# Overview of Australian Indigenous health status, April 2010

Australian Indigenous
Health*InfoNet*

# Australian Indigenous Health*InfoNet*

The Australian Indigenous Health*InfoNet*'s mission is to contribute to 'closing the gap' in health between Indigenous and other Australians by (1) providing online access to the evidence and knowledge needed to inform practice and policy in Indigenous health, and (2) assisting the sharing and information and knowledge among all relevant stakeholders.

The Health*InfoNet* addresses the first part of 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 Health*InfoNet*'s research mainly involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources, but it also undertakes some primary data collection and analysis.

The Health*InfoNet* is a world leader in knowledge/research utilisation/translation, the area of research which aims at transferring the results of pure and applied research into practice. In this research, the Health*InfoNet* addresses the knowledge needs of its wide range of potential users, including policy makers, health service providers, program managers, clinicians, researchers and the general community.

The Health*InfoNet* addresses the second part of its mission through the support of yarning places – electronic networks that enable people with an interest in Indigenous health to share information, knowledge and experience, even when they live in different states, territories and regions, come from different sectors (such as health, education and justice), and work for different organisations.

**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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# Overview of Australian Indigenous health status, April 2010

**Neil Thomson**

**Andrea MacRae**

**Jane Burns**

**Michelle Catto**

**Olivier Debuyst**

**Ineke Krom**

**Richard Midford**

**Christine Potter**

**Kathy Ride**

**Sasha Stumpers**

**Belinda Urquhart**

***April 2010***

Australian Indigenous Health*InfoNet*

Perth, Western Australia

# Contents

# Preface

This overview has been prepared by the Australian Indigenous Health*InfoNet* as a part of our efforts to contribute to 'closing the gap' between the health of Indigenous people and other Australians by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians, researchers and the general community. [1]

The main purpose of the overview is to provide a comprehensive summary of the most recent indicators of the health of Indigenous people. It is beyond the scope of the overview to analyse trends in the various indicators, so it tends to draw attention to the persisting poor health status of Australia's Indigenous peoples. It is important to acknowledge that some improvements have occurred in Indigenous health status – a brief summary of improvements is provided in the section entitled 'Concluding comments'.

Research for the overview involves the collection, collation, and analysis of a wide range of relevant information, including both published and unpublished material. Sources include 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 national 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 our own analyses of data obtained from a variety of sources. For example, estimates of the age-adjusted incidence of end-stage renal disease were made using notification data published by ANZDATA. Similarly, information about a number of communicable diseases was derived from data published by the National Centre for HIV Epidemiology and Clinical Research.

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 an introduction about the condition and evidence of the current burden of the condition among Indigenous people.

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), on which updated versions of this overview will be made available.

We welcome your comments and feedback about the overview.

Neil Thomson

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

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[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.

# Acknowledgements

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- other staff of the Australian Indigenous Health*InfoNet* for their assistance, support and encouragement in the preparation of this overview; and
- the Office for Aboriginal and Torres Strait Islander Health (OATSIH) within the Australian Department of Health and Ageing for their ongoing support of the work of the Health*InfoNet*.

# Introduction

This overview of Australian Indigenous health draws largely on previously 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). Very little information is available separately for Australian Aboriginal people and Torres Strait Islanders, so no attempt has been made to provide separate summaries for these two sub-groups of the Indigenous population.

# Limitations of the sources of Indigenous health information

The assessment of Indigenous health status requires accurate information about the size of the population and the numbers of specific health conditions/occurrences. This information is required at national, regional, and local level (for more information about the assessment of population health status, see [1]).

There have been some improvements in recent years – both in estimates of the Indigenous population (the denominator for calculation of rates) and in the availability of data for a number of health conditions/occurrences (the numerators) – but there is still some uncertainty in most areas.

In relation to population estimates, the Australian Bureau of Statistics (ABS) has made considerable efforts in recent decades to achieve accurate counts of the Indigenous population in the five-yearly Australian censuses [2]. Despite these efforts, doubts remain about the extent to which official estimates reflect the actual size of the Indigenous population [3].

The ABS has also worked for many years with the Australian Institute of Health and Welfare (AIHW) and state and territory authorities to improve the accuracy of Indigenous status in a number of health-related collections, including birth and death registrations, hospital administrative data, and the maternal/perinatal collection. Some attention has been directed also to the data collections related to communicable diseases, cancer, and to a number of other disease-specific collections.

A persisting problem is the extent to which Indigenous people are correctly identified in the various health-related data collections. In death registrations, for example, not all Indigenous deaths are correctly identified as such, with some identified as non-Indigenous [4]. Estimating the proportions of deaths correctly identified is not simple, however, so it is difficult to estimate the actual number of Indigenous deaths occurring and the corresponding rates. The ABS has for a number of years estimated that only 50-60% of Indigenous deaths were correctly identified, but, based on a study linking registered deaths with records from the 2006 Australian census, it has recently updated its estimate to around 92% [4]. The fact that the estimates for the NT and WA were 111% and 109% respectively – that is, the numbers of Indigenous deaths registered in these jurisdictions were greater than suggested from the analysis involving census records – demonstrates the difficulties in estimating Indigenous mortality. The estimates for the other jurisdictions are all less than 100% – 87% for NSW, 94% for Qld, and 65% for the other jurisdictions combined.

At 96%, the implied identification of Indigenous births was much better in 2002-2006 than in previous years [5]. The level of identification in hospital admissions is very variable, with the overall level unlikely to be better than for deaths [6]. The levels of Indigenous identification in many of the other health-related data collections are generally so incomplete as to preclude reasonably accurate estimates.

With these uncertainties, there must be some doubt about the precision of the various estimates of

Indigenous health status. The differences between Indigenous and non-Indigenous people in the levels of most of these estimates are so great, however, that the slight imprecision in some estimates is of little practical importance.

# The context of Indigenous health

## Indigenous population

ABS projections from the 2006 census of the numbers of Aboriginal and Torres Strait Islander people suggest an Indigenous population of 562,681 people at 30 June 2010 [7]. The projection for NSW is the highest (165,190 Indigenous people), followed by Qld (160,514), WA (76,218), and the NT (68,559) (Table 1). The NT has the highest proportion of Indigenous people among its population (30.5%) and Vic the lowest (0.7%).

*Table 1 Estimated Indigenous population, by jurisdiction, Australia, 30 June 2010*

| Jurisdiction | Indigenous population | Proportion of Australian Indigenous population (%) | Proportion of jurisdiction population (%) |
|---|---|---|---|
| NSW | 165,190 | 29.4 | 2.3 |
| Vic | 36,734 | 6.5 | 0.7 |
| Qld | 160,514 | 28.5 | 3.6 |
| WA | 76,218 | 13.5 | 3.4 |
| SA | 30,382 | 5.4 | 1.9 |
| Tas | 20,086 | 3.6 | 4.0 |
| ACT | 4,709 | 0.8 | 1.3 |
| NT | 68,599 | 12.2 | 30.5 |
| Australia | 562,681 | 100.0 | 2.6 |

Source: ABS, 2009 [7], ABS, 2009 [8]

Notes:

1. The figures shown are the series A projections, which were derived by ABS from the experimental estimated resident population for Indigenous people at 30 June 2006 using a number of assumptions about births, internal migration and deaths
2. Australian population includes Jervis Bay Territory, the Cocos (Keeling) Islands, and Christmas Island
3. Proportions of jurisdiction populations have used total population figures estimated from demographic information for March 2009

The estimated Indigenous population increased by around 58,700 (13%) between 2001 and 2006, with the largest increases documented for WA (18%), the NT (17%) and Qld (16%) [2].

The majority of Indigenous people live in cities and towns, but the Indigenous population is much more widely dispersed across Australia than is the non-Indigenous population [2]. Slightly more than one-half of the Indigenous population lives in areas classified as ‘major cities’ or ‘inner regional’ areas, compared with almost nine-tenths of the non-Indigenous population. (As well as these two classifications of ‘remoteness’ in terms of access to goods and services and opportunities for social interaction, the Australian Standard Geographical Classification (ASGC) has four other categories: ‘outer regional’, ‘remote’, ‘very remote’ and ‘migratory’ [9].) Almost one-quarter of Indigenous people live in areas classified as ‘remote’ or ‘very remote’ in relation to having ‘very little or very restricted access to goods and services and opportunities for social interaction’. Only 2% of non-Indigenous people live in ‘remote’ or ‘very remote’ areas.

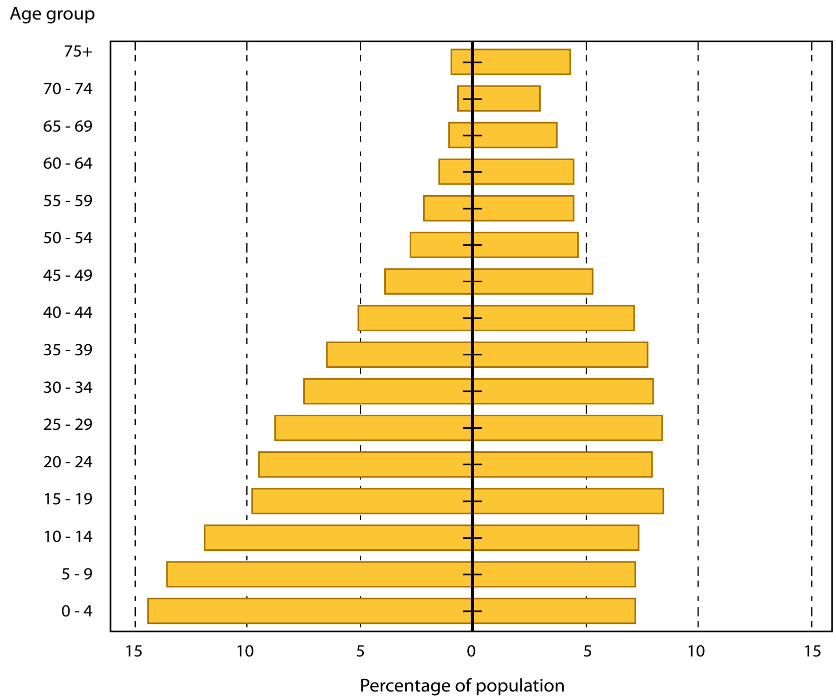
In terms of specific geographical areas, more than one-half of all Indigenous people live in nine of the

37 Indigenous regions (based largely on the former Aboriginal and Torres Strait Islander Commission (ATSIC) regions): Sydney; Brisbane; Coffs Harbour; Perth; Townsville, Cairns; Adelaide; Tasmania; and Wagga Wagga [2].

Detailed information about the composition of the Indigenous population is not available for 2010, but in 2006 around 463,900 people were Aboriginal, 33,100 Torres Strait Islander, and 20,200 people of both Aboriginal and Torres Strait Islander descent [2]. Most Torres Strait Islander people live in Qld, with NSW the only other state with a large number of Torres Strait Islanders.

The Indigenous population is much younger overall than the non-Indigenous population [2]. According to the 2006 Australian census, about 37% Indigenous people were aged less than 15 years, compared with 19% of non-Indigenous people (Figure 1). About 3% of Indigenous people were aged 65 years or over, compared with 13% of non-Indigenous people.

*Figure 1 Population pyramid of Indigenous and non-Indigenous populations, 2010*



Source: Derived from ABS, 2009 [7]

# Historical and socioeconomic context

There is a clear relationship between the social inequalities experienced by Indigenous people and their current health status [10]. This social disadvantage, directly related to dispossession and characterised by poverty and powerlessness, is reflected in measures of education, employment, and income. Before presenting the key indicators of Indigenous health status, it is important, therefore, to provide a brief summary of the context within which these indicators should be considered.

## The historical context

Indigenous Australians generally enjoyed better health in 1788 than most contemporary Europeans [11-15]. Indigenous people did not suffer from smallpox, measles, influenza, tuberculosis, scarlet fever, sexually transmitted syphilis and gonorrhoea, diseases that were common in 18th century Europe. Indigenous people probably suffered from hepatitis B, some bacterial infections (including non-venereal syphilis and yaws), some mosquito-borne infections (such as Ross River fever and Murray River encephalitis) and some intestinal parasites. Trauma is likely to have been a major cause of death, and anaemia, arthritis, periodontal disease and tooth attrition are known to have occurred. Their impact at a population level was relatively mild compared with the effects of the epidemic diseases that affected 18th century Europe. All of this changed with the arrival of introduced illness, initially smallpox and sexually transmitted infections (gonorrhoea and venereal syphilis), and later tuberculosis, influenza, measles, scarlet fever, and whooping cough. These diseases, particularly smallpox, caused enormous loss of life among Indigenous populations, but the devastation was not restricted to the immediate victims. The epidemics also affected the fabric of Indigenous societies through depopulation and social disruption.

Prior to 1788 and the subsequent spread of non-Indigenous people across Australia, Indigenous people were able to define their own sense of being through control over all aspects of their lives, including ceremonies, spiritual practices, medicine, social relationships, management of land, law and economic activities [16-18]. In addition to the health impacts of introduced diseases, the spread of non-Indigenous peoples undermined the ability of Indigenous people to lead healthy lives by devaluing their culture, destroying their traditional food base, separating families, and dispossessing whole communities [12-14]. This loss of autonomy undermined social vitality, which, in turn, affected the capacity to meet challenges, including health challenges. A cycle of dispossession, demoralisation and poor health was thus perpetuated.

## The importance of contemporary social determinants and cultural concepts in Indigenous health

The health disadvantages experienced by Indigenous people can be considered historical in origin [18] but perpetuation of the disadvantages owes much to contemporary structural and social factors, embodied in what are termed the 'social determinants' of health [10, 19, 20]. In broad terms, economic opportunity, physical infrastructure and social conditions influence the health of individuals, communities and societies as a whole. These factors are specifically manifest in measures such as education, employment, income, housing, access to services, social networks, connection with land, racism, and incarceration. On all these measures Indigenous people suffer substantial disadvantage.

It is also important in coming to an understanding of Indigenous health to understand how Indigenous people themselves conceptualise health. There was no separate term in Indigenous languages for health as it is understood in western society [21]. The traditional Indigenous perspective of health is holistic. It encompasses everything important in a person's life, including land, environment, physical body, community, relationships and law. Health is the social, emotional, and cultural well-being of the whole community and the concept is thus linked to the sense of being Indigenous. This conceptualisation of health has much in common with the social determinants model and has crucial implications for the simple application of biomedically-derived concepts as a means of improving Indigenous health. The reductionist, biomedical approach is undoubtedly useful in identifying and reducing disease in individuals, but its limitations in addressing population-wide health disadvantages, such as those experienced by Indigenous people, must be recognised.

## Indicators of Indigenous social disadvantage

The key measures in these areas for Indigenous people nationally include:

### *Education*

According to the 2006 Australian census:

- 88% of five year old Indigenous children and 95% of five year old non-Indigenous children were attending an educational institution;

- 2.5% of the Indigenous population had not attended school compared with 0.9% of the non-Indigenous population;
- one-third (32%) of Indigenous people reported year 10 as their highest year of school completion and less than one-quarter (22%) had completed year 12 compared with almost one-half (47%) of non-Indigenous people;
- one-quarter (25%) of Indigenous people reported having a post-school qualification, compared with almost one-half (47%) of non-Indigenous people; and
- only 1.7% of Indigenous people reported attending a university, compared with 4.1% of non-Indigenous people [22].

An ABS school report revealed:

- in 2008 the apparent retention rate for Indigenous students from year 7/8 to year 10 was 89% and from year 7/8 to year 12 was 46%; and
- for non-Indigenous students, the apparent retention rate from year 7/8 to year 10 was 100% and from year 7/8 to year 12 was 76% [23].

The 2008 national report on schooling in Australia showed:

- 68% of Indigenous students in year three and 63% in year five achieved the national reading benchmark, compared with 94% and 93% respectively of all Australian students;
- 65% of year three Indigenous students and 64% of year five Indigenous students achieved the national benchmark for grammar and punctuation compared with 93% of all year three students and 94% of year five students; and
- 79% of Indigenous students in year three and 69% in year five achieved the national numeracy benchmark, compared with 96% and 94% respectively of all Australian students [24].

## *Employment*

According to the 2006 Australian census:

- 46% of Indigenous people aged 15 years or older were employed, 8.5% were unemployed, and 46% were not in the labour force. In comparison, 62% of non-Indigenous people aged 15 years or older were employed, 3.3% were unemployed, and 35% were not in the labour force;
- excluding people employed under the Community Development Employment Project (CDEP) scheme increases the unemployment rate for Indigenous people to approximately 25% – five times the rate of 5% for non-Indigenous people; and
- the most common occupation classification of employed Indigenous people was 'labourer' (24%). The most common occupation classification of employed non-Indigenous people was 'professional' (20%) [22].

## *Income*

According to the 2006 Australian census:

- the mean equivalised gross household income for Indigenous persons was $460 per week – approximately 62% of that for non-Indigenous people ($740);
- 45% of the Indigenous population were in the lowest income quintile (mean equivalised gross household income of less than $315 per week). The non-Indigenous population was almost evenly distributed among the five income quintiles;

- the median gross individual income for Indigenous people was $278 per week compared with $473 for non-Indigenous people; and
- 'professionals' were the highest median gross weekly income earners and 'labourers' were the lowest, but Indigenous people earned 28% less and 16% less than non-Indigenous people in these occupations [22].

# Births and pregnancy outcome

In 2008, there were 15,011 births registered in Australia with one or both parents identified as Indigenous (5% of all births registered) [25], but this figure probably underestimates the true number slightly as Indigenous status is not always identified, and there may be a lag in birth registrations. The ABS estimated that 96% of Indigenous births in 2002-2006 were correctly identified as such [5]. Completeness of identification varied across the country, with only Vic, Qld, WA, SA and the NT having levels above 90%.

Both parents were identified as Indigenous in 32% of these births occurring in 2008, only the mother in 41% (including births where paternity was not acknowledged and those where the father's Indigenous status was unknown), and only the father in 27% [25].

# Age of mothers

In 2008, Indigenous women had more babies and had them at younger ages than did non-Indigenous women – teenagers had one-fifth of the babies born to Indigenous women, compared with only 4% of those born to non-Indigenous mothers [25]. The median age of Indigenous mothers was 24.7 years, compared with 30.7 years for all women. The highest birth rates (known technically as fertility rates) were for the 20-24 years age group for Indigenous women and in the 30-34 years age group for non-Indigenous women (Table 2). The fertility of teenage Indigenous women (75 babies per 1,000 women) was more than four times that of all teenage women (17 babies per 1,000).

# Total fertility rates

In 2008, total fertility rates were 2,515 births per 1,000 Indigenous women and 1,969 per 1,000 for all women (Table 3) [25]. The highest total fertility rate for Indigenous women was for WA (3,160 babies per 1,000), followed by SA (2,936 per 1,000) and Qld (2,728 per 1,000).

*Table 2 Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2008*

| Status of mother / age group (years) | Jurisdiction | | | | | | |
|---|---|---|---|---|---|---|---|
| | NSW | Vic | Qld | WA | SA | NT | Aust |
| Indigenous | | | | | | | |
| 15-19 | 57 | 51 | 77 | 117 | 94 | 91 | 75 |
| 20-24 | 121 | 127 | 166 | 180 | 155 | 156 | 147 |
| 25-29 | 117 | 111 | 141 | 173 | 148 | 116 | 132 |
| 30-34 | 84 | 112 | 106 | 98 | 117 | 75 | 93 |
| 35-39 | 40 | 59 | 46 | 53 | 55 | 36 | 45 |
| 40-44 | 10 | 15 | 10 | 12 | 18 | 11 | 11 |
| All mothers | | | | | | | |
| 15-19 | 14 | 11 | 25 | 23 | 18 | 52 | 17 |
| 20-24 | 53 | 42 | 74 | 67 | 58 | 105 | 57 |
| 25-29 | 102 | 93 | 120 | 117 | 111 | 111 | 106 |
| 30-34 | 127 | 132 | 125 | 132 | 127 | 105 | 128 |
| 35-39 | 73 | 78 | 64 | 71 | 62 | 58 | 71 |
| 40-44 | 15 | 16 | 12 | 13 | 12 | 13 | 14 |

Source: ABS, 2009 [25]

Notes:

1. Rates per 1,000 women in each age group
2. Figures are not provided for Tas and the ACT because of the small numbers involved and doubts about the level of identification of Indigenous births, but numbers for those jurisdictions are included in figures for Australia

*Table 3 Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2008*

| Status of mother | Jurisdiction | | | | | | |
|---|---|---|---|---|---|---|---|
| | NSW | Vic | Qld | WA | SA | NT | Aust |
| Indigenous | 2,146 | 2,373 | 2,728 | 3,160 | 2,936 | 2,419 | 2,515 |
| All mothers | 1,917 | 1,861 | 2,100 | 2,120 | 1,952 | 2,224 | 1,969 |

Source: ABS, 2009 [14]

Notes:

1. Total fertility rate is the number of children born to 1,000 women at the current level and age pattern of fertility
2. Figures in this table are restricted to those jurisdictions with estimated identification of Indigenous births of around 90% or higher

# Birthweights

The average birthweight of babies born to Indigenous mothers in 2007 was 3,182 grams, almost 200 grams less than the average for babies born to non-Indigenous mothers (3,381 grams) [Derived from 26]. Babies born to Indigenous women in 2007 were twice as likely to be of low birthweight (LBW) (12.5%) than were those born to non-Indigenous women (5.9%). (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of death in infancy and other health problems.) The low-birthweight proportions for babies born to Indigenous women were highest for WA and SA (both 16.2%).

*Table 4 Mean birthweights and percentage of low birthweight for babies born to Indigenous and non-Indigenous mothers, selected jurisdictions, Australia, 2007*

| | NSW | Vic | Qld | WA | SA | NT | Aust |
|---|---|---|---|---|---|---|---|
| Indigenous mothers | | | | | | | |
| Mean birthweight | 3,217 | 3,216 | 3,214 | 3,107 | 3,067 | 3,133 | 3,182 |
| % low birthweight | 11.2 | 12.0 | 11.2 | 16.2 | 16.2 | 12.5 | 12.5 |
| Non-Indigenous mothers | | | | | | | |
| Mean birthweight | 3,382 | 3,370 | 3,385 | 3,357 | 3,359 | 3,290 | 3,374 |
| % low birthweight | 5.7 | 6.3 | 6.3 | 6.4 | 6.4 | 7.9 | 6.2 |

Source: Derived from Laws and Sullivan, 2009 [26]

Notes:

1. Low birthweight is defined as less than 2,500 grams
2. Mean birthweights and low birthweight proportions for babies born to non-Indigenous mothers have been estimated from published figures for Indigenous and all mothers

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, and duration of the pregnancy [27]. A mother's alcohol consumption and use of tobacco and other drugs during pregnancy also impacts on the size of her baby.

Tobacco, in particular, has a major impact on birthweight. The mean birthweight of live babies born in 2001-2004 to Indigenous women who smoked was 3,037 grams, more than 250 grams lighter than those born to Indigenous women who did not smoke (3,290 grams) [28]. The comparable figures for live babies born to non-Indigenous women were 3,210 and 3,416 grams respectively. The impact of tobacco smoking during pregnancy was seen also in the proportions of low birthweight liveborn babies – 16% and 10% respectively for Indigenous and non-Indigenous women, who smoked during pregnancy, and 10% and 5% for those who didn't.

The 2000-2001 Western Australian Aboriginal Child Health Survey (WAACHS) reported slightly higher average birthweights than the weights documents above – 3,100 grams for babies born to Indigenous mothers who used tobacco in pregnancy and 3,310 grams for those whose Indigenous mothers did not [29]. The lowest average birthweights reported in the WAACHS were for babies whose Indigenous mothers used marijuana with tobacco (3,000 grams) or marijuana with both tobacco and alcohol (2,940 grams).

# Mortality

## Introduction

Major impediments to producing a complete picture of Indigenous mortality in Australia are the incomplete identification of Indigenous status in death records, and the experimental nature of the recently adopted population estimates [4]. As a result, the 2,472 deaths registered in 2008 where the deceased person was identified as Indigenous is certainly an underestimate of the actual number of Indigenous deaths.

Assessment by the ABS of the completeness of recording of Indigenous deaths in 2006-2007 is based on a comparison of these deaths with Indigenous status reported in the 2006 census [30]. Based on this comparison, the ABS has estimated that the Australia-wide level of Indigenous identification in deaths notifications in 2006-2007 was 92%, a level much higher than previous estimates (around 58%). The estimated completeness of identification of Indigenous people in death registrations has improved since the 1990s, mostly because of improvements in NSW and Qld, but there must still be some doubt about the actual levels of identification. There is a considerable variation in levels from each state and territory: WA (111%) and the NT (109%) had levels greater than 100%, indicating that the numbers of Indigenous deaths registered in these jurisdictions was greater than suggested from the analysis involving census records. NSW had a level of 87% and Qld a level of 94%. Vic, SA, Tas, and the ACT had small numbers of Indigenous deaths and had a group level of 65%. Reflecting the various levels of identification of Indigenous status in death registrations, caution needs to be exercised in interpretation of the figures presented in this report.

The variable levels of Indigenous identification, coupled with the need to update the procedures for estimating coverage based on population figures derived from the 2006 census, has meant that recent ABS publications do not include detailed tables of Indigenous deaths, nor information about overall death rates. As a result, there is no consistency about the extent of information available for recent years. Reflecting this, readers should be aware that the following sections vary in terms of the years to which they relate.

### Box 1

Comparison of Indigenous and non-Indigenous mortality needs to take account of differences in the age structures of the Indigenous and non-Indigenous populations in a process known as standardisation, and also to adjust for uncertainties about the completeness of both death and population numbers for the Indigenous population.

The lack of detailed information about Indigenous deaths in terms of sex and age means that it is not possible to estimate standardised death rates, but it is possible to compare the numbers of registered and adjusted Indigenous deaths with the numbers expected from the corresponding age-sex-specific death rates for the total populations. This comparison produces what are called standardised mortality ratios (SMRs). The SMRs reported here are based on the 2006 age-sex-specific death rates for the total Australian population.

Two sets of the SMRs are provided – one based on registered deaths and the other using the ABS adjustment factors to take some account of the uncertainties about the completeness of both death and population numbers for the Indigenous population.

## Standardised mortality ratios

After adjusting for the differences in the age structures of the Indigenous and non-Indigenous populations and for uncertainties about the completeness of both death and population numbers for the Indigenous population, the numbers of deaths of Indigenous people in 2004-2008 were between two and four times higher than the numbers expected from the age-sex-specific death rates for the total Australian population (Table 5) [Derived from 4]. The adjusted SMRs range from 2.16 for Indigenous females living in NSW to 3.92 for Indigenous males living in the NT.

*Table 5* *Indigenous deaths and SMRs, by sex and jurisdiction, Australia, 2004-2008*

| | Registered deaths | | SMR | | | |
|---|---|---|---|---|---|---|
| | | | Registered | | Adjusted | |
| | Males | Females | Males | Females | Males | Females |
| NSW | 1,516 | 1,174 | 1.92 | 1.88 | 2.21 | 2.16 |
| Qld | 1,569 | 1,269 | 2.28 | 2.29 | 2.42 | 2.42 |
| WA | 1,328 | 1,028 | 3.61 | 3.47 | 3.25 | 3.12 |
| SA | 360 | 316 | 2.42 | 2.53 | n/a | n/a |
| NT | 1,282 | 1,001 | 4.26 | 3.83 | 3.92 | 3.52 |
| Australia | 6,393 | 5,056 | 2.45 | 2.40 | 2.67 | 2.61 |

Source: Derived from ABS, 2009 [4]

Notes:

1. Registered SMRs (standardised mortality ratios) are the numbers of deaths registered divided by the numbers expected from the age-sex-specific death rates for the total Australian population at 30 June 2006
2. Adjusted SMRs use the ABS adjustment factors for each jurisdiction. These factors are based on a detailed assessment by the ABS of a linkage between Census and death records
3. Due to the small numbers involved, the ABS did not make an estimate of the adjustment factor applicable to South Australia
4. Caution should be exercised in the interpretation of these SMRs as some uncertainty persists about the completeness of both death and population numbers

# Expectation of life

In 2009, the ABS revised its estimates for expectation of life at birth for Indigenous people [30]. After adjustment for the underestimate of the number of deaths identified as Indigenous, the ABS estimates that Indigenous males born in 2005-2007 could expect to live to 67.2 years, about 11.5 years less than the 78.7 years expected for non-Indigenous males (Table 6) [30]. The expectation of life at birth of 72.9 years for Indigenous females in 2005-2007 was almost 10 years less than the expectation of 82.6 years for non-Indigenous females.

These revised estimates are significantly higher than previous estimates. Importantly, comparisons between the original and revised estimates should not be interpreted as a change in Indigenous life expectancy, but should be seen as the result of a revision in statistical methods used to calculate life expectancy [30].

*Table 6* *Expectation of life at birth in years for Indigenous people and the total population, by sex, selected states, Australia, 2005-2007*

| Population | Males | Females |
|---|---|---|
| Indigenous | | |
| Australia | 67.2 | 72.9 |
| NSW | 69.9 | 75.0 |
| Qld | 68.3 | 73.6 |
| WA | 65.0 | 70.4 |
| NT | 61.5 | 69.2 |
| Total population | | |
| Australia | 78.7 | 82.6 |

Source: ABS, 2009 [30]

Notes: The Australian Indigenous estimates are based on deaths in all states and territories

# Age at death

For those jurisdictions with reasonable information about Indigenous deaths, the median age at death in 2008 for Indigenous males ranged from 49.0 years for those living in SA to 59.9 years for those living in NSW [4]. (The median age at death is the age below which 50% of people die. Because the measure partly reflects the age structures of the respective populations, it is a less precise measure than age-specific death rates, which are summarised below.) These levels are around 20 years less than those for non-Indigenous males, which ranged from 66.3 to 79.2 years. The median age at death for Indigenous females in 2008 ranged from 53.5 years for SA to 63.8 years for NSW. These levels are also more than 20 years less than those for non-Indigenous females, which ranged between 75.7 and 84.6 years.

In 2006-2008, age-specific death rates were higher for Indigenous people than for non-Indigenous people across all age groups, but the rate ratios were particularly high in the young and middle adult years (Table 7) [4]. (The rate ratios, based on the numbers of deaths registered, vary according to the levels of Indigenous identification (see above). Reflecting these variations, the ABS warns that the rates and ratios for NSW/Qld and WA/SA/NT should not be compared.)

*Table 7 Age-specific death rates (registered deaths), by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA, and the NT, 2006-2008*

| Age group (years) | Indigenous | | Non-Indigenous | | Rate ratio | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| | | | **NSW/Qld** | | | |
| 0 | 9 | 7 | 5 | 4 | 1.7 | 1.9 |
| 1 - 4 | 51 | 34 | 24 | 18 | 2.1 | 1.8 |
| 5 - 14 | 20 | 13 | 11 | 8 | 1.9 | 1.5 |
| 15 - 24 | 104 | 46 | 57 | 23 | 1.8 | 2.0 |
| 25 - 34 | 199 | 115 | 81 | 33 | 2.5 | 3.5 |
| 35 - 44 | 399 | 258 | 128 | 67 | 3.1 | 3.9 |
| 45 - 54 | 798 | 496 | 281 | 168 | 2.8 | 3.0 |
| 55 - 64 | 1,653 | 1,144 | 671 | 397 | 2.5 | 2.9 |
| 65+ | 5,326 | 4,246 | 4,252 | 3,742 | 1.3 | 1.1 |
| | | | **SA/WA/NT** | | | |
| 0 | 12 | 10 | 3 | 3 | 3.7 | 2.9 |
| 1 - 4 | 55 | 57 | 24 | 14 | 2.3 | 4.1 |
| 5 - 14 | 41 | 21 | 8 | 7 | 5.1 | 2.9 |
| 15 - 24 | 253 | 135 | 65 | 26 | 3.9 | 5.2 |
| 25 - 34 | 504 | 280 | 97 | 37 | 5.2 | 7.6 |
| 35 - 44 | 1,006 | 508 | 133 | 72 | 7.6 | 7.0 |
| 45 - 54 | 1,633 | 1,049 | 274 | 164 | 6.0 | 6.4 |
| 55 - 64 | 2,826 | 2,057 | 644 | 383 | 4.4 | 5.4 |
| 65+ | 7,278 | 6,256 | 4,186 | 3,689 | 1.7 | 1.7 |

Source: ABS, 2009 [4]

Notes:

1. Rates are infant deaths per 1,000 live births for the 0 years age group and deaths per 100,000 population for all other age groups.
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3. The ABS warns that the completeness of death date is much less for NSW/Qld than for WA/SA/NT, so the rates and ratios are not comparable

# Infant mortality

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. For those jurisdictions with reasonable information about Indigenous deaths in 2006-2008, the highest Indigenous infant mortality rate was in the NT (13.6) and the lowest in SA (6.4) (Table 8) [4]. These rates are considerably higher than those for the total population in these jurisdictions, which range from the NT (7.8) to WA and SA (both 3.5).

*Table 8 Infant mortality rates, Indigenous and total populations, and rate ratios, selected jurisdictions, 2006-2008*

| Jurisdiction | Indigenous | Total population | Rate ratio |
|---|---|---|---|
| NSW | 7.7 | 4.5 | 1.7 |
| Qld | 7.9 | 5.1 | 1.5 |
| WA | 10.1 | 3.5 | 2.9 |
| SA | 6.4 | 3.5 | 1.8 |
| NT | 13.6 | 7.8 | 1.7 |

Source: Derived from ABS, 2009 [4]

Notes:

1. Infant mortality rate is the number of infant deaths per 1,000 live births
2. The Indigenous rates are likely to be under-estimated, due to the incomplete identification of Indigenous status on births and deaths records

# Causes of death

For deaths identified as Indigenous in 2001-2005, cardiovascular disease (also known as 'diseases of the circulatory system', which includes heart disease and stroke) was the leading cause of death for Indigenous males and females living in Qld, WA, SA and the NT (Table 9) [31]. The number of deaths recorded for Indigenous males was 3.2 times the number expected from the age-cause-specific rates for non-Indigenous males, and number recorded for Indigenous females was 2.7 times the number expected from the age-cause-specific rates for non-Indigenous females. (See Box 1 for further information about these standardised mortality ratios (SMRs)). The estimates quoted here have not been adjusted for the overall under-identification of Indigenous people in death registration systems, so true SMRs are likely to be slightly higher).

For Indigenous males, the next most frequent causes of death were injuries (including transport accidents, intentional self-harm and assault) (SMR 2.9), malignant neoplasms (cancers) (SMR 1.5), diseases of the respiratory system (SMR 4.3), and endocrine, nutritional and metabolic disorders (mainly diabetes) (SMR 7.5) [31]. For Indigenous females, the most frequent causes of death after cardiovascular disease were malignant neoplasms (SMR 1.6), endocrine, nutritional and metabolic disorders (SMR 10.1), external causes (SMR 3.5), and diseases of the respiratory system (SMR 3.6).

*Table 9 Indigenous:non-Indigenous standardised mortality ratios, by cause and sex, Qld, WA, SA and the NT, 2001-2005*

| Cause of death | Males | Females |
|---|---|---|
| | **SMR** | **SMR** |
| Circulatory | 3.2 | 2.7 |
| Injuries | 2.9 | 3.5 |
| Cancer | 1.5 | 1.6 |
| Endocrine, nutritional and metabolic | 7.5 | 10.1 |
| Respiratory | 4.3 | 3.6 |
| Digestive | 5.8 | 5.1 |
| Genitourinary | 4.8 | 6.0 |
| Nervous system | 2.9 | 1.6 |
| Mental and behavioural disorders | 5.8 | 3.1 |
| Infectious/ parasitic | 5.1 | 5.0 |
| | | |
| All causes | 3.0 | 2.9 |

Source: AIHW, 2008 [33]

Notes:

1. 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 Australian total population applied to the Indigenous population
2. Due to under-identification of Indigenous deaths, these SMRs are likely to underestimate the true differences between the Indigenous and non-Indigenous populations

# Maternal mortality

In Australia in 2003-2005 (the most recent period for which detailed data are available), six (10%) of the 60 maternal deaths where Indigenous status was known were of Indigenous women (Indigenous status was not reported in 8% of the deaths) [34].

Reflecting the higher rate of confinements among Indigenous women, the maternal mortality ratio for Indigenous women in 2003-2005 was 21.5 deaths per 100,000 confinements, almost three times higher than the ratio of 7.9 per 100,000 for non-Indigenous women (Table 10) [34]. For direct maternal deaths, the ratio for Indigenous women was 7.2 per 100,000 compared with 3.6 per 100,000 for non-Indigenous women.

*Table 10 Numbers of confinements and maternal deaths, and maternal mortality ratios, by Indigenous status, Australia, 2003-2005*

| Indigenous status | Confinements | Maternal deaths | Maternal mortality ratio |
|---|---|---|---|
| Indigenous | 27,901 | | |
| Direct and indirect maternal deaths | | 6 | 21.5 |
| Direct maternal deaths | | 2 | 7.2 |
| Non-Indigenous | 745,347 | | |
| Direct and indirect maternal deaths | | 59 | 7.9 |
| Direct maternal deaths | | 27 | 3.6 |

Source: Derived from Sullivan, Hall, King, 2008 [34]

Notes:

1. Maternal mortality ratio is the number of maternal deaths divided by the number of confinements (in 100,000s). Due to some uncertainty about the numbers of Indigenous deaths and confinements, some caution must be exercised in the interpretation of the ratios
2. The non-Indigenous numbers and ratios include deaths for which Indigenous status was not known. This probably results in a slight, unknown over-estimate of non-Indigenous numbers and ratios, and a resultant under-estimate of the differences between Indigenous and non-Indigenous women

# Hospitalisation

Statistics on hospital admissions and procedures 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, because they represent only illness that is serious enough to require hospitalisation and are influenced to some degree by the geographic accessibility of hospitals and variations in admission policies.

Another limitation of hospital statistics as an indicator of the health of the public is that they relate to episodes of hospitalisation rather than individual patients. Thus, multiple admissions by a relatively small number of patients – as occurs for end-stage renal disease, for example – limit the inferences that can be drawn about overall health patterns from aggregated statistics. These statistics are, of course, useful in assessing the need for health services, but of far less use in assessing health.

As is the case with other major health-related data collections (such as births and deaths), the identification of Indigenous status in the hospital data collection is incomplete. During 2007-2008, the AIHW conducted audits to assess the level of under-identification of Indigenous status in each state and territory and found that NSW, Vic, Qld, WA, SA and the NT had adequate identification, with 20% or less under-identification of Indigenous status [6, 35]

# Separation rates

Of the 7.58 million hospital separations for NSW, Vic, Qld, WA, SA and the NT during 2007-08, 271,290 (3.6%) were identified as Indigenous (Table 11) [6]. Around two-fifths (41%) of separations for Indigenous patients were for overnight stays.

The overall age-standardised separation rate of 916 per 1,000 for the Indigenous population was 2.6 times that of the non-Indigenous population (357 per 1,000) (Table 11) [6]. The age-standardised separation rate for Indigenous people living in the NT was 1,670 per 1,000, 7.3 times that rate of 228 per 1,000 for non-Indigenous people.

*Table 11 Numbers of hospital separations and age-standardised separation rates, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2007-08*

| Jurisdiction | Indigenous |  | Non-Indigenous |  | Rate ratio |
|---|---|---|---|---|---|
|  | Number | Rate | Number | Rate |  |
| NSW | 54,189 | 566 | 2,242,332 | 320 | 1.8 |
| Vic | 12,970 | 684 | 2,118,578 | 396 | 1.7 |
| Qld | 69,305 | 868 | 1,451,366 | 374 | 2.3 |
| WA | 54,817 | 1,185 | 728,803 | 354 | 3.3 |
| SA | 18,446 | 1,000 | 567,474 | 350 | 2.9 |
| NT | 61,563 | 1,671 | 28,687 | 228 | 7.3 |
| All jurisdictions | 271,290 | 916 | 7,137,240 | 357 | 2.6 |

Source: AIHW, 2009 [6]

Notes:

1. Rates per 1,000 population have been standardised using the population estimates at 30 June 2005
2. Non-Indigenous rates, but not numbers, include separations for which Indigenous status was not stated
3. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
4. Numbers and rates for the NT are for public hospitals only
5. The incomplete identification of Indigenous status means that these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

# Age-specific separation rates

Hospital separation rates were higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2007-08 than for non-Indigenous people for virtually all age groups, with the highest differences in the middle adult years (Table 12) [6].

*Table 12 Age-specific hospital separation rates, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2007-08*

| Age group (years) | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Indigenous rate | Non-Indigenous rate | Rate ratio | Indigenous rate | Non-Indigenous rate | Rate ratio |
| 0-4 | 363 | 273 | 1.3 | 183 | 205 | 0.9 |
| 5-14 | 117 | 95 | 1.2 | 349 | 75 | 4.7 |
| 15-24 | 160 | 135 | 1.2 | 422 | 226 | 1.9 |
| 25-34 | 343 | 151 | 2.3 | 666 | 375 | 1.8 |
| 35-44 | 728 | 212 | 3.4 | 869 | 332 | 2.6 |
| 45-54 | 1,186 | 317 | 3.7 | 1,263 | 338 | 3.7 |
| 55-64 | 1,903 | 561 | 3.4 | 1,067 | 493 | 2.2 |
| 65-74 | 2,359 | 952 | 2.5 | 2,376 | 764 | 3.1 |
| 75+ | 2,388 | 1,483 | 1.6 | 1,693 | 1,047 | 1.6 |

Source: Derived from AIHW, 2009 [6]

Notes:

1. Rates per 1,000 population
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3. Rates for the NT are for public hospitals only
4. Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

# Causes of hospitalisation

In 2007-08, the most common reason of hospitalisation for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT was 'care involving dialysis', which was responsible for 43% of Indigenous separations (115,279 separations) [6]. Many of these separations involved repeat admissions for the same people, some on an almost daily basis. The ICD group 'Injury, poisoning and certain 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, being responsible for 19,919 separations (7.3% of all separations, and 12.8% of separations excluding those for dialysis) (Table 13).

Excluding separations for dialysis and pregnancy-related conditions (most of which involved normal deliveries), the next leading causes of hospitalisation for Indigenous people were for respiratory conditions (responsible for more than 16,600 separations – 10.6% of separations excluding those for dialysis) and digestive diseases (more than 14,000 separations – 9.2% of separations excluding those for dialysis) (Table 13) [6].

Separation rates were higher for Indigenous people than for non-Indigenous people for all main ICD groups.

*Table 13 Numbers and proportions of hospital separations for leading causes of Indigenous separations (excluding dialysis), and Indigenous:non-Indigenous ratios, NSW, Vic, Qld, WA, SA and the NT, 2007-08*

| Principal diagnosis | Number of separations | Proportion of separations (excl dialysis) | 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 | 14,325 | 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 | 8,552 | 5.5 | 1.8 |
| Genitourinary diseases | 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 | 19.4 | --- |
| | | | |
| All causes, excluding dialysis | 156,011 | 100.0 | 1.4 |

Source: Derived from AIHW, 2009 [6]

Notes:

1. Excludes hospitalisation for dialysis
2. Rates for the NT are for public hospitals only
3. Ratios are the standardised separation rates for Indigenous people divided by the standardised separation rates for non-Indigenous people
4. Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

# Selected health conditions

## Cardiovascular disease

Cardiovascular disease (CVD) presents a significant burden for Indigenous people in terms of prevalence, hospitalisation, and mortality [36].

The conventional risk factors for cardiovascular disease can be divided into two main categories: behavioural and biomedical. Behavioural risk factors are based on an individual's behaviour, but can be influenced by other underlying social, economic, psychological and cultural factors. Behavioural factors include tobacco smoking, physical inactivity, poor nutrition and risky alcohol consumption. Biomedical risk factors, such as high blood cholesterol, can be influenced by modifications to behaviour, lifestyle or use of medical interventions, and include high blood pressure (hypertension), high blood cholesterol, overweight and obesity, diabetes and chronic kidney disease [36].

As important as these factors may be, they should be considered within a broad social determinants of health framework, with the following aspects being important contributors to the development of cardiovascular disease among Indigenous people:

- cultural and historical factors, such as loss of land, and disruptions to culture, language and identity [36, 37];
- environmental and socioeconomic factors, such as poor housing, low education and income [36];

- psychosocial stressors, such as death of a family member or close friend, serious injury or disability [36]; and
- limited access to health care, both preventive and clinical [38, 39].

## Extent of cardiovascular disease among Indigenous people

### *Prevalence*

The most recent source of population-level information about the extent of CVD among Indigenous people is the National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) undertaken by the ABS in 2004-2005 [40]. Almost one-in-eight Indigenous people reported having a long-term heart or related condition, with the proportion being slightly higher for those living in remote areas (14%) than in non-remote areas (11%). The proportions represent a slight, but not statistically significant, increase from those reported to the 2001 National Health Survey (NHS).

After adjusting for differences in the age structures of the Indigenous and non-Indigenous populations, heart and circulatory problems/diseases were around 1.3 times more common for Indigenous than for non-Indigenous people [40]. Hypertensive disease was 1.5 times more common for Indigenous than for non-Indigenous people, and other diseases of the heart and circulatory system 1.2 times more common.

Overall, a lower proportion of Torres Strait Islander (9%) than Aboriginal people (12%) reported having a heart and circulatory problem/disease, but the proportion was 11% for Torres Strait Islanders living in the Torres Strait area [40].

At 31 December 2006, there were almost 1,300 Indigenous people living in the Top End of the NT and the NT part of central Australia registered as having rheumatic heart disease (RHD) [6]. Almost two-thirds (65%) of these people were females. The overall prevalences of RHD were 1.6% for Indigenous males and 3.0% for Indigenous females, 26 times and 27 times higher, respectively, than the prevalences for non-Indigenous males and females.

### *Hospitalisation*

There were 8,552 hospital separations identified as Indigenous for 'diseases of the circulatory system' in NSW, Vic, Qld, WA, SA and the NT (public hospitals only) in 2007-08. [6, 36]. The hospitalisation rate for Indigenous people was 1.8 times that for non-Indigenous people.

For ischaemic heart disease (also known as coronary heart disease), there were almost 6,000 admissions to hospital of Indigenous people in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2004 to June 2006 [41]. Of these admissions, almost 2,550 were for acute myocardial infarction (heart attack). Admission rates for Indigenous males were 1.7 times higher for ischaemic heart disease and 2.7 times higher for acute myocardial infarction than the corresponding rates for non-Indigenous males. Rates for Indigenous females were 2.7 times higher for ischaemic heart disease and 3.4 times higher for acute myocardial infarction than the corresponding rates for non-Indigenous females

For cerebrovascular disease (including stroke) there were almost 1,150 admissions to hospital of Indigenous people in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2004 to June 2006 [6]. Admission rates for Indigenous males were 1.6 times higher for cerebrovascular disease and 1.9 times higher for stroke than the corresponding rates for non-Indigenous males. The rates for Indigenous females were 2.1 and 2.2 times higher respectively than those for non-Indigenous females.

Hospitalisation rates for hypertension for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2004 to June 2006 were considerably higher than those for non-Indigenous people; 3.4 times higher for males and 4.0 times higher for females overall [6]. In the age groups 25-34, 35-44 and 45-54 years the rates were between five and seven times higher for males and between eight and 11 times higher for females.

### *Mortality*

CVD was the leading cause of death for Indigenous people living in Qld, WA, SA and the NT in 2001-2005, with the numbers of deaths registered being 3.2 times the number expected from non-Indigenous rates for Indigenous males and 2.7 times for Indigenous females (Table 9) [33]. Ischaemic heart disease (particularly heart attacks) was responsible for more than three-fifths of the deaths from cardiovascular disease of Indigenous males and for around one-half of those of Indigenous females. Cerebrovascular disease (stroke) was responsible for 15% of the deaths from cardiovascular disease of Indigenous males and for 20% of those of Indigenous females.

The striking difference between Indigenous and non-Indigenous people in CVD mortality is the much greater impact among young and middle-aged Indigenous adults. For all CVD, the death rates for Indigenous people in the 35–44 and 45–54 year age groups living in Qld, WA, SA and the NT in 2002-2005 were 7 to 12 times higher than those for their non-Indigenous people counterparts [36]. The death rates for Indigenous people in these age groups were similar to those for non-Indigenous people many years older.

# 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 [44, 45]. There are currently no national data on cancer incidence in Indigenous people due to poor data quality in several jurisdictions. For those Indigenous patients who are registered, there is concern that not all are correctly identified as Indigenous [45]. Identification of Indigenous people is not yet included on pathology forms, but Indigenous identification in the registries has been improving [31]. The extent to which Indigenous cancer patients are identified in hospital inpatient statistics also varies across Australia [33]. Second, the fact that cancer has often been reported in terms of the proportions of deaths it causes (19% of Indigenous deaths compared with around 30% of non-Indigenous deaths in Australia [46]), 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 [43, 44].

## Extent of cancer among Indigenous people

Indigenous people are less likely to have some types of cancer than other Australians, but they are: (1) significantly more likely to have cancers that have a poor prognosis; (2) usually diagnosed with cancer at a later stage; (3) less likely to receive adequate treatment; and (4) more likely to die from cancers than other Australians [45]. The patterns of Indigenous cancer incidence and mortality are largely explained by the higher prevalence of risk factors, most notably tobacco use.

### *Incidence*

Across Australia in 2000-2004, there were 3,083 new cases of cancer diagnosed among Indigenous people [31]. In contrast to the pattern for non-Indigenous people, for whom new cases are more common among males than females, more new cases of cancer were reported among Indigenous females (1,598) than Indigenous males (1,485).

After adjusting for differences in the age structures of the two populations, cancer incidence rates were lower for Indigenous people (males: 426 cases per 100,000 population; females: 352 per 100,000) than for non-Indigenous people (males: 558 per 100,000; females: 398 per 100,000) [31].

The most common cancers diagnosed among Indigenous males in this period were of the lung, bronchus and trachea (19% of all male cancers reported), prostate cancer (10%), colorectal cancer (10%), cancer of unknown primary site (6%), and lymphomas (5%). The most common cancers diagnosed among Indigenous females were breast cancer (25% of all female cancer cases reported), cancer of the lung, bronchus and trachea (12%), colorectal cancer (9%), cancer of the cervix (7%) and cancer of unknown primary site (6%).

## *Specific cancers*

The incidence of cancer is somewhat different for Indigenous people than for non-Indigenous people [31]. In 2000-2004, even with under-reporting, age-standardised incidence rates were higher for lung cancer, cancers of the mouth and throat, and cancer of unknown primary site for Indigenous males and females living in NSW, Vic, Qld, WA, SA and the NT than for their non-Indigenous counterparts [31] (Table 14). 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.

The rates for cervical cancer among Indigenous females were more than double those for non-Indigenous females [31]. Among less common cancers, Indigenous people had higher age standardised incidence rates than did non-Indigenous people for cancers of the liver and gallbladder, pancreatic cancer, and cancer of the oesophagus.

Age-standardised incidence rates were lower for Indigenous people than for non-Indigenous people for colorectal cancer and lymphomas [31]. Rates for breast cancer were lower for Indigenous females than for non-Indigenous females, and rates for prostate cancer were lower for Indigenous males than for non-Indigenous males.

*Table 14 Age-standardised incidence rates for selected cancers, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2000-2004*

| Cancer | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Indigenous | Non-Indigenous | Ratio | Indigenous | Non-Indigenous | Ratio |
| Lung | 91 | 61 | 1.5 | 44 | 28 | 1.6 |
| Breast | - | - | - | 85 | 115 | 0.7 |
| Prostate | 56 | 141 | 0.4 | - | - | - |
| Colorectal | 40 | 76 | 0.5 | 37 | 52 | 0.7 |
| Lymphoma | 43 | 59 | 0.7 | 22 | 39 | 0.6 |
| Unknown primary site | 31 | 19 | 1.7 | 27 | 14 | 1.9 |
| Mouth and throat | 26 | 11 | 2.2 | 11 | 11 | 1.1 |
| Liver and gall bladder | 21 | 10 | 2.1 | 14 | 5 | 2.6 |
| Pancreas | 16 | 11 | 1.5 | 12 | 9 | 1.4 |
| Cervix | - | - | - | 17 | 7 | 2.4 |

Source: Derived from ABS, 2008 [31].

Notes:

1. Rates per 100,000 population
2. Ratio is the Indigenous rate divided by the non-Indigenous rate
3. Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

### *Mortality*

Cancer is a major cause of Indigenous mortality in Australia, exceeded only by circulatory and respiratory diseases [33, 47]. Indigenous people with cancer are more likely than their non-Indigenous counterparts to die from their disease [48].

For Indigenous people living in Qld, WA, SA and the NT in 2000-2004, the numbers of deaths from cancer were higher than the numbers expected from death rates for non-Indigenous people (the SMRs for males and females were 1.4 and 1.5 respectively) [33]. This apparent contradiction is the result of a high number of deaths for other causes in the Indigenous population as well as high death rates from cancer for Indigenous people in the middle age groups.

# Diabetes

Diabetes, especially type 2 diabetes, is a significant health problem among Indigenous people, but it is not possible to reach a single estimate of the prevalence due to considerable limitations in data collection [54]. Mortality statistics provide an indication of the substantial impact of diabetes, and despite their limitations, hospitalisation data also confirm the much greater impact of the condition among Indigenous people than among non-Indigenous people.

## Extent of diabetes among Indigenous people

### *Incidence and prevalence*

The most recent analysis of diabetes incidence in Australia was undertaken by the AIHW in 2009 using data from Australia's National Diabetes Register (NDR), which applies to all Australians who had commenced using insulin for diabetes since 1999 [55]. It must be noted, however, that only a small proportion of those with type 2 diabetes and gestational diabetes require insulin treatment, so the data presented in this report substantially underestimate the total number of Australians with diabetes. In addition, recording of Indigenous status was poor prior to 2005 so analysis of the data based on Indigenous status is for 2005-

2007 only.

In 2005-2007, new cases of insulin-treated diabetes occurring in Indigenous peoples 15 years or older accounted for 1.9% of new cases of type 1 diabetes, 2.6% of new cases of type 2 diabetes, and 2% of new cases of gestational diabetes [55]. Overall, 2.9% of people on the NDR in 2005-2007 were recorded as Indigenous which is slightly higher than the Indigenous population percentage in 2006 (2.6% of the Australian population).

Self-reported prevalence of diabetes/high sugar levels was 6% for Indigenous people who participated in the 2004-2005 NATSIHS [40, 41, 56]. These problems were reported more frequently by Indigenous people living in remote areas (9%) than by those living in non-remote areas (5%). The proportions represent a slight, but not statistically significant, increase from those reported in the 2001 NHS. Bearing in mind the fact that for every person with identified diabetes there is likely to be another person with diabetes not yet diagnosed, these estimates are similar to those made in a major review of evidence from a variety of epidemiological studies that concluded that the overall prevalence among Indigenous people was between 10% and 30% [57].

After adjusting for differences in the age structures of the two populations, the level of diabetes/high sugar was around 3.4 times more common for Indigenous people than for non-Indigenous people [40]. The ratio between Indigenous and non-Indigenous females (4.1) was higher than that between Indigenous and non-Indigenous males (2.9).

A lower proportion of Torres Strait Islanders (5%) than Aboriginal people (6%) reported having diabetes/high sugar levels (the difference is not statistically significant), but the proportion was 11% for Torres Strait Islanders living in the Torres Strait area [40].

The prevalence of diabetes increases with age, with the increase occurring at much younger ages among Indigenous people – the prevalence reported by Indigenous people aged 35-44 years was five times that reported by non-Indigenous people (Table 15) [40].

*Table 15 Proportions of people reporting diabetes/high sugar levels as a long-term health condition, by Indigenous status, and Indigenous:non-Indigenous ratios, Australia, 2004-2005*

| Age group (years) | Indigenous people | Non-Indigenous people | Ratio |
|---|---|---|---|
| 15-24 | 1.0 | 0.5 | 2.0 |
| 25-34 | 4.3 | 0.6 | 7.2 |
| 35-44 | 10.0 | 2.0 | 5.0 |
| 45-54 | 20.7 | 4.0 | 5.2 |
| 55+ | 32.1 | 11.6 | 2.8 |

Source: ABS, 2006 [40]

Notes:

1. Proportions are expressed as percentages
2. Ratio is the Indigenous proportion divided by the non-Indigenous proportion.

Few reports have been published about gestational diabetes mellitus (GDM), but information from the NT Midwives' Collection in the mid 1990s found that around 6.3% of Indigenous women in the NT developed GDM, compared with 4.1% of non-Indigenous women [58]. After allowance is made for the younger ages generally of the Indigenous women compared with the non-Indigenous women, the level of GDM among Indigenous women was 2.3 times higher than that among non-Indigenous women. Hospitalisation data from July 2004 to June 2006 in NSW, Vic, Qld, WA, SA and the NT showed that Indigenous women were hospitalised for gestational diabetes at twice the rate of other women [41]. In comparison, general practitioner (GP) encounters as measured in the BEACH survey [41] indicate that gestational diabetes was managed with Indigenous females at four times the rate of encounters with other Australian females.

### Hospitalisation

As is the case with most health conditions, hospitalisation rates are not an accurate reflection of the burden of diabetes in the community. This is reflected in the fact that diabetes was recorded as the principal diagnosis in only 1.4% of episodes of hospitalisation for both Indigenous males and females in NSW, Vic, Qld, WA, SA and the NT in July 2004 to June 2006, representing 4.8% of all hospitalisations for diabetes [41].

After adjustment for the under-identification of Indigenous people in hospital statistics at the national level, hospitalisation rates for diabetes Indigenous males and females in July 2004 to June 2006 were around four and six times the rates of other Australian males and females, respectively [41]. The greatest difference in rates for both males and females occurred in the age range 45-54 years, where Indigenous males were hospitalised at around ten times the rate of non-Indigenous males, and Indigenous females were hospitalised at around 14 times the rate of non-Indigenous females. Type 2 diabetes was the most common form of diabetes, responsible for 85% of hospitalisations of Indigenous people. Type 1 diabetes accounted for almost 14% of hospitalisations among Indigenous people. As well as admissions for diabetes as a principal diagnosis, type 2 diabetes was also reported frequently as an additional diagnosis in admissions for care involving diseases of the circulatory system (56%), diseases of the genitourinary system (39%), and other endocrine, metabolic and nutritional disorders (29%).

Time series data for Qld, WA, SA and the NT from 2000-01 to 2005-06 indicate an average yearly increase of 28% in the hospitalisation rate for diabetes among Indigenous males and females, compared with a 36% increase in the hospitalisation rate for non-Indigenous people [41].

### Mortality

Diabetes is a major contributor to Indigenous mortality, being responsible for almost 8% of deaths of Indigenous people living in Qld, WA, SA and the NT in 2002-2006 [35]. The age-standardised death rate for diabetes was 8.8 times higher for Indigenous than for non-Indigenous people (the difference is statistically significant).

## Social and emotional wellbeing (including mental health)

Despite the importance of mental health to the total wellbeing of the whole Indigenous community [59], 'there are glaring deficiencies in our knowledge' about mental health disorders [60]. 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' [61].

In trying to clarify the terms used, *The National Mental Health Plan, 2003-2008* defines mental health as 'a state of emotional and social wellbeing in which the individual can cope with the normal stresses of life and achieve his or her potential' [61]. (The Plan notes that the term 'social and emotional wellbeing' is preferred by some people, including Indigenous people, because of its more positive and holistic connotations.)

The Plan recognises a continuum between mental health (or social and emotional wellbeing) and mental illness – 'a clinically diagnosable disorder that significantly interferes with an individual's cognitive, emotional and social abilities' [61]. Using this terminology, mental illness includes potentially life-threatening conditions like chronic depression and schizophrenia, for which a person needs professional help, often from a psychiatrist. The Plan uses the term 'mental health problems' for those issues that interfere with a person's cognitive, emotional and social abilities to a lesser extent than a clinical mental illness. Trauma and grief – related to 'the history of invasion, the ongoing impact of colonisation, loss of land and culture, high rates of premature mortality, high levels of incarceration, high levels of family separations … and also Aboriginal deaths in custody' – have been identified as underlying the great burden among Indigenous people of 'mental health problems', which may lead to 'mental illness' [59, 61].

The distinction between 'mental illness' and 'mental health problems' is not well defined [61], but it is an important distinction in ensuring that all aspects of the lack of mental health (or social and emotional wellbeing) are addressed adequately in Indigenous, and other, populations.

The combination of the Plan with the *Social and emotional well being framework: a national strategic framework for Aboriginal and Torres Strait Islander peoples' mental health and social and emotional well being, 2004-2009* [62] provides the foundation for greater coordination of Indigenous-specific initiatives with relevant general developments in the mental health area, and thus enhances the prospects of much more rapid progress than has been achieved to date. Importantly, the policy statements include appropriate monitoring mechanisms involving the high-level committees responsible nationally for monitoring overall progress in Indigenous mental health.

## Extent of mental illness and mental health problems among Indigenous people

### *Prevalence*

The extent of mental illness and mental health problems has been recognised as 'a major difficulty for most [Indigenous] communities' [59], but, as noted above, the precise details have been poorly documented up until the 2004-2005 NATSIHS [40], which included a module capturing eight aspects of social and emotional wellbeing. The NATSIHS social and emotional wellbeing module attempted to capture an Aboriginal and Torres Strait Islander holistic and whole-of-life view of social and emotional wellbeing, which includes mental health, but also the impact of other factors on emotional wellbeing [63].

After adjusting for differences in age structures of the Indigenous and total Australian populations, the 2004-2005 NATSIHS found that Indigenous people aged 18 years or older were twice as likely as their non-Indigenous counterparts to feel high or very high levels of psychological distress [40].

The higher overall levels of psychological distress reported by Indigenous people are consistent with the relative frequencies with which the two populations experienced specific stressors in the previous 12 months. According to the 2004-2005 NATSIHS, 77% of Indigenous people experienced one or more significant stressors in the previous 12 months (Table 16) [40]. In comparison, 59% of the total population reported in the 2006 General Social Survey that they experienced one or more significant stressors in the previous 12 months [64]. The proportions reporting specific stressors were generally higher for Indigenous people than for the total population, particularly for the 'death of a family member or friend', 'alcohol or drug related problem', 'trouble with police', and 'witness to violence'. Almost one-in-five Indigenous people (19%) reported that a member of the family had been sent to jail in the previous 12 months, but that stressor was not reported for the total population.

*Table 16 Proportions of stressors reported in the previous 12 months, by Indigenous status, year and stressor type, Australia, 2004-2005 and 2006*

| | Indigenous status / year | |
|---|---|---|
| | Indigenous | Total population |
| Type of stressor | 2004-2005 | 2006 |
| Death of a family member or friend | 42 | 23 |
| Serious illness or disability | 28 | 30 |
| Not able to get a job | 17 | 13 |
| Alcohol or drug related problem | 25 | 8.6 |
| Overcrowding at home | 17 | --- |
| Member of family sent to jail/in jail | 19 | --- |
| Witness to violence | 14 | 3.9 |
| Trouble with police | 16 | 3.9 |
| Discrimination/racism | 12 | --- |
| Any stressor | 77 | 59 |

Source: ABS, 2006 [40] ABS, 2007 [31]

Notes:

1. Proportions are expressed as percentages
2. The total population proportion for 'serious illness or disability' data has been estimated by adding proportions for the two sub-components, so may slightly overstate the true proportion

The WAACHS reported that 24% of Indigenous children and young people aged 4-17 years were rated by their parents as being at high risk of clinically significant emotional or behavioural difficulties (compared with 15% in the general Australian population) [65]. Children of Indigenous carers who had been forcibly separated from their families were more than twice as likely to be at high risk of incurring clinically significant emotional and behavioural difficulties, and had twice the rates of alcohol and other drug use. Seven-out-of-10 Indigenous children were living in families that had experienced three or more major life stress events (such as death in the family, serious illness, family breakdown, financial problems or arrest) in the 12 months prior to the survey, and 22% had experienced seven or more such events.

## Hospitalisation

Reflecting the high levels of distress experienced by Indigenous people, there were 11,283 hospital separations with a principal diagnosis of 'mental and behavioural disorders' identified as Indigenous in Australia in 2007-08 (4.2% of separations identified as Indigenous, excluding those for renal dialysis) [6][2]. The rate for Indigenous people was 1.9 times that for non-Indigenous people.

Information about hospitalisation for the specific sub-categories within this ICD chapter is not available for 2007-08, but the separation rates of Indigenous people for 'mental and behavioural disorders due to psychoactive substance use' in 2005-06 were 4.5 times higher for males and 3.3 times higher for females than those for their non-Indigenous counterparts [31]. Rates for Indigenous males and females for 'schizophrenia, schizotypal and delusional disorders' and 'organic mental disorders' were more than double those for non-Indigenous males and females. The separation rates for 'disorders of adult personality and behaviour' and 'mood and neurotic disorders' were slightly higher for Indigenous males than for non-Indigenous males; the rates for these sub-categories were similar for Indigenous and non-Indigenous females.

Hospital admissions for intentional self-harm were more common for Indigenous people than for non-Indigenous people living in NSW, Qld, WA, SA and the NT in 2005-07 [63]. Admission rates were 2.9 times

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[2] The ICD chapter 'Mental and behavioural disorders', used for the classification of both hospitalisation and mortality, is very broad. As well as mental illness and mental health problems, it includes mental retardation and a broad sub-category for disorders relating to the use of psychoactive substances (including alcohol, tobacco, other drugs and volatile substances). The chapter doesn't include, however, the results of intentional self-harm, which are classified within the ICD chapter 'External causes of morbidity and mortality'.

higher for Indigenous males and 2.1 times higher for Indigenous females than for their non-Indigenous counterparts.

## Mortality

In 2003-2007, 221 Indigenous people living in NSW, Qld, WA, SA, and the NT died as a result of 'mental and behavioural disorders'. There were 2.4 times more Indigenous deaths than expected in NSW, 2.1 times in Qld, 4.1 times in WA, 2.4 times in SA, and 6.0 times in the NT (based on total Australian rates) [66]. This does not include deaths due to 'intentional self-harm' (suicide), which accounted for a further 409 Indigenous deaths.

Deaths from intentional self-harm were much higher for Indigenous people than for non-Indigenous people in 2003-2007, particularly for males (Table 17) [66]. Age-standardised rates ranged from 20 deaths per 100,000 (NSW) to 76 per 100,000 (NT) for Indigenous males, and from 6.7 per 100,000 (WA) to 17.1 per 100,000 (SA) for Indigenous females. Rates for Indigenous people were higher than those for non-Indigenous people in all jurisdictions, with the rate ratios highest for SA (3.3 for males and 3.4 for females).

*Table 17 Age-standardised death rates for intentional self-harm, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, selected jurisdictions, Australia, 2003-2007*

| Jurisdiction | Indigenous | | Non-Indigenous | | Rate ratio | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| NSW | 19.4 | n.a. | 13.3 | 3.5 | 1.5 | n.a |
| Qld | 38.2 | 9.8 | 15.8 | 3.8 | 2.4 | 2.6 |
| WA | 39.7 | 6.7 | 16.1 | 4.7 | 2.5 | 1.4 |
| SA | 63.6 | 17.1 | 19.4 | 5.0 | 3.3 | 3.4 |
| NT | 76.4 | 9.1 | 24.4 | 4.8 | 3.1 | 1.9 |
| Australia | 37.2 | 7.1 | 15.3 | 4.2 | 2.4 | 1.7 |

Source: Steering Committee for the Review of Government Service Provision, 2009 [66]

Notes:

1. Rates per 100,000 population; rate is not available for Indigenous females for NSW
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3. Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true differences between Indigenous and non-Indigenous people

These overall death rates conceal the very high rates of suicide among young Indigenous people. Indigenous people die from suicide at much younger ages than non-Indigenous people, particularly among those aged less than 25 years and between 25-34 years (Table 18) [66].

*Table 18 Death rates for intentional self-harm, by Indigenous status and age group, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2003-2007*

| Age group (years) | Indigenous | Non-Indigenous | Rate ratio |
|---|---|---|---|
| Under 25 | 11.7 | 3.7 | 3.2 |
| 25-34 | 40.7 | 13.8 | 2.9 |
| 35-44 | 28.5 | 14.4 | 2.0 |
| 45 and over | 8.1 | 11.5 | 0.7 |

Source: Steering Committee for the Review of Government Service Provision, 2009 [66]

Notes:

1. Rates per 100,000 population
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3. Due to the incomplete identification of Indigenous status, these figures under-estimate the true differences between Indigenous and non-Indigenous people

Research in NSW, Qld, the ACT and the NT has highlighted the increasing impact of suicide among young Indigenous people [67-69]. It has been suggested that that suicide and attempted suicide among Indigenous youth (at least in NSW and the ACT) is not the result of mental illness 'in the strict pathological sense'

[68], but it is certainly a manifestation of mental health problems. The level of intentional self-harm has certainly been recognised as a key indicator of Indigenous disadvantage [66].

# Renal disease

Renal disease, particularly kidney disease, is more prevalent among Indigenous people than among non-Indigenous people [35]. It has been well-established that the overall incidence rate of end-stage renal disease (ESRD) among Indigenous people is significantly higher than among non-Indigenous people [70].

## Extent of renal disease among Indigenous people

### *Prevalence*

Data from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) reveal that a total of 846 Indigenous people were newly identified with ESRD in the four-year period 2004 and 2007 – the age-standardised notification rate of 860 per 1,000,000 population for Indigenous people was almost nine times the rate of 100 per 1,000,000 for non-Indigenous people (Table 19) [71]. The highest rates were for Indigenous people living in the NT (2,366 per 1,000,000), WA (1,076), Qld (886) and SA (845).

Almost three-fifths (58%) of Indigenous people newly registered with the ANZDATA in the four-year period 2004-2007 were aged less than 55 years compared with less than one-third (31%) of non-Indigenous people registered (Table 20) [71]. Age-specific notification rates were higher for Indigenous people than for non-Indigenous people across all ages. Rate ratios were particularly high for people aged 45-54 years (15.2) and 55-64 years (14.1) [Derived from 71].

### *Hospitalisation*

The most common reason for hospitalisation for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2007-08 was for the procedure of haemodialysis, with the admission rate more than 12 times that of non-Indigenous people [6].

### *Mortality*

For the five-year period 2001-2005, death rates for chronic kidney disease (CKD; including ESRD) were much higher for Indigenous males and females aged 25 years or older than for their non-Indigenous counterparts. The greatest differences occurred in the 45-54 age group with Indigenous males having a rate 31 times that of non-Indigenous males and Indigenous females a rate 51 times higher than that of non-Indigenous females [31]. In 2004-06, death rates for CKD were 7 and 11 times higher for Indigenous males and females than those for non-Indigenous males and females respectively [70]. These figures probably underestimate the contribution of CKD to death rates as deaths involving CKD can occur in the context of other chronic conditions [72]. For example, deaths from diabetes, where renal failure was reported as an associated cause of death, occurred at almost twice the rate for Indigenous males and females than for their non-Indigenous counterparts [31].

*Table 19 Numbers of notifications and age-standardised notification rates for end-stage renal disease, by Indigenous status, and Indigenous:non-Indigenous rate ratios, selected jurisdictions, Australia, 2004-2007*

| Jurisdiction | Indigenous | | Non-Indigenous | | Rate ratio |
|---|---|---|---|---|---|
| | Number | Rate | Number | Rate | |
| NSW | 84 | 296 | 2,677 | 99 | 3.0 |
| Vic | 32 | 657 | 2,045 | 101 | 6.5 |
| Qld | 223 | 886 | 1,573 | 104 | 8.5 |
| WA | 164 | 1,076 | 742 | 99 | 10.9 |
| SA | 50 | 845 | 627 | 107 | 7.9 |
| NT | 270 | 2,366 | 32 | 77 | 30.7 |
| Australia | 828 | 860 | 8057 | 100 | 8.6 |

Source: Derived from McDonald, Excell, Livingston (2008) [71]

Notes:

1. Rates per 1,000,000 population have been standardised using the Australian population at 31 December 2005 as the reference
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3. Notifications for Tas and the ACT have not been shown separately because of the small numbers of notifications, but are included in the figures for Australia

*Table 20 Numbers of notifications and notification rates of end-stage renal disease, by Indigenous status and age group, and Indigenous:non-Indigenous rate ratios, Australia, 2004-2007*

| Age (years) | Indigenous | | Non-Indigenous | | Rate ratio |
|---|---|---|---|---|---|
| | Number | Rate | Number | Rate | |
| 0-14 | 5 | 7 | 90 | 6 | 1.2 |
| 15-24 | 13 | 32 | 180 | 16 | 2.0 |
| 25-34 | 56 | 191 | 395 | 35 | 5.4 |
| 35-44 | 154 | 616 | 712 | 60 | 10.3 |
| 45-54 | 253 | 1,505 | 1,107 | 99 | 15.2 |
| 55-64 | 235 | 2,647 | 1,647 | 187 | 14.1 |
| 65-74 | 94 | 2,393 | 2,102 | 378 | 6.3 |
| 75+ | 18 | 1,118 | 1,824 | 362 | 3.1 |
| All ages | 828 | 860 | 8,057 | 100 | 8.6 |

Source: Derived from McDonald, Excell, Livingston (2008) [71]

Notes:

1. Rates per 1,000,000 population
2. Rate ratio is the Indigenous rate divided by the non-Indigenous rate

# 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, however. The vast majority of injuries do not result in hospitalisation or death and there are few systematic data other than those collected as part of population surveys, such as the ABS National Health Surveys. As a result, many injuries are not brought to the attention of health policy-makers and program managers [73-75].

The classification of injury has generally followed the World Health Organization's International Classification of Diseases (ICD), which includes particular attention to the external cause and intention of the injury [76]. This system is followed in this section, but it has its limitations (for more details, see [77]).

Understanding of the proximal 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 environments; substance abuse; violence; social and familial dysfunction; risky behaviour; risky home environments; and limited access to health and social support services [74, 75, 78-80].

## Extent of injury among Indigenous people

### *Prevalence*

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 [40]. Reporting of injury-caused health conditions increased substantially in Indigenous adults over the age of 25 years, and was highest in the 34-44 and 45-55 years age groups. Within these age groups, 24% of Indigenous and around 16% of non-Indigenous people reported a health condition as a result of an injury or accident. 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).

In view of the higher levels among Indigenous than non-Indigenous people of health conditions as a result of an injury or accident, it is somewhat surprising that the reported frequency of having had an injury in the four weeks prior to being interviewed in the 2004-2005 NATSIHS was slightly less for Indigenous people (15% reported having had an injury) than for non-Indigenous people (19%) [53]. Indigenous people were three times as likely as non-Indigenous people to report a recent injury that was the result of an attack by another person (rate ratio 2.8) and five times as likely to report being under the influence of alcohol or other substances at the time of injury (rate ratio of 4.5).

One-quarter of Indigenous people reported in the 2002 NATSISS that they had been a victim of physical or threatened violence in the previous 12 months. After taking account of the different age structures of the two populations, the level of victimisation among Indigenous people was more than twice the level among non-Indigenous people [81]. Victimisation was mainly among younger Indigenous people, with males aged 15-24 years having the highest reported level (36%).

### *Hospitalisation*

In 2007-08, injuries were responsible for 19,919 hospital separations for Indigenous people living in Qld, WA, SA and the NT – 7% of all Indigenous separations (excluding those for renal dialysis) [6]. The separation rate of 46 per 1,000 for Indigenous people was almost twice that of 24 per 1,000 for non-Indigenous people.

In the two-year period July 2004 to June 2006, Indigenous males living in NSW, Vic, Qld, WA, SA and the NT had higher hospitalisation rates for injury and poisoning than other males across all age groups [41]. Indigenous females had higher rates of hospitalisation for injury and poisoning than other females across all age groups, except those aged 65 years and over.

Assault was the most frequent external cause of the hospitalisation of Indigenous people for injury Australia-wide in the two-year period July 2004 to June 2006, being responsible for 22% of Indigenous male admissions for injury and for 32% of Indigenous female admissions for injury [41]. The numbers of admissions of Indigenous people for assault were very much higher than the numbers expected from non-Indigenous rates – 8 times higher for males and 35 times higher for females. Over the seven-year period 1998-99 to 2005-06, however, there were significant declines in the hospitalisation rate for assault among Indigenous males and females equivalent to 16% and 9% reductions, respectively.

After assault, the next most common external causes of injury hospitalisation for Indigenous males were falls (18%) and exposure to inanimate mechanical forces (15%) [41]. The next most common external causes of injury hospitalisation for Indigenous females were falls (16%), and complications of medical and surgical care (6%). Transport accidents ranked fourth for Indigenous males (11%), and sixth for Indigenous females (7%).

### *Mortality*

Injury was the underlying cause of death for 16% of all Indigenous deaths in Australia in the period 2001-2005, compared with 6% of non-Indigenous deaths [31]. The number of deaths of Indigenous males from external causes of injury was 2.7 times the number expected from the rates for non-Indigenous males, and the number for Indigenous females 3.2 times the number expected from the rates for non-Indigenous females. Death rates from injury for Indigenous males and females were higher than those for their non-Indigenous counterparts in every age group. In the 35-44 year age group, the rate for Indigenous females was almost five times that for non-Indigenous females.

Intentional self-harm was the leading cause of death from external causes for Indigenous males living in Qld, WA, SA and the NT in 2001-2005, being responsible for 35% of the Indigenous male deaths from injury [31, 43]. Transport accidents were responsible for 27% of deaths of Indigenous males and assault for 8%. Transport accidents were responsible for 30% of the deaths of Indigenous females from injury, assault for 16% and intentional self-harm for 18%.

# Respiratory disease

Respiratory diseases represent a significant burden of ill-health and hospitalisation among Indigenous people, particularly among the very young and older people [82]. The development of respiratory diseases is associated with a number of contributing factors, including poor environmental conditions, socioeconomic disadvantage, risky behaviour (particularly cigarette smoking), and previous medical conditions [83]. Infants and children under 5 years of age are particularly susceptible to developing respiratory conditions, due to factors like: low levels of hand and face washing, and of childhood immunisation; parental smoking; poor nutrition (including aspects related to infant-feeding and weaning practices); and poor environmental conditions [84]. Among Indigenous adults, common risk factors for respiratory diseases include tobacco smoking, use of alcohol and other substances, diabetes mellitus and chronic renal disease [83]. Factors that affect the risk of developing asthma include environmental and related factors (for example diet and lifestyle), which may also change the course of the disease or trigger attacks of airway narrowing and symptoms [33]. Factors that can trigger airway narrowing and symptoms in people with asthma include exercise, viral infections, irritants (for example, smoking and air pollutants), specific allergens and some food preservatives.

## Extent of respiratory disease among Indigenous people

### *Prevalence*

Disease of the respiratory system was reported by 27% of Indigenous people who participated in the 2004-2005 NATSIHS [40]. Respiratory conditions 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.

With 15% of Indigenous people reporting having asthma, it was the most commonly reported respiratory condition among Indigenous people, and the second most commonly reported health condition [85]. Asthma was reported more frequently by Indigenous people living in non-remote areas (17%) than by those living in remote areas (9%).

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 [33, 40].

The lower overall proportion of Torres Strait Islander (13%) than Aboriginal people (15%) reporting asthma was largely due to the low level reported by Torres Strait Islanders living in the Torres Strait area (5%) [40].

### *Hospitalisation*

There were 16,601 hospital separations for respiratory disease among Indigenous people living in NSW, Vic, Qld, WA, SA, and the NT in 2007-08, representing 6% of separations identified as Indigenous [6]. Hospitalisation rates for Indigenous people were 2.9 times higher than those for non-Indigenous people (based on the under-identification of Indigenous people in the hospital inpatient collections, this ratio is probably higher). The more detailed information available for 1999-2000 revealed that separation rates were particularly high in infancy and early childhood [31, 86].

### *Mortality*

Disease of the respiratory system is among the leading causes of death for Indigenous people, being responsible for almost 9% of all deaths of Indigenous people living in Qld, WA, SA and the NT in 2001-2005 [31]. The numbers of deaths from respiratory disease among Indigenous people were around four times higher than the numbers expected from rates for the non-Indigenous population (Table 9). (Bearing in mind the under-identification of Indigenous people in death registration systems, this difference is likely to be higher.) Overall, respiratory disease was responsible for around 10% of the excess deaths experienced by Indigenous people.

The more detailed information available for Indigenous people living in WA, SA and the NT combined in 1999-2001 reveals that the leading specific respiratory cause of death for both Indigenous males and females was chronic lower respiratory disease, for which there were around five times more deaths than expected [87]. Pneumonia and influenza were responsible for only small numbers of deaths, but they were 12–15 times more than the numbers expected from the rates for the non-Indigenous population.

The differences between Indigenous and non-Indigenous people in death rates from respiratory disease were particularly high among young adults, with rates in the 35-44 years age group being around 22 times higher for males and 20 times higher for females [31].

## Communicable diseases

Communicable diseases of particular importance to Indigenous people include: tuberculosis; hepatitis (A, B, and C); sexually transmitted infections; HIV/AIDS; *Haemophilus influenzae* type b (Hib); pneumococcal disease, and meningococcal disease [88, 89].

Communicable diseases can be caused by: bacteria (for example, pertussis (whooping cough) and tuberculosis); viruses (for example, measles, influenza and HIV); fungi (for example, tinea); and protozoan parasites (for example, malaria) [32]. Communicable diseases also include infestation with larger parasites, such as head lice, as well as diseases which are spread through infectious particles, such as transmissible spongiform encephalopathies. Risk factors for communicable diseases vary according to the type of disease.

Information regarding specific communicable diseases comes from a variety of sources, including individual studies and state and territory notifiable disease collections. Data from state and territory collections are collected and published by the National Notifiable Disease Surveillance System (NNDSS), but Indigenous status is often not reported for large proportions of notifications.

## Tuberculosis

Tuberculosis 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) [90]. The main risk factors for tuberculosis are poverty, overcrowding, and malnutrition [91, 92], all common among many Indigenous communities. Other risk factors, also common among Indigenous people, are diabetes mellitus, smoking, alcohol abuse, and advanced renal disease [91, 93]. Another risk factor for tuberculosis is HIV [94].

### *Extent of tuberculosis among Indigenous people*

### *Incidence*

Of the 832 notifications of tuberculosis (TB) among Australian-born people in Australia in 2003-2007, 172 (21%) were identified as being Indigenous [Derived from 95, 96-99]. Almost one-half (47%) of the new cases among Indigenous people were reported by the NT (80 cases) and one-quarter (25%) by Qld (43 cases) (Table 21). The Australia-wide crude incidence rate of 7.0 cases per 100,000 population for Indigenous people was more than 10 times the rate of 0.7 per 100,000 for non-Indigenous people. The crude incidence rate was highest for the NT (27 cases per 100,000 population).

The comparison of crude incidence rates underestimates the true difference between Indigenous and non-Indigenous people because of differences in the age structures of the Indigenous and non-Indigenous populations - after adjusting for these differences, the incidence rate for Indigenous people was almost 15 times that of non-Indigenous people (Table 22) [Derived from 95, 96-99]. The incidence of TB was higher for Indigenous people than for non-Indigenous people across all age groups, with rate ratios being highest for the 45-54 years and 55-64 years age groups.

*Table 21 Numbers of new cases and crude notification rates of tuberculosis, Indigenous people, by jurisdiction, Australia, 2003-2007*

| Jurisdiction | Number | Population | Rate |
|---|---|---|---|
| NSW | 23 | 143,824 | 3.2 |
| Vic | 4 | 30329 | 2.6 |
| Qld | 43 | 136754 | 6.3 |
| WA | 11 | 70945 | 3.1 |
| SA | 9 | 27578 | 6.5 |
| Tas | 2 | 18333 | 2.2 |
| ACT | 0 | 4300 | - |
| NT | 80 | 60373 | 26.5 |
| Australia | 172 | 492677 | 7.0 |

Source: Derived from: Li, 2004 [95], Roche, 2006 [96], Roche, 2007 [97], Roche, 2008 [98] and Barry, 2009 [99]

Notes:

1. Population figures are for 30 June 2004 (the mid-point of the five-year period, 2002-2006)
2. Rates are crude incidence rates per 100,000 population

*Table 22 Numbers of new cases and notification rates of tuberculosis, by Indigenous status and age group, and Indigenous:non-Indigenous rate ratios, Australia, 2003-2007*

| Age group | Indigenous | | Non-Indigenous | | Rate ratio |
|---|---|---|---|---|---|
| | Number | Rate | Number | Rate | |
| 0-4 | 10 | 3.3 | 44 | 0.7 | 4.5 |
| 5-14 | 10 | 1.6 | 41 | 0.3 | 5.2 |
| 15-24 | 22 | 4.5 | 42 | 0.3 | 14.5 |
| 25-34 | 32 | 8.7 | 68 | 0.5 | 18.0 |
| 35-44 | 26 | 8.4 | 49 | 0.3 | 25.3 |
| 45-54 | 33 | 16.0 | 72 | 0.5 | 30.6 |
| 55-64 | 19 | 17.5 | 67 | 0.6 | 28.4 |
| 65+ | 20 | 29.4 | 277 | 2.1 | 14.1 |
| All ages | 172 | | 660 | | 14.8 |

Source: Derived from: Li, 2004 [95], Roche, 2006 [96], Roche, 2007 [97], Roche, 2008 [98] and Barry, 2009 [99]

Notes:

1. Rates are per 100,000 population
2. Any discrepancy between the figures shown for 'all ages' and the sum of the numbers for the specific age groups is due to age not being stated in the notification
3. Rate ratio is the Indigenous rate divided by the non-Indigenous rate
4. The rate ratio for 'All ages' is the standardised incidence ratio, which is the number of Indigenous cases reported divided by the number expected if the Indigenous population had the same age-specific rates as the non-Indigenous population

## Hepatitis

Hepatitis, an inflammation of the liver, can be caused by viral infections, alcohol or drug abuse, other toxins, or an attack by the body's immune system on itself. The viruses identified most frequently have been designated hepatitis A, B, and C (hepatitis types D through G have been identified also). The following sections summarise information about hepatitis A, B, and C.

### *Hepatitis A*

Of the 314 notifications of hepatitis A virus (HAV) for people living in WA, SA, and the NT in 2004-2006, 105 (33%) were identified as being Indigenous (Indigenous status was not stated in 1% of cases) [Derived from 100, 101, 102]. The crude notification rate of 22 per 100,000 for Indigenous people was 11.6 times the rate of 1.9 per 100,000 for non-Indigenous people. The real incidence of HAV among Indigenous people is probably much higher than these figures suggest, however, as the disease is endemic in many rural and remote communities [103].

A detailed study of clinically significant HAV infections found that the disease was much more common among Indigenous children than non-Indigenous children, particularly those living in the NT, WA, SA, and north Queensland [104]. Children aged 0-4 years are at greatest risk of HAV infection.

HAV is transmitted principally through person-to-person contact, and also through food and water contaminated with faecal matter from an infected individual. Eating shellfish taken from contaminated water is another known route of infection.

### *Hepatitis B*

Of the 157 notifications of hepatitis B virus (HBV) for people living in WA, SA, and the NT in 2006-2008, 27 (15%) were identified as being Indigenous (Indigenous status was not stated in 4% of cases) [Derived from 101, 102, 105, 106]. The crude notification rate of 5.5 per 100,000 for Indigenous people was 3.9 times the rate of 1.4 per 100,000 for non-Indigenous people.

For both the Indigenous and non-Indigenous populations, the rate of HBV diagnoses in 2008 was highest among those aged 20 to 29 years [Derived from 101, 102, 105, 106]. Indigenous people had a considerably higher rate of HBV diagnoses in almost every age group [107]. Outer regional areas had the highest rate of newly acquired HBV infection in the Indigenous population, but the rate of infection was highest for non-Indigenous people in remote areas of residence.

Transmission of HBV is due to contact with blood and other body fluids (semen, vaginal fluids, and saliva) from an infected individual, commonly through sexual contact or use of contaminated injecting equipment [108]. A mother may also transmit HBV to the foetus during pregnancy. Only one-third of people acutely infected with HBV will experience obvious symptoms, including jaundice, loss of appetite and mild flu-like symptoms, but the virus can cause a more prolonged illness in which a person may look and feel well, but slowly develop severe liver damage. The risk of developing cancer of the liver is also increased in people with chronic HBV infection.

A universal vaccination program commencing in the Indigenous community in 1988 has had considerable success [109], but some studies suggest that Indigenous children had a sub-optimal response to the HBV vaccine more often than their non-Indigenous counterparts [110]. Possible explanations for the inefficiency of the vaccine include a failure in the cold-chain (maintaining the vaccine within a sufficiently cool temperature range), genetic differences, or extrinsic environmental factors, such as heavy smoking among pregnant women. HBV vaccination programs are nevertheless cost-effective and relatively successful and help reduce the levels of HBV infection in the Indigenous community.

## *Hepatitis C*

Of the 7,429 notifications of hepatitis C virus (HCV) for people living in WA, SA, and the NT in 2006-2008, 607 (8%) were identified as being Indigenous (in 16% of notifications, Indigenous status was not stated) [Derived from 101, 102, 105, 106]. The crude notification rate of 123 per 100,000 for Indigenous people was 2.5 times the rate of 50 per 100,000 for non-Indigenous people. Over the five-year period 2004 to 2008, notification rates were consistently much lower for Indigenous people living in the NT than for those living in WA and SA [107].

Unlike other reported communicable diseases, the rate of newly diagnosed hepatitis C infection among Indigenous persons was highest for those living in inner regional areas and major cities. For non-Indigenous people, the rates for those living in remote and very remote areas were slightly higher than for those living in major cities and inner and outer regional areas [107].

The age pattern of newly diagnosed HCV was quite different for the Indigenous and non-Indigenous populations [107]. Among Indigenous people, rates were highest among those in the 15-19 years and 20-29 years age groups. Among non-Indigenous people, they were highest in the 40-49 years and 30-39 years age groups. Rates were generally higher for males than for females.

Transmission of the HCV typically occurs via blood-to-blood contact [111]. Injecting drug use (IDU) is the most common method of contracting the virus and is responsible for the vast majority of cases.

Many people who are infected with HCV do not have symptoms and in many cases the virus is detected through blood tests for other medical matters [111]. Persistence of HCV in the body, which occurs in about 80% of cases, can cause cirrhosis (permanent scarring of the liver). Chronic HCV infection is generally asymptomatic until cirrhosis has developed. There is no vaccine or cure for HCV, but the virus can be managed with appropriate treatment [111].

## *Haemophilus influenzae type b*

*Haemophilus influenzae* type b (Hib) is a bacterium that can cause meningitis, epiglottitis, pneumonia, septicaemia, cellulitis, osteomyelitis, pericarditis and septic arthritis [112]. Babies and children are particularly susceptible to Hib, which is spread by respiratory secretions. The main risk factors for Hib include contact with other children, particularly in large families or day care centres [113].

## Extent of Hib disease among Indigenous people

Hib notifications in Australia declined steeply following the commencement of nationally-funded infant vaccination in 1993, but the disease persists at much lower levels [114]. Hib notifications in Australia declined from 617 cases reported in 1993-1994 to 32 cases in 2004-2005, with no deaths during 2005. The incidence of invasive Hib disease has declined sharply in Australia, but Indigenous populations continue to be at higher risk of contracting Hib than non-Indigenous populations. In 2004-2005, Indigenous people were 7.5 times more likely than non-Indigenous people to be diagnosed with invasive Hib. This ratio is lower than in 2002-2003 (17.5), but much higher than the pre-vaccination ratio of 2.7 in 1993-1994.

## Pneumococcal disease

Pneumococcal disease, which is caused by the bacterium *Streptococcus pneumonia* (pneumococcus), includes upper respiratory tract infection and lower respiratory tract infection (primarily pneumonia) [115]. 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.

Vaccination for IPD has been funded from 2001 for Indigenous children 0-2 years (in central Australia and adjacent areas, the conjugate pneumococcal vaccine program extends to five years of age) [116]. From 2005, vaccination has been funded for all Australian infants. Vaccination with the polysaccharide vaccine has been funded since 1999 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. From 2005, vaccination has been funded for all Australians aged 65 years or more.

## Extent of pneumococcal disease among Indigenous people

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) [89, 115].

Based on notifications for people living in NSW, WA, SA and the NT in 2003-2006, the incidence of IPD among Indigenous people (42 per 100,000) was 4.6 times higher than that among other people (9 per 100,000)[115].[3] For both Indigenous and other people, notification rates were highest in the 0-4 years age group (65 per 100,000 for Indigenous people and 36 per 100,000 for other people) and in the 50 years and over age group (52 per 100,000 compared with 15 per 100,000). Importantly, the incidence among Indigenous people aged 25-49 years was also very high, with a rate (51 per 100,000) 11.2 times higher than that among other people (4.5 per 100,000). These aggregated data conceal important regional differences, however, with notification rates for Indigenous people being much higher in the NT (134 per 100,000 in 2004) compared with other jurisdictions combined (36 per 100,000) [117].

Vaccination programs have had a significant impact on the numbers of cases of IPD among both Indigenous

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[3] These jurisdictions are the only ones with reasonable levels of identification of Indigenous people in notifications. Indigenous rates have been compared with those for all other people, including those for whom Indigenous status was not known.

and non-Indigenous people, but notification rates remain higher for Indigenous people than for non-Indigenous people. At the start of the national Indigenous childhood pneumococcal vaccination program in 2001, the rate among Indigenous children aged less than 2 years was 219 per 100,000, 2.9 times higher than the rate among non-Indigenous children [117]. By 2006, the rate among Indigenous children had dropped to 73 per 100,000, and that among non-Indigenous children to 21 per 100,000 [116]. In Indigenous adults, IPD rates decreased after the introduction of vaccination programs in the Kimberley [118] and in north Queensland [119], but rates remain higher for Indigenous adults than for non-Indigenous adults nationally [116].

The high rates of IPD notifications among Indigenous people are reflected in hospitalisation rates for pneumococcal septicaemia and meningitis [115]. Also, two (19%) of the 11 deaths from IPD for people living in Qld, WA, SA and the NT in 2003-2005 were identified as Indigenous.

## Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus). Manifestations of meningococcal disease include meningitis, meningococcaemia without meningitis, and septic arthritis [115]. The risk of infection can be increased in crowded housing conditions [120]. The most common groups of meningococcus found in Australia are B (73%) and C (14.5%) [121]. Vaccination against serogroup C has been funded for all infants since 2003, with a catch-up program for all aged up to 19 years of age.

### *Extent of meningococcal disease among Indigenous people*

The rate of meningococcal disease is higher among Indigenous people than among other Australians, and children aged less than five years are particularly susceptible [115]. Previously recorded outbreaks among Indigenous children in central Australia and north-west Queensland were due to types A and C [122], but recent data suggest that the disease in young children is now mainly due to serogroup B [123].

In 2003-2006, 8% (106 cases) of the 1,263 cases of meningococcal disease notified in NSW, Vic, WA, SA and the NT were identified as Indigenous [115]. More than 32% of all cases and almost 69% of cases identified as Indigenous occurred among children aged 4 years or younger. The rate of 44 per 100,000 for Indigenous children aged 0-4 years was 4.9 times the rate of 9 per 100,000 for their non-Indigenous counterparts. Overall, the standardised rate of 5.1 per 100,000 for Indigenous people was more than twice the rate of 1.9 per 100,000 for other Australians.

There were 21 deaths from meningococcal disease for people living in Qld, WA, SA and the NT in 2002-2005 [115]. One death was of a person identified as Indigenous.

## Sexually transmissible infections

Sexually transmissible infections (STIs) are infections that are spread by heterosexual or homosexual contact with an infected person [88]. STIs are caused by microorganisms that are transmitted from one person to another through semen and fluid from the vagina, blood, or saliva. Most STI cases are found among sexually active teenagers and young adults, and unprotected sex is generally the primary risk factor [33, 88, 106].

The majority of STIs are asymptomatic or produce only mild symptoms. Many people affected find out they have an infection through screening and contact tracing [124]. STIs can usually be effectively treated if diagnosed early, but, if left untreated, they may lead to complications. Many factors have been identified as contributing to the development of STIs. Factors that are particularly relevant to the Indigenous population include: poor access to health services; lack of clinical staff who have the competence and sensitivity to deal with sexual health issues in the Indigenous population; a younger more mobile population; and socio-economic disadvantage [107].

The National Notifiable Diseases Surveillance System collects data on some STIs, including chlamydia, gonorrhoea, syphilis, donovanosis, and HIV/AIDS [42]. Human papilloma virus (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. 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, greater targeted screening, and public awareness campaigns [123]. The high screening rates in some Indigenous communities probably contributes to the higher rates reported for Indigenous people than for non-Indigenous people.

## Gonorrhoea

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoeae* [125]. In women, gonorrhoea can affect the urethra, cervix, and rectum, while in men it can affect the urethra and rectum. Gonorrhoea can also infect the throat in women and men. Gonorrhoea is highly contagious and if left untreated the infection can cause pelvic inflammatory disease in women and may cause damage to the testes in men. In some instances, untreated gonorrhoea can lead to infertility in both women and men, and may also lead to infections in the joints and skin [125, 126].

For people living in Qld, WA, SA and the NT, notification rates of gonorrhoea were much higher for Indigenous people than for non-Indigenous people in the three-year period 2006-2008: 1,132 cases per 100,000 population (based on 10,685 cases notified) compared with 14 cases per 100,000 (based on 3,268 cases notified) respectively [106]. (These rates do not include the 13% of notifications for which Indigenous status was not stated.) The highest rates for Indigenous people were for the NT (2,606 cases per 100,000) and WA (1,761 cases per 100,000). Notification rates for gonorrhoea have increased slightly for both Indigenous and non-Indigenous people over the five-year period 2004-2008 [107].

Gonorrhoea notification rates were highest among Indigenous people aged 15-19 years and 20-29 years [107]. Among non-Indigenous people, the rates were highest in the 20-29 years and 30-39 years age groups. The number of notifications of gonorrhoea in 2008 was slightly higher for females than males among Indigenous people, but males contributed 77% of the notifications for non-Indigenous people [106].

Gonorrhoea notification rates were much higher for Indigenous people living in remote and very remote areas than for those living in major cities and inner and outer regional areas. For non-Indigenous people, notification rates were highest in very remote and inner regional areas [106].

## Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [33, 127]. In the initial stage of the infection, syphilis causes painless ulcers or sores around the mouth or genital area [126, 127]. If detected early, syphilis can be easily treated but, if left untreated, the infection can be very serious causing damage to the brain, heart, blood vessels, spinal cord, and bones. For pregnant women, untreated syphilis poses further serious health threats as the infection can be passed on to the child and physical deformities and brain damage may result [126].

Australia-wide, notification rates of syphilis were much higher for Indigenous people than for non-Indigenous people in the three-year period 2006-2008: 37 cases per 100,000 population (based on 592 cases notified) compared with 4.4 cases per 100,000 (based on 2,723 cases notified) respectively [106]. (These rates do not include the 5% of notifications for which Indigenous status was not stated.) More than nine-tenths (93%) of the Indigenous notifications were for Qld, WA, SA and the NT, for which jurisdictions the notification rate for Indigenous people (58 per 100,000) was 45 times the rate for non-Indigenous people (1.3 per 100,000).Australia-wide, syphilis notification rates tended to fluctuate for Indigenous people over the five-year period 2004-2008, but increased for non-Indigenous people [107].

The syphilis notification rates were highest among Indigenous people aged 15-19 years and 20-29 years [107]. Among non-Indigenous people, the rate was highest in the 30-39 years age group, with slightly lower rates in the 20-29 years and 40-49 years age groups. The numbers of notifications of syphilis in 2008 were similar for Indigenous males and females, but males contributed 95% of the notifications for non-Indigenous people.

Syphilis notification rates were much higher for Indigenous people living in remote and very remote areas than for those living in major cities and inner and outer regional areas. For non-Indigenous people, notification rates were highest in major cities and in very remote areas.

### *Chlamydia*

Chlamydia, caused by the bacterium *Chlamydia trachomatis*, is one of the most common STIs in Australia [124]. The infection in women can cause cervicitis, endometritis, and pelvic inflammatory disease, which can lead to tubal factor infertility and ectopic pregnancy. In men, it can cause urethritis, epididymo-orchitis, and prostatitis. Due to lack of obvious symptoms of the disease, the incidence of chlamydia is underestimated by notification data.

Notification rates for chlamydia were much higher for Indigenous people living in WA, SA and the NT in the three-year period 2006-2008 than for their non-Indigenous counterparts: 1,699 cases per 100,000 population (based on 8,459 cases notified) compared with 190 per 100,000 (21,362 cases notified) [Derived from 95-98, 99] (These rates do not include the 24% of notifications for which Indigenous status was not stated.) Notifications of chlamydia among Indigenous people increased between 2004 and 2008, but the increase was not as great as among non-Indigenous people.

For both Indigenous and non-Indigenous people, notification rates of chlamydia in 2008 were highest among people aged 15 to 29 years, and higher among females than males [107]. Notification rates for Indigenous people were much higher in remote and very remote areas than in major cities and in inner and outer regional areas.

## HIV / AIDS

The Human Immunodeficiency Virus (HIV) is a retrovirus that destroys cells in the body's immune system [42]. Over time, the virus weakens immune system functioning to the point where minor infections become fatal. This late stage of HIV is referred to as Acquired Immune Deficiency Syndrome (AIDS) [128]. At present there is no vaccine to prevent HIV, nor is there a cure, but the illness can be managed and infected persons can be clinically healthy for many years [33, 42, 128].

The transmission of HIV occurs in one of three ways: unprotected sexual contact with an infected person; infected blood passing into another person's bloodstream; and an infected mother can pass HIV on to her child either during birth or through breast-feeding [128]. The behaviour that presents the greatest risk of exposure to HIV includes unprotected anal sex. Other unsafe behaviours that can put people at high risk of HIV include: unprotected vaginal sex; unprotected oral sex; and sharing injecting equipment (such as syringes and needles).

To date, Australia has successfully prevented an uncontrolled spread of HIV and the overall rates of HIV and AIDS are low in comparison with other countries [106]. 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' [129]. Indigenous people were seen as being at particular risk of HIV infection due to high rates of STIs and their lack of access to effective services [130].

### *Extent of HIV/AIDS among Indigenous people*

National surveillance data show a slight increase in the number of newly diagnosed HIV infections in the Indigenous population in 2008 compared with 2007 (19 and 17 new cases respectively) [106]. Over the decade 1999-2008, the number of new HIV diagnoses among Indigenous people increased by 73% (11 new cases in 1999), but an analysis on a year-by-year basis shows fluctuations in the number of new HIV cases. The greatest proportion of Indigenous HIV diagnoses were attributable to males, 79% in 2008, and the median age of Indigenous people newly diagnosed with HIV was 35 years.

In comparison, new diagnoses of HIV in the non-Indigenous population decreased slightly from 2007 to 2008 (1,029 cases compared with 976) [Derived from 106]. Males accounted for 86% of new HIV diagnoses in the non-Indigenous population and the median age of diagnosis among non-Indigenous people was 36 years (slightly older than the median age for Indigenous people).

Almost two-fifths (37%) of new HIV infections among the Indigenous population in 2008 were reported in NSW, and one-fifth (21%) each in WA and SA [106]. In terms of exposure to HIV, men who have sex with men accounted for more than one-half (53%) of new HIV cases among Indigenous people. Injecting drug use and heterosexual contact were also identified as common methods of exposure for HIV among Indigenous people (32% and 16% respectively). The majority of new Indigenous HIV infections occurred in major cities and the rate of infection declined generally as the area of residence became more remote.

The patterns of new HIV infections are slightly different for Indigenous and non-Indigenous people [Derived from 106]. As is the case for Indigenous people, most new cases of HIV infections among non-Indigenous people in 2008 were reported in NSW (37% of new cases). Vic (29%) and Qld (20%) also accounted for substantial proportions of the new cases occurring among non-Indigenous people. WA and SA were each responsible for 21% of the new cases among Indigenous people but for only 7% and 4% respectively among non-Indigenous people. Among non-Indigenous people, 93% of all new cases in 2008 were attributed to men who have sex with men (66%) and heterosexual contact (27%). Injecting drug use was responsible for only 2.5% of new cases among non-Indigenous people.

Overall in Australia, the cumulative number of HIV diagnoses by the end of 2008 was 28,330 [106]. For the same period, there were 10,348 AIDS cases and 6,765 deaths following AIDS. In comparison, there were 186 HIV notifications among the Indigenous population in the period 1999-2008 and 100 AIDS diagnoses from 1992-2004 [100, 106].

## Skin infections and infestations

Susceptibility to skin infections increases with poor living conditions and overcrowding [131]. Skin infections and infestations in Indigenous communities reflect serious health inequalities, but have attracted much less professional attention than they deserve. Scabies, a disease caused by the mite *Sarcoptes scabiei* resulting in inflammation and itching [132], is endemic in many remote Indigenous communities, with prevalence in children up to 50% [133]. The cycles of scabies transmission can result in pyoderma (also referred to as impetigo), a bacterial infection of the skin that can lead to kidney disease and possibly heart disease. Up to 70% of children living in some Indigenous communities have skin sores, with group A streptococcus (GAS) the major pathogen. GAS is responsible for continuing outbreaks of post-streptococcal glomerulonephritis and acute rheumatic fever. Indigenous people, particularly those living in the high-rainfall, humid areas of northern Australia, are also vulnerable to a variety of fungal and related organisms [132].

Skin diseases cause very few deaths directly, but they can be linked with serious complications. Skin diseases accounted for around 2.3% of hospital separations in 2007-08 for patients identified as Indigenous, at a rate more than two-and-a-half times that of non-Indigenous people [6].

# Eye health

Eye health can be affected by genetic factors, ageing, premature birth, diseases (such as diabetes), smoking, injuries, UV exposure and nutrition. The eye health of Indigenous people has probably improved overall, but many Indigenous people are still more likely than non-Indigenous people to suffer from preventable eye conditions, such as trachoma (a bacterial infection) [134, 135]. Of increasing concern for many Indigenous people is diabetic retinopathy, a complication of diabetes that causes damage to the small blood vessels in the retina, can impair vision and may cause blindness [135, 136].

The eye health of many Indigenous people is also limited by difficulty in accessing optometry or specialist ophthalmology services [135]. For Indigenous people with vision refractive error, for example, the main issues are access to and utilisation of testing, the administrative difficulty of dispensing spectacles, and the cost of spectacles and of repairs [137].

## Extent of eye health problems among Indigenous people

The National Indigenous Eye Health Survey in 2008 aimed to: determine the prevalence and causes of vision impairment (cataract, macular degeneration, glaucoma, diabetic retinopathy, refractive error and trachoma); evaluate the access to, and utilisation of, health care services in Indigenous communities and in large residential enclaves; and provide the evidence base for the planning of effective eye care programs for Indigenous people [135]. Overall 2,883 Indigenous people had their eyes examined. The blindness rate in Indigenous adults (1.8%) was found to be 6.2 times the rate found in total population surveys of adults. The rate of low vision in Indigenous adults (8.6%) was 2.8 times the rate for the total population.

Major causes of blindness in Indigenous adults were: cataract (32%), optic atrophy (14%), refractive error (14%), diabetic eye disease (9%), and trachoma (9%). Overall, 3% of Indigenous adults were found to suffer vision loss from cataract, which is 12 times more common than among adults in the total population [135]. Only 65% of Indigenous people with vision loss from cataract had received surgery. Refractive error was responsible for one-half of the vision loss in both adults and children. Of all participants in the survey, 39% could not read normal size print and 62% reported wearing reading glasses for near work.

The National Aboriginal and Torres Strait Islander Social Survey 2008 collected information on the eye health of Indigenous children including: long-sightedness; short-sightedness; partial or total blindness; glaucoma; and lazy eye [138]. For Indigenous children aged 4-14 years, almost one-in-ten (9%) were found to have an eye or sight problem.

In the 2004-2005 NATSIHS, eye and/or sight problems were reported by 30% of Indigenous people who participated [40]. These problems were reported slightly less frequently by Indigenous people living in remote areas (25%) than by those living in non-remote areas (32%). This overall level of eye and/or sight problems among Indigenous people is similar to that documented in the 2001 NHS.

The National Indigenous Eye Health Survey (2008) reported that Indigenous children had better vision than their non-Indigenous peers, particularly those living in remote areas [135]. Vision loss in Indigenous children was found to be 0.22 times less common in Indigenous children than in non-Indigenous children. The major cause of low vision was refractive error (56%). These findings were similar to those reported by the WAACHS: 8% of Indigenous children aged 4-17 years did not have normal vision in both eyes (a level significantly lower than the 14% of children in the general population found in the 1993 WA Child Health

Survey not to have normal vision in both eyes) [29]. Of 4-17 year-old Aboriginal children without normal vision in both eyes, 58% used prescribed glasses or contact lenses.

In Australia, trachoma is found almost exclusively within the Indigenous population, either in its infectious (follicular) form or as scarring (resulting from repeated infections over years) [134, 135]. Until recently, it had been difficult to develop an accurate picture of where infectious trachoma remains endemic because of the lack of systematic screening. The establishment in November 2006 of the National Trachoma Surveillance and Reporting Unit (NTSRU), however, means that good information will now be available for children living in many parts of WA, SA and the NT [139]. The National Indigenous Eye Health Survey reported 3.8% of Indigenous children had active trachoma [135]. Trachoma was found to be less common in urban areas, but 50% of very remote communities had endemic trachoma.

Almost two-fifths (37%) of Indigenous adults participating in the National Indigenous Eye Health Survey reported having diabetes [135]. Of these people, 12% had visual impairment and only 20% reported having had an eye examination in the previous year. The average age of onset of diabetes was reported to be 44 years with an average duration time of 11 years. For participants with diabetes, 25% had mild/moderate non-proliferative retinopathy, 0.45% had severe non-proliferative retinopathy, 8.6% had clinically significant macular oedema and 2.5% had proliferative retinopathy. Only 39% of these participants had received any treatment for their condition.

# Ear health

The level of ear disease and hearing loss among Indigenous people remains higher than that of the general Australian population, particularly among children and young adults [140, 141]. Otitis media (OM), infection of the middle ear, particularly in suppurative forms, is associated with some impairment of hearing, with major implications for language development and learning [141]. The risk of permanent hearing loss increases if OM is not adequately treated and followed up. The hearing impairment associated with OM is generally conductive in nature and mild to moderate in degree, and may be intermittent or persistent depending on the middle-ear condition present at the time [142]. 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.

## Extent of ear disease among Indigenous people

The National Aboriginal and Torres Strait Islander Social Survey 2008 collected information on the ear and hearing problems of Indigenous children, including: total or partial deafness; otitis media; ringing in ears (tinnitus); and tropical ear or swimmer's ear (otitis externa). One-in-ten Indigenous children aged 4-14 years were reported as having experienced an ear or hearing problem [138].

Ear/hearing problems were reported by 12% of Indigenous people who participated in the 2004-2005 NATSIHS [40]. These problems were reported slightly more frequently by Indigenous people living in remote areas (13%) than by those living in non-remote areas (12%), but the difference is not statistically significant. Complete or partial deafness was reported by 9% of Indigenous people living in both remote and non-remote areas, but the level of otitis media was higher for Indigenous people living in remote areas (4%) than for those living in non-remote areas (2%).

After adjusting for differences in the age structures of the two populations, otitis media was around 2.8 times more common for Indigenous people than for non-Indigenous people [40]. An overall comparative figure for complete or partial deafness was not published, but the levels were higher for Indigenous than for non-Indigenous people for all age groups except people aged 55 years or older (for which group the levels were similar – 25% compared with 26%). The levels of complete or partial deafness among

Indigenous people were around two times or more than those among non-Indigenous people for age groups up to 34 years. The proportions of ear/hearing problems were similar for Torres Strait Islanders (11%) and Aboriginal people (12%) overall, but the proportion for Torres Strait Islanders living in the Torres Strait area was slightly lower (9%).

The more detailed information collected by the WAACHS reveals that 18% of Indigenous children aged 0-17 years had recurring ear infections [29]. 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.

Individual studies have documented very high levels of CSOM in some Indigenous communities [141]. The World Health Organization (WHO) has identified a prevalence of CSOM of greater than 4% as being 'a massive public health problem' requiring 'urgent attention' [143]: some Indigenous communities have a prevalence up to 10 times higher than this [141].

Hospitalisation rates in 2007-08 for ear diseases were slightly higher for Indigenous people than for non-Indigenous people. The age standardised separation rate of 3.3 per 1,000 for the Indigenous population was 1.3 times that of the non-Indigenous population (2.6 per 1000) [6].

As with many other areas of Indigenous health, this massive public health problem will be solved 'only with urgent attention to improving housing and access to running water, nutrition and quality of care, and giving communities greater control over these improvements' [144].

# Oral health

Oral health is defined as 'a standard of health of the oral and related tissues that enables an individual to eat, speak, and socialise without active disease, discomfort, or embarrassment and that contributes to general wellbeing' [145]. Thus, it is more than simply the absence of disease in the oral cavity: it is a standard of oral functioning that enables comfortable participation in everyday activities.

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 [146]. Caries is reversible in its early stages, but, if untreated, can cause irreversible damage. 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 [146], especially diabetes mellitus [147] and osteoporosis [148].

## Extent of oral health problems among Indigenous people

### *Caries*

Indigenous children experience more caries that non-Indigenous children in their deciduous teeth [149]. The Child Dental Health Survey (CDHS) found that more Indigenous children aged 4-10 years in NSW, SA and the NT had caries in their deciduous teeth than did their non-Indigenous counterparts. The largest difference between Indigenous and non-Indigenous children was for those aged 6 years, where nearly twice as many Indigenous children than non-Indigenous children had caries (72% compared to 38% respectively).

Not only do more Indigenous children have caries, but they have a larger number of decayed teeth at all ages (4-10 years) than their non-Indigenous counterparts [149]. The biggest difference was seen among Indigenous four-year-olds, who had more than three times the number of decayed teeth than non-

Indigenous children of the same age.

Poorer oral health for Indigenous children continues when they get their permanent teeth [149]. More Indigenous children aged 6-17 years had caries than did their non-Indigenous counterparts. The largest difference was for those aged 15 years, who were almost three times as likely to have caries as their non-Indigenous counterparts. Indigenous children also had a higher level of caries than non-Indigenous children. The largest difference was among Indigenous fifteen-year-olds, who had 2.7 times the level of decay compared with non-Indigenous children of the same age.

Indigenous adults experience more caries than do non-Indigenous adults [150]. According to the National Survey of Adult Oral Health (NSAOH), Indigenous people 15 years and older have 2.3 times more untreated caries: 57% of Indigenous adults and 25% of non-Indigenous adults had one or more tooth affected. The severity of decay that Indigenous people experience is also higher. Indigenous adults had more than three times the number of decayed tooth surfaces than did non-Indigenous adults. Indigenous people aged 35-54 years had more than five times more decayed tooth surfaces than did their non-Indigenous counterparts.

## *Periodontal diseases*

Periodontal diseases, including gingivitis and periodontitis, are more common among Indigenous children and adults than among their non-Indigenous counterparts [149]. Children rarely develop severe periodontal disease, but gingivitis is relatively common, particularly among older children. The prevalence of gingival bleeding, a common symptom of gingivitis, was higher for Indigenous children in NSW and SA than for non-Indigenous children (information is not available for other states and territories). Rates of gingival bleeding were around three times higher for Indigenous children 13-14 years in NSW than for their non-Indigenous counterparts. Almost one-half (49%) of Indigenous 12 year-olds in SA had gingival bleeding, compared with less than one-quarter (23%) of non-Indigenous children of the same age group. Three-in-five Indigenous children in remote communities showed some evidence of gingivitis and around one-in-five children were at moderate risk of developing gingivitis. Almost 42% of Indigenous children aged 15-16 years were at moderate risk and 25% were at high risk of developing gingivitis.

The NSAOH found that almost 27% of Indigenous adults aged 15-74 years had gingivitis [150]. The prevalence of moderate and severe periodontitis among Indigenous people was 1.3 times higher than the prevalence among non-Indigenous people. Similarly, more Indigenous adults had a slightly higher levels of deep (4+mm) periodontal pockets and clinical attachment loss than did their non-Indigenous counterparts.

Indigenous people are affected by periodontal diseases at younger ages than non-Indigenous people [150, 151]. According to the NSAOH, Indigenous people aged 15-34 years experienced almost twice the prevalence of moderate or severe periodontitis than did non-Indigenous people of the same age group (13.5% compared with 7.3%) [150]. The levels of both deep periodontal pockets and clinical attachment loss are higher for Indigenous people aged 15-34 years than for their non-Indigenous counterparts: 18% compared with 13%, and 24% compared with 17%, respectively. The prevalence of tooth sites with deep periodontal pockets is more than twice as high for Indigenous people than for non-Indigenous people in this age range (1.3% compared with 0.6%).

## *Edentulism*

Edentulism, or complete tooth loss, reflects both poor oral hygiene and a past surgical approach to the treatment of oral diseases that relied largely on extractions [150]. Edentulism is strongly correlated to age; in Australia, less than 2% of adults aged 35-54 years have complete tooth loss but this increases to 36% for people 75 years and older. The age distribution of edentulism for Indigenous Australians is noticeably different from that of the total population. For people aged 35-54 years, edentulism is around five times more common among Indigenous people (7.6%) than among non-Indigenous people (1.6%). For those aged 55-74 years, 21% of Indigenous people suffer from edentulism compared with 14% of non-Indigenous people.

# Disability

Disability is recognised as a condition that affects most people in the population – to varying degrees and at different stages of their lives [152]. There is no precise agreement, however, about what constitutes a disability, which results in differences in estimates of prevalence.

Disability can be considered in terms of the nature of the impairment (such as sight and hearing impairments, difficulties with mobility or brain damage) or the interaction between the individual's health condition and their environment [153]. In recent years, much greater attention has been directed to how the person with impairment functions rather than the impairment itself.

The ABS defines disability as a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts everyday activities [154]. Its periodic Surveys of Disability, Ageing and Carers also collect information about a person's need for assistance with core activities.

## Extent of disability among Indigenous people

According to information collected as a part of the 2006 Australian census, 19,600 Indigenous people (4%) needed assistance with core activities some or all of the time [31]. After adjusting for differences in the age structures of the two populations, Indigenous people aged 18 years or older were more than twice as likely as their non-Indigenous counterparts to need assistance with core activities some or all of the time (Table 23). The proportions of Indigenous people needing assistance with core activities were higher than those of non-Indigenous people for all age groups, particularly for people aged 35-64 years.

The levels of disability were generally higher for Indigenous males than for Indigenous females, across the lifespan.

*Table 23 Proportions of people needing assistance with core activities, by Indigenous status and age, Australia, 2006*

| Age group (years) | Indigenous | Non-Indigenous | Ratio |
|---|---|---|---|
| 18-24 | 2.5 | 1.3 | 2.0 |
| 25-34 | 2.8 | 1.2 | 2.3 |
| 35-44 | 4.9 | 1.7 | 2.8 |
| 45-54 | 8.2 | 2.7 | 3.1 |
| 55-64 | 13.2 | 4.8 | 2.8 |
| 65 or older | 20.2 | 13.4 | 1.5 |
| All ages | 8.4 | 4.1 | 2.1 |

Source: ABS, AIHW 2008 [31]

Notes:

1. Proportions are expressed as percentages; proportions for all ages have been standardised using the 2001 Australian standard population
2. Rate ratio is Indigenous proportion divided by the non-Indigenous proportion

Among those in need of assistance, the median ages for Indigenous males and females were 41 years and 49 years respectively, compared with 61 years and 75 years for their non-Indigenous counterparts [31]. The need for assistance with core activities increased from the 35-44 years age group for both Indigenous males and females. The proportion of Indigenous males needing assistance with core activities was higher than that of Indigenous females up to 70 years of age, but the reverse was true beyond that age [31].

The need for assistance with core activities among Indigenous people varied with the remoteness of residence: 5% of the Indigenous population living in non-remote areas needed assistance, 4% living in remote areas, and 3% living in very remote areas [31].

# Factors contributing to Indigenous health

The factors contributing to the poor health status of Indigenous people should be seen within the broad context of the 'social determinants of health' [10, 155]. 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.

Information about some of these determinants is available (see 'The context of Indigenous health'), but much more attention tends to be focused on the so-called 'health risk factors', including those summarised in the following sections. These risk factors are more proximal to adverse health outcomes, but the interpretation of the following information needs to recognise the potential roles of the underlying determinants of health.

# Selected health risk factors

## 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 [157, 158]. The NHMRC has endorsed a number of dietary guidelines for infants, adolescents, adults, older Australians, women of childbearing age, and pregnant women [156]. The NHMRC guidelines recommend that adults consume a minimum of two serves of fruit and five serves of vegetables per day, selected from a wide variety of types and colours [159]. The guidelines also recommend including reduced-fat varieties of milk, yoghurts and cheeses, and choosing foods low in salt.

According to the 2004-2005 NATSIHS, 58% of Indigenous respondents aged 12 years or older living in non-remote areas consumed one serve or less of fruit per day, compared with 46% of non-Indigenous respondents [35]. That is, only 42% of Indigenous people aged 12 years or older living in non-remote areas and 54% of non-Indigenous respondents consumed fruit at the recommended level of two or more serves per day.

Almost two-thirds of Indigenous and non-Indigenous people aged 12 years or older living in non-remote areas reported consuming two to four serves of vegetables per day, but only 10% of Indigenous respondents and 14% of non-Indigenous respondents reported consuming five serves or more per day.

For respondents living in remote areas, the questions in the 2004-2005 NATSIHS were amended to whether they usually ate fruit and/or vegetables each day. The proportions of Indigenous people aged 12 years and older living in remote areas who did not consume these dietary items daily was substantially higher than for their counterparts living in non-remote areas – 15% and 2% respectively for vegetable consumption, and 20% and 12% respectively for fruit consumption [35, 40].

More than three-quarters of Indigenous people aged 12 years or older living in non-remote areas reported that they usually drank whole milk (including full-cream powdered milk), with only 20% drinking reduced fat and/or skim milk [40]. In contrast, 45% of their non-Indigenous counterparts consumed reduced fat and/or skim milk and 45% whole milk. The consumption of reduced fat and/or skim milk was very low (6%) among Indigenous people aged 12 years or older living in remote areas, with 87% reporting that they drank whole milk.

More than four-fifths of Indigenous people aged 12 years or older living in remote areas reported 'sometimes' or 'usually' adding salt after cooking, compared with two-thirds of those living in non-remote areas [40].

The 2004-2005 NATSIHS also addressed the question of food security by asking respondents whether respondents ran out of food in the previous 12 months. Approximately 24% of Indigenous people aged 15 years and older reported they ran out of food in the 12 months before the survey, compared with 5% of non-Indigenous people [41]. Those in remote areas were more likely to report having run out of food than those in non-remote areas (36% compared with 20%). Approximately 8% of Indigenous people reported they went without food when they couldn't afford to buy more, compared with 2% of non-Indigenous people.

## Physical activity

The *National Physical Activity Guidelines for Australians* recommend at least 30 minutes of moderate activity on most, preferably all, days of the week to enhance health and reduce the risk of cardiovascular disease and other chronic conditions [160]. Insufficient levels of physical activity have been shown to be a risk factor for cardiovascular disease, type 2 diabetes, certain cancers, depression, and overweight and obesity [161].

Data on the levels of physical activity of Indigenous people are limited [162]. After adjusting for differences in the age structures of the Indigenous and non-Indigenous populations, approximately 51% of Indigenous respondents in non-remote areas reported in the 2004-2005 NATSIHS their exercise level as sedentary (very low or no exercise), 27% as low and 21% as moderate or high, compared with 33%, 36% and 31% respectively of non-Indigenous people [41]. Sedentary or low levels of physical activity were highest among Indigenous people aged 45–54 years and 55 years or older (83% and 85% respectively); moderate or high levels of physical activity were highest among those aged 15–24 and 25–34 years (32% and 27% respectively). A higher proportion of Indigenous females than Indigenous males reported that their level of exercise was sedentary (51% compared with 42%).

## Bodyweight

Body mass index (BMI – weight in kilograms divided by height in metres squared) is the standard measure for classifying a person's weight for height [32]. Being overweight (BMI between 25.0 to 29.9) or obese (BMI >= 30.0) increases a person's risk for cardiovascular disease, type 2 diabetes, respiratory diseases, renal disease, certain cancers, osteoarthritis, pregnancy complications, and psychosocial problems [162]. A high BMI can be a result of many factors, either alone or in combination, such as poor nutrition, physical inactivity, socioeconomic disadvantage, genetic predisposition, increased age, and alcohol and tobacco use [162, 163]. Being underweight (BMI less than 18.5) can also have adverse health consequences, including decreased immunity (leading to increased susceptibility to some infectious diseases), osteoporosis (bone loss), decreased muscle strength, and hypothermia (lowered body temperature). The 2003 NHMRC dietary guidelines for adults recommend that adults prevent weight gain by being physically active and eating according to their energy needs.

Based on information collected as a part of the 2004-2005 NATSIHS, 57% of Indigenous people aged 15 years or older were overweight or obese, with no real difference according to remoteness of residence [40]. A slightly higher proportion of Indigenous men (58%) than Indigenous women (55%) was overweight or obese. Almost 6% of Indigenous people aged 15 years or older were underweight, with 4% of Indigenous men and 7% of Indigenous women having a BMI of less than 18.5. After adjusting for differences in the age structures of the two populations, the level of being overweight or obese was 1.2 times higher for Indigenous people aged 15 years or older than for their non-Indigenous counterparts.

In 2004-2005, Indigenous people over the age of 18 were more likely to be overweight or obese if: their self-reported health status was fair/poor (68%) compared with those whose health was excellent or very good (55%); they had three or more long-term health conditions (65% compared with 56% of those who had two or less long-term health conditions); they had circulatory problems (72% compared with 57% without circulatory problems); or had diabetes (83% compared with 57% of those without diabetes) [41]. The prevalence of overweight and obesity among Indigenous people aged 18 years and over has been steadily increasing in non-remote areas from 51% in 1995 to 56% in 2001 and 60% in 2004-2005.

Overweight and obesity were slightly more common among Torres Strait Islanders aged 15 years or older (61%) than among Aboriginal people in that age range (56%) (the difference is not statistically significant) [40]. The level of overweight and obesity was particularly high among Torres Strait Islanders living in the Torres Strait area, with 86% having a BMI of 25.0 or greater.

## Immunisation

In response to the greater burden of communicable diseases among Indigenous people, the NHMRC has endorsed a series of special guidelines and schedules for immunisation of vaccine-preventable diseases, which include some extra vaccinations [164].

Respondents to the 2004-2005 NATSIHS reported that 88% of Indigenous children aged 0-6 years living in non-remote areas were fully immunised against the vaccine-preventable diseases included in the relevant NHMRC vaccination schedule [40]. The available immunisation records suggest the level fully immunised may be somewhat lower, as the proportions for the separate vaccines were: diphtheria and tetanus (79%), pertussis (whooping cough) (74%), hepatitis B (83%), Hib (73%), and MMR (measles, mumps, and rubella) (85%).

Three-fifths of Indigenous people aged 50 years or older reported to the 2004-2005 NATSIHS that they had been vaccinated against influenza in the previous 12 months, with vaccination levels higher for people living in remote areas (80%) than for those living in non-remote areas (52%) [40]. All of these levels were higher than those for non-Indigenous people (46%). Similarly, vaccination levels for pneumonia in the previous 5 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%).

## 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]. It also has anti-infective properties and contains immunoglobulins which provide some immunity against early childhood diseases [166]. The NHMRC recommends that as many infants as possible be exclusively breastfed until six months of age and that mothers then continue breastfeeding until 12 months of age [165].

According to the 2004-2005 NATSIHS, 79% of Indigenous children aged less than four years living in non-remote areas were reported to have been breastfed for at least some period [40]. This level is slightly lower than the 88% of non-Indigenous children aged less than four years who had been breastfed. A similar proportion of Indigenous and non-Indigenous infants had been breastfed for six to 12 months (19% and 22% respectively) and for 12 months or more (13% and 14% respectively). On the other hand, the findings of the WAACHS suggest 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 [29].

The *Footprints in time – the longitudinal study of Aboriginal children* collected data from 11 sites (rural, remote and urban) around Australia in 2008-2009 [167]. Data on breastfeeding from this study showed that 22% of Indigenous infants had been breastfed for at least 12 months and there was a positive correlation between the length of breastfeeding and the relative isolation of the family.

## Tobacco smoking

Smoking tobacco increases the risk of cardiovascular disease, some cancers, lung diseases, and a variety of other health conditions [33]. Smoking is also a risk factor for complications during pregnancy and is associated with preterm birth, small for gestational age babies, low birthweight, and perinatal death [27]. Passive smoking is also of concern to health, with children particularly susceptible to problems including middle ear infections, asthma, respiratory infections, reduced lung function, low birthweight, and sudden infant death syndrome [33].

In 2003, tobacco smoking was the leading cause of the burden of disease and injury among Indigenous people, responsible for 12.1% of the total burden and one-fifth of all deaths [168].

One-half of Indigenous people (50%) aged 18 years or older reported to the 2004-2005 NATSISS that they smoked daily. Overall, the proportion of Indigenous men who smoked (51%) was slightly higher than the proportion of Indigenous women who smoked (49%) [40]. The level of smoking is slightly higher for Indigenous people living in remote areas (52%) than for those living in non-remote areas (49%). The level of smoking among Indigenous people has not really changed since at least 1994 (52%) [169].

The proportions of people smoking daily were similar for Torres Strait Islanders (49%) and Aboriginal people (50%) overall, but the proportion of daily smokers among Torres Strait Islanders living in the Torres Strait area was lower (38%) [40].

After adjusting for differences in the age structures of the two populations, daily smoking was 2.2 times more common among Indigenous people aged 15 years or older in 2004-2005 than among their non-Indigenous counterparts [40]. Even higher rates of smoking have been reported among Indigenous mothers. In 2007, in the jurisdictions that provided data (NSW, Qld, WA, SA, Tas, the ACT and the NT), smoking during pregnancy was more than three times more common among Aboriginal and Torres Strait Islander mothers than among non-Indigenous mothers (52% compared with 15%) [26].

## Alcohol use

Regular drinking at harmful levels leads to a significant increase in risk of chronic ill-health and premature death, and binge drinking places both the drinker and others at increased risk of injury and morbidity [31]. Alcohol consumption in pregnancy can result in a spectrum of harms for the unborn child; the risk of birth defects is greatest when there is high and frequent alcohol intake in the first trimester, but any alcohol exposure throughout pregnancy can impact on the development of the foetal brain [170].

In 2003, alcohol was the fifth leading cause of the burden of disease and injury among Indigenous people, responsible for 6.2% of the total burden and 7% of all deaths [168]. Just over one-fifth of burden due to injury and more than one-sixth of burden due to mental disorders were attributable to alcohol.

Surveys have shown consistently that Indigenous people are less likely to drink alcohol than non-Indigenous people, but those that do drink are more likely to consume it at hazardous levels [31, 171].

The 2007 National Drug Strategy Household Survey found that 23% of Indigenous people aged 14 years or older were abstainers or ex-drinkers compared with 17% of non-Indigenous people aged 14 years or older [171].

Analyses involving the 2004-2005 NATSIHS found that the proportions of people aged 18 years or older who had never consumed alcohol or had not done so for more than 12 months was 24% for Indigenous people and 15% for non-Indigenous people [40]. Seventeen per cent of Indigenous men and 11% of non-Indigenous men aged 18 years or older had never consumed alcohol or had not done so in the previous 12 months; the proportions for Indigenous and non-Indigenous females were 30% and 20% respectively.

On the other hand, analysis derived from the 2004-2005 NATSIHS, found that the proportions of people aged 18 years or older who consumed alcohol at a 'high risk' level were 8% for Indigenous people and 6% for non-Indigenous people ('high risk' is defined as daily consumption of six standard drinks or more for males and four standard drinks or more for females) [40]. High risk alcohol consumption was reported for 11% of Indigenous males and 8% of non-Indigenous males, and for 6% of Indigenous females and 3% of non-Indigenous females.

Information about levels of total abstinence or abstinence for greater than 12 months and high risk consumption are not available by remoteness of residence, but consumption at 'risky' and 'high risk' levels (four and six standard drinks or more for males, and two and four standard drinks or more for females respectively) were slightly higher for Indigenous people aged 18 years or older living in remote areas (17%) than for their counterparts living in non-remote areas (15%) (the difference is not statistically significant) [40]. Compared with results from the 2001 NHS, consumption at 'risky' and 'high risk' levels increased by five percentage points for Indigenous people living in remote areas and decreased by two percentage points for those living in non-remote areas.

Alcohol consumption at 'risky' or 'high risk' levels was more common among Aboriginal people aged 18 years or older (17%) than among Torres Strait Islanders in that age range (13%) (the difference is not statistically significant) [40]. The level of 'risky' or 'high risk' alcohol consumption was even lower among Torres Strait Islanders living in the Torres Strait area (9%).

In 2009, the NHMRC introduced revised guidelines that depart from specifying 'risky' and 'high risk' levels of drinking. The guidelines seek to estimate the overall risk of alcohol-related harm over a lifetime and to reduce the level of risk to one death for every 100 people [170]. For men and women, guideline one states that to reduce the risk of alcohol-related harm over a lifetime, no more than two standard drinks should be consumed on any day, and guideline two states that to reduce the risk of injury on a single occasion of drinking, no more than four standard drinks should be consumed. Guideline three recommends avoiding alcohol for those under 15 years, and delaying alcohol for those aged 15 to 17 years. Guideline four recommends pregnant and breast feeding women avoid alcohol.

# Concluding comments

It is clear from this overview of current health status that Indigenous people remain the least healthy sub-population in Australia. 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 Australia's Indigenous people continues to improve slowly.

For a start, there have been significant reductions in recorded mortality in recent years in a number of jurisdictions.[4] Age-standardised death rates for Indigenous people living in WA, SA and the NT declined by around 13% over the period 1991-2006 [41]. The decline for Indigenous females (15%) was somewhat

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[4] Being based on recorded deaths, for which the level of under-identification of Indigenous status is uncertain and, to some extent, variable, the report notes that 'caution should be exercised in assessing trends in Indigenous mortality over time'.

higher than the decline for Indigenous males (9%). The declines in death rates were less for Indigenous people than for non-Indigenous people, particularly for males, with Indigenous:non-Indigenous death rate ratios increasing for both males and females. A parallel analysis of Indigenous deaths in Qld, WA, SA and the NT for 1998-2006 found no significant declines in recorded mortality [41].[5] In light of this finding, it would be interesting to examine the trends in WA, SA and the NT separately over the later period, as it may be that the significant declines in those jurisdictions occurred mainly occurred in the 1990s.

An earlier analysis of Indigenous mortality in the NT, the jurisdiction with by far the best quality data about Indigenous deaths, provides evidence of declines in death rates for some causes of death and a slowing in the increase in rates for others [172]. In the twelve-year period 1990-2001, the death rate for chronic obstructive pulmonary disease declined significantly. The death rates for stroke and renal failure for people aged less than 50 years also declined, but not significantly. On the other hand, the rates for ischaemic heart disease and diabetes mellitus increased significantly in 1990-2001, but at lesser annual rates of change than documented for the period 1977-1989.

The most recent estimates of life expectancy at birth for Indigenous people - 67.2 years for males and 72.9 years for females in 2005-2007 – are less than previous estimates, but, as the ABS warns, the apparent improvements are likely to be due largely to revised statistical methods [30][6].

Indigenous infant mortality rates for WA, SA and the NT declined significantly over the 16-year period 1991-2006 [41]. 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.

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 are still around 200 grams less than the weights of babies born to non-Indigenous mothers [26]. 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 [26].

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

- reductions in the impact of respiratory infections in childhood [173];
- substantial declines in death rates from invasive pneumococcal pneumonia (mostly due to the introduction of vaccination programs) [116];
- reductions in the incidence and severity of trachoma (though inflammatory trachoma remains endemic in some remote communities of central and northern Australia) [135];
- a substantial reduction in the prevalence of hepatitis B virus infection (since the introduction of vaccination programs) [115];
- a rapid decline in the incidence of invasive *Haemophilus influenzae* type B (Hib) disease in Indigenous children (following the introduction of vaccination) [115]; and
- a reduction in the number of new cases of tuberculosis, from 79 in 1984 [174] to an average of around 30 in the mid 2000s [99].

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

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5. Indigenous identification in death registrations in Queensland has been deemed adequate only since 1998.
6. A variety of techniques has been developed by demographers to estimate life expectancy in instances where registration of deaths is incomplete. This is effectively the case with Indigenous deaths: even though very few Indigenous deaths will not be registered, many Indigenous deaths are not correctly identified as such.

Report 2005, which called on Australian governments to commit to achieving Indigenous Islander health equality within 25 years [175].[7]

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 [176]. 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)[8] committed in December 2007 to 'closing the gaps' in disadvantage between Indigenous and other Australians [177].

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' [178].

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' [179].

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. The 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;
- Ensure access to early childhood education for all Indigenous four year olds in remote communities within five years;
- Halve the gap in reading, writing and numeracy achievements for children within a decade;
- Halve the gap for Indigenous students in year 12 attainment rates by 2020; and
- Halve the gap in employment outcomes between Indigenous and non-Indigenous Australians within a decade [180].

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 [180]. 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.

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[7] The *Social Justice Report* is an annual report of the Human Rights Commission's Aboriginal and Torres Strait Islander Social Justice Commissioner.

[8] COAG is 'the peak intergovernmental forum in Australia, comprising the Prime Minister, State Premiers, Territory Chief Ministers and the President of the Australian Local Government Association (ALGA)'.

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 per 1,000 persons of the same age group

**age-specific fertility rate**

the number of live births to women in a specified age group in one year per 1,000 women in 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

**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+)

**crude rate**

the number of new cases (crude incidence rate) or deaths (crude death rate) due to a disease over the total population that could be affected, without considering age or other factors

**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

**excess deaths**

the difference between the actual number of deaths occurring and the number expected from rates for the comparable population (the population used for comparison is most often the total Australian population or the total for the specific jurisdictions being considered)

**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**

**hospital separation**

an episode of care for admitted patients, which can be total or portions of hospital stays from admission to discharge, transfer or death

**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**

**maternal mortality ratio**

number of maternal deaths divided by the number of confinements (in 100,000s)

**median age at death**

the age above and below which 50% of deaths occurred

**morbidity**

state of being diseased or otherwise unwell

**mortality**

death

**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**

**standardised rate**

the number of new cases (standardised incidence rate) or deaths (standardised death rate) due to a disease for a particular population after adjustment has been made for differences in the age structures of this population and a reference population; see **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 |
| ACT | Australian Capital Territory |
| AIDS | Acquired immune deficiency syndrome |
| AIHW | Australian Institute of Health and Welfare |
| ANCARD | Australian National Council on AIDS and Related Diseases |
| ANZDATA | Australia and New Zealand Dialysis and Transplant Registry |
| ASGC | Australian Standard Geographical Classification |
| ATSIC | Aboriginal and Torres Strait Islander Commission |
| BEACH | Bettering the Evaluation and Care of Health |
| BMI | Body mass index |
| CDEP | Community Development Employment Projects scheme |
| CDHS | Child Dental Health Survey |
| CHINS | Community Housing and Infrastructure Needs Survey |
| CKD | Chronic kidney disease |
| COAG | Council of Australian Governments |
| CSOM | Chronic suppurative otitis media |
| CVD | Cardiovascular disease |
| ESRD | End-stage renal disease |
| GAS | Group A streptococcus |
| GDM | Gestational diabetes mellitus |
| HAV | Hepatitis A virus |
| HBV | Hepatitis B virus |
| HCV | Hepatitis C virus |
| 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 |
| LBW | Low birthweight |
| MMR | Maternal mortality ratio |
| NACCHO | National Aboriginal Community Controlled Health Organisation |
| NATSIHS | (2004-2005) National Aboriginal and Torres Strait Islander Health Survey |
| NATSISS | National Aboriginal and Torres Strait Islander Social Survey |
| NDR | National Diabetes Register |
| NDSHS | National Drug Strategy Household Survey |
| NHMRC | National Health and Medical Research Council |
| NHS | National Health Survey |
| NNDSS | National Notifiable Diseases Surveillance System |

| | |
|---|---|
| NSAOH | National Survey of Adult Oral Health |
| NSW | New South Wales |
| NT | Northern Territory |
| OATSIH | Office for Aboriginal and Torres Strait Islander Health |
| OM | Otitis media |
| Qld | Queensland |
| RHD | Rheumatic heart disease |
| RR | Rate ratio- usually in this publication the Indigenous rate divided by the non-Indigenous rate |
| SA | South Australia |
| SMR | Standardised mortality ratio |
| STD | Sexually transmitted disease; see STI |
| STI | Sexually transmitted infection |
| Tas | Tasmania |
| TB | Tuberculosis |
| UV | Ultraviolet |
| Vic | Victoria |
| WA | Western Australia |
| WAACHS | Western Australian Aboriginal Child Health Survey |
| WHO | World Health Organization |

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# Notes

## Bibdjool

Donna Lei Rioli - a Western Australian Indigenous artist - was commissioned by the Health*InfoNet* in 2008 to create a new logo incorporating a gecko for the re-development of its website. The gecko was chosen because it is one of a few animals that are found across the great diversity of Australia.

Donna is a young Tiwi/ Nyoongar woman who is dedicated to the heritage and culture of the Tiwi people on her father's side, Maurice Rioli, and the Nyoongar people on her mother's side, Robyn Collard. Donna enjoys painting because it enables her to express her Tiwi and Nyoongar heritage and she combines the two in a unique way.

Donna interpreted the brief with great awareness and conveyed an integrated work that focuses symbolically on the pathway through life. This is very relevant to the work and focus of Australian Indigenous Health*InfoNet* in contributing to improving the health and wellbeing of Indigenous Australians.

Host institution

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