than the rate for non-Indigenous people (165 per 1,000 compared to 21 per 1,000 respectively) [49], and

- hospitalisations for renal (kidney-related) complications of diabetes were 11.8 times as high for Indigenous people as non-Indigenous people [49].

In 2004-05 to 2006-07, for Indigenous people in NSW, Qld, WA, SA and public hospitals in the NT, hospitalisations for complications associated with type 2 diabetes as a principal diagnosis increased (from 10.24 per 1,000 people in 2004-05, to 14.40 per 1,000 people in 2006-07) with hospitalisations for diabetes complications accounting for most of the increase in total hospitalisations [49]. Similar patterns for type 2 diabetes over a longer period (2001-02 to 2006-07) were found for Qld, WA, SA and public hospitals in the NT [49].

Mortality

In 2003, type 2 diabetes was ranked fourth of all the leading fatal conditions across Australia for Indigenous males, and second among Indigenous females: a rate almost 13 times higher for males and 25 times higher for females when compared with the non-Indigenous population [43]. The most current age-standardised mortality data specific to WA for diabetes, were for the period 2001-2003 [25]. During this period:

- the age-standardised death rate of 96 per 100,000 for Indigenous males aged less than 75 years for diabetes as an underlying cause was markedly higher than the rate of 7.2 per 100,000 for non-Indigenous males; the rate of 125 per 100,000 for Indigenous females was also markedly higher than the rate of 4.0 per 100,000 for non-Indigenous females [25], and

8 The NDR collects information on those people who use insulin to treat their diabetes, and as such does not reflect the much higher prevalence of type 2 diabetes that is not managed with insulin.

9 These figures largely reflect the relative proportion of the Indigenous populations in these states and territories but, it is possible that the NDR may underestimate the number of Indigenous registrants due to low registration rates for the NDR and under-reporting of Indigenous status.

- the age-standardised death rate of 157 per 100,000 for Indigenous males aged less than 75 years for diabetes as associated cause was much higher than the rate of 15 per 100,000 for non-Indigenous males; the rate of 128 per 100,000 for Indigenous females was also much higher than the rate of 9 per 100,000 for non-Indigenous females [25].

Social and emotional wellbeing (including mental health)

Mental health problems and mental illnesses or disorders are increasingly becoming a significant public health issue [50]. The consequences for individuals, families and communities are a key challenge for governments worldwide. For Australians, one in five will experience a mental health problem in any one year [51]. Despite the importance of mental health to the total wellbeing of the whole Indigenous community [52], 'there are glaring deficiencies in our knowledge' about mental health disorders [53]. The deficiencies in knowledge are complicated by the complexity of the general area of mental health, in which 'diverse views exist and where terms are used in different ways' [54].

The World Health Organization (WHO) has defined mental health as a state of wellbeing whereby a person is aware of their own abilities to cope with everyday stressors, work productively and make contributions to their community [55]. Mental health problems and mental health illnesses or disorders are identified through a diagnostic process and refer to 'the spectrum of cognitive, emotional and behavioural disorders that interfere with the lives and productivity of people' [56]. Mental health problems usually stem from a response to a life stressor and are more common but, have the potential to develop into a mental illness. Widespread grief and loss, child removals and unresolved trauma, cultural dislocation and identity issues, economic and social disadvantage, physical health problems, incarceration, child removal, juvenile justice supervision, violence including family violence and substance misuse, have been identified as underlying the great burden among Indigenous people of 'mental health problems', which may lead to 'mental illness' [57].

The WHO has included mental health as part of their general definition of health, a holistic view supported by Aboriginal and Torres Strait Islander people [58]. In the 'whole-of-life view' included in the *National Aboriginal health strategy*, health is defined as not just the physical wellbeing of a person but the social, emotional and cultural wellbeing of the whole community [59]. This 'whole of life' view provides the foundation for the term 'social and emotional wellbeing' which refers to the ability of individuals or communities to develop, live in harmony with others and the environment, and to effect change [60].

Extent of social and emotional wellbeing among Indigenous people in WA

In 2007-2008, of Indigenous people living in WA, 28,831 had community mental health contact (412 per 1,000 population), which was 1.8 times that for non-Indigenous people [23]. In the same period, 590 Indigenous mental health related separations were reported with specialised psychiatric care (8.3 per 1,000 population), 1.4 times that for non-Indigenous people [23].

The *2008 National Aboriginal and Torres Strait Islander social survey* (NATSISS) provides data on the levels of psychological stress for Indigenous people living in WA aged 15 years and over [60]. Over two thirds (67%) of Indigenous people 15 years and over reported having experienced low to moderate levels of stress (29 per 1,000 population), and 32% reported high to very high levels of stress (14 per 1,000 population) in the previous 12 months. The levels of low to moderate stress were similar for Indigenous females and males with reports at 15 per 1,000 population for both. High to very high levels of stress were reported more for Indigenous females (8.1 per 1,000 population) compared with Indigenous males (5.9 per 1,000 population) [60]. The highest reported level of low to moderate stress (76%) was reported for the 55 years and over age group (4.1 per 1,000 population). Approximately one third of Indigenous people in the age groups: 15-24 years; 25-34 years; 35-44 years; and 45-54 years reported experiencing high to very high levels of stress in the previous 12 months [61].

The 2004-2005 NATSIHS was the first survey to collect data on the social and emotional wellbeing of Aboriginal and Torres Strait Islander population aged 18 years or older living in remote and non-remote areas [44]. More than half the adult Indigenous population living in WA reported being happy (72%), calm and peaceful (57%) and/or full of life (55%) all or most of the time, and just under half (47%) said they had a lot of energy all or most of the time [29]. These findings were similar for Indigenous people living in both remote and non-remote areas of WA. Almost one in ten (9.5%) of Indigenous adults surveyed, reported feeling nervous all or most of the time and when asked if they ever felt without hope/hopeless, 8.2% said that they had this feeling all or most of the time, with 11% indicating that that they felt so sad all or most of the time that nothing could cheer them up. A high proportion of the WA Indigenous population reported feeling restless (13%) and/or that everything was an effort all or most of the time (18%)[10].

10 All responses related to the four week period prior to interview.

By remoteness, Indigenous people reported feelings of being nervous (remote 6.6 %, non-remote 12%), without hope (remote 6.7%, non-remote 9.7%), restless (remote 11%, non-remote 15%), everything was an effort (remote 18%, non-remote 19%), and being so sad nothing could cheer them up (remote 10%, non-remote 12%), more often in a remote area compared to non-remote areas. Over three-quarters of Indigenous people 18 years or over also reported experiencing more than one personal stressor in the previous 12 months, with only 21% reporting no stressors..The stressors reported most frequently by Indigenous people were: death of a family member or close friend (51%); alcohol and drug problems (29%); member of family sent to jail/currently in jail (24%); and trouble with the police (20%)[11] [62].

Earlier data available from the Western Australian Aboriginal child health survey (WAACHS)[12] provided descriptive survey data on the physical and mental (emotional and behavioural) health of Indigenous children and young people aged 0-17 years. It was a state-wide survey and the first of its kind in Australia. For young people 12-17 years old (unless otherwise stated), findings indicated three main areas of interest; emotional or behavioural difficulties, conduct difficulties and suicide attempts [63, 64]. Specifically, the report indicated that 24% of Indigenous children aged 4-17 years, were at high risk of clinically significant emotional or behavioural difficulties compared with 15% of similarly aged children in the general population. Risk factors associated with clinically significant emotional and behavioural difficulties included separation from their natural families and/or experiencing seven or more major life stress events (such as death in the family, serious illness, family breakdown, family violence, financial problems or arrest). More than 16% of young people had seriously considered committing suicide in the 12 months prior to the survey - of these, 39% had attempted suicide with those at a high risk of experiencing significant emotional and behavioural difficulties and those exposed to family violence more likely to consider committing suicide.

Resiliency factors associated with mental health issues for Indigenous young people in WA identified by the survey included factors associated with location and household occupancy. Children living in areas of extreme isolation and those living in homes with a high level of household occupancy were found to be at less risk of clinically significant emotional or behavioural difficulties than children living in the Perth metropolitan area (no isolation) and children living in homes with a low level of household occupancy [63].

Hospitalisation

Further information about mental health issues for Indigenous people is available from hospitalisation and mortality data. Specific to WA, for the two-year period 2002-03 and 2003-04:

- the age-standardised hospitalisation rate of 3.2 per 1,000 for Indigenous males aged less than 75 years for depressive disorders was higher than the rate of 2.4 per 1,000 for non-Indigenous males; the rate of 6.6 per 1,000 for Indigenous females was higher than the rate of 5.2 per 1,000 for non-Indigenous females [25]; and

- the age-standardised hospitalisation rate of 3.0 per 1,000 for Indigenous males aged less than 75 years for anxiety disorders was higher than the rate of 2.0 per 1,000 for non-Indigenous males; the rate of 6.2 per 1,000 for Indigenous females was higher than the rate of 3.8 per 1,000 for non-Indigenous females [25].

Mortality

In 2004-2008, 90 Indigenous people living in WA died as a result of suicide, this represents an Indigenous suicide rate of 31 per 100,000 population compared with 1,068 non-Indigenous people at a rate of 11 per 100,000 population [23].

In 2001-03, the age-standardised rate of 25 per 100,000 for Indigenous males in WA for death from self-harm was higher than the rate of 18 per 100,000 for non-Indigenous males; the rate of 5.1 per 100,000 for Indigenous females was slightly less than the rate of 5.5 per 100,000 for non-Indigenous females [25].

Kidney health (renal disease)[13]

'Kidney disease', 'renal disease' and 'renal disorder' are collective terms that refer to a variety of different disease processes involving damage to the working units of the kidneys [65, 66]. Kidney damage or reduced kidney activity that lasts for three months or more is termed chronic kidney disease (CKD) [67] and if left untreated, can cause death [68]. CKD includes diabetic nephropathy, hypertensive

11 The data are of limited usefulness as they have been presented in relative isolation and without appropriate comparison with non-Indigenous people.
12 Survey reports were provided by carers of Aboriginal children and by Aboriginal young people aged 12-17 years and were accepted as given. Responses were not verified by interviewers and medical practitioners were not involved to validate or diagnose reports of given conditions.
13 Renal (and urologic) disease includes conditions affecting the function of the body's urinary system, which involves the kidneys, ureters, bladder and urethra.

renal disease, glomerular disease, chronic renal failure and end-stage renal disease (ESRD) [35]. Other generally less serious urologic disorders associated with kidney health include acute post-streptococcal glomerulonephritis (APSGN), urinary tract infection (UTI), and urolithiasis [35, 69]. Kidney disease is expensive to treat and has a marked impact on the quality of life of those who suffer from the disease as well as those who care for them [18, 70].

The incidence of CKD is higher among Aboriginal and Torres Strait Islander peoples than for other Australians [66, 68, 71-73]. Between 2001 and 2004-05, there was a significant increase in the proportion of Indigenous Australians reporting kidney problems with the age-standardised Indigenous rate for kidney disease in 2004-05, recorded at ten times the non-Indigenous rate [35]. A number of risk factors are associated with renal disease including diabetes, high blood pressure, infections, low birth weight and obesity [35]. These conditions are particularly common among Indigenous people and contribute to high rates of renal disease [23]. A number of pathways linking disadvantage and kidney disease underlie these high rates including: poor social determinants (e.g., sub-standard living conditions, inadequate environmental sanitation and poverty), engagement in high risk behaviours that can adversely affect health (e.g., poor diet, low activity levels, alcohol and tobacco use) and factors relating to the health-care system and government policies including limited access to medical care [74].

Extent of renal disease among Indigenous people in WA

With information on earlier CKD limited to self-reported data, the primary focus in the literature has been on ESRD [18, 72, 75]. In 2009, the highest incidence rates among Indigenous people of treated ESRD in Australia were recorded in the NT (925 per 1,000,000 population) followed by WA (485 per 1,000,000 population) [76]. Of the 977 patients aged less than 65 years, who were on the waiting list in Australia at 31 December 2009, 39 (4%) were Aboriginal/Torres Strait Islander patients, with the highest number of Indigenous patients (14) residing in WA (36%) [76].

In 2009, 37 new Indigenous patients were identified with ESRD in WA – the age-standardised notification rate of 485 new cases per 1,000,000 population for Indigenous people was almost five times the rate of 104 per 1,000,000 for non-Indigenous people (Table 13) derived from [76].

Table 13. ***Notification rates of new patients commencing treatment for end-stage renal disease, by Indigenous status, and rate ratios, WA and Australia, 2009***

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
Western Australia	37	485	232	104	4.7
Australia	189	358	2337	107	3.3

Source: Derived from [76].

Notes: 1. Rates per 1,000,000 population per year for patients.

2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

In 2004-2006, incidence of ESRD for Indigenous people in WA was nearly eleven times the rate for non-Indigenous people [27]. For Indigenous females the incidence rate was higher than for Indigenous males when compared with their non-Indigenous counterparts (a rate of 16.9 and 7.2 respectively).

The high rates of ESRD are a major public health problem for Indigenous people, particularly those living in remote parts of the country. In 2004-06, the incidence of ESRD for Indigenous Australians varied greatly with remoteness and was especially high in remote and very remote areas of Australia with almost 20 times, and 18 times the rate of their non-Indigenous counterparts respectively [27].

In 2004-2007, just under two-thirds (64%) of Indigenous people in WA newly registered with the ANZDATA were aged less than 55 years compared with under one-third (29%) of non-Indigenous people registered (Table 14), derived from [77]. Apart from the age group 75 and over, age-specific notification rates were higher for Indigenous people across all ages compared with non-Indigenous people. Rate ratios were particularly high for people aged 35-44 years (20), 45-54 years (23), and 55-64 years (20).

Table 14. Age-specific end-stage renal disease notification rates, by Indigenous status, rate ratios, and age group, in WA, 2004- 2007

Age group	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	1	9.7	6	3.9	2.5
15-24	3	52	20	17.9	2.9
25-34	14	328	27	25	13.2
35-44	35	959	57	48	20
45-54	53	2179	107	94	23
55-64	44	3614	153	178	20
65-74	13	2263	176	341	6.6
75+	1	354	196	455	0.8
All ages	164	573	742	94	6.1

Source: Derived from [77].

Notes: 1. Rates per 1,000,000 population.

2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

Treatment for CKD involves dialysis or for those with ESRD, kidney replacement therapy (KRT), also known as renal replacement therapy (RRT), where transplantation of the kidney is required [67]. Dialysis, specifically haemodialysis (HD) conducted in urban or regional clinics and hospitals, is the most common form of treatment for Indigenous people with ESRD [18, 78-82]. A total of 187 Aboriginal and Torres Strait Islander People commenced dialysis during 2009, a decrease from 249 in 2008 and 237 in 2007 [76].

In 2009, HD accounted for a majority of treatment (81%) and the number of Aboriginal and Torres Strait Islander People commencing peritoneal dialysis (PD) (35 patients) was less than the previous two years [76]. In 2009, 251 (3,291 per 1,000,000 population) prevalent dialysis patients in WA (including both PD and HD) were Indigenous, a rate more than seven times higher when compared with their non-Indigenous counterparts (442 per 1,000,000 population) derived from [76].

Hospitalisation

With no recent data specific to WA, for NSW, Vic, Qld, WA, SA and public hospitals in the NT combined, care involving dialysis accounted for the most common diagnosis for hospitalisations in 2007-08 of Indigenous Australians at a rate of 11 times that for other Australians and five times the rate for CKD as a principal or additional diagnosis [67]. The rate of hospitalisations for CKD dialysis for Indigenous males was eight times the rate compared with other Australian males and 15 times higher for Indigenous females compared with their non-Indigenous counterparts[14] [67]. Indigenous females also had the highest rates for principal diagnosis (5.5) and for additional diagnosis (6.8) compared with their non-Indigenous counterparts . Contributing factors to these higher rates is thought due to the higher prevalence of Type 2 diabetes among Indigenous women compared with Indigenous men and the large proportion of Indigenous women carrying high levels of body fat around their abdomen; both factors placing them at higher risk for CKD [67].

Mortality

In 2004-2008, the age-standardised mortality rate for kidney disease for Indigenous people living in WA, was 6.8 times the rate for non-Indigenous people [23]. This rate was the second highest recorded after the NT across the reporting jurisdictions (NSW, Qld, SA WA and the NT) and reflects a slight increase in rates since the period 2003-2007 when the rate for Indigenous people living in WA was 6.4 times higher than the rate for non-Indigenous people.

Injury

Injury from a variety of sources presents a significant burden of ill-health among Indigenous people. Assessing the total impact of injury is difficult. Injuries are measured by way of deaths and hospitalisation rates, but many injuries sustained by Indigenous people are not recorded in a systematic database or by routine data collections except for those collected as part of population surveys, such as the ABS National health surveys. As a result, the full extent of injuries may be underestimated and also not brought to the attention of health policy-makers and program managers [83-86].

14 Data presented in this report refers to episodes of admitted care, meaning the same patient can potentially have multiple hospitalisations within the same period. Consequently, data represents health service usage by those with CKD rather than representing the number or proportion of people in Australia with CKD admitted to hospital.

Even for injuries that are serious enough to be recorded in the routine data collections or are identified by specific studies, there are some issues with their classification. The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause and intention of the injury. This system is followed in this section [84, 85].

Understanding of the factors contributing to most types of injury among Indigenous people is limited, but the levels and types of injury need to be seen within a broad context including: disruption to cultural, environmental, and lifestyle variables; socioeconomic disadvantage; geographical isolation; increased road usage; exposure to hazardous environment(s); substance abuse; violence; social and familial dysfunction; risky behaviour; risky home environments; and limited access to health and social support services [83, 84, 87-89].

Extent of injury among Indigenous people in WA

The actual frequency of injury among Indigenous people in WA is not known, but data from the 2004-2005 NATSIHS indicate that self-reported health conditions as a result of an injury or accident were reported more frequently by Indigenous people than by non-Indigenous people across all age groups [44]. Reporting of injury increased substantially in Indigenous adults over the age of 25 years, and was highest in the 34-44, and 45-55 year age groups. Overall, the reporting of a long-term condition as a result of an injury or accident was 1.4 times higher for Indigenous people than for non-Indigenous people, with the ratio for males (1.5) being slightly higher than that for females (1.3).

Hospitalisation

With more recent mortality and hospitalisation data unavailable for WA, Australia-wide data revealed that in 2007-08, Indigenous Australians were hospitalised for injury at twice the rate of other Australians; and for the period 2003-2007, Indigenous Australians died at more than twice the rate of non-Indigenous Australians [14].

The most current hospitalisation data related to injury for WA was for the two year period 2002-03 and 2003-04 [25]. For this two year period, of the 71,143 hospitalisations for 'injury and poisoning' for persons aged 0-74 years, 11.4% (8,138) were identified as Indigenous [25] and the age-standardised hospitalisation rates for Indigenous people aged 0-74 years for injury and poisoning were 62 per 1,000 for Indigenous males compared with 22 per 1,000 for non-Indigenous males; and 60 for Indigenous females compared with 13 for non-Indigenous females [25].

The age-standardised hospitalisation rates for Indigenous people aged 0-74 years for transport accidents involving cars, buses, trucks, motorcycles and pedestrians were 6.9 per 1,000 for Indigenous males compared with 3.3 per 1,000 for non-Indigenous males; and 4.0 per 1,000 for Indigenous females compared with 1.2 per 1,000 for non-Indigenous females [25]. For injuries caused by other accidents including other land transport accidents, water transport accidents, falls, drowning and poisoning, rates were 37 per 1,000 for Indigenous males compared with 16 per 1,000 for non-Indigenous males; and 27 per 1,000 for Indigenous females compared with 8.8 per 1,000 for non-Indigenous females. For self-harm, rates were 5.0 per 1,000 for Indigenous males compared with 1.2 per 1,000 for non-Indigenous males; and 4.7 per 1,000 for Indigenous females compared with 1.9 for non-Indigenous females and for assault were 20 per 1,000 for Indigenous males compared with 1.2 per 1,000 for non-Indigenous males; and 26 per 1,000 for Indigenous females compared with 0.4 per 1,000 for non-Indigenous females [25].

Mortality

The most current mortality data related to injury available for WA was for the period 2001-2003 [25]. In WA, in 2001-2003:

- the age-standardised death rate of 121 per 100,000 for Indigenous males aged less than 75 years for 'injury and poisoning' was almost three times the rate of 44 per 100,000 for non-Indigenous males; the rate was 54 per 100,000 for Indigenous females compared with the rate of 16 per 100,000 for non-Indigenous females [25]

- the age-standardised death rate of 31 per 100,000 for Indigenous males aged less than 75 years for transport accidents was more than double the rate of 12 per 100,000 for non-Indigenous males; the rate of 19 per 100,000 for Indigenous females was almost five times the rate of 4.1 per 100,000 for non-Indigenous females [25]

- the age-standardised death rate of 49 per 100,000 for Indigenous males aged less than 75 years for other accidents (including other land transport accidents, water transport accidents, falls, drowning, poisoning etc.) was more than three times higher than the rate of 13 per 100,000 for non-Indigenous males; the rate of 22 per 100,000 for Indigenous females was four times the rate of 5.2 per 100,000 for non-Indigenous females [25]

- the age-standardised death rate of 15 per 100,000 for Indigenous males aged less than 75 years for assault was nearly seven times the rate of 1.1 per 100,000 for non-Indigenous males; the rate of 7.0 per 100,000 for Indigenous females was higher than the rate of 0.7 per 100,000 for non-Indigenous females [25], and

- the age-standardised death rate for Indigenous males aged less than 75 years for self-harm was 25 per 100,000 for Indigenous people, higher than the rate of 18 per 100,000 for non-Indigenous males; the rate of 5.1 per 100,000 for Indigenous females was slightly lower than the rate of 5.5 per 100,000 for non-Indigenous females. (Note that this was the only rate that was lower for Indigenous females than for non-Indigenous females [25].)

Respiratory disease

Respiratory diseases represent a significant burden of ill-health and hospitalisation among Indigenous people, particularly among very young and older people [14, 35]. Subsequently, respiratory illnesses are a key contributor to the gap in life expectancy between Indigenous and non-Indigenous Australians [90]. Factors contributing to the high rates of respiratory diseases in Indigenous populations include poor environmental conditions, socioeconomic disadvantage, risky behaviour (particularly, cigarette smoking), and previous medical conditions [35, 91-93]. Infants and children under five years of age are more susceptible to developing respiratory conditions due to factors such as low levels of hand and face washing and childhood immunisation, low birth weight, parental smoking, poor nutrition (including aspects related to infant-feeding and weaning practices), and poor environmental conditions [35]. Among Indigenous adults, common risk factors for respiratory diseases include tobacco smoking, use of alcohol and other substances, diabetes mellitus, and chronic renal disease [14, 92].

The most commonly reported respiratory disease among Indigenous people is asthma [14]. Factors that may affect the risk of acquiring asthma include environmental and other related factors (e.g., diet and lifestyle), which may also change the course of the disease, or trigger attacks of airway narrowing and symptoms [14]. Factors that can trigger airway narrowing and symptoms in people with asthma include exercise, viral infections, irritants (e.g., smoking and air pollutants) and specific allergens (e.g., dust mites and mould spores).

Extent of respiratory disease among Indigenous people in WA

The actual frequency of respiratory disease among Indigenous people in WA is not known. However, after adjusting for differences in the age structures of the two populations, the overall levels of respiratory disease were similar for Indigenous and non-Indigenous people, but the level of asthma among Indigenous people was 1.6 times that among non-Indigenous people [29].

Australia-wide, disease of the respiratory system was reported by 27% of Indigenous people who participated in the 2004-2005 NATSIHS [44]. These problems were reported more frequently by Indigenous people living in non-remote areas (30%) than by those living in remote areas (17%). The proportions represent a slight decrease from those reported to the 2001 NHS [94].

In 2004-05, 15% of Indigenous people reported having asthma, making it the most commonly reported respiratory condition among Indigenous people, and the second most commonly reported health condition [44]. Asthma was reported more frequently by Indigenous people living in non-remote areas (17%) than by those living in remote areas (9%). For Indigenous people living in WA, asthma was also reported as the most common respiratory disease at 14%, just below the national level of 15%.

Hospitalisation

In 2007-08, for Indigenous people living in NSW, Vic, Qld, WA, SA and NT combined, 11% of hospitalisations were the result of respiratory diseases [14]. The most current age-standardised hospitalisation rates for WA for respiratory diseases were for the period 2002-03 to 2003-04 [25]. In 2002-03 to 2003-04:

- the age-standardised hospitalisation rates for Indigenous people aged 0-74 years for respiratory diseases were over three times the rates for non-Indigenous people: 44 per 1,000 for Indigenous males compared with 14 per 1,000 for non-Indigenous males; and 49 per 1,000 for Indigenous females compared with 12 per 1,000 for non-Indigenous females [25], and

- the age-standardised hospitalisation rates for Indigenous people aged 0-74 years for pneumonia were almost seven times the rates for non-Indigenous people: 16 per 1,000 for Indigenous males compared with 2.0 per 1000 for non-Indigenous males; and 15 per 1,000 for Indigenous females compared with 1.7 for non-Indigenous females [25].

Mortality

In 2009, diseases of the respiratory system were responsible for nearly 8% of all deaths of Indigenous people living in Australia [17]. Chronic lower respiratory diseases were the major cause of death for Indigenous people, representing approximately 5% of deaths, compared with approximately 4% of non-Indigenous deaths[15]. In 2004-2008, the rates of death from respiratory disease among Indigenous people in WA, were just under five times higher than the rates for non-Indigenous people (209 per 100,000 compared with 44 per 100,000 respectively) [23].

15 Caution needs to be exercised in interpretation of the various death rates presented in this report, most of which are based on the numbers of deaths registered as Indigenous. These numbers underestimate the actual numbers of Indigenous deaths, with the level of underestimation varying by jurisdiction (see 'Limitations of the sources of Indigenous health information'). The 'projected' death rates take into account the estimated incompleteness of Indigenous identification in each jurisdiction. It is likely that the true death rates for Indigenous people will be closer to these rates than to those based solely on death registrations.

Communicable diseases

Communicable diseases of particular importance to Indigenous people include sexually transmissible infections (STIs), hepatitis A, B, and C, human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS), [95, 96]. Risk factors for communicable diseases vary according to the type of disease, which can be caused by bacteria (e.g., pertussis (whooping cough) and tuberculosis), viruses (e.g., measles, influenza and HIV), fungi (e.g., tinea), and parasites (e.g., malaria and head lice) [97].

Information regarding specific communicable diseases comes from a variety of sources, including individual studies and the WA notifiable disease collection. Data from State and Territory collections are collected and published by the National Notifiable Disease Surveillance System (NNDSS), but Indigenous status is not reported for a large proportion of diseases [98].

Hospitalisation data are a poor reflection of the extent and patterns of communicable diseases in the community, but they do provide some indication of the overall burden among Indigenous peoples. In 2005-06, in NSW, Vic, Qld, WA, SA and the NT combined, the rate at which Indigenous people were hospitalised for infectious and parasitic diseases was twice that of non-Indigenous people [35]. The highest rates occurred for Indigenous children aged 0-4 years.

Sexually transmissible infections

STIs are spread by heterosexual or homosexual contact with an infected person and most cases are found among sexually active teenagers and young adults [14, 95]. Unprotected sex is a main risk factor for STIs. Infections that can be transmitted through sexual contact include gonorrhoea, syphilis, HIV/AIDS, hepatitis B, chlamydia, human papilloma virus (HPV), genital herpes and donovanosis. HPV and genital herpes are believed to be the most common STIs in Australia, but they are not notifiable diseases so it is difficult to monitor incidence [62].

Most STIs are asymptomatic or produce mild symptoms, and people affected often find out they have an infection through screening and contact tracing [99-101]. STIs can usually be effectively treated if diagnosed early, but, if left untreated, they may lead to complications.

Variations in notification rates over time may reflect real changes in incidence, but could also be due to the introduction of easier and more sensitive testing procedures, improved education encouraging notification reports from health authorities, and improved contact tracing [101, 102]. If information on Aboriginal and Torres Strait Islander status is incomplete this may lead to an underestimation of the incidence of STIs for this population [100].

Extent of STIs among Indigenous people in WA

In WA, rates of notifiable STIs in Indigenous people have been unacceptably high for many years and of particular concern is the continuing high incidence of STIs in Indigenous youth. The WAACHS reported that Indigenous youth have sex at an earlier age (consequently increasing the risk of contracting STIs) in comparison to the general population [64, 103]. Survey responses indicated that 75% of Aboriginal 17 year olds reported having had sex, with 49% of this group reporting having had sex before the age of 16, compared with 24% of youth in the general population.

The surveillance of STIs in WA is restricted to infections that are notifiable under the provisions of the Health Act 1911. No surveillance data are reported on other important, but, non-notifiable STIs such as genital warts or genital herpes. The most common newly acquired notifiable STIs among Indigenous people in WA include gonorrhoea, infectious syphilis and chlamydia [100, 104, 105].

Gonorrhoea

Gonorrhoea, which is caused by the bacterium Neisseria gonorrhoea, mainly affects the mucosal and glandular structures of the genital tract (cervix in women, urethra in men), and is highly contagious [106]. It can cause pelvic inflammatory disease in women, which can result in ectopic pregnancy or sterility. The disease can be successfully treated with oral antibiotics, but some strains of N. gonorrhoea in urban Australia are penicillin-resistant [99, 100].

Extent of gonorrhoea among Indigenous people in WA

In 2009, the crude gonorrhoea notification rate (60 per 100,000 population) in WA was just under two-thirds higher than that in Australia overall (37 per 100,000 population), and was the second highest of all jurisdictions after the NT (669 per 100,000 population) [107]. The figure for WA was the lowest reported for the previous five years. In 2009, the notification rate of gonorrhoea for Aboriginal people living in WA, was 996 per 100,000 population, 50 times the rate of 20 per 100,000 for non-Aboriginal people. This rate comparison between Aboriginal and non-Aboriginal people was the lowest observed for the previous ten years.

In 2009, the Aboriginal to non-Aboriginal notification rate ratio of gonorrhoea observed in females (106) was over three times that of males (33) living in WA [107]. The most noticeable age-specific notification rate difference for gonorrhoea was between Aboriginal and non-Aboriginal females and males aged 15-19 (136 and 106 respectively) [107].

In 2009, the highest age-standardised notification rate of gonorrhoea by region for Aboriginal people living in WA was reported in the Kimberley region (2,389 per 100,000 population), a rate 27 times higher than the rate for non-Aboriginal people in the same region (90 per 100,000 population) [107]. The second highest age-standardised notification rate of gonorrhoea by region for Aboriginal people living in WA, and the highest Aboriginal to non-Aboriginal rate ratio was reported in the Goldfields region (2,124 per 100,000 population), a rate more than 148 times the rate for non-Aboriginal people in the same area (14 per 100,000 population).

In 2009, the highest age-specific gonorrhoea notification rate in WA occurred in the 15-19 year old age group for Aboriginal people living in the Kimberley region (10,069 per 100,000 population), which was 45 times the overall age-specific rate for all 15-19 year olds in WA (222 per 100,000 population) [107]. Rates were also high for Aboriginal people in the 20-24 age group in the Kimberly region (8,930 per 100,000) and 20-24 age group in the Pilbara region (8,369 per 100,000). Aboriginal children aged 10-14 years were notified with a gonorrhoea infection (458 per 100,000 population) compared to nil notifications for non-Aboriginal children in the same age group.

Syphilis

Syphilis, which is caused by the organism Treponema pallidum, is an STI that has primary, secondary, latent, and tertiary stages [108]. The infection is especially contagious during the primary phase, when sores are present and is generally not contagious during the latent phases. Untreated syphilis can lead to serious damage of the nervous system and other body organs, or to death. Penicillin is the usual treatment [99, 100].

Extent of syphilis among Indigenous people in WA

In 2009, the crude syphilis notification rate in WA (8.1 per 100,000 population) was two thirds that in Australia overall (12.2 per 100,000 population) [107]. The notification rate of syphilis (infectious and non-infectious) for Aboriginal people living in WA was 123 per 100,000 population, a rate 22 times more than the rate of 5.7 per 100,000 for non-Aboriginal people.

In 2009, the Aboriginal to non-Aboriginal rate ratio of total syphilis notifications in WA observed in females (34) was almost two and a half times that of males (14) [107]. The most noticeable age-specific notification rate for syphilis was between Aboriginal and non-Aboriginal females aged 15-19, and 50 years and over (92 and 60 respectively). For males the most noticeable age-specific rate between Aboriginal and non-Aboriginals was for the 50 years and over age group (25) [107].

In 2009, the highest age-standardised notification rate of infectious syphilis by region for Aboriginal people living in WA, was reported from the Kimberley region (106 per 100,000 population), the second highest was the Pilbara region (94 per 100,000 population) while the age-standardised rates for non-Aboriginal people in all regions were low (average of 2.5 per 100,000 population) [107]. The highest age-standardised notification rate for non-infectious syphilis in both Aboriginal and non-Aboriginal people occurred in the Kimberly region (273 per 100,000 population and 35 per 100,000 population respectively). The highest Aboriginal to non-Aboriginal rate ratios of infectious and non-infectious syphilis were observed in the South Metropolitan region (3.7 times and 15 times respectively).

Chlamydia

Chlamydia, which is caused by the bacterium Chlamydia trachomatis, is one of the most common STIs in Australia [99, 100]. The infection in women can cause cervicitis, endometritis, and pelvic inflammatory disease, leading to tubal factor infertility and ectopic pregnancy. In men, it can cause urethritis, epididymo-orchitis, and prostatitis. Azithromycin treatment for chlamydial infection has been a major advance in recent years. Due to lack of obvious symptoms of the disease, incidence is underestimated by notification data.

Extent of chlamydia among Indigenous people in WA

In 2009, the crude chlamydia notification rate in WA (395 per 100,000 population) was the second highest in Australia behind the NT (941 per 100,000 per population) [107]. The notification rate of chlamydia for Aboriginal people living in WA in 2009 was 1,242 per 100,000 population, over four and a half times the rate of 270 per 100,000 for non-Aboriginal people.

In 2009, the age-standardised rate of chlamydia notifications in WA for Aboriginal females were just under two times the notifications recorded for Aboriginal males (1,611 per 100,000 population and 898 per 100,000 respectively) [107]. The most noticeable differences in notification rates between Aboriginal and non-Aboriginal people were for young males and females aged 10-14 years (58 and 15 respectively) [107].

In 2009, the highest age-standardised notification rate of chlamydia by region for Aboriginal people living in WA, was reported from the Kimberley region (2,201 per 100,000 population) which was four times the rate for non-Aboriginal people in the same region (585 per 100,000 population) [107]. Across the whole of WA, all rates of chlamydia notifications for Aboriginal people were two to four times the rate for non-Aboriginal people in the same regions; the lowest rate in the Great Southern region at two times, the highest rate in the Goldfields at just over four times the rate for non-Aboriginal people.

In 2009, the highest age-specific chlamydia notification rate in WA, occurred in the 15-19 age group for Aboriginal people living in the Kimberley region (12,534 per 100,000 population), which was eight times the overall age-specific rate for 15-19 year olds across WA (1,567 per 100,000 population) [107]. Rates were also high for Aboriginal people in the 15-19 year age group (9,302 per 100,000) in the Goldfields and Pilbara regions (7,426 per 100,000 population). Across WA, Aboriginal children aged 10-14 years were 18 times more likely to be notified with a chlaymdia infection than their non-Aboriginal counterparts (550 per 100,000 population and 31 per 100,000 respectively).

Hepatitis

Hepatitis, an inflammation of the liver, can be caused by viral infections, alcohol or drug abuse, or an attack by the body's immune system on itself [14, 109]. The viruses identified most frequently have been designated hepatitis A, B, and C (hepatitis types D through G have been identified also). Hepatitis B and C notifications are classified as either newly acquired (infection evident of being acquired in the two years prior to diagnosis), or unspecified (the duration of the infection is unknown) [107].

Extent of hepatitis A among Indigenous people in WA

Infection with the hepatitis A virus (HAV) is transmitted principally through person-to-person contact, and also through food and water contaminated with faecal matter from an infected individual [110]. It is easily transmitted in environments where sanitation infrastructure is inadequate and hygiene poor, for example, in underdeveloped countries and many remote Indigenous communities across Australia.

In 2009, there were no notifications in WA of HAV among the Indigenous population [111], but the real incidence of hepatitis A among Indigenous people may be underestimated due to incomplete information on Indigenous identification [100]. The reduction in notification could also be a result of the introduction of the vaccination program in 2005 for Indigenous infants under five years of age living in the NT, Qld, SA and WA [110].

Extent of hepatitis B among Indigenous people in WA

Infection with the hepatitis B virus (HBV) occurs due to contact with blood and other body fluids (i.e., semen, vaginal fluids, and saliva) from an infected individual, commonly through sexual contact or use of contaminated injecting equipment. A mother may also transmit HBV to the foetus during pregnancy [100]. In 2009, of the 39 newly acquired notifications of hepatitis B in WA, 1 (3%) was identified as being Aboriginal compared with 38 (97%) identified as non-Aboriginal [107]. The Aboriginal to non-Aboriginal rate ratio of 0.7 for 2009, for newly acquired Hepatitis B was the second lowest recorded for the previous ten years. Of the 699 unspecified notifications of hepatitis B, 44 (6%) were identified as being Aboriginal compared with 623 (89%) identified as non-Aboriginal. The status of the remaining 32 cases was unknown. The Aboriginal to non-Aboriginal rate ratio of 3.6 for 2009, was the second lowest recorded for the previous ten years [107].

In 2009, a majority of newly acquired and unspecified hepatitis B notifications occurred in non-Aboriginal people in WA, but the age-standardised rates of newly acquired hepatitis B notifications and unspecified hepatitis B notifications for Aboriginal people (1.3 per 100,000 population and 105 per 100,000 population respectively) were almost three and a half times that of non-Aboriginal people (1.8 per 100,000 population and 30 per 100,000 population respectively) with the Aboriginal to non-Aboriginal rate recorded as much higher in females than males (2.6 and 0.0 respectively) [107].

In 2009, the highest age-standardised rate of newly acquired hepatitis B in Aboriginal people occurred in the Goldfields region of WA (16 per 100,000 population) compared with the highest rate for non-Aboriginal people reported in the South Metropolitan region (2.7 per 100,000 population) [107]. The highest age-standardised rate for unspecified hepatitis B in the Aboriginal population occurred in the Goldfields region (486 per 100,000 population) and in the non-Aboriginal population in the Kimberly region (583 per 100,000 population [107].

Extent of hepatitis C among Indigenous people in WA

Infection with hepatitis C virus (HCV) occurs via contact with contaminated blood - typically through sharing of a needle during IV drug use, tattooing, or a blood transfusion [111]. HCV can also be passed from mother to foetus during pregnancy and sexual contact may be another potential route of transmission. No vaccine exists for HCV [112]. Preventive measures include avoiding IV drug use. Recent data indicates increasing rates of hepatitis C among Indigenous people in WA [111].

In 2009, the rate of hepatitis C diagnosis in the Aboriginal and Torres Strait Islander population in WA was nearly four times higher than in the non-Indigenous population [100]. Of the 93 newly acquired notifications of hepatitis C, 26 (28%) were identified as being Aboriginal compared with 67 (72%) identified as non-Aboriginal [107]. Of the 1,066 unspecified notifications of hepatitis C, 114 (11%) were identified as being Aboriginal compared with 862 (81%) identified as non-Aboriginal, with the status of the remaining 90 cases unknown [107].

In 2009, the age-standardised rates of newly acquired hepatitis C notifications and unspecified hepatitis C notifications for Aboriginal people in WA (31 per 100,000 population and 155 per 100,000 population respectively) were many times that of non-Aboriginal people (3.2 per 100,000 population and 40 per 100,000 population respectively) [107] and the Aboriginal to non-Aboriginal rate ratio was higher in males than females (11.4 and 6.8 respectively).

In 2009, the highest rates of newly acquired hepatitis C in Aboriginal people were found in the Great Southern region of WA (85 per 100,000 population), eight and a half times the rate of non-Aboriginal people (10 per 100,000) [106]. The highest rate of unspecified hepatitis C in Aboriginal people occurred in the Great Southern region (365 per 100,000 population), just over eight times the rate for non-Aboriginal people (43 per 100,000) [107]. Potential factors identified as contributing to these high rates of hepatitis C include increasing injecting drug use in Indigenous communities, overrepresentation of Indigenous people in adult and juvenile correctional settings, and poor access to educational and treatment services [112].

HIV/AIDS

HIV is transmitted from person to person through the exchange of blood and bodily fluids. In Australia, transmission occurs primarily through sexual contact between men [111]. The virus can also be transmitted through: sexual contact between men and women; and sharing of needles and/or syringes (primarily for drug injection) with someone who is infected. Babies born to HIV-infected women may become infected before or during birth or through breast-feeding after birth.

Australia has prevented an uncontrolled spread of HIV and the overall rates of HIV and AIDS are low in comparison with other countries [111]. However, great concerns have been expressed about the possible impact of HIV/AIDS among Indigenous people, for whom AIDS has been seen as having the potential 'to further erode the social and economic fabric of Indigenous communities' [113]. Indigenous people are seen as being at particular risk of HIV infection due to high rates of STIs and their lack of access to effective services [114].

Factors that may contribute to higher rates of STIs and blood borne viruses (such as HIV and AIDS) in Indigenous people include less access to culturally appropriate primary health care services and shortage of clinical staff, transmission risk due to networks of sexual contact within cultural groups, higher rates of screening leading to early detection and treatment, socio economic disadvantage, shame and historical factors associated with treatment for STIs and marketing messages on the topic not always reaching and having impact with Indigenous communities [100].

Extent of AIDS/HIV among Indigenous people in WA

In 2009, there were three cases of HIV infection reported among Indigenous people in WA (one female and two males) [107]. The three cases of HIV reported among Indigenous people were all a result of heterosexual exposure. HIV notifications for Indigenous people were similar to notifications for non-Indigenous people (age-standardised rate 5.2 compared with 4.1 respectively) with the rate fluctuating for the period 2005-2009 from 3.0 per 100,000 to 10 per 100,000 for Indigenous people while the rate for non-Indigenous people remained relatively stable (3.0 to 4.1 per 100,000) [107].

Other communicable diseases

Other communicable diseases of significance affecting Indigenous people in WA include tuberculosis, gastroenteritis, pneumococcal disease and meningococcal disease.

Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by the bacterium Mycobacterium tuberculosis, which penetrates the lung tissue causing inflammation and the development of encapsulated bacterial cells (tubercles) [115, 116]. The main risk factors for TB are poverty, overcrowding, and malnutrition [115, 117]; all common among many Indigenous communities. Other risk factors, also common among Indigenous people, are diabetes mellitus, smoking, alcohol abuse, and advanced renal disease. A recently emerged risk factor for tuberculosis is HIV infection [118, 119].

Tuberculosis is a nationally notifiable disease in Australia with information on notified cases collated by state and territory jurisdictions under jurisdictional public health legislation [120]. Reports on TB notifications in Australia highlight that it remains a major global health problem.

Extent of tuberculosis among Indigenous people

There were 11 new cases of tuberculosis reported among Indigenous people in WA in 2003-2007, but none reported in 2007 [Derived from 120-124]. The crude rate for Indigenous people in WA in 2003-2007 was 3.1 notifications per 100,000 population, less than one-half of the overall rate for Indigenous people in Australia. After adjusting for differences in the age structures of the Australian Indigenous and non-Indigenous populations, the notification rate for Indigenous people was 14 times that for non-Indigenous people.

Gastroenteritis

Gastrointestinal infections and infestations, particularly those causing diarrhoea, are significant causes of morbidity among Indigenous children [125]. Diarrhoea, usually referred to as gastroenteritis, is not a major problem among non-Indigenous children in Australia, but it remains a common cause of morbidity for Indigenous children. The greater impact of gastroenteritis among Indigenous than among non-Indigenous children is reflected in hospitalisation data.

Extent of gastroenteritis among Indigenous children in WA

Gastroenteritis is prevalent in Australian Aboriginal infants and children and is a major cause of hospitalisation in WA. A retrospective analysis of hospitalisation data of the 1995–1996 cohort of infants born in WA to mid-2002, found that Aboriginal infants were hospitalised eight times more frequently than their non-Aboriginal peers, and were readmitted more frequently and sooner for

diarrhoeal illnesses than their counterparts [126]. They also stayed in hospital for twice as long; many Aboriginal patients were hospitalised on numerous occasions. Hospitalisation rates were higher in remote areas and were significantly associated with co-morbidities such as under-nutrition, anaemia, co-existing infections and intestinal carbohydrate intolerance.

Despite higher rates of gastroenteritis being reported among Indigenous infants and children, marked reductions in mortality from the illness represent a decline in severity over recent decades. In the period 1970-1979, there were 69 deaths of Indigenous children in hospital in WA from gastroenteritis (53 were infants) [127]. In the period 1980-1989, there were nine Indigenous deaths (six infants), but none in the period 1990-2000.

Pneumococcal disease

Pneumococcal disease, which is caused by the bacterium Streptococcus pneumoniae (pneumococcus), includes upper respiratory tract infection and lower respiratory tract infection (primarily pneumonia) [35, 96, 128]. Invasive pneumococcal disease (IPD) occurs when the bacterium infects normally sterile sites, such as blood and cerebrospinal fluid, causing life-threatening septicaemia and meningitis. Recognised risk factors for pneumococcal disease include chronic illness (including chronic respiratory, cardiac and renal diseases) and immuno-compromised conditions. Children aged less than five years are particularly susceptible to pneumococcal disease.

Indigenous children and adults have a significantly higher incidence of pneumococcal disease than non-Indigenous people, but detailed data are available only for IPD, which has been notifiable Australia-wide since 2001 (since 1997 in Qld and the NT) [96, 128]. Vaccination for IPD is targeted for Indigenous children aged 0-2 years (except in central Australia and adjacent areas where the conjugate pneumococcal vaccine program extends to five years of age) [128]. Vaccination with the polysaccharide vaccine is recommended for Indigenous adults with risk factors for IPD (all Indigenous adults aged 15 years or over are eligible in the NT), and for all Indigenous people aged 50 years or older.

Extent of pneumococcal disease among Indigenous people in WA

Vaccination programs have had a significant impact on the disparity in disease rates between Indigenous and non-Indigenous people [129, 130]. At the start of the National Indigenous Childhood Pneumococcal vaccination program in 2001, the rate among Indigenous children aged less than two years was 219 per 100,000, 2.9 times higher than in non-Indigenous children [130]. By 2004, the rate in Indigenous children had dropped to 92, no different to the rate in non-Indigenous children. In Indigenous adults, IPD rates decreased after the introduction of vaccination programs in the Kimberley [131] and in North Queensland [132, 133], but nationally, rates remain higher for Indigenous adults than for non-Indigenous adults [130].

In 2006, of the 130 cases of pneumococcal disease notified in WA, 53 were for Indigenous people [118]. For notifications aged less than five years of age, seven were for Indigenous people compared with 11 for non-Indigenous people. For notifications aged five to 64 years, 46 were for Indigenous peoples compared with 36 for non-Indigenous people and for notifications aged over 65 years of age there were none for Indigenous people compared with 30 for non-Indigenous people [118]. Of the 130 cases notified there were 12 deaths including three Indigenous people. During the period 1997-2007, the IPD incidence rate was 47 cases per 100,000 population per year among Aboriginal people in WA compared with seven cases per 100,000 population per year in non-Aboriginal people [134]. After introduction of the 7-valent pneumococcal conjugate vaccine (7vPCV) in 2001, IPD rates among Aboriginal children decreased by 46% for those less than two years of age and by 40% for those two-to-four years of age with rates decreasing by 64% and 51% for non-Aboriginal children respectively.

Meningococcal disease

Meningococcal disease is caused by the bacterium Neisseria meningitidis (also known as meningococcus). Manifestations of meningococcal disease include meningitis, meningococcemia without meningitis, septic arthritis, and septicaemia [128, 135]. The risk of infection can be increased in crowded housing conditions [35, 62]. The most common groups of meningococcus found in Australia are B (73%) and C (15%) [136]. Vaccination against serogroup C has been funded for all infants since 2003, with a catch-up program for those aged up to 19 years of age [62].

Extent of meningococcal disease among Indigenous people in WA

There were six notifications of meningococcal disease for Indigenous people living in WA in 2004, a rate of 8.6 per 100,000 [25]. (The source did not provide an estimate of the rate for non-Indigenous people, but the age-standardised notification rate for non-Indigenous people living in NSW, WA, SA and the NT in 2000-2002 was 3.4 per 100,000 [128].)

More recent data was not available for WA, but in 2004-2006, for WA, SA and the NT combined, the notification rate for Indigenous Australians was almost eight times the rate for other Australians [35].

Eye health

Eye health can be affected by genetic factors, ageing, premature birth, diseases (such as diabetes) smoking, injuries, UV exposure and nutrition. There has been progress in improving the eye health of Indigenous people, but they are still more likely than non-Indigenous people to suffer from preventable eye conditions [137-139]. For example, Australia is the only developed country in the world where trachoma is still found. Nationally, eye and vision health issues cause 11 years of life lost to disability, constitute the third leading cause of the gap between Indigenous and non-Indigenous Australians, and increase Indigenous mortality at least two-fold [140]. The eye health of many Indigenous people is further compromised by difficulty in accessing optometrist or specialist services [141]. For those with refractive error, for example, the main issues are access to and utilisation of testing, cost of spectacles, the administrative difficulty of dispensing, and the repair of spectacles.

Extent of eye conditions amoung Indigenous people in WA

According to the 2004-2005 NATSIHS, eye and vision health were the most common self-reported health complaints in WA (29%) [29, 44, 140].

In 2008, the National Indigenous Eye Health Survey (NIEHS), conducted by the Indigenous Eye Health Unit at the University of Melbourne, found that WA had the highest prevalence of vision loss among Indigenous adults in Australia (12%), and the second highest prevalence of vision loss among Indigenous children (1.9%) [142]. Major causes of vision loss among Indigenous populations in WA were similar to those found nationally: refractive error was responsible for 5% of vision loss, cataract 5%, diabetic retinopathy 1.8%, trachoma 0.7% and other causes 1.4% [142]. Cataract prevalence appears to have increased since the 2004-2005 NATSIHS, which reported a prevalence of 3% [29]. Only three-fifths (61%) of Indigenous Western Australians affected by cataract had cataract surgery, which was lower than the national average (65%) [142]. Of Indigenous people who had diabetes, 12% also had vision loss; 16% had had an eye exam; and 48% of Indigenous people with diabetic retinopathy requiring laser surgery, were actually treated [142].

WA is one of only two Australian states where NIEHS identified trachoma as a cause of vision loss among adults. In terms of infectious trachoma, the highest levels in Australia are found in remote areas of WA, with the prevalence slightly higher in inland than coastal areas (13% compared with 11%) [142]. These findings were confirmed by the Trachoma Surveillance Report 2009, in which the reported trachoma prevalence between 20% and 49% in Aboriginal children aged one to nine was four out of 41 screened communities in the Kimberley, six out of 20 screened communities in the Goldfields, six out of 12 screened communities in the Pilbara, and one out of six screened communities in the Midwest [143]. The overall trachoma prevalence of active trachoma for the state was 15% constituting a significant falling trend in comparison to previous periods.

Ear conditions

Ear infections are the most common type of illness in babies and young children, and three out of four children experience some form of otitis media (OM) by the time they are three years of age [144]. OM, which often occurs as a result of another illness (involving viruses or bacteria or both), is a common disorder in both developed and developing countries [145], but its form, onset, and natural history vary from population to population [146]. OM, particularly suppurative forms, is associated with some impairment of hearing, with major implications for language development and learning difficulties [147, 148].

The level of ear disease and hearing loss among Indigenous people remains much higher than that of the general Australian population, particularly among children and young adults [147, 149]. The high prevalence of OM among Aboriginal people is well established, and suppurative OM is of greatest concern[16]. OM can affect Indigenous babies within weeks of birth and a high proportion of children will continue to suffer from chronic suppurative otitis media (CSOM) throughout their developmental years [150].

As is the case with knowledge about most specific health conditions, the most valuable information about ear disease comes from specific studies, which have found particularly high levels of OM among Indigenous people living in rural and remote communities and lower levels for those living in urban areas (see [149] for a detailed review of the various studies).

Extent of ear disease among Indigenous people in WA

The overall frequency of ear disease among Indigenous people in WA is not known, but according to the 2004-05 NATSIHS around one in eight Indigenous people (12%) across Australia reported ear diseases and/or hearing problems with increasing prevalence with age [44]. The proportions of young people with ear and hearing problems were much higher for Indigenous than non-Indigenous people: 10% compared with 3% for people aged 0-14 years, 8% compared with 4% for those aged 15-24 years, and 12% compared with 7% for those aged 25-34 years [44].

Separate information about OM among Indigenous people in WA is available from the 2004-2005 NATSIHS: 1.6% of Indigenous people reported having OM, 2.6 times the proportion of 0.6% among non-Indigenous people [29]. A slightly higher proportion of Indigenous males (1.7%) than Indigenous females (1.4%) reporting having OM.

Overall hospitalisation rates across Australia for ear and hearing problems were similar for Indigenous and non-Indigenous people in 2003-04[17] [3]. There were, however, more separations for Indigenous people (64%) due to OM than for non-Indigenous people (55%).

In 2002-03 and 2003-04, the age-standardised hospitalisation rates for Indigenous people in WA aged 0-74 years for tympanoplasty and OM were 0.8 per 1,000 for Indigenous males compared with 0.1 per 1,000 for non-Indigenous males (rate ratio 11.5) and 0.9 per 1,000 for Indigenous females compared with 0.1 per 1,000 for non-Indigenous females (rate ratio 17.0) [25].

Information collected by the WAACHS reveals that 18% of Indigenous children aged 0-17 years had recurring ear infections [15]. Children 0-11 years were more likely (20%) to have recurring ear infections than children aged 12-17 years (14%). Abnormal hearing was reported by carers for 7% of the children aged 4-17 years. Of children with recurring ear infections with discharge, 28% had abnormal hearing compared with 1% of those without ear infections.

Oral health

Oral health is defined as 'a standard of health of the oral and related tissues in the mouth (including mucous membrane, connective tissue, muscles, bone, teeth and gums), that enables an individual to eat, speak, and socialise without active disease, discomfort, or embarrassment and that contributes to general wellbeing' [3, 151]. It may also refer to immunological, physiological, sensory and digestive system functioning, but is most often used to refer to two specialised tissues of the mouth; the teeth and the gums [3].

Two major threats to oral health are dental caries and periodontal diseases. Dental caries is caused by acid-producing bacteria living in the mouth, which proliferate on sweet and sticky food [152]. Periodontal diseases (affecting the gums) are caused by bacterial infection associated with poor oral hygiene, infrequent dental visits, age, smoking, low education and income levels, and certain medical conditions [152], especially diabetes mellitus [153], and osteoporosis [154].

16 As with all areas of Indigenous health, there is considerable diversity in the impact of ear disease among Indigenous people across Australia. In particular, ear disease has not been identified as a major problem among Torres Strait Islander people. The patterns described in this section do not apply to all Indigenous people, but they are characteristic for many Indigenous communities, particularly those in remote parts of the country.

17 As noted in the section entitled 'Hospitalisation', it is likely that the Australia-wide numbers and rates under-estimate Indigenous hospitalisation by as much as 25%.

Most information available about oral health in the Indigenous population relates to dental caries among children, and there is limited information about the oral health of adults. Generally the extent of caries in deciduous teeth among young Indigenous children has been increasing, whereas it has been declining for their non-Indigenous counterparts [155].

Extent of oral health problems among Indigenous people in WA

Detailed information about the oral health of Indigenous people in WA is not known, but it is likely to be similar to the situation documented nationally by the 2004–2005 NATSIHS, the first ABS survey to collect substantial information about the oral health of Indigenous people [44]. Of Indigenous people aged 15 years or older nationally, 11% had never visited a dentist or other health professional about their teeth. This proportion was 24% for Indigenous people in remote areas compared with 6% in non-remote areas. More than three-quarters (78%) of all Indigenous people aged 15 years or older had lost fewer than five adult teeth in their lifetime, but the proportion that had lost five or more teeth ranged from around 1% of people aged 15–24 years to 61% of those aged 55 years or older with almost one-half (47%) of this group having lost 10 or more adult teeth. Older people in non-remote areas reported a higher level of tooth loss and greater use of dentures than those in remote areas, but a higher proportion of people aged 55 years or older in remote areas (19%) than in non-remote areas (10%) said they required dentures but did not have them [44].

According to the WAACHS, an estimated 19% of Aboriginal and Torres Strait Islander children were reported by their carers to have holes in their teeth [15]. Prevalence of cavities was lowest for children 0-3 years (8%) and highest for children aged 4-7 years (31%). Carers reported 28% of children had never had a tooth filled and almost one-in-ten had had a tooth removed because it was not amenable to restorative dental care [15].

Factors contributing to health

The health of individuals and populations is influenced and determined by many factors acting in various combinations [2]. The dominant view is that health is 'multicausal' with healthiness, disease, disability and death the result of the interaction of human biology (genetics), lifestyle and environmental (including social) factors.

The factors contributing to the poor health status of Indigenous people should be seen within the broad context of the 'social determinants of health' [3, 5]. These 'determinants', which are complex and interrelated, include income, education, employment, stress, social networks and support, social exclusion, working and living conditions, gender and behavioural aspects. Related to these are cultural factors, such as traditions, attitudes, beliefs, and customs. Together, these social and cultural factors also have a major influence on a person's behaviour. Indicators of the social disadvantage experienced by Indigenous people should be borne in mind in the interpretation of information about a number of specific health determinants.

Psychosocial factors

The 2002 NATSISS collected information about stressors experienced by Indigenous people in the previous 12 months (stressors included: death of a family member or friend; serious illness or disability; not able to get a job; and alcohol or drug-related problem) [29]. The 2004-2005 NATSIHS included separate information for WA on stressors experienced by Indigenous people in the previous 12 months (information about such stressors is potentially very important, but their usefulness is limited in that they were published in relative isolation and without appropriate comparison with non-Indigenous people). Over three quarters (78%) of Indigenous people 18 years and over reported experiencing more than one personal stressor with only 21% reporting no experienced stressors [44]. The stressors reported most frequently by Indigenous people were: death of a family member or close friend (51%); alcohol and drug problems (29%); member of family sent to jail/currently in jail (24%) and trouble with the police (20%). Other stressors reported included being witness to violence (14%); overcrowding at home (14%); not being able to get a job, discrimination, abuse or violent crime (13%); gambling problem (11%); divorce or separation (10%); serious accident (9%); and involuntary loss of job (5%).

Nutrition

The nutritional status of Indigenous people is influenced by socio-economic disadvantage, and geographical, environmental and social factors [156]. Poor nutrition is a common risk factor for overweight and obesity, malnutrition, cardiovascular disease, type 2 diabetes, certain cancers, osteoporosis, and tooth decay [14, 157].

Fruit and vegetable consumption is strongly linked to the prevention of chronic disease and to better health therefore the nutritional status of Australian populations is usually determined by assessment of the amount of fruit and vegetables consumed on a daily basis [158]. The National Health and Medical Research Council (NHMRC) recommend a daily intake for adults of at least two serves of fruit and five of vegetables. Other recommendations are to limit saturated fats and moderate total fat intake, and to choose foods low in salt. In 2003, insufficient fruit and vegetable consumption contributed to 3.5% of the total burden of disease in Indigenous Australians and 5.7% of deaths [43].

Nutrition among Indigenous people in WA

According to the 2004-2005 NATSIHS, 94% of Indigenous people aged 12 years and older in WA consumed vegetables daily with 28% consuming one serve or less, 56% having two-four serves, 15% having five or more serves (recommended minimum consumption; NHMRC) [29]. Consumption of vegetables was similar for non-Indigenous people with 16% consuming one serve or more, 66% consuming two-four serves and 19% having the recommended five or more serves. The reported figures for daily consumption of fruit revealed that 52% consumed only one serve or less (slightly more than their non-Indigenous counterparts (44%)), while 48% reported having two or more serves daily, almost 10% less than non-Indigenous people (56%) [29]. Detailed information about the consumption of fruit and vegetables was not collected for respondents in the 2004-2005 NATSIHS by remoteness, but the proportions of people who did not consume these dietary items daily was substantially higher for Indigenous people aged 12 years or older living in remote areas than for those living in non-remote areas – 12% and 0.7% respectively for vegetable consumption, and 24% and 7.6% respectively for fruit consumption [29].

The 2004-2005 NATSIHS also provided data on the consumption of salt and milk for Indigenous people by remoteness. For Indigenous people aged 12 years or older in WA living in remote areas, 86% reported 'sometimes' or 'usually' adding salt after cooking compared

with 71% of those living in non-remote areas [29]. (Data on the consumption of salt by non-Indigenous people was not available.) Over three-quarters of Indigenous people aged 12 years or older in WA reported drinking whole milk (including full-cream powdered milk) as their usual choice, with those living in remote areas reporting higher levels of consumption than those in non-remote areas (87% and 70% respectively). The level of whole milk consumption for non-Indigenous people living in WA was slightly more than one-half the level of consumption for Indigenous people. Less than one-quarter of Indigenous people reported consuming low/reduced fat milk with those living in remote areas consuming more than those in non-remote areas (25% compared with 7.1%). This rate was lower than their non-Indigenous counterparts with 39% of non-Indigenous people reported drinking reduced fat/skim milk. Overall, 3.8% of Indigenous people reported not drinking milk at all, which was less than their non-Indigenous counterparts (5.4%) [29].

People living in rural and remote areas of Australia are often limited in their food choices because of transport, distance, cost, and geographical or climatic conditions creating barriers for adequate and accessible food supply [159]. The Environmental health needs survey, conducted in 2007-2008 (the third in a series surveying housing, services, utilities, community infrastructure and the immediate living environment in discrete Indigenous communities in WA), found that 10% of Indigenous communities in WA report having no access to fresh food, fruit and vegetables [160]. This is a reduction from the 17% of communities surveyed in 2004 that had no access to fresh food, fruit and vegetables. The same survey found that the average distance travelled by community members for fresh food supplies was 49 kilometres-the majority of communities (62%) are within 30kms of fresh food supplies, whilst 15% of communities are more than 100kms from the nearest fresh food supplies.

Physical activity

The *National physical activity guidelines for Australians* recommend at least 30 minutes of moderate activity on at least five days of the week to reduce the risk of cardiovascular disease and other chronic conditions [28, 161]. The recommended daily activity can be a combination of shorter activities such as two lots of 15 minute activities. The guidelines also suggest that adults think of all body movement as a benefit and incorporate as much active body movement they can every day. Insufficient levels of physical activity have shown to be a risk factor for cardiovascular disease, type 2 diabetes, certain cancers, depression, and overweight and obesity [14, 162].

Physical activity among Indigenous people in WA

Self-reported data from the 2008 NATSISS revealed that of all Indigenous adults who took part in sport or physical activities in the 12 months prior to the survey, 13.1% were living in WA [61]. Of all Indigenous females who took part in sport or physical activities, 15.4% were living in WA compared with 11.5% of Indigenous males. For Indigenous children aged 4-14 who took part in sport or physical activities, 13.6% were living in WA.

The 2004-2005 NATSIHS collected information relating to the frequency, intensity and duration of exercise undertaken by Indigenous people living in non-remote areas across Australia [29, 44]. In non-remote areas of WA, 71% of Indigenous people aged 15 years or older reported being sedentary (less than 100 minutes or no exercise) or practicing low levels of exercise (100 minutes to less than 1,600 minutes). The proportion of Indigenous people in non-remote areas across Australia who were sedentary or engaged in low level exercise in the two weeks prior to interview was higher in 2004-2005 (75%) than in 2001 (68%) [44].

Bodyweight

Body mass index (BMI) - weight in kilograms divided by the square of height in metres - is the internationally recognised measure for classifying overweight and obesity in adults. Being overweight (BMI between 25 to 29.9) or obese (BMI >= 30) increases a person's risk for cardiovascular disease, type 2 diabetes, respiratory diseases, renal disease, certain cancers, osteoarthritis, pregnancy complications, and psychosocial problems [28]. A high BMI can be the result of poor nutrition, physical inactivity, socioeconomic disadvantage, genetic predisposition, increased age, and alcohol and tobacco use [28, 163]. A BMI in the range of 18.5-24.99 is classified as acceptable, conferring an 'average' risk of co-morbidity.

Current information using 2003 data on the contribution of risk factors to Indigenous disease burden (ill health, disability and premature death) revealed that high body mass (overweight/obesity) was responsible for 11.4% of the total Indigenous Australian burden of disease, making it the second leading cause among 11 risk factors examined [43, 164]. This data may actually under-represent the total numbers of Indigenous Australians who are at risk of the health problems associated with being overweight or obese. This is because optimal BMI cut-offs are still unknown in Indigenous Australian populations due to differences in body shape and other physiological factors between different population groups. Research indicates that an appropriate BMI for acceptable

weight in Indigenous Australian populations might be between 17 and 22kg/m2 [165]. There is also evidence that measuring the waist to hip ratio (WHR) in Indigenous peoples is more sensitive and easier to measure than body mass index [166]. Research has shown that WHR is the most accurate predictor of cardio-metabolic risks is Indigenous populations, with BMI being the least accurate [167].

Bodyweight among Indigenous people in WA

According to the 2004-2005 NATSIHS, Indigenous people aged 15 years or older living in non-remote areas in WA were 1.2 times more likely than their non-Indigenous counterparts to be overweight/obese (59% compared with 50%, after adjusting for differences in the age structures of the two populations) [29]. No significant difference was reported according to remoteness of residence, but in each age group the disparity between Indigenous and non-Indigenous people was greater for females than for males (58% of Indigenous females reported being overweight/obese compared with 41% of non-Indigenous females; 59% of Indigenous males reported being overweight/obese compared with 60% of non-Indigenous males) [29, 44]. After adjusting for non-response, the proportion of Indigenous people in non-remote areas Australia-wide who were overweight or obese increased from 48% in 1995 to 56% in 2004-2005 [44].

Data for the underweight and normal weight categories were not separated for WA, but 41% of Indigenous people and 50% of non-Indigenous people aged 15 years or older in WA were recorded as being in the combined category underweight/normal weight range [Derived from 29]. Over one-third of Indigenous males, females and non-Indigenous males were reported as being in this range but the level was higher for non-Indigenous women (59%).

Immunisation

In response to the greater burden of communicable diseases among Indigenous people, the NHMRC endorsed a series of special guidelines and schedules for immunisation of vaccine-preventable diseases, which include some extra vaccinations [168]. The latest recommendations are available from the Department of Health and Ageing website.

Immunisation among Indigenous people in WA

According to the Australian Childhood Immunisation Register, the proportion of Indigenous children in WA aged five years who were fully immunised in 2010 was 80%, slightly lower than that recorded for other Australians (87%) [23]. More detailed data specific to WA are not available, but according to the 2004-2005 NATSIHS 88% of Indigenous children aged 0-6 years living in non-remote areas across Australia were fully immunised against the vaccine-preventable diseases included in the relevant NHMRC vaccination schedule [44]. Based on actual immunisation records, the level fully immunised would appear to be somewhat lower, as the proportions for the separate vaccines were: diphtheria and tetanus (79%), whooping cough (74%), hepatitis B (83%), poliomyelitis (79%), Hib (73%), and MMR (measles, mumps, and rubella) (85%).

In 2004-05, nearly two-thirds (60%) of Indigenous people across Australia aged 50 years or older reported to the NATSIHS that they had been vaccinated against influenza in the previous 12 months; with vaccination levels reported as higher for people living in remote areas (80%) than for those living in non-remote areas (52%); with all levels higher than those for non-Indigenous people (46%) [44]. Similarly, vaccination levels for pneumonia in the previous five years were higher for Indigenous adults aged 50 years or older (remote: 56%; non-remote: 26%; all: 34%) than that for their non-Indigenous counterparts (20%). Further findings from the NATSIHS reported that in WA, 30% of Indigenous Australians aged 50 years and over were fully vaccinated against influenza and pneumococcal disease, with this proportion similar to figures for Indigenous people Australia wide at 31%, and rates of screening for cervical cancer for Indigenous women aged 20-69 years at 42.6%[18] [23].

Breastfeeding

Breast milk, which is the natural and optimum food for babies, contains proteins, fats and carbohydrates at levels that are appropriate for an infant's metabolic capacities and growth requirements [156, 169]. Breast milk also has anti-infective properties and contains immunoglobulins which provide some immunity against early childhood diseases [170]. Subsequently, breastfeeding is considered as having many positive effects on the survival, growth and development of infants [35, 169]. Evidence suggests that breastfeeding may also lower the risk of obesity and protect against a range of chronic illnesses which can develop in adulthood, including type 2 diabetes, heart disease, atherosclerosis, and high blood pressure [169]. Preliminary results by Australian researchers from the

18 This figure included only women that reported biennial pap smears.

Australian Institute for Economic Research on Health, suggest that between 11% and 28% of the chronic disease burden in Australia could be attributed to a lack of breastfeeding during infancy [169].

Extent of breastfeeding among Indigenous women in WA

Surveys indicate that a majority of Indigenous women breastfeed their babies. The WAACHS reported that mothers of Indigenous children were more likely to initiate breastfeeding and breastfeed for longer than mothers in the general population, particularly those living in more isolated areas [15]. According to the 2004-2005 NATSIHS, in non-remote areas of WA, 81% of Indigenous babies aged 0-3 years had been breastfed or were currently being breastfed compared with 90% of non-Indigenous babies [29]. Similar figures were reported Australia wide with 79% of Indigenous babies aged 0-3 years reported as having been breastfed or were currently being breastfed compared with 88% of non-Indigenous babies [44]. Data collected in 2008 from the *Footprints in time survey* (a longitudinal study of Indigenous children undertaken by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA)), also revealed similar results with 80% of Indigenous children Australia-wide reported as having been breastfed [171].

Tobacco smoking

Tobacco smoking is the most preventable cause of ill health and death in Australia [14]. In 2003, tobacco contributed to 7.8% of the burden of disease; lung cancer (35%), chronic obstructive pulmonary disease (COPD) (27%) and ischaemic heart disease (coronary heart disease) (15%) accounted for more than three quarters of this burden [172]. In 2003, tobacco was attributed to 20% of the burden of cancer disease and nearly 10% of the burden of cardiovascular disease [172]. For the same period, tobacco contributed to 12% of the burden of disease among the Indigenous population; the highest level of disease burden attributable to tobacco was for cancer (35%) and cardiovascular disease (33%) [173]. Smoking tobacco also increases the risk of stroke, asthma, rheumatoid arthritis and osteoporosis [14]. Passive smoking is also of concern to health, with children particularly susceptible.

Extent of tobacco smoking among Indigenous people in WA

The 2008 NATSISS, found that 44% of the Indigenous population in WA aged 15 years and over were current smokers [61]. This figure has not changed from the prevalence reported in the 2004-05 NATSIHS. According to the 2004-2005 NATSIHS, 44% of Indigenous people aged 18 years or older in WA reported that they were current smokers; the level was slightly higher for people living in remote areas (46%) than for those living in non-remote areas (42%). After adjusting for differences in the age structures of the two populations, daily smoking was 2.0 times more common among Indigenous people aged 18 years or older (39%) than among their non-Indigenous counterparts (20%) [44]. The proportion of Indigenous men who smoked daily (45%) was lower than the proportion of Indigenous women (51%), but more Indigenous males in remote areas were current daily smokers (53%) than their non-remote counterparts (35%). Proportions for Indigenous women living in remote and non-remote areas were similar (50% and 52% respectively). AIHW analysis of the National Perinatal Statistics Unit (NPSU) National perinatal data collection found that Indigenous women in WA smoked during pregnancy at 3.6 times the rate of their non-Indigenous counterparts (54% compared with 15%) [27].

Alcohol use

Excessive alcohol use has been found to contribute to a wide range of diseases including stroke, coronary heart disease, high blood pressure, some cancers, and pancreatitis [14]. It also contributes to a wide range of injuries including motor vehicle accidents, drownings, homicides, and falls.

Abstinence from drinking alcohol is advised for women when pregnant or breastfeeding [174]. Consumption of alcohol in pregnancy can affect the unborn child leading to Foetal alcohol spectrum disorder (FASD); an umbrella term that describes a range of diagnoses (comprising abnormalities such as growth retardation, characteristic facial features, and central nervous system anomalies - including intellectual impairment). These disorders are incurable and wholly preventable [175, 176].

In 2003, alcohol contributed to 2.3% of the burden of disease in Australia [172]. Among Indigenous Australians alcohol accounted for 5.4% of the burden of disease; the highest levels of disease burden attributable to alcohol were for injury (22%), mental disorders (16%), and cancers (6%) [173].

Surveys have consistently shown that Indigenous people are less likely to drink alcohol than non-Indigenous people[19] [177], but those who do drink are more likely to consume it at hazardous levels [3, 178]. The 2008 NATSISS, found that 35% of Indigenous people aged 15 years and over had never consumed alcohol or had not done so in the last 12 months compared with 17% of the total Australian population aged 14 years or older [61, 179]. NATSISS data is not directly comparable to the 2004-05 NATSIHS due to conceptual and methodology differences, however both surveys report similar results for those drinking at risky/high risk levels; the 2008 NATSISS found that 17% of the Indigenous population aged 15 years or older reported drinking at medium/high risk levels, while the 2004-05 NATSIHS found that 16% of the Indigenous population aged 18 years and over reported drinking at risky/high risk levels [44, 61]. After adjusting for the age differences between the Indigenous and non-Indigenous populations, the NATSIHS found that the proportion of Indigenous adults who reported drinking at risky/high risk levels was similar to that of the non-Indigenous population (15% and 14% respectively) [44].

Extent of alcohol use among Indigenous people in WA

The 2008 NATSISS found that 34% of the Indigenous population in WA aged 15 years or older abstained from alcohol in the last 12 months [61]. Analysis by the ABS and AIHW of the 2004-05 NATSIHS found that 26% of the Indigenous population in WA aged 18 years or over had abstained from alcohol in the last 12 months [27]. Further analysis by the ABS and AIHW of the 2004-05 NATSIHS and the 2004-05 NHS found that 30% of the Indigenous population in WA abstained from alcohol in the previous 12 months compared with 14% of the Western Australian non-Indigenous population [27].

The 2008 NATSISS also found that 19% of Indigenous people in WA aged 15 years or older drank at medium/high risk levels [60]. While not directly comparable, this is similar to the 2004-05 NATSIHS which found that 19% of Indigenous people in WA aged 18 years and older drank at risky/high risk levels [29]. Analysis by the ABS and AIHW of the 2004-05 NATSIHS and the 2004-05 NHS found that those who drank at long-term risky/high risk levels were similar for the Western Australian Indigenous and non-Indigenous population (16% and 15% respectively), but the proportion of the Indigenous population who drank at short-term risky/high risk levels was more than twice that of the non-Indigenous population (18% and 8% respectively) [27].

Hospitalisations

In the six jurisdictions of NSW, Vic, Qld, WA, SA and the NT combined, over the period July 2004 to June 2006, approximately 1.4% of all hospitalisations of Indigenous Australians were for a principle diagnosis related to alcohol use; Indigenous males were hospitalised at five times the rate of non-Indigenous males per 1,000 population (12.5 compared with 2.5 respectively), and Indigenous females were hospitalised at three times the rate of non-Indigenous females per 1,000 population (6.0 compared with 1.8 respectively) [27]. Around 80% of all Indigenous hospitalisations related to alcohol use had a principal diagnosis of mental and behavioural disorder due to alcohol use; the most common type of disorder was acute intoxication. Indigenous Australians were hospitalised at eight times the rate of their non-Indigenous counterparts for acute intoxication (3.4 compared with 0.4 per 1,000 respectively); at 10 times the rate for mental and behavioural disorders due to withdrawal (1.3 compared with 0.1 per 1,000 respectively); and at 23 times the rate for psychotic disorder (0.3 compared with 0.0 per 1,000 respectively). Indigenous hospitalisation for liver disease and for accidental poisoning by alcohol occurred at five times the rate of non-Indigenous Australians (1.2 and 0.2 per 1,000 compared with 0.2 and 0.1 per 1,000 respectively).

For the years 2005–06, both Indigenous males and females in WA experienced significantly higher rates of alcohol-related attendance at hospital emergency departments than their non-Indigenous counterparts (8.9 and 4.5 per 100,000 population respectively) [180]. In 2005, admissions and beddays from the harmful use of alcohol that were wholly attributable to alcohol were also higher among Indigenous males compared with their non-Indigenous counterparts (37% for admissions and 38% for beddays compared with 30% and 26% respectively) and Indigenous females compared with their non-Indigenous counterparts (31% for admissions and 27% for beddays compared with 23% and 18% respectively). For the total population, the Kimberley and Pilbara had the highest hospitalisation rates due to alcohol consumption among the nine health regions compared with the State rate. For the Indigenous population, the Goldfields, Great Southern, Kimberley, Midwest, Pilbara and Wheatbelt had significantly higher rates compared with the State rate.

Mortality

In the six jurisdictions of NSW, Vic, Qld, WA, SA and the NT combined, over the period July 2004 to June 2006, 4% of deaths were related to alcohol use; the majority were for alcoholic liver disease [27]. Death from alcoholic liver disease occurred at eight times the rate of non-Indigenous Australians (24.1 per 100,000 compared with 3.2 per 100,000); death from mental and behavioural disorders

19 The abstinence rate includes both life-time abstainers and those people who previously drank; the higher level of total abstention among the Indigenous population reflects the greater proportion of people who used to drink but have given up.

due to alcohol use occurred at ten times the rate (10.2 per 100,000 compared with 1.0 per 100,000); and death from poisoning by alcohol occurred at nine times the rate (0.9 per 100,000 compared with 0.1 per 100,000). Overall, Indigenous males died from alcohol-related causes at seven times the rate of non-Indigenous males (48.4 per 100,000 compared with 6.8 per 100,000), and Indigenous females died from alcohol-related causes at twelve times the rate of non-Indigenous females (23.8 per 100,000 compared with 1.9 per 100,000).

In WA, for the years 1997-2005, Person years of life (PYL) (a measure of the level of premature death resulting from alcohol use) per 1,000 population was almost four times higher for Indigenous males compared with their non-Indigenous counterparts (21.7 compared with 5.5 respectively) and over seven times higher for Indigenous females compared with their non-Indigenous counterparts (9.5 compared with 1.3 respectively) [180]. For the years 1997-2005, the proportion of alcohol deaths wholly attributable to alcohol was twice as great for Indigenous males compared with their non-Indigenous counterparts (43% and 20% respectively), and over three times as great for Indigenous females compared with their non-Indigenous counterparts (55% and 16% respectively).

Illicit drug use

Illicit drug use describes the use of those drugs which are illegal (for example, cannabis, heroin, ecstasy and cocaine), the use of volatile substances (for example, petrol, glue and solvents) and the non-medical use of prescribed drugs [14]. Illicit drug use is a risk factor for ill-health including conditions such as HIV/AIDS, hepatitis, poisoning and self-inflicted injury and can cause death. In 2003, illicit drug use accounted for 2% of the burden of disease and was attributed to 8% of the mental health burden of disease, and 4% of the injury burden of disease Australia wide [172]. For the same year, illicit drug use contributed to 3.4% of the burden of disease among the Indigenous population; the highest level of disease burden attributable to illicit drugs was for mental health (13%) and injury (4%) [173].

The 2008 NATSISS found that 20% of Indigenous Australians aged 15 years and over had used an illicit substance in the last 12 months prior to interview, a rate one and a half times the level of that reported in the 2007 National drug strategy household survey (NDSHS) for the Australian population aged 14 years or over (13%), but less than that reported in the 2004-05 NATSIHS for the Indigenous population aged 18 years and over (28%) [44, 179, 181].

Extent of illicit drug use among Indigenous people in WA

According to the 2004-2005 NATSIHS, 31% of Indigenous people in WA aged 18 years or older reported having used illicit drugs in the past 12 months (including amphetamines, marijuana and/or pain killers/tranquilisers/sleeping pills). The proportions were higher for Indigenous males than females in WA (37% compared with 27%), and Australia wide (32% compared with 24%) [29, 44]. The 2004-05 NATSIHS also revealed that the proportion of Indigenous people aged 18 years and older in WA who have used an illicit drug in the past 12 months prior to interview (31%) was twice the level of that reported in the 2007 NDSHS for the Western Australian population (16%) [182].

Concluding comments

It is clear from this overview of current health status that Indigenous people remain the least healthy sub-population in WA [183]. Being a 'snapshot' of the most recent indicators of health status – with little attention to trends – the overview, however, doesn't reflect, the evidence that the health status of Indigenous people in WA continues to improve slowly.

For a start, there have been significant reductions in recorded mortality in recent years in a number of jurisdictions, including WA. Age-standardised death rates for Indigenous people living in WA, SA and the NT declined by around 13% over the period 1991-2006 [27]. The declines in death rates were less for Indigenous people than for non-Indigenous people. This trend is particularly evident over the period 2005-2009, with Indigenous:non-Indigenous death rate ratios in WA increasing for both males and females with ratios highest in the middle adult years (nearly eight times higher) [16].

The most recent estimates of life expectancy at birth for Indigenous people in WA – 65.0 years for males and 70.4 years for females in 2005-2007 – are higher than previous estimates, but, as the ABS warns, the apparent improvements are likely to be due largely to revised statistical methods [16].

Indigenous infant mortality rates for WA, SA and the NT declined significantly over the 16-year period 1991-2006 [27]. The Indigenous rate declined by 47% over that period, slightly more than the 34% decline of the rate for non-Indigenous people. The Indigenous:non-Indigenous rate ratio declined from 4.3 to 3.2 [27], with more recent estimates for the period 2007-2009 in WA reporting an Indigenous:non-Indigenous rate ratio of 2.6 [16].

The declines in infant mortality rates have occurred despite the lack of real changes in the birthweights of babies born to Indigenous mothers – the mean weights of babies born to Indigenous mothers are still around 240 grams less than the weights of those born to non-Indigenous mothers in WA [13]. Importantly, the proportions of low birthweight (less than 2,500 grams) babies born to Indigenous mothers increased by 16% over the 15-year period and are still around twice those of babies born to other mothers [184].

In terms of specific health conditions in WA, substantial improvements have occurred in the overall impact of many infectious diseases (including improvements due to immunisation programs):

- substantial declines in death rates from invasive pneumococcal pneumonia (mostly due to the introduction of vaccination programs) [118, 129-131]
- reductions in the incidence and severity of trachoma (though inflammatory trachoma remains endemic in some remote communities of central and northern Australia) [137, 143]
- a substantial reduction in the prevalence of hepatitis B virus infection (since the introduction of vaccination programs) [106, 185]
- a marked reductions in mortality from gastroenteritis over recent decades with 69 deaths of Indigenous children (53 were infants) in the period 1970-1979, nine Indigenous deaths (six infants) in the period 1980-1989, and no deaths reported in the period 1990-2000 [127], and
- a reduction in the number of new cases of tuberculosis, from 18 in 1999-2003 to 11 in 2003-2007 [120-124].

There is no doubt other evidence of improvement in some measures of health status, and of deterioration in others, but clearly, the gap between the health status of Indigenous people and that of other Australians is still very, very wide.

The vast gap between the health of Indigenous and other Australians was highlighted in the Social Justice Report 2005, which called on Australian governments to commit to achieving Indigenous health equality within 25 years [186].

Following the release of the report, 40 of Australia's leading Indigenous and non-Indigenous health peak bodies and human rights organisations joined forces to launch a campaign to 'close the gap' on health inequality [187]. In December 2006, the coalition

published an open letter to the Prime Minister, the State Premiers and Territory Chief Ministers, parliamentarians and the Australian public calling for an end to Indigenous health inequality. The 'close the gap' campaign was launched in April 2007.

Importantly, Australian governments, through the Council of Australian Governments (COAG) committed in December 2007 to 'closing the gaps' in disadvantage between Indigenous and other Australians [188].

The Indigenous Health Summit, held in March 2008, concluded with the Prime Minister issuing, on behalf of the Australian Government and the Indigenous peoples of Australia, a statement of intent 'to work together to achieve equality in health status and life expectancy between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians by the year 2030' [189].

In March 2008, the Prime Minister also announced establishment of the National Indigenous Health Equality Council, which 'advises the [Australian Government's] Minister for Health and Ageing, the Hon Nicola Roxon MP, on the achievement of equitable and sustainable health outcomes for Aboriginal and Torres Strait Islander peoples' [190].

Each State and Territory was tasked with developing implementation plans detailing their respective 'Closing the gap' initiatives which for WA, committed the State government to a process that involves genuine engagement and partnership with the Western Australian Aboriginal community [183, 191].

Reflecting the increased attention directed to Indigenous reform, it is now a standing item on all COAG meetings. As a part of its deliberations about 'closing the gap', COAG has agreed on a number of specific targets for reducing Indigenous disadvantage in the areas of education, early childhood development, health and employment [183, 192]. Particular targets are to:

- close the life expectancy gap within a generation
- halve the gap in mortality rates for Indigenous children under five within a decade, and
- halve the gap in reading, writing and numeracy achievements for children within a decade.

In addressing these targets, COAG has committed $4.6 billion over four years across early childhood development, health, housing, economic participation and remote service delivery, and has also achieved a number of supportive commitments by the corporate and community sectors [192]. Agreement has been reached also on the establishment of a new national Indigenous representative body.

This is the first time that such a high level of commitments has been made by the Australian, State and Territory governments and others, raising the possibility of substantial reductions in the health and other disadvantages experienced by Indigenous people.

As encouraging as these commitments are, achievement of substantial improvements in the health and wellbeing of Indigenous people will depend largely on the effective implementation of comprehensive strategies and policies that address the complexity of the factors underlying the disadvantages experienced by Indigenous people.

Importantly, effective, integrated comprehensive strategies and policies will need to be sustained for a long time, as improvements to the extent set in the various targets will not occur in the short-term. The timeframes for the 'closing the gap' targets suggest there is some awareness by governments of the enormity of the challenge, but the real test will be to sustain the commitments through changing political and economic cycles.

Glossary

age-specific death rate number of deaths of persons of a specific age group in one year. The rate is usually expressed as the number of deaths per 1,000 or 100,000 persons of the same age group

age-specific fertility rate the number of live births to women in a specified age group. The rate is usually expressed as the number of births per 1,000 women of the same age group

age-standardisation a procedure for adjusting rates (such as death rates) to minimise the effects of differences in age composition and facilitate valid comparison of rates for populations with different age compositions. See direct standardisation and indirect standardisation

age-standardised death rate refers to indirectly age-standardised using 'other Australians' population as the standard population; see age-standardisation and indirect standardisation

age-standardised hospitalisation rate observed number of hospitalisations for Indigenous people divided by the expected number of hospitalisations based on the age-specific rates for the total Australian population

body mass index (BMI) a measure calculated by dividing weight in kilograms by height in metres squared, and which categorises a person as ranging from underweight to obese: underweight (BMI: <18.5); normal (BMI: 18.5–24.9); overweight (BMI: 25.0–29.9); obese (BMI: 30.0+)

case-fatality rate the ratio of deaths within a designated population of people with a particular condition, over a certain period of time

crude notification rate the number of deaths in the population in a year divided by the total population, usually expressed separately for each sex

dialysis a treatment for end-stage renal disease in which the work of the kidneys is performed artificially

direct standardisation the procedure for adjusting rates in which the specific rates for a study population are averaged using as weights the distribution of a standard population

expectation of life predicted number of years of life remaining to a person if the present pattern of mortality does not change. It is a statistical abstraction based on current age-specific death rates

fertility rate See age-specific fertility rate and total fertility rate.

incidence the number of instances of illness commencing, or of persons falling ill, during a given period in a specified population (see incidence rate)

incidence rate the number of instances of illness commencing, or of persons falling ill, during a given period in a specified population divided by the population at risk

indirect standardisation the procedure for adjusting rates in which the specific rates in a standard population are averaged using as weights the distribution of the study population

infant mortality rate number of infant deaths per 1,000 live births

International Classification of Disease (ICD) World Health Organization's internationally accepted classification of death and disease

life expectancy See expectation of life

median age at death the age above and below which 50% of deaths occurred

morbidity state of being diseased or otherwise unwell

mortality death

persons years of life a measure of the level of premature death resulting from alcohol use

prevalence the number of instances of a given disease or other condition in a given population at a designated time

risk factor an attribute or exposure that is associated with an increased probability of a specified outcome, such as the occurrence of a disease. Not necessarily a causal factor

standardisation the process by which adjustments are made to take account of differences in the age structures of populations

standardised mortality ratio (SMR) the ratio of the observed number of deaths in a study population to the number expected if the study population had the same age-specific rates as a standard population. (The SMR is expressed sometimes as the ratio multiplied by 100.); see age-standardisation and indirect standardisation

total fertility rate the number of live births a woman would have if, throughout her reproductive years, she had children at the rates prevailing in the reference calendar year. It is the sum of the age-specific fertility rates for that calendar year

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Abbreviations

ABS	Australian Bureau of Statistics
ACCHS	Aboriginal Community Controlled Health Service
AIDS	Acquired immune deficiency syndrome
AIHW	Australian Institute of Health and Welfare
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
APSGN	Acute post-streptococcal glomerulonephritis
BMI	Body mass index
CKD	Chronic kidney disease
COPD	Chronic obstructive pulmonary disease
CSOM	Chronic suppurative otitis media
ESRD	End-stage renal disease
FASD	Foetal alcohol spectrum disorder
GAS	Group A streptococcus
HAV	Hepatitis A virus
HBsAg	Hepatitis B surface antigen (a serological marker for HBV)
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HD	Haemodialysis
Hib	H. influenzae type b
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
ICD	International Classification of Diseases - the World Health Organization's internationally accepted classification of death and disease
IPD	Invasive pneumococcal disease
KRT	Kidney replacement therapy
KSDC	Kimberley Satellite Dialysis Centre
LBW	Low birthweight
MMR	Measles, mumps and rubella
NATSISS	(2002) National Aboriginal and Torres Strait Islander Social Survey
NATSIHS	(2006) National Aboriginal and Torres Strait Islander Health Survey
NDR	National Diseases Register
NHMRC	National Health and Medical Research Council
NHS	(2001) National Health Survey
NNDSS	National Notifiable Diseases Surveillance System
NPSU	National Perinatal Statistics Unit
NSW	New South Wales
NT	Northern Territory
OM	Otitis media

PD	Peritoneal dialysis
PYL	Person's years of life
Qld	Queensland
RRT	Renal replacement therapy
SA	South Australia
SDQ	Strengths and difficulties questionnaire
SMR	Standardised mortality ratio
STD	Sexually transmissible disease; see STI
STI	Sexually transmissible infection
Vic	Victoria
WA	Western Australia
WAACHS	Western Australian Aboriginal Child Health Survey
WHO	World Health Organization
WHR	Waist to hip ratio

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The Australian Indigenous Health*InfoNet* attempts to contribute to improvements in Indigenous health by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians, researchers and the general community. We welcome your comments and feedback about this overview.

Australian Indigenous Health*InfoNet*

Kurongkurl Katitjin

School of Indigenous Australian Studies

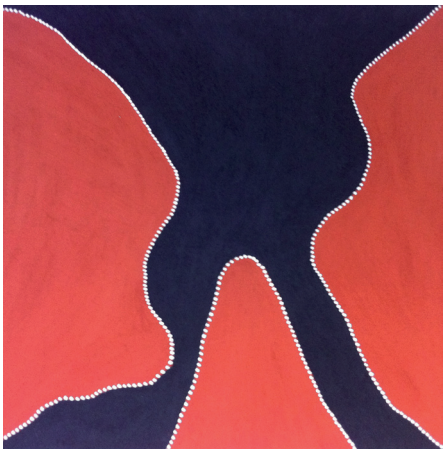
Edith Cowan University

2 Bradford Street, Mount Lawley, Western Australia, 6050,

Email: healthinfonet@ecu.edu.au

Telephone: (08) 9370 6109

Facsimile: (08) 9370 6022



Jiyirriny Ngarrangkarni - Kangaroo Dreaming

Katie Cox

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