Australian Indigenous
Health*InfoNet*

Overview of Australian Indigenous health status 2011

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Australian Indigenous Health*InfoNet*

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

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

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

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Overview of Australian Indigenous health status 2011

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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' in health between 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 health status of Australia's Indigenous peoples. The overview doesn't attempt to review other aspects, such as the availability and use of services (including barriers to their use) and strategies and policies related to specific health topics. Readers interested in these aspects should refer to the topic-specific reviews that are available on the Health*InfoNet*'s website. 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, particularly those produced by the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare (AIHW) and the Steering Committee for the Review of Government Service Provision (SCRGSP).

Very important additions to the regular ABS and AIHW publications are four series of special reports that bring together key information about Indigenous disadvantages in health and related areas:

- Reports in *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples* series, first produced jointly in 1997 by the ABS and the AIHW. Reports in this series were then produced jointly by the ABS and the AIHW in 1999, 2001, 2003, 2005 and 2008. The ABS produced an online version in 2010 and the AIHW an overview version in 2011
- The Indigenous compendium to the *Reports on government services* produced by the SCRGSP; the compendium has been published annually by the Productivity Commission since 2003
- The report on key indicators of Indigenous disadvantage, also produced by the SCRGSP and published by the Productivity Commission; the report has been published biennially since November 2003
- Reports in the *Aboriginal and Torres Strait Islander health performance framework* series. These reports, prepared by the AIHW for the Australian Department of Ageing in 2006, 2008 and 2011, are accompanied by substantial detailed analyses.

This overview draws heavily 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 ABS, the AIHW, and the SCRGSP.

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 Kirby Institute and 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 provided by ANZDATA. Similarly, information about a number of communicable diseases was derived from data published by the Kirby Institute.

The initial sections provide information about the context of Indigenous health, Indigenous population, 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.

It should be noted that some references in this overview to specific health conditions or groups of related health conditions follow the exact terms used by the World Health Organization (WHO) in its International Classification of Disease (ICD). These terms are usually included in quote marks preceded by ICD.

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

Particular thanks are extended to:

- other staff of the Australian Indigenous Health*InfoNet* for their assistance, support and encouragement in the preparation of this overview
- the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA) for the provision of notification data on end-stage renal disease (ESRD)
- 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*.

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.

Key facts

Indigenous population

- At 30 June 2011, the estimated Australian Indigenous population was 575,552.
- NSW had the highest number of Indigenous people (168,773, 29% of the total Indigenous population); the NT had the highest proportion of Indigenous people in its population (30% of NT population are Indigenous).
- In 2006, the majority of Indigenous people lived in cities and towns; around one quarter of Indigenous people lived in remote or very remote areas.
- The Indigenous population is much younger than the non-Indigenous population.

Indigenous births and pregnancy outcome

- In 2010, there were 16,129 births registered in Australia with one or both parents identified as Indigenous (4% of all births registered).
- In 2010, Indigenous mothers were younger than non-Indigenous mothers; the median age was 24.6 years for Indigenous mothers and 30.7 years for non-Indigenous mothers.
- In 2010, the total fertility rates were 2,575 births per 1,000 for Indigenous women and 1,886 births per 1,000 for all women.
- In 2008, the average birthweight of babies born to Indigenous mothers was 3,196 grams, 189 grams less than the average for babies born to non-Indigenous mothers.
- In 2008, the proportion of babies of low birthweight born to Indigenous women was twice that of babies born to non-Indigenous women (12.3% compared with 5.9%).

Indigenous mortality

- In 2004-2008, the age-standardised death rate for Indigenous people was 1.8 times the rate for non-Indigenous people.
- Between 1991 and 2008, there was a 25% reduction in the death rates of Indigenous people in WA, SA and the NT.
- For Indigenous people born 2005-2007, life expectancy was estimated to be 67.2 years for males and 72.9 years for females, around 10 years less than the estimates for non-Indigenous males and females.
- In 2006-2010, age-specific death rates were higher for Indigenous people than for non-Indigenous people across all age-groups, and were much higher in the young and middle adult years.
- For 2008-2010, the infant mortality rate was higher for Indigenous infants than for non-Indigenous infants; the rate for Indigenous infants was highest in the NT.
- From 1991 to 2008, there were significant declines in infant mortality rates for Indigenous and other infants.
- For 2004-2008, the leading causes of death among Indigenous people were cardiovascular disease, cancer, and respiratory disease.
- In 2003-2005, maternal mortality ratios were 2.7 times higher for Indigenous women than for non-Indigenous women.

Indigenous hospitalisation

- In 2009-10, around 3.9% of all hospitalisations were of Indigenous people.
- In 2009-10, the age-standardised separation rate for Indigenous people was 2.4 times higher than that for other people.
- In 2009-10, the main cause of hospitalisation for Indigenous people was ICD 'factors influencing health status and contact with health services' (around 48% of hospital separations), followed by injury (7.4% of hospital separations).

Selected health conditions

Cardiovascular disease

- In 2004-2005, 12% of Indigenous people reported having a long-term heart or related condition; after age-adjustment, these conditions were around 1.3 times more common for Indigenous people than for non-Indigenous people.
- In 2008-09, Indigenous people were hospitalised for cardiovascular disease at 1.9 times the rate of non-Indigenous people.
- In 2004-2008, cardiovascular diseases were the leading cause of death among Indigenous people, accounting for 27% of Indigenous deaths.

Cancer

- In 2003-2007, the age-adjusted cancer incidence rates were lower for Indigenous people than for non-Indigenous people.
- In 2003-2007, most common cancers diagnosed among Indigenous people were lung and breast cancer.
- In 2004-2008, death rates for cancer were higher for Indigenous people than for non-Indigenous people (1.2 times higher for males and 1.5 times higher for females).

Diabetes

- In 2004-2005, after age-adjustment, Indigenous people were 3.4 times more likely than non-Indigenous people to report having some form of diabetes.
- In 2006-2008, after age-adjustment, hospitalisation rates for diabetes among Indigenous males and females were 3.4 and 5.0 times the rates of other males and females.
- In 2004-2005, Indigenous people died from diabetes at almost seven times the rate of other Australians.

Social and emotional wellbeing

- In 2008, 79% of Indigenous people aged 18 years and over experienced at least one significant stressor in the previous 12 months; the comparable figure for the total population was 62% in 2010.
- In 2008, after age-adjustment, Indigenous people were more than two-and-a-half times as likely as non-Indigenous people to feel high or very high levels of psychological distress.
- In 2008-09, after age-adjustment, Indigenous people were hospitalised for ICD 'mental and behavioural disorders' at almost twice the rate of non-Indigenous people.
- In 2005-2009, Indigenous people died from intentional self-harm at 2.5 times the rate of non-Indigenous people.

Kidney health

- In 2009-10, care involving dialysis was the most common reason for hospitalisation among Indigenous people; Indigenous people were hospitalised at 11 times the rate of other people.
- In 2007-2009, after age-adjustment, the notification rate of end-stage renal disease was almost 10 times higher for Indigenous people than for non-Indigenous people.
- In 2004-2008, the age-standardised death rate from kidney disease was 5.1 times higher for Indigenous people than for non-Indigenous people.

Injury

- In 2009-10, Indigenous people were hospitalised for injuries at almost twice the rate of other people.
- In 2004-2008, injury was the third most common cause of death among Indigenous people, accounting for 15% of Indigenous deaths.

Respiratory disease

- In 2004-2005, 27% of Indigenous people reported having a respiratory condition, with 15% having asthma; after age-adjustment, the levels of respiratory disease were similar for Indigenous and non-Indigenous people.
- In 2006-2008, the age-standardised hospitalisation rates for respiratory disease were 2.6 times higher for Indigenous people than for other people.
- In 2004-2008, the age-standardised death rate for respiratory diseases was 2.3 times higher for Indigenous people than for non-Indigenous people.

Eye health

- In 2004-2005, eye and sight problems were reported by 30% of Indigenous people.
- In 2008, the rate of blindness for Indigenous adults was 6.2 times higher than for non-Indigenous adults.

Ear health

- The level of ear disease and hearing loss among Indigenous people remained higher than that of the general population, particularly among children and young adults.

Oral health

- In 2000-2003, Indigenous children had more caries in their deciduous and permanent teeth than did non-Indigenous children, and higher levels of gingivitis.
- In 2004-2006, periodontal diseases and caries were more prevalent among Indigenous adults than among non-Indigenous adults.

Disability

- In 2008, after age-adjustment, Indigenous people were more than twice as likely as non-Indigenous people to have a profound/core activity restriction.

Communicable diseases

- In 2003-2007, the age-standardised incidence rate of tuberculosis was 14.8 times higher for Indigenous people than for non-Indigenous people.
- In 2008-2010, the crude hepatitis B and C notification rates were 2.2 and 5.1 times higher for Indigenous people than for non-Indigenous people.

- In 2003-2006, the age-standardised notification rate for *Haemophilus influenza* type b was 8.8 times higher for Indigenous people than for non-Indigenous people.
- In 2006-2008, the age-standardised rate of invasive pneumococcal disease was 7.3 times higher for Indigenous people than for other Australians.
- In 2003-2006, the age-standardised notification rate of meningococcal disease was 2.7 times higher for Indigenous people than for non-Indigenous people.
- In 2008-2010, sexually transmissible infections were more common among Indigenous people than among non-Indigenous people; gonorrhoea notifications were 50 times higher.
- In 2010, the rate of human immunodeficiency virus (HIV) infection was similar for Indigenous and non-Indigenous people.
- In some remote Indigenous communities, more than 70% of young children had scabies and pyoderma.

Factors contributing to Indigenous health

Nutrition

- In 2004-2005, the majority of Indigenous people reported eating fruit (86%) and vegetables (95%) on a daily basis.
- In 2004-2005, 13% of Indigenous people reported having no usual daily fruit intake (compared with 7% of non-Indigenous people), and 5% reported no usual daily vegetable intake (compared with 1% of non-Indigenous people).

Physical activity

- In 2004-2005, after age-adjustment, 51% of Indigenous people in non-remote areas reported low or very low levels of physical activity, compared with 33% of non-Indigenous people.

Bodyweight

- In 2004-2005, after age-adjustment, the level of obesity/overweight was 1.2 times higher for Indigenous people than for non-Indigenous people.

Immunisation

- In 2004-2005, 88% of Indigenous children 0-6 years in non-remote areas were fully immunised against the recommended vaccine-preventable diseases.

Breastfeeding

- In 2004-2005, 84% of Indigenous mothers reported having breastfed their children.

Tobacco smoking

- In 2010, after age-adjustment, daily smoking was 2.2 times more common among Indigenous people than among non-Indigenous people (38% compared with 18%).

Alcohol use

- In 2008, 35% of Indigenous people aged 15 years or older abstained from alcohol, a level of abstinence more than 2.5 times that of the Australian population aged 15 years or older in 2007-08.
- In 2004-2005, 8% of Indigenous people aged 18 years or older consumed alcohol at a 'high risk' level, compared with 6% of their non-Indigenous counterparts.
- In 2006-2008, Indigenous people were hospitalised for a diagnosis related to alcohol use at a rate 4.2 times that of non-Indigenous people.
- In 2004-2008, the death rate from alcohol-related causes was 6.3 times higher for Indigenous people than for non-Indigenous people.

Illicit drug use

- In 2008, Indigenous people aged 15 years or older were 1.6 times more likely than non-Indigenous people aged 14 years or older to have used an illicit substance in the previous 12 months.

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, but, wherever possible, separate information has been provided.

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 levels (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 for calculation rates) – 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, however, 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 identified correctly is not simple, so it is difficult to estimate the actual number of Indigenous deaths occurring and the corresponding rates. The ABS uses estimates of the proportions of registered deaths correctly identified as Indigenous in preparing its life tables, the source of life expectancy figures. Details of these estimates are not available for recent years. However, it is likely that they are in line with the ABS's assessment of the completeness of recording of Indigenous deaths in 2006-2007, which was based on a comparison of deaths in those years with Indigenous status reported in the 2006 census [5]. Based on this comparison, the ABS estimated that the Australia-wide level of Indigenous identification in deaths notifications in 2006-2007 was 92% [5], a level much higher than previous estimates (around 56%) [6].

The proportion Indigenous births identified correctly was 96% in 2002-2006, a significant improvement over the level for previous years [7]. The level of identification in hospital admissions is very variable, with the overall level unlikely to be better than for deaths [8]. 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

Historical context and social determinants of Indigenous health

There is a clear relationship between the social inequalities experienced by Indigenous people and their current health status [9]. 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 of Indigenous health

Indigenous peoples generally enjoyed better health in 1788 than most people living in Europe [10-14]. They did not suffer from smallpox, measles, influenza, tuberculosis, scarlet fever, sexually transmitted syphilis and gonorrhoea, diseases that were common in eighteenth-century Europe. Indigenous people probably suffered from hepatitis B, some bacterial infections (including non-venereal syphilis and yaws) 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. The impact of these diseases at a population level was relatively small compared with the effects of the diseases that affected eighteenth century Europe.

All of this changed after 1788 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 [11, 12, 15, 16]. These diseases, particularly smallpox, caused enormous loss of life among Indigenous populations, but the devastation was not restricted to the immediate victims. The epidemic also affected the fabric of Indigenous societies through depopulation and social disruption.

The impact of introduced diseases was almost certainly the major cause of death for Indigenous people, but direct conflict and occupation of Indigenous homelands also contributed substantially to Indigenous mortality [15, 17, 18]. The initial responses of Indigenous people to the arrival of the First Fleet were apparently quite peaceful, but it didn't take long before conflict started to occur – initially over access to fish stocks and then as non-Indigenous people started to plant crops and introduce livestock. This pattern of conflict almost certainly occurred as non-Indigenous people spread across the country.

Conflict escalated in many places, in some instances resulting in overt massacres of Indigenous people. The 1838 massacre at Myall Creek (near Inverell, NSW) is probably the most infamous [19], but less well-known massacres occurred across Australia [18]. As Bruce Elder notes, as 'painful and shameful as they are', the massacres 'should be as much a part of Australian history as the First Fleet, the explorers, the gold rushes and the bushrangers' [18, p.vi].

Prior to 1788, 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 [20-22]. In addition to the impacts of introduced diseases and conflict, 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 [11, 12, 15]. 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 established.

These impacts on Indigenous populations eventually forced colonial authorities to try to 'protect' remaining Indigenous peoples. This pressure led to the establishment of Aboriginal 'protection' boards, the first established in Vic by the Aboriginal Protection Act of 1869 [23]. A similar Act established the NSW Aborigines Protection Board in 1883, with the other colonies also enacting legislation to 'protect' Indigenous populations within their boundaries. The 'protection' provided under the provisions of the various Acts imposed enormous restrictions on the lives of many Indigenous people. These restrictions meant that, as late as 1961, in eastern Australia 'nearly one-third of all Australians recorded as being of Aboriginal descent lived in settlements' [24, p.4].

The provisions of the Acts were also used to justify the forced separation of Indigenous children from their families 'by compulsion, duress or undue influence' [23, p.2]. The National Inquiry into the separation of the children concluded that 'between one in three and one in ten Indigenous children were forcibly removed from their families and communities in the period from approximately 1910 until 1970' [23, p.31]. It was the 1960s, at the earliest, when the various 'protection' Acts were either repealed or became inoperative.

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

The health disadvantages experienced by Indigenous people can be considered historical in origin [22], but perpetuation of the disadvantages owes much to contemporary structural and social factors, embodied in what are termed the 'social determinants' of health [9, 25, 26]. 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. For many Indigenous people, the ongoing effects of 'protection' and the forced separation of children from their families compound other social disadvantages.

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 [27]. 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 wellbeing 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 [28]:

- 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; 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
- only 1.7% of Indigenous people reported attending a university, compared with 4.1% of non-Indigenous people.

An ABS school report [29] revealed, in 2010:

- the apparent retention rate for Indigenous students from year 7/8 to year 10 was 96%, from year 7/8 to year 12 it was 47%
- for non-Indigenous students, the apparent retention rate from year 7/8 to year 10 was 101%; and from year 7/8 to year 12 it was 79%.

The 2010 national report on schooling in Australia [30] showed:

- 75% of Indigenous students in year three and 66% in year five were at or above the national minimum standard for reading, compared with 95% and 93% respectively of all Australian students
- 79% of year three Indigenous students and 71% of year five Indigenous students were at or above the national minimum standard for writing, compared with 97% of all year three students and 94% of year five students
- 66% of year three Indigenous students and 71% of year five Indigenous students were at or above the national minimum standard for spelling, compared with 94% of all year three students and 93% of year five students
- 66% of year three Indigenous students and 65% of year five Indigenous students were at or above the national minimum standard for grammar and punctuation, compared with 97% of all year three students and 94% of year five students
- 77% of Indigenous students in year three and 71% in year five were at or above the national minimum standard for numeracy, compared with 96% and 95% respectively of all Australian students.

Employment

According to the 2006 Australian census [28]:

- 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 Projects (CDEP) scheme increases the unemployment rate for Indigenous people to approximately 25% – five times the rate of 5% for non-Indigenous people
- 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%).

Income

According to the 2006 Australian census [28]:

- the mean equivalised gross household income for Indigenous persons was $460 per week – approximately 62% of that for non-Indigenous persons ($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
- 'professionals' were the highest median gross weekly income earners and 'labourers' were the lowest, but Indigenous people earned 28% and 16% less respectively than non-Indigenous people in these occupations.

Indigenous population

ABS projections from the 2006 census of the numbers of Aboriginal and Torres Strait Islander people suggest an Indigenous population of 575,552 people at 30 June 2011 [31]. The projected population for NSW is the highest (168,773 Indigenous people), followed by Qld (164,883), WA (77,694), and the NT (69,855) (Table 1). The NT has the highest proportion of Indigenous people among its population (30.3%) and Vic the lowest (0.7%).

Table 1. Estimated Indigenous population, by jurisdiction, Australia, 30 June 2011

Jurisdiction	Indigenous population	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	168,773	29.3	2.3
Vic	37,647	6.5	0.7
Qld	164,883	28.6	3.6
WA	77,694	13.5	3.4
SA	31,040	5.4	1.9
Tas	20,580	3.6	4.0
ACT	4,825	0.8	1.3
NT	69,855	12.1	30.3
Australia	575,552	100.0	2.6

Source: ABS, 2009 [31], ABS, 2008 [32]

Notes: 1 The figures shown are the series B 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 June 2011

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].

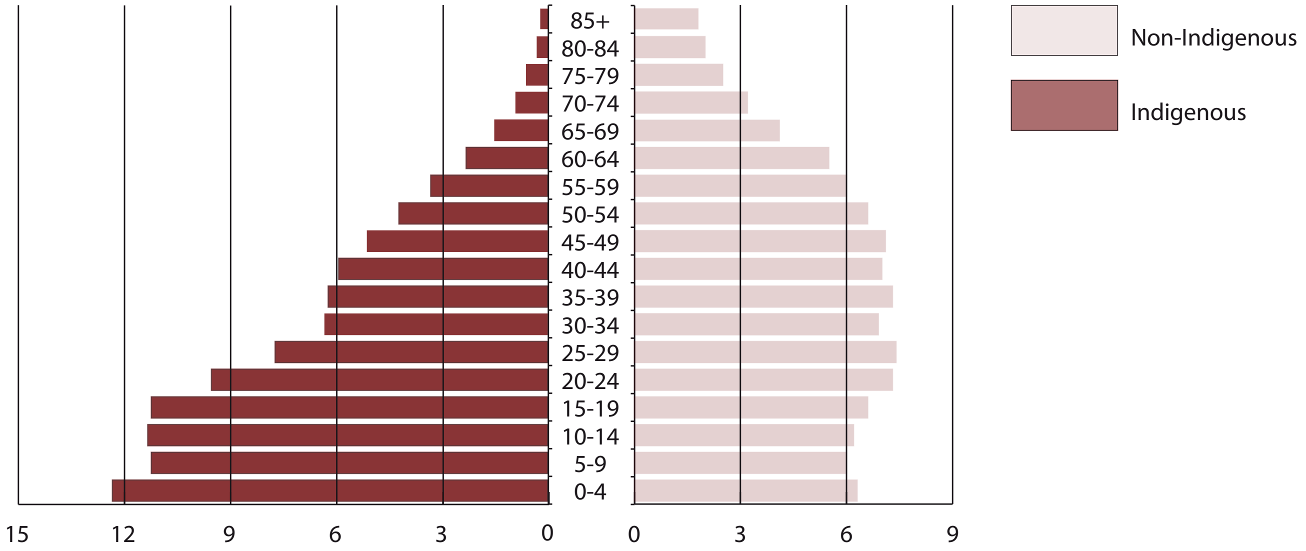
The majority of Indigenous people live in cities and towns, but the Indigenous population is much more widely dispersed across Australia than is the non-Indigenous population [33]. Slightly more than one-half of the Indigenous population lives in areas classified as 'major cities' or 'inner regional' 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' [34].) Almost one-quarter of Indigenous people live in areas classified as 'remote' or 'very remote' in relation to having 'very little access to goods, services and opportunities for social interaction' [35]. Only 2% of non-Indigenous people live in 'remote' or 'very remote' areas.

In terms of specific geographical areas, in 2006 about one-half of all Indigenous people lived 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 2011, but in 2006 around 463,900 (90%) people were Aboriginal, 33,100 (6%) Torres Strait Islander, and 20,200 (4%) 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 [33]. According to projections from the 2006 Australian census, at June 2011 about 35% Indigenous people were aged less than 15 years, compared with 19% of non-Indigenous people (Figure 1) [31, 32]. About 4% of Indigenous people were aged 65 years or over, compared with 14% of non-Indigenous people.

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



Source: Derived from ABS, 2009 [31], ABS, 2011 [36]

Births and pregnancy outcome

In 2010, there were 16,129 births registered in Australia with one or both parents identified as Indigenous (4% of all births registered) [37], 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 [7]. Completeness of identification varied across the country, with only Vic, Qld, WA, SA and the NT having levels above 90%.

In 2010, both parents identified as Indigenous in 32% of Indigenous registered births [37]. Only the mother identified as Indigenous in 42% of these births (including births where paternity was not acknowledged and those where the father's Indigenous status was unknown), and only the father identified as Indigenous in 27% (including births where the mother's Indigenous status was unknown).

Age of mothers

In 2010, Indigenous women had more babies and had them at younger ages than did non-Indigenous women – teenagers had one-fifth (20%) of the babies born to Indigenous women, compared with only 4% of those born to all mothers [37]. The median age of Indigenous mothers was 24.6 years, compared with 30.7 years for all mothers. 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 rate of teenage Indigenous women (76 babies per 1,000 women) was almost five times that of all teenage women (16 babies per 1,000).

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2010

Status of mother / age-group (years)	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous mothers							
15-19	56	39	95	104	76	91	76
20-24	126	97	183	163	163	142	149
25-29	112	116	163	142	139	113	132
30-34	87	97	123	99	102	81	98
35-39	47	50	53	46	58	36	47
40-44	11	15	15	14	8	9	12
All mothers							
15-19	13	9	24	19	15	48	16
20-24	49	37	71	59	54	93	53
25-29	97	89	111	109	108	105	100
30-34	123	125	122	124	122	102	123
35-39	73	75	63	65	62	60	70
40-44	16	16	13	14	12	12	15

Source: ABS, 2011 [38]

Notes:
1 Rates per 1,000 women
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. Numbers for those jurisdictions are included in figures for Australia

Total fertility rates

In 2010, total fertility rates were 2,575 births per 1,000 Indigenous women and 1,886 per 1,000 for all women (Table 3) [38]. The highest total fertility rate for Indigenous women was for Qld (3,167 babies per 1,000 women), followed by WA (2,844 per 1,000) and SA (2,724 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2010

Status of mother	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous	2,195	2,066	3,167	2,844	2,724	2,360	2,575
All mothers	1,865	1,754	2,029	1,959	1,874	2,105	1,886

Source: ABS, 2011 [38]

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 are not provided for Tas and the ACT because of the small numbers involved and doubts about the level of identification of Indigenous births. Numbers for those jurisdictions are included in figures for Australia

Birthweights

The average birthweight of babies born to Indigenous mothers in 2008 was 3,196 grams, almost 200 grams less than the average for babies born to non-Indigenous mothers (3,385 grams) [39]. Babies born to Indigenous women in 2008 were twice as likely to be of low birthweight (LBW) (12.3%) than were those born to non-Indigenous women (5.9%) (Table 4). (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 in SA (16.3%), WA (14.8%) and Vic (14.2%).

Table 4. Mean birthweights and percentage of low birthweight for babies born to Indigenous and non-Indigenous mothers, selected jurisdictions, Australia, 2008

	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous mothers							
Mean birthweight	3,241	3,184	3,232	3,113	3,116	3,156	3,196
% low birthweight	10.9	14.2	10.4	14.8	16.3	13.7	12.3
Non-Indigenous mothers							
Mean birthweight	3,387	3,377	3,397	3,370	3,368	3,407	3,385
% low birthweight	5.7	6.1	6.1	5.7	6.1	4.7	5.9

Source: Derived from Laws, Li and Sullivan, 2010 [39]

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 [40]. 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) [41]. 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 documented above – 3,110 grams for babies born to Indigenous mothers who used tobacco in pregnancy and 3,310 grams for those whose Indigenous mothers did not [42]. 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

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 2,767 deaths registered in 2010 where the deceased person was identified as Indigenous is certainly an underestimate of the actual number of Indigenous deaths.

The extent to which the number of Indigenous deaths is under-estimated is not available for recent years, however, even though the ABS does make adjustments to the number of registered deaths in preparing their estimates of life expectancy [4]. It is likely that these adjustments are in line the ABS's assessment of the completeness of recording of Indigenous deaths in 2006-2007, which was based on a comparison of deaths in those years with Indigenous status reported in the 2006 census [5]. Based on this comparison, the ABS estimated that the Australia-wide level of Indigenous identification in deaths notifications in 2006-2007 was 92% [5], a level much higher than previous estimates (around 56%) [6].

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 is still be some doubt about the actual levels of identification [4]. As a result, the ABS notes that caution should be exercised in the interpretation of the estimates of Indigenous mortality, particularly estimates of trends over time. This caution is reflected in recent ABS publications that 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.

Adjusting for age-structures of populations

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.

Age-standardised death rates can be calculated when detailed information about Indigenous deaths, including sex and age, is available [43]. By directly age-standardising, Indigenous rates can be more accurately compared with non-Indigenous rates. This method also allows for time series comparisons.

When detailed information is not available, it is still possible to calculate standardised mortality ratios (SMRs), as has been done in previous versions of this overview. SMRs allow for the comparison of numbers of registered Indigenous deaths with the numbers expected from the corresponding age-sex-specific death rates for the total populations. SMRs estimate how many deaths would be expected if the age-specific rates of the standard population were applicable.

Age-standardised death rates

After adjusting for the differences in the age structures of the Indigenous and non-Indigenous populations, the overall death rate for Indigenous people in 2004-2008 was 1.8 times the rate for non-Indigenous people (Table 5) [44]. For NSW, Qld, WA, SA and the NT – the jurisdictions with adequate levels of Indigenous identification – the rate for Indigenous people and the Indigenous:non-Indigenous rate ratios were slightly higher. The rates for Indigenous people were highest in WA (1,673 per 100,000) and the NT (1,582 per 100,000).[2]

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[2] The estimate for WA includes unusually high numbers of Indigenous deaths registered in 2007 and 2008, so should be interpreted with caution.

Table 5. Age-standardised death rates, by Indigenous status, and Indigenous:non-Indigenous rate ratios, selected jurisdictions, Australia, 2004-2008

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	947	615	1.5
Qld	1,063	609	1.7
WA	1,673	580	2.9
SA	1,023	615	1.7
NT	1,582	679	2.3
NSW, Qld, WA, SA and the NT	1,184	609	1.9
Australia	1,102	607	1.8

Source: AIHW, 2011 [44]

Notes:
1 Rates per 100,000 are directly age-standardised using the 2001 Australia standard population
2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3 Data do not include registered deaths where Indigenous status is not stated
4 The estimate for WA includes unusually high numbers of Indigenous deaths registered in 2007 and 2008, so should be interpreted with caution
5 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

Between 1991 and 2008, there was a 25% reduction in the death rates for Indigenous people in WA, SA and the NT; most of this decline can be attributed to the declines of Indigenous deaths in WA and the NT [44]. The decrease was greater among Indigenous females (27%) than among Indigenous males (23%). There were also reductions for non-Indigenous males and females, so there was no decrease in the rate ratios.

Expectation of life

In 2009, the ABS revised its estimates for expectation of life at birth for Indigenous people [5]. 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, 11.5 years less than the 78.7 years expected for non-Indigenous males (Table 6). 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 [5].

Table 6. Expectation of life at birth in years for Indigenous people and the total population, by sex, selected jurisdictions, 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 [5]

Note: 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[3] in 2010 for Indigenous males ranged from 50.8 years for those living in the NT to 58.3 years for those living in NSW [4]. These levels were around 20 years less than those for non-Indigenous males, which ranged from 64.9 to 79.6 years. The median age at death for Indigenous females in 2010 ranged from 55.4 years for those living in the NT to 67.1 years for those living in NSW. These levels were also around 20 years less than those for non-Indigenous females, which ranged between 75.2 and 84.9 years.

In 2006-2010, age-specific death rates were higher for Indigenous people than for non-Indigenous people across all age-groups, but the rate ratios were highest 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).)

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[3] 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.

Table 7. Age-specific death rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, SA and the NT, 2006-2010

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW						
0	7	6	5	4	1.6	1.6
1–4	32	37	20	17	1.6	2.2
5–14	14	9.6	11	7	1.3	1.3
15–24	84	22	50	21	1.7	1.1
25–34	167	92	76	31	2.2	3.0
35–44	381	202	126	66	3.0	3.0
45–54	813	405	281	170	2.9	2.4
55–64	1,518	1,052	659	394	2.3	2.7
65+	4,741	4,273	4,219	3,735	1.1	1.1
Qld						
0	10	7	5	4	1.8	1.8
1–4	56	58	25	20	2.2	3.0
5–14	22	16	11	9	1.9	1.8
15–24	123	76	59	25	2.1	3.1
25–34	260	125	87	34	3.0	3.7
35–44	499	321	128	67	3.9	4.8
45–54	956	624	271	158	3.5	3.9
55–64	1,819	1,397	642	376	2.8	3.7
65+	6,335	5,025	4,049	3,563	1.6	1.4
SA						
0	6	6	4	3	1.7	1.8
1–4	0	77	25	17	0.0	4.6
5–14	11	23	7	8	1.6	3.1
15–24	156	98	56	21	2.8	4.7
25–34	326	203	91	35	3.6	5.8
35–44	690	486	146	82	4.7	6.0
45–54	1,258	884	292	190	4.3	4.7
55–64	2,124	1,662	676	403	3.1	4.1
65+	4,148	4,174	4,406	3,927	0.9	1.1
NT						
0	14	12	4	4	3.7	3.2
1–4	85	54	24	10	3.6	5.3
5–14	47	38	24	7	2.0	5.9
15–24	292	120	108	34	2.7	3.5
25–34	506	238	92	32	5.5	7.5
35–44	1,061	604	160	52	6.6	11.6
45–54	1,716	1,210	359	152	4.8	8.0
55–64	3,000	1,952	787	314	3.8	6.2
65+	6,949	5,710	3,553	2,676	2.0	2.1

Source: ABS, 2011 [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 Due to the small number of deaths registered in Vic, Tas and the ACT, these states and territories have been excluded
4 Due to the inconsistent number of Indigenous deaths registered in WA in 2007-2009, information for this State is not available

Infant mortality

The infant mortality rate (IMR) 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 [4]. For those jurisdictions with reasonable information about Indigenous deaths in 2008-2010, the highest Indigenous IMR occurred in the NT and the lowest in SA (Table 8). These rates are considerably higher than those for non-Indigenous people in these jurisdictions.

Table 8. Infant mortality rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, SA and the NT, 2008-2010

Jurisdiction	**Indigenous**		**Non-Indigenous**		**Rate ratio**	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
NSW	5.9	4.4	4.6	3.5	1.3	1.3
Qld	10.0	7.4	5.4	4.0	1.9	1.9
SA	4.2	5.1	3.8	3.0	1.1	1.7
NT	12.4	10.4	4.2	3.2	3.0	3.3

Source: Derived from ABS, 2011 [4]

Notes:
1 Infant mortality rate is the number of infant deaths per 1,000 live births
2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3 The Indigenous rates are likely to be under-estimated, due to the incomplete identification of Indigenous status on births and deaths records
4 Due to the small number of deaths registered in Vic, Tas and the ACT, these states and territories have been excluded
5 Due to the inconsistent number of Indigenous deaths registered in WA in 2007-2009, information for this State is not available
6 Caution should be used when interpreting the Indigenous rate for Qld because there is some uncertainty about the accuracy of the 2010 data

In the five-year period from 2004 to 2008, Indigenous infants most commonly died from ICD 'conditions originating in the perinatal period', including birth trauma, disorders relating to foetal growth, and from complications from pregnancy, labour and delivery [44]. Indigenous infants died from 'conditions originating in the perinatal period' at twice the rate of non-Indigenous infants (4.4 compared with 2.1 per 1,000). The second most common cause of infant death was ICD 'signs, symptoms and ill-defined conditions', which includes sudden infant death syndrome (SIDS); Indigenous infants died at more than four times the rate of non-Indigenous infants (and, for SIDS alone, almost three times the rate).

From 1991 to 2008, there have been significant declines in IMRs for Indigenous and other infants in WA, SA and the NT [44]. The Indigenous IMR declined from 24.5 per 1,000 in 1991 (compared with 5.7 per 1,000 for other infants) to 9.2 per 1,000 in 2008 (2.8 per 1,000 for other infants). The rate ratio decreased from 4.3 in 1991 to 3.2 in 2008.

Causes of death

For deaths identified as Indigenous in 2004-2008, the ICD group 'diseases of the circulatory system' (more commonly known as cardiovascular disease, which includes heart disease and stroke) was the leading cause of death for Indigenous people living in NSW, Qld, WA, SA and the NT, (543 per 100,000 population) (Table 9) [45]. This was followed by neoplasms (cancer) (268 per 100,000) and respiratory diseases (152 per 100,000). For all major causes of death, Indigenous people died at a higher rate than non-Indigenous people within these jurisdictions.

Table 9. Standardised death rates, by Indigenous status and cause, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2004-2008

Cause of death	**Rate**		**Rate ratio**
	Indigenous	**Non-Indigenous**	
Cardiovascular disease	543	213	2.5
Neoplasms (cancer)	268	181	1.5
Respiratory diseases	152	51	3.0
Endocrine, metabolic and nutritional disorders (including diabetes)	135	22	6.3
Digestive diseases	96	20	4.7
Injury	95	37	2.6
Kidney diseases	56	11	5.1
Nervous system diseases	37	23	1.6
Infectious and parasitic diseases	29	9	3.2
Conditions originating in the perinatal period	6.1	2.8	2.1
Other causes	97	41	2.3
All causes	1498	611	2.5

Source: Steering Committee for the Review of Government Service Provision, 2011 [45]

Notes:
1 Due to under-identification of Indigenous deaths, these rates are likely to under-estimate the true differences between the Indigenous and non-Indigenous populations
2 Rates per 100,000 population have been standardised using the 2001 Australian population as the standard
3 Rate ratios are the Indigenous rate divided by the non-Indigenous rate

In 2009, the leading specific causes of death differed for Indigenous males and females [46]. The two leading specific causes of death were ischaemic heart disease followed by diabetes for Indigenous male and females; intentional self-harm (suicide) was the third leading cause of death for Indigenous males and chronic lower respiratory diseases for Indigenous females. Ischaemic heart disease was also the leading cause of death for non-Indigenous people in 2009. For non-Indigenous males, the next most common cause of death was lung and related cancers, followed by stroke. For non-Indigenous females, the next most common causes were stroke followed by ICD 'dementia and Alzheimer's diseases'.

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) [47].

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) [47]. For direct maternal deaths, the ratio of 7.2 per 100,000 for Indigenous women was twice the ratio of 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 [47]

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

Avoidable mortality

Avoidable mortality refers to deaths that could have been prevented with timely and effective health care, including early detection and effective treatment, and appropriate modifications of lifestyle behaviours (such as quitting smoking) [44].

In the five-year period from 2004 to 2008, there were 6,443 deaths of Indigenous people aged 0-74 years from avoidable causes (5.5% of all deaths from avoidable causes) in NSW, Qld, WA, SA and the NT [44]. Almost three-quarters (72%) of all Indigenous deaths were from avoidable causes (compared with 66% of non-Indigenous deaths).

Indigenous males died from avoidable causes at 3.3 times the rate of non-Indigenous males (631 and 189 per 100,000, respectively), and Indigenous females died from avoidable causes at 3.8 times the rate of non-Indigenous females (397 and 104 per 100,000, respectively) [44]. Indigenous males and females aged 35-44 years died from avoidable causes at 5.2 and 5.6 times the rate respectively of non-Indigenous males and females.

The age-standardised rates of avoidable deaths among Indigenous people were highest in the NT (772 per 100,000) and WA (688 per 100,000), and lowest in NSW (356 per 100,000) (Table 11) [44]. Indigenous people died from avoidable causes at 3.5 times the rate of non-Indigenous people in NSW, Qld, WA, SA and the NT.

Table 11. Age-standardised rates of avoidable deaths, by Indigenous status and jurisdiction, and Indigenous:non-Indigenous rate ratios, persons aged 0-74 years, NSW, Qld, WA, SA and the NT, 2004-2008

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	356	147	2.4
Qld	463	148	3.1
WA	688	136	5.1
SA	543	149	3.6
NT	772	201	3.8
All jurisdictions	507	146	3.5

Source: AIHW, 2011 [44]

Notes: 1 Due to under-identification of Indigenous deaths, these rates are likely to under-estimate the true differences between the Indigenous and non-Indigenous populations

2 Rates per 100,000 population

3 All jurisdiction rates have been standardised using the 2001 Australian standard population

4 Rate ratio is the Indigenous rate divided by the non-Indigenous rate

In 2004-2008, the most common conditions contributing to avoidable deaths among Indigenous people in NSW, Qld, WA, SA and the NT were ischaemic heart disease (19%), cancer (17%), diabetes (9.5%), and suicide (8.0%) [44]. The death rates from avoidable causes were around twice as high for Indigenous people than for non-Indigenous people for cancer and suicide, four times as high for ischaemic heart disease, and 13 times as high for diabetes.

Between 1997 and 2008, there were significant declines in the death rate from avoidable causes for Indigenous people in WA, SA and the NT, from 939 per 100,000 in 1997 to 751 per 100,000 in 2008 (compared with 206 per 100,000 in 1997 and 139 per 100,000 in 2008 for non-Indigenous people) [44]. Because of the decline in death rate for avoidable causes for non-Indigenous people, the rate ratios actually increased from 4.6 in 1997 to 5.4 in 2008.

The death rate from avoidable causes for Indigenous people living in NSW, Qld, WA, SA and the NT also decreased in eight-year period from 2001 to 2008, from 597 per 100,000 in 2001 to 499 per 100,000 in 2008 (compared with 177 per 100,000 in 2001 and 141 per 100,000 in 2008 for non-Indigenous people) [44]. There was a slight increase in the rate ratio from 3.4 in 2001 to 3.5 in 2008.

Hospitalisation

Statistics on hospitalisation provide some insights into ill-health in the population [48]. 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 the available hospital statistics as an indicator of the health of the population is that they relate to episodes of hospitalisation rather than to individual patients [48]. Thus, multiple admissions by a relatively small number of patients – as occurs for renal dialysis, 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. An audit conducted by the AIHW in 2007-2008 found that NSW, Vic, Qld, WA, SA and the NT had adequate identification of Indigenous status, with 20% or less under-identification [49].

Separation rates [4]

Of the 7.92 million hospital separations for NSW, Vic, Qld, WA, SA and the NT during 2009-10, 305,008 (3.9%) were identified as Indigenous (Table 12) [50]. Around two-fifths (39%) of separations for Indigenous patients were for overnight stays.

In 2009-10, the overall age-standardised separation rate of 898 per 1,000 for Indigenous people was 2.4 times that of other Australians (369 per 1,000) (Table 12) [50]. The age-standardised separation rate for Indigenous people living in the NT was 1,664 per 1,000, 7.9 times the rate of 211 per 1,000 for other people. About 80% of the difference between these rates was due to higher separations for Indigenous people admitted for renal dialysis.

Table 12. Numbers of hospital separations and age-standardised separation rates, by Indigenous status and jurisdiction, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2009-10

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	61,029	538	2,446,788	332	1.6
Vic	15,176	621	2,295,263	406	1.5
Qld	77,297	800	1,690,626	386	2.1
WA	61,602	1,314	825,607	375	3.5
SA	20,473	1,057	632,597	361	2.9
NT	69,431	1,664	30,259	211	7.9
All jurisdictions	305,008	898	7,921,144	369	2.4

Source: AIHW, 2011 [50]

Notes:
1 Rates per 1,000 population
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

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[4] 'Separation' refers to an episode of admitted patient care, which can be either a patient's total stay in hospital, or part of a patient's stay in hospital that results in a change to the type of care (e.g. from acute care to rehabilitation) [50]. Hospital separations are more widely known as 'admissions', but can also be referred to as 'hospitalisations' [44, 50].

Age-specific separation rates

Hospital separation rates were higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2009-10 than for non-Indigenous people for virtually all age-groups, with the highest ratios in the middle adult years (Table 13) [50].

Table 13. Age-specific hospital separation rates, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2009-10

Age-group (years)	Males			Females		
	Indigenous rate	Non-Indigenous rate	Rate ratio	Indigenous rate	Non-Indigenous rate	Rate ratio
0-4	349	247	1.4	277	189	1.5
5-9	124	100	1.2	91	78	1.2
10-14	97	84	1.2	90	70	1.3
15-19	127	126	1.0	269	174	1.5
20-24	190	126	1.5	488	250	1.9
25-29	230	132	1.7	522	317	1.6
30-34	368	154	2.4	649	385	1.7
35-39	650	190	3.4	640	357	1.8
40-44	853	224	3.8	869	307	2.8
45-49	1089	274	4.0	1173	310	3.8
50-54	1335	357	3.7	1488	369	4.0
55-59	1701	474	3.6	1884	433	4.4
60-64	1908	642	3.0	2424	534	4.5
65+	1917	1180	1.6	1748	919	1.9

Source: Derived from AIHW, 2011 [50], ABS, 2009 [31], ABS, 2010 [51]

Notes:
1 Numbers include separations for which Indigenous status was not stated
2 Rates are expressed as separations per 1,000 population
3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
4 The rates have not been adjusted for likely under-identification of Indigenous separations, so it is likely that the Indigenous rates, and hence the rate ratios, could be 25-30% higher

Causes of hospitalisation

In 2009-10, the most common reason for the hospitalisation of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT was for the ICD group 'factors influencing health status and contact with health services', which was responsible for 48% of Indigenous separations (145,881 separations) [50]. 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 22,701 separations (7.4% of all separations, and 14.3% of separations excluding those for dialysis).

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 18,342 separations – 11.5% of separations excluding those for dialysis) and digestive diseases (14,687 separations – 9.2% of separations excluding those for dialysis) [50].

The most recent comparative information is from the two-year period from June 2006 to July 2008 which indicates that Indigenous people in NSW, Vic, Qld, WA, SA and the NT were hospitalised at higher rates than non-Indigenous Australians for all major causes except digestive diseases (Table 14) [44].

Table 14. 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, July 2006 – June 2008

Principal diagnosis	Number of separations	Proportion of separations (excl dialysis) (%)	Ratio
Injury	39,574	13.0	1.9
Pregnancy-related	38,317	12.6	1.4
Respiratory diseases	31,632	10.4	2.6
Digestive diseases	27,528	9.1	0.9
Symptoms, signs and abnormal clinical and laboratory findings	22,873	7.5	1.4
Mental and behavioural disorders	21,778	7.2	1.8
Circulatory diseases	16,530	5.5	1.6
Genitourinary diseases	12,879	4.2	1.1
Diseases of the skin and subcutaneous tissue	12,103	4.0	2.3
Endocrine (including diabetes)	10,592	3.5	3.0
Infectious/parasitic diseases	10,450	3.4	2.2
Other	59,395	19.6	---
All causes, excluding dialysis	303,651	100.0	1.3

Source: Derived from AIHW, 2011 [44]

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
5 This is the most current data available which allow for a comparison of Indigenous and non-Indigenous rates

Selected health conditions

Cardiovascular disease

Cardiovascular disease (CVD; ICD 'diseases of the circulatory system') presents a significant burden for Indigenous people in terms of prevalence, hospitalisation, and mortality [52]. CVD includes all diseases and conditions that affect the heart and blood vessels. Rheumatic heart disease, ischaemic heart disease, cerebrovascular disease, and hypertension are of particular importance to Indigenous people.

The conventional risk factors for CVD can be divided into two main categories: behavioural and biomedical [52]. Behavioural risk factors are based on an individual's behavior, but can be influenced by underlying social, economic, psychological, and cultural factors. Behavioural factors include tobacco smoking, physical inactivity, poor nutrition, and risky alcohol consumption. Biomedical risk factors - including high blood pressure (hypertension), high blood cholesterol, and, overweight and obesity, diabetes, and chronic kidney disease - can be influenced by modifications to behaviour, lifestyle, or the use of medical interventions.

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 CVD disease among Indigenous people:

- cultural and historical factors, such as loss of land, and disruptions to culture, language and identity [52-54]
- environmental and socioeconomic factors, such as poor housing, low education and income [52-55]
- psychosocial stressors, such as death of a family member or close friend, serious injury or disability [52, 54]
- limited access to health care, both preventive and clinical [53, 56].

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 2004-2005 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) [57]. Almost one-in-eight Indigenous people (12%) 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 increase from those reported in the 2001 National Health Survey (NHS) (11%).

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 people than for non-Indigenous people [57]. Hypertensive disease was 1.5 times more common for Indigenous people than for non-Indigenous people, and other diseases of the heart and circulatory system were 1.2 times more common.

Overall, a lower proportion of Torres Strait Islander people (9%) than Aboriginal people (12%) reported having a heart and circulatory problem/disease, but the proportion was 11% for Torres Strait Islander people living in the Torres Strait area [57].

At 31 December 2009, there were almost 1,400 Indigenous people living in the Top End of the NT and the NT part of Central Australia registered as having rheumatic heart disease (RHD) [44]. Almost two-thirds (65%) of these people were females. The rates of RHD in the Indigenous population in both the Top End of the NT and Central Australia were significantly higher than the rates for non-Indigenous people in these areas. The rates for Indigenous males were 38 times as high in the Top End of the NT and 14 times as high in Central Australia as the corresponding rates for non-Indigenous males. Rates of RHD for Indigenous females were 23 times as high in the Top End of the NT and 20 times as high in Central Australia than the corresponding rates for non-Indigenous females. The rate of RHD for Indigenous people was highest in the 45-54 years age-group (34.5 per 1,000). The highest ratios between Indigenous and non-Indigenous rates were for the 0-14 and 25-34 years age-groups, with rate ratios of 178 and 108 respectively.

Hospitalisation

There were 9,149 hospital separations identified as Indigenous for CVD in NSW, Vic, Qld, WA, SA and the NT in 2009-10 [50]. The most recent information on hospitalisation rates for Indigenous people and non-Indigenous people was for 2008-09, when the rate was 1.9 times higher for Indigenous people than for non-Indigenous people [58].

For ischaemic heart disease (also known as coronary heart disease), there were around 7,200 hospital admissions of Indigenous people in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2006 to June 2008 [44]. Of these admissions, around 2,870 were for acute myocardial infarction (heart attack). Admission rates for Indigenous males were 1.7 times higher for ischaemic heart disease and 2.2 times higher for acute myocardial infarction than the corresponding rates for other Australian males. Rates for Indigenous females were 2.8 times higher for ischaemic heart disease and 3.1 times higher for acute myocardial infarction than the corresponding rates for other Australian females.

For cerebrovascular disease (including stroke), there were around 1,330 admissions to hospital of Indigenous people in NSW, Vic, Qld, WA, SA and the NT in July 2006 to June 2008 [44]. Admission rates for Indigenous males were 1.6 times higher for cerebrovascular disease overall and 1.7 times higher for stroke than the corresponding rates for other males. The rates for Indigenous females were 1.9 and 2.1 times higher, respectively, than those for other females.

Hospitalisation rates for hypertension for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in July 2006 to June 2008 were considerably higher than those for non-Indigenous people: 2.6 times higher for males and 2.5 times higher for females [44]. The highest ratios were for the 35-44 and 45-54 years age-groups where Indigenous rates were between four and five times higher than non-Indigenous rates.

Mortality

In 2004-2008 in Qld, WA, SA and the NT, CVD was the leading cause of death accounting for 27% of all deaths of Indigenous people [44]. The death rate of Indigenous people was 1.8 times that of non-Indigenous people. The rate for Indigenous males was 1.8 times that of non-Indigenous males, and the rate for Indigenous females 1.7 times that of their non-Indigenous counterparts. Ischaemic heart disease was responsible for around than three-fifths (60%) of the deaths of Indigenous males from CVD and for around one-half (46%) those of Indigenous females. Cerebrovascular disease was responsible for 16% of the deaths of Indigenous males from CVD and for 21% of deaths of Indigenous females.

The striking difference between Indigenous people and non-Indigenous people in CVD mortality is the much greater impact among young and middle-aged Indigenous adults. In 2002-2005 in Qld, WA, SA and the NT, for all CVD, the death rates for Indigenous people in the 35–44 and 45–54 year age-groups were 8 to 12 times higher than corresponding non-Indigenous rates [52]. 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 has attracted 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 [59, 60]. Indigenous identification in the registries has been improving [61, 62], but there are currently no national data on cancer incidence in Indigenous people due to poor data quality in several jurisdictions [63]. For those Indigenous patients who are registered with cancer, there is concern that not all are correctly identified as Indigenous [60]. Provision for the identification of Indigenous people is not yet included on all pathology forms and the extent to which Indigenous cancer patients are identified in hospital inpatient statistics varies across Australia [62]. 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 in 2009 [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 [59].

Extent of cancer among Indigenous people

Incidence

During 2003-2007, an average of 458 Indigenous people living in Qld, WA, SA and the NT were diagnosed with cancer each year [63].[5] After adjusting for differences in the age structures of the two populations, cancer incidence rates were lower for Indigenous people than for non-Indigenous people during this period (385 and 433 cases per 100,000 people, respectively).

The most common cancer diagnosed among Indigenous people for the 2003-2007 period was lung cancer (average of 71 cases per year), and the second most common was breast cancer (among Indigenous females) (average of 49 cases per year) [63]. Earlier data for the period 2000-2004 revealed that more new cases of cancer were reported among Indigenous females (1,598) than among Indigenous males (1,485), a contrast to the pattern for non-Indigenous people, for whom new cases are more common among males than females [64].

In terms of specific cancers, age-standardised incidence rates for Indigenous people living in NSW, Vic, Qld, WA, SA, Tas and the NT in 2007 were higher for lung cancer and cervical cancer (in Indigenous females) than for their non-Indigenous counterparts [45]. In 2003-2007 the incidence rate for cervical cancer was almost three times higher for Indigenous females than for non-Indigenous females (18 and 7 cases per 100,000 females, respectively) [63]. Despite being the most commonly reported cancer amoung Indigenous women each year between 2002 and 2006 in Qld, WA, SA and the NT, Indigenous women were significantly less likely to be diagnosed with breast cancer than were non-Indigenous women (69 and 103 new cases per 100,000 women, respectively), but death rates did not differ significantly [65].

Recent comparable data for other cancers are not available, but data for 2000-2004 reveal that Indigenous males and females had higher age-standardised incidence rates than did their non-Indigenous counterparts for lung cancer; cancers of the liver and gall bladder; pancreas; cancers of the mouth and throat; oesophagus; and cancer of unknown primary site (Table 15) [64]. Age-standardised incidence rates were lower for Indigenous males and females than for their non-Indigenous counterparts for colorectal cancer and lymphomas. 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 15. 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 gallbladder	21	10	2.1	14	5	2.6
Pancreas	16	11	1.5	12	9	1.4
Oesophagus	17	8	2.0	4	3	1.3
Cervix	-	-	-	17	7	2.4

Source: ABS and AIHW, 2008 [64]

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

In 2009, cancer was the underlying cause of 465 deaths of Indigenous people across Australia [46]. The median age of death with an underlying cause of cancer was 62.7 years for Indigenous people and 75.3 years for non-Indigenous people.

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[5] The overall level of missing data on Indigenous status for cancers diagnosed between 2003 and 2007 was 11%.

Cancer was the second most common cause of death for Indigenous people living in NSW, Qld, WA, SA and the NT in 2004-2008, exceeded only by deaths from CVD [44]. The death rates for cancer among Indigenous males and females were higher than among their non-Indigenous counterparts (1.2 and 1.5 times higher, respectively) and death rate ratios were higher for cervical cancer (4.3), lung cancer (1.7), and digestive organ cancers (1.4) for Indigenous people than for their non-Indigenous counterparts. Death rates for cervical cancer in 2004-2008 had slightly decreased since 2003-2007, when Indigenous women died at over five times the rate of non-Indigenous women (9.9 compared with 1.9 per 100,000 women) [44, 66]. For breast cancer, death rates were similar for the two populations in 2004-2008 [67].

The patterns of Indigenous cancer incidence and mortality are largely explained by the higher prevalence of risk factors, most notably tobacco use [68-70]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat [64]. The unusual situation of Indigenous people having lower incidence rates and higher death rates for cancer than do non-Indigenous people could be due to a number of factors. First, Indigenous people could have higher case-fatality rates than do non-Indigenous people: this could reflect differences between the two populations in the proportions of cancers with high case-fatality rates [60, 71-73]. Second, cancers could be detected at a more advanced stage among Indigenous people than among non-Indigenous people. Third, there could be differences between Indigenous and non-Indigenous people in treatment outcomes by stage of diagnosis. From the available information, Indigenous people are: significantly more likely to have cancers that have a poor prognosis; usually diagnosed with cancer at a later stage; less likely to receive optimal treatment; and are more likely to die from cancers than other Australians [60].

Diabetes

There are several types of diabetes, of which the most frequently occuring are type 1, type 2 and gestational diabetes mellitus (GDM) [74]. Type 1 diabetes is relatively rare in the Indigenous population, but type 2 diabetes represents a serious health problem for Indigenous people, who tend to develop it at earlier ages than do other Australians, and often die from it at younger ages [62]; GDM, which can occur during pregnancy, is more common among Indigenous women than among non-Indigenous women [75].

Statistics on diabetes incidence, prevalence, hospitalisation, and mortality among the Indigenous population are often underestimated for several reasons, including under-identification of Indigenous status, and information only being collected routinely for types of diabetes that require insulin treatment [74]; self-reported diabetes data may underestimate the prevalence of diabetes by up to 50% [76].

Diabetes can lead to life-threatening health complications, some of which may develop within months of diagnosis while others may take years to develop [77]. Complications of diabetes include disease of the large blood vessels (macrovascular), which can cause heart disease and stroke, and disease of the small blood vessels (microvascular), which can cause eye disease and peripheral nerve disease. For many Indigenous people, diabetes is not diagnosed until after complications have developed; when diagnosis occurs in the presence of end-stage disease it results in higher death rates, a greater dependency on tertiary level care, and higher health care costs [78].

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 have commenced using insulin for diabetes since 1999 [74]. Recording of Indigenous status was poor prior to 2005, so analysis of the data including Indigenous status is for 2005-2007 only. Only a small proportion of people with type 2 diabetes and GDM require insulin treatment, however, so the data presented in this report can only accurately measure incidence of type 1 diabetes.

In 2005-2007, new cases of insulin-treated diabetes occurring in Indigenous people 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 2.2% of new cases of GDM [74]. Overall, 2.9% of people on the NDR in 2005-2007 were recorded as Indigenous, which is slightly higher than the proportion of Indigenous people in the total population percentage in 2006 (2.5%).

Self-reported prevalence of diabetes/high sugar levels was 6% for Indigenous people who participated in the 2004-2005 NATSIHS [57]. These problems were reported more frequently by Indigenous people living in remote areas (9%) than by those living in non-remote areas (5%). After adjusting for age differences between the two populations, Indigenous people were around 3.4 times more likely to report some form of diabetes than non-Indigenous people (12% compared with 4%).

The ratio between Indigenous and non-Indigenous females for self-reported diabetes/high sugar levels was higher than that between Indigenous and non-Indigenous males (4.1 compared with 2.9) [57].

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 [57].

The prevalence of diabetes increased with age, with a pattern of onset very similar to that of hypertensive disease (high blood pressure) [57]. The increase occurred at much younger ages among Indigenous people: the prevalence reported by Indigenous people aged 25-34 years was almost seven times that of non-Indigenous people, and the prevalences reported by Indigenous people aged 35-44 and 45-54 years were more than five times those reported by non-Indigenous people in tose age-groups (Table 16).

Table 16. 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)	Proportion of Indigenous people (%)	Proportion of non-Indigenous people (%)	Ratio
15-24	1.0	0.5	1.9
25-34	4.3	0.6	6.8
35-44	10.0	2.0	5.1
45-54	20.7	4.0	5.2
55+	32.1	11.6	2.8

Source: ABS, 2006 [57]

Notes: 1 Proportions are expressed as percentages

2 Ratio is the Indigenous proportion divided by the non-Indigenous proportion

Diabetes is known to have adverse effects on pregnant women and their babies, depending on maternal diabetes status [75]. Maternal outcomes that may be adversely affected include: duration of pregnancy; type of labour; caesarean section; hypertension; and length of stay in hospital. Infant outcomes that may be adversely affected include: gestational age; birthweight; Apgar score; level of resuscitation; admission to special care; and length of stay in hospital.

In 2005-06 to 2007-08, almost 7% of Indigenous mothers in NSW, Vic, Qld, WA, SA and the NT had diabetes in pregnancy: 0.1% had pre-existing type 1 diabetes; 1.5% had pre-existing type 2 diabetes; and 5.0% had GDM [75]. Compared with non-Indigenous women who gave birth, Indigenous women were 3.2 times more likely to have pre-existing diabetes and 1.6 times more likely to have GDM. Indigenous mothers with pre-existing diabetes had higher rates of pre-term birth, delivery with no labour, caesarean section, hypertension, and longer stay in hospital than did Indigenous mothers with GDM or without diabetes. Indigenous mothers with GDM were more likely to have a pre-term birth, caesarean section, hypertension, and longer stay in hospital than were mothers without diabetes in pregnancy.

Adverse outcomes for babies, including high level resuscitation, admission to special care nursery or neonatal intensive care unit, low Apgar score, and longer hospital stays, were higher for those born to Indigenous mothers with pre-existing diabetes than for those born to Indigenous mothers with GDM or those without diabetes [75].

General practice attendances and hospitalisation

Hospitalisation rates are not necessarily an accurate reflection of the burden of diabetes in the community since, as with most chronic health conditions, the treatment of diabetes is well supported by primary health care from doctors, nurses, and allied health professionals. Between 2005-06 and 2009-10, diabetes problems were managed at a rate of 8 per 100 general practitioner (GP) encounters for Indigenous people, which is more than double the rate for non-Indigenous people [79].

In 2007-2009, around 2% of hospitalisations for Indigenous people were for diabetes [79]. Between 2002-03 and 2008-09, diabetes-related hospitalisation rates for Indigenous people increased by 23% in Qld, WA, SA and the NT. In the same period, the rate for other Australians increased by 33%, although from a smaller base.

Diabetes was recorded as the principal diagnosis in 1.4% of hospital separations for Indigenous people in NSW, Vic, Qld, WA, SA and the NT from July 2006 to June 2008, representing 4.8% of all hospitalisations for diabetes [44]. After adjusting for age, hospitalisation rates for diabetes among Indigenous males and females were 3.4 and 5.0 times the rates of other males and females. The largest difference in rate ratios was seen in males aged 35-44 years who were hospitalised at around nine times the rate of non-Indigenous males. The largest difference in rate ratios for females occurred in the 45-54 years age-group, for which ages Indigenous females were hospitalised at around 13 times the rate of non-Indigenous females. Type 2 diabetes was the most common form of diabetes, responsible for 84% of diabetes-related hospitalisations for Indigenous people.

Hospitalisation rates in NSW, Vic, Qld, WA, SA and the NT from July 2007 to June 2009 were highest for Indigenous people living in remote (33 per 1,000), very remote (21 per 1,000) and outer regional areas (19 per 1,000) [44]. This compares with rates for non-Indigenous people of 2.8 per 1,000 (rate ratio 11.7), 8.6 per 1,000 (rate ratio 2.5), and 4.2 per 1,000 (rate ratio 4.4), respectively.

Complications from diabetes, including circulatory and ophthalmic conditions, but in particular renal complications, were the cause of high rates of hospitalisations. In NSW, Vic, Qld, WA, SA and the NT in 2008-09, hospitalisation rates for renal complications of diabetes were 11.2 times higher for Indigenous people than they were for non-Indigenous people [80]. The hospitalisation rate for complications associated with type 2 diabetes as a principal diagnosis increased by 19% for Indigenous people from 2004-05 to 2008-09 (from 11.3 per 1,000 people in 2004-05 to 13.5 per 1,000 people in 2008-09). Hospitalisation rates for multiple complications of diabetes were around 6.5 times higher for Indigenous people than for non-Indigenous people in 2008-09 (3.1 compared with 0.5 per 1,000).

There was an average yearly increase of 20% in the hospitalisation rate for diabetes among Indigenous males and females living in Qld, WA, SA and the NT from 2001-02 to 2007-08 (compared with a 45% increase in the hospitalisation rate for other Australians) [44]. This equates to a 23% decrease in the hospitalisation rate ratio between Indigenous and other Australians for diabetes over this time period (from 5.6 in 2001-02 to 4.7 in 2007-08). From 2004-05 to 2007-08, there was an average yearly increase of 17% in the hospitalisation rate for diabetes among Indigenous males and females in NSW, Vic, Qld, WA, SA and the NT, compared with a 15% increase in the rate for non-Indigenous people.

Mortality

Diabetes causes more deaths among Indigenous people than it does among non-Indigenous people [44]. From 2004 to 2008, diabetes was responsible for 7.2% of Indigenous deaths compared with 2.5% of non-Indigenous deaths in NSW, Qld, WA, SA and the NT. After adjusting for differences in the two populations, the Indigenous rate is almost seven times the rate of other Australians. (It should be noted that death data on diabetes are probably an underestimate as the condition tends to be under-reported on death certificates or is not recorded as the underlying cause of death [81].)

Social and emotional wellbeing (including mental health)

Good mental health is essential to the health and wellbeing of individuals, families, and communities [82]. Mental health remains, however, a complex domain due to the multiplicity of contributing internal and external factors, and the diverse views and subsequent varying terminology that exists within the field [83].

National government policies provide some clarity by defining terms such as mental health, mental health problems, and mental illness. These policies accept the World Health Organization (WHO) definition for mental health, describing it as a state of social and emotional wellbeing in which individuals can cope with the normal stresses of life and realise their potential [83, 84]. It is influenced by a complex interplay of biological, psychological, social, environmental, and economic factors [82, 83, 85]. People with good mental health are able to contribute to community life, participate in the workforce, and foster meaningful and positive relationships with others [83, 84, 86].

Some individuals experience compromised mental health due to mental health problems or mental illness. The distinction between mental health problems and mental illness is not well defined [83], but it is important to delineate the meaning of these concepts to ensure all aspects of mental health/illness are adequately addressed within the Indigenous and wider populations. Mental health problems are characterised by reduced cognitive, emotional, or social functioning, but not to the extent that the criteria for a mental illness are met [82, 83]. Conversely, a mental illness is a clinically diagnosable disorder that significantly interferes with an individual's cognitive, emotional, or social abilities, and is generally determined according to the classification system of the Diagnostic and Statistical Manual of Mental Disorders (DSM) or the ICD.

Mental health, mental health problems, and mental illness are not discrete entities, rather they occur on a continuum, and it is expected that people will fluctuate between periods of good mental health, and periods of not-so-good mental health during their lifetimes [82, 83, 86]. This broader conceptualisation of mental health has been recognised in Australia and is fundamental to the aims of current mental health policy. This conceptualisation also closely aligns with the Indigenous view of mental health and wellbeing, which is termed social and emotional wellbeing.

Social and emotional wellbeing refers to the social, emotional, spiritual, and cultural wellbeing of an individual [86]. It goes beyond traditional mental health discourse to encapsulate the importance of connection to land, culture, spirituality, ancestry, family and community, and how these impact on an individual while also recognising the influence of political and historical factors on mental health and wellbeing [86, 87]. It is the preferred terminology by many Indigenous people because of its more positive and holistic connotations.

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' [88, p.7], but the precise details have been poorly documented up until the 2004-2005 NATSIHS [57], and, particularly, the 2008 National Aboriginal and Torres Strait Islander Social Survey (NATSISS). The NATSISS sought to provide a broad understanding of Indigenous social and emotional wellbeing by collecting information on psychological distress, stressors, positive wellbeing, social networks and social support, and removal from family [89].

After adjusting for differences in age structures of the Indigenous and total Australian populations, the 2008 NATSISS found that Indigenous people aged 18 years or older were more than two-and-a-half times as likely as their non-Indigenous counterparts to feel high or very high levels of psychological distress [80]. A significantly greater proportion of Indigenous people reported feeling sad and without hope than did their non-Indigenous counterparts.

The higher overall levels of psychological distress reported by Indigenous people than by non-Indigenous people are consistent with the relative frequencies with which the two populations experienced specific stressors in the previous 12 months. According to the 2008 NATSISS, 79% of Indigenous people aged 18 years and over experienced at least one significant stressor in the previous 12 months (Table 17) [44]. During this time, Indigenous people reported experiencing an average of 4.5 stressors; the most commonly reported stressor being death of a family member or close friend. A pattern was observed between psychological distress levels and stressors: high or very high levels of distress were associated with high numbers of reported stressors among Indigenous people.

In comparison, 62% of the total population reported in the 2010 General Social Survey (GSS) that they experienced at least one or more significant stressors in the previous 12 months [90]. The proportions reporting specific stressors were generally higher for Indigenous people than for the total population, particularly for 'death of a family member or close friend' and 'trouble with the police' [44, 90]. Several stressors, including 'pregnancy', 'time in jail', 'overcrowding at home', and 'treated badly/discrimination', were reported only for the Indigenous population.

Table 17. Proportions of stressors reported in the previous 12 months, by Indigenous status, year and stressor type, Australia, 2008 and 2010

Type of stressor	Indigenous status / year	
	Proportion of Indigenous people (%)	Proportion of total population (%)
	2008	2010
Death of a family member or close friend	40	23
Serious illness or disability	33	30
Not able to get a job	23	15
Alcohol-related problems	21	8
Mental illness	17	13
Pregnancy	17	--
Drug-related problems	15	--
Trouble with the police	15	4
You, a family member or friend spent time in jail	13	--
Overcrowding at home	13	--
Treated badly/discrimination	10	--
Total reporting stressor(s)	79	62

Source: AIHW, 2011 [44] ABS, 2011 [90]

Notes:
1 Proportions are expressed as percentages
2 The content of this table is restricted to the more frequently reported stressors
3 Data have not been age-standardised
4 The total population proportion for 'serious illness or disability' data has been estimated by adding proportions for the two sub-components together, so may slightly overstate the true proportion
5 The 2010 GSS combined alcohol and drug related problems within the one sub-category

The 2008 NATSISS sought to broaden the scope of social and emotional wellbeing information captured by going beyond the deficit focus of the 2002 survey and including of measures of positive wellbeing [89]. Indigenous people reported on feelings of calmness and peacefulness, happiness, fullness of life, and energy. Nine-tenths (90%) of Indigenous people reported feeling happy either some, most, or all of the time, approximately 21% reported feeling energetic a little or none of the time, and around 16% reported feeling full of life, and calm and peaceful, a little or none of the time [80]. The lack of comparable data precludes definitive statements about the positive wellbeing of Indigenous people compared with that of non-Indigenous people. However, the greater frequency of psychological distress in the Indigenous population, together with the type and number of stressors reported, suggests Indigenous people experience lower levels of social and emotional wellbeing than do non-Indigenous people.

Social and emotional wellbeing is influenced by the support a person receives from their social networks [91]. Data from the 2008 NATSISS showed that 89% of Indigenous people aged 15 years and over were able to obtain emotional, physical, or financial help from someone else during a time of crisis. Non-Indigenous people experience similar levels of social support: the 2006 GSS found that 93% of non-Indigenous people were able to access support at a time of crisis.

Removal from one's natural family also has significant implications for a person's social and emotional wellbeing [92]. The 2008 NATSISS revealed that Indigenous people who had been removed, or had a relative removed, from their natural family were more inclined to experience high or very high levels of psychological distress compared with those who had not been removed from their natural family. Almost two-fifths (39%) of Indigenous people experiencing high or very high levels of psychological distress reported having been removed, or having had a relative removed, from their natural family. Three-tenths (30%) of Indigenous people with high or very high levels of distress hadn't been removed from their natural family.

In terms of the social and emotional wellbeing of Indigenous children, the WAACHS remains the most recent and detailed source of information. The WAACHS, undertaken in 2001 and 2002, 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 WA population) [93]. 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. Around 72% of 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, 12,099 of the hospital separations with a principal diagnosis of ICD 'mental and behavioural disorders' were identified as Indigenous in NSW, Vic, Qld, WA, SA and the NT in 2009-10 (7.6% of separations excluding those for dialysis) [50]. Information about hospitalisation rates are not available for 2009-10, but the hospitalisation rate of Indigenous males for 'mental and behavioural disorders' in 2008-09 in was 28 per 1,000, 2.2 times the rate for non-Indigenous males [80]. For the same period, the hospital rate for 'mental and behavioural disorders' among Indigenous females was 23 per 1,000, 1.4 times the rate for non-Indigenous females.[6]

Hospitalisation for the specific sub-categories within the ICD chapter 'mental and behavioural disorders' was generally higher for Indigenous people than for the total population [80]. In 2008-09, the separation rates of mental and behavioural disorders due to ICD 'schizophrenia, schizotypal, and delusional disorders' were 4.1 times higher for Indigenous people than for their non-Indigenous counterparts in NSW, Vic, Qld, WA, SA and the NT. Similarly, the rate for Indigenous people for ICD 'substance use disorder' was 3.8 times higher than the rate for non-Indigenous people.

Hospital admissions for intentional self-harm were also more common for Indigenous people than for non-Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-09 [80]. Separation rates were 2.7 times higher for Indigenous males and 2.2 times higher for Indigenous females than for their non-Indigenous counterparts. Indigenous people living in remote areas had a particularly high rate of separations for intentional self-harm – more than 3 times the rate reported for non-Indigenous people.

Mortality

In 2005-2009, 268 Indigenous people living in NSW, Qld, WA, SA, and the NT died as a result of ICD 'mental and behavioural disorders'[7], accounting for 2% of all deaths among Indigenous people [80]. Based on indirect standardisation, it has been estimated that the death rate for Indigenous males due to 'mental and behavioural disorders' in 2005-2009 was 2.5 times the rate for non-Indigenous males. For the same period, the death rate for Indigenous females due to 'mental and behavioural disorders' was 1.6 times the rate for non-Indigenous females.

The reported number of deaths for ICD 'mental and behavioural disorders' do not include deaths due to ICD 'intentional self-harm'[8] (suicide), which accounted for a further 453 deaths in 2005-2009 [80]. Deaths from intentional self-harm were much higher for Indigenous people than for non-Indigenous people, particularly for males (Table 18). Age-standardised death rates ranged from 17 per 100,000 (NSW) to 65 per 100,000 (NT) for Indigenous males, and from 12 per 100,000 (Qld) to 15 per 100,000 (WA) 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 for males (3.4) and WA for females (3.3).

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[6] 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'.

[7] Mental and behavioural disorders include ICD-10 codes F00-F99.

[8] Under the ICD, intentional self-harm is classified under 'External causes of morbidity and mortality' (codes X60-X84, Y87.0).

Table 18. Age-standardised death rates for intentional self-harm, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2005-2009

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW	17	n.p.	12	4	1.4	n.p
Qld	39	12	17	4	2.3	2.6
WA	51	15	17	5	3.1	3.3
SA	60	n.p.	18	5	3.4	n.p.
NT	65	n.p.	20	n.p.	3.2	n.p.
All jurisdictions	39	10	15	4	2.6	2.4

Source: Steering Committee for the Review of Government Service Provision, 2011 [80]

Notes:
1 Indirect standardisation rates per 100,000 population; rate is not available for Indigenous females for NSW, SA, and NT
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
4 n.p. indicates data not published

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 those aged less than 25 years and 25-34 years (Table 19) [80].

Table 19. 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, 2005-2009

Age-group (years)	Indigenous	Non-Indigenous	Rate ratio
Under 25	14	4	4.1
25-34	41	13	3.3
35-44	30	14	2.1
45 and over	10	12	0.8
All ages	24	10	2.5

Source: Steering Committee for the Review of Government Service Provision, 2011 [80]

Notes:
1 Crude rates per 100,000 population
2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3 The 'All ages' death rates for the Indigenous and non-Indigenous populations are indirect standardised death rates
4 Due to the incomplete identification of Indigenous status, these figures under-estimate the true differences between Indigenous and non-Indigenous people

Research in NSW and the ACT, Qld, and the NT has highlighted the increasing impact of suicide among young Indigenous people [94-96]. It has been suggested that suicide and attempted suicide among Indigenous youth (at least in NSW and the ACT) are not the result of mental illness 'in the strict pathological sense' [97, p.88], 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 [80].

Kidney health (renal disease)

Kidney disease, renal disease and renal disorder are terms that refer to a variety of different disease processes involving damage to the working units of the kidneys[9] [98, 99]. Of particular importance to Indigenous people is chronic kidney disease (CKD), which is defined as kidney damage or reduced kidney activity that lasts for three months or more [100]. CKD includes diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [64]. If left untreated, CKD can cause death [101]. CKD is expensive to treat and has a marked impact on the quality of life of those who suffer from the disease as well as those who care for them [102, 103]. A number of risk factors are associated with kidney disease, including diabetes, high blood pressure, infections, low birth weight and obesity [104]. These conditions are particularly common among Indigenous people and contribute to high rates of CKD [45, 64].

Extent of kidney disease among Indigenous people

Prevalence

The prevalence of CKD is higher among Indigenous people than among other Australians [44, 64, 105]. Between 2001 and 2004-2005, there was a significant increase in the proportion of Indigenous people reporting kidney problems; after age-adjustment, CKD was ten times higher among Indigenous people than among non-Indigenous people in 2004-2005 (the rate ratio was 5.3 in 2001) [64].

With most information on CKD limited to self-reported data, the primary focus in the literature has been on ESRD [104, 105]. The overall incidence rate of ESRD for Indigenous people is consistently reported as being significantly higher than that for non-Indigenous people [99, 105].

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[9] Renal (and urologic) disease includes conditions affecting the function of the body's urinary system, which involves the kidneys, ureters, bladder and urethra.

Data from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) reveal that a total of 675 Indigenous people were newly identified with ESRD in the three-year period 2007 to 2009 – the age-standardised notification rate of 960 per 1,000,000 population for Indigenous people was almost 10 times the rate of 97 per 1,000,000 for non-Indigenous people (Table 20) [Derived from 106, 107-109]. Notification rates of ESRD were higher for Indigenous people than for non-Indigenous people in all states and territories, with the highest rates recorded for Indigenous people living in the NT (1,594 per 1,000,000), WA (1,194 per 1,000,000), and SA (876 per 1,000,000).

Table 20. 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, 2007-2009

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	80	283	2,200	98	2.9
Vic	19	415	1,601	101	4.1
Qld	167	637	1,318	106	6.0
WA	156	1,194	605	97	12.4
SA	44	876	503	107	8.2
NT	201	1,594	36	89	18.0
Australia	675	960	6574	97	9.9

Source: Derived from ANZDATA, 2010 [106], ABS, 2008 [107], ABS, 2001 [108], ABS, 2009 [109]

Notes: 1 Rates per 1,000,000 population have been standardised using the ERP from 30 June 2001

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

3 Notification rates 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

Almost two-thirds (63%) of Indigenous people newly registered with the ANZDATA in the period 2007-2009 were aged less than 55 years, compared with less than one-third (30%) of non-Indigenous people registered [Derived from 106, 107-109] (Table 21). 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 35-44 years (12.6) and 45-54 years (14.3).

Table 21. Numbers of notifications and notification rates of end-stage renal disease, by Indigenous status and age-group, and Indigenous:non-Indigenous rate ratios, Australia, 2007-2009

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	1	2	83	7	0.2
15-24	12	37	155	18	2.1
25-34	48	214	313	36	5.9
35-44	143	703	507	56	12.6
45-54	222	1,528	932	107	14.3
55-64	183	2,239	1,360	190	11.8
65-74	59	1,670	1,667	375	4.5
75+	7	438	1,557	390	1.1
All ages	675	960	6,574	97	9.9

Source: Derived from ANZDATA, 2010 [106], ABS, 2008 [107], ABS, 2001 [108], ABS, 2009 [109]

Notes: 1 Rates per 1,000,000 population

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

Management of ESRD involves dialysis or kidney replacement therapy (KRT), also known as renal replacement therapy (RRT), where transplantation of the kidney is required [100]. A total of 187 Indigenous people commenced dialysis during 2009, a decrease from 249 in 2008 and 237 in 2007 [105]. For the same period, 24 new transplant operations were performed in Indigenous recipients compared with 748 operations performed in non-Indigenous recipients. Of the 977 patients aged less than 65 years who were on the transplant waiting list in Australia at 31 December 2009, 39 (4%) were Indigenous patients, with the highest number (14) residing in WA (36% of all Indigenous patients on the waiting list).

Haemodialysis (HD), conducted in urban or regional clinics and hospitals, is the most common form of dialysis treatment for Indigenous people with ESRD [105, 110-112]. In 2009, HD accounted for the majority of treatment (81%); the number of Indigenous people commencing peritoneal dialysis (PD) (35 patients) was less than in the previous two years [105]. For the same period, there were 1,174 prevalent dialysis patients in Australia (including both PD and HD) identified as Indigenous, with a rate nearly five times higher for Indigenous people (2,220 per 1,000,000 population) than for the total population (473 per 1,000,000 population) [105].

Hospitalisation

In 2009-10, care involving dialysis was the most common reason for the hospitalisation of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT, with Indigenous people hospitalised 11 times more often than other Australians [50], a ratio similar to that in 2007-08 [100]. In 2007-08, Indigenous people were five times more likely to be hospitalised for other principal or additional CKD diagnoses than other Australians. For the procedure of HD, the admission rate was more than 12 times that of other people [8].

In 2007-08, Indigenous females had the highest rates of regular dialysis hospitalisations, almost 15 times that of other females; Indigenous males were hospitalised for regular dialysis more than 8 times the rate of other males [100]. Hospitalisation rates for CKD as both principal diagnosis and as an additional diagnosis for Indigenous females were between five and seven times the rates for other females[10]. Contributing factors to these higher rates for Indigenous females include the higher prevalence of type 2 diabetes among Indigenous women and the large proportion of Indigenous women carrying high levels of body fat around their abdomen; both factors place them at higher risk for CKD.

Mortality

In 2004-2008, the age-standardised death rate for kidney disease for Indigenous people was 5.1 times the rate for non-Indigenous people living in NSW, Qld, SA, WA and the NT [45]. Over the period 2001-2008 in NSW, Qld, WA, SA and the NT, the death rates (per 100,000) for kidney disease for Indigenous people increased by 102% compared with a 23% increase for non-Indigenous Australians [44].

In 2003-2007 in NSW, Qld, WA, SA and the NT, death rates where CKD was the underlying cause were around 3.7 and 4.7 times higher for Indigenous males and females than for their non-Indigenous counterparts [104]. These figures probably underestimate the contribution of CKD to death rates, however, as deaths involving CKD can occur in the context of other chronic conditions. For example, deaths where kidney failure was reported in 2003-2007 as an associated cause of death (e.g. with diabetes) occurred at three times the rate for Indigenous people than for non-Indigenous people.

Injury

Injury from a variety of sources presents a significant burden of ill-health for Indigenous people [113]. Assessing the total impact of injury is difficult because 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 [114]. As a result, many injuries are not brought to the attention of health policy-makers and program managers.

The classification of injury has generally followed the WHO's ICD, which includes particular attention to the external cause and intention of the injury [115]. This system is followed in this section, but it has its limitations (for more details, see [116]).

Understanding injury within an Indigenous context needs to take a diverse range of issues into consideration including: disruption to cultural, environmental, and lifestyle variables; socioeconomic disadvantage; geographical isolation; increased road usage; exposure to hazardous environments; substance use; violence; social and familial dysfunction; risky behaviour; risky home environments; and limited access to health and social support services [113, 114].

Extent of injury among Indigenous people

Prevalence

According to the 2004-2005 NATSIHS, 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 [57]. Reporting of injury-caused health conditions increased substantially among Indigenous adults over the age of 25 years, and was highest in the 35-44 and 45-54 years age-groups. Within these age-groups, 24% of Indigenous people reported a health condition as a result of an injury or accident. After adjusting for differences in the age structures of the two populations, 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 of health conditions reported as a result of an injury or accident among Indigenous than non-Indigenous people, it is somewhat surprising that proportion of Indigenous people who reported having had an injury in the four weeks prior to being interviewed in the 2004-2005 NATSIHS was slightly less for non-Indigenous people (15% compared with 19%) [117]. Indigenous people were almost 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 almost five times as likely to report being under the influence of alcohol or other substances at the time of injury (rate ratio 4.5).

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

According to the 2008 NATSISS, almost one-quarter (23%) of Indigenous people reported that they had been a victim of physical or threatened violence in the previous 12 months, a level similar to that reported for the 2002 NATSISS (24%) [91]. Victimisation was higher among younger Indigenous people, with males and females aged 15-24 years having the highest reported proportions (29% and 31%, respectively) [118]. Self-reported victimisation levels were highest among Indigenous people in the 15-24 years age-group across all levels of remoteness. For Indigenous males, victimisation was highest in major cities and remote/very remote areas (both 31%), followed by non-remote areas (28%) and regional areas (26%). Over 30% of Indigenous females experienced victimisation in all levels of remoteness.

According to the 2008 NATSISS, 74% of Indigenous people aged 15 years or over reported problems in their neighbourhood or community, with around one-quarter reporting family violence (25%) or assault (23%) [44]. WA had the highest proportion of Indigenous people reporting family violence as a problem (34%), followed by the NT (32%). For assault, the NT had the highest proportion with 31%, followed by WA (30%). Indigenous people living in remote areas reported family violence (38%) and assault (37%) more frequently than those living in non-remote areas (22% and 19%, respectively).

Hospitalisation

In 2009-10, injuries were responsible for 22,701 hospital separations for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT, accounting for 14% of all Indigenous separations (excluding those for dialysis) [50]. The separation rate of 46 per 1,000 for Indigenous people was almost twice that of 24 per 1,000 for other Australians.

In 2008-09, Indigenous males (52 per 1,000) and females (42 per 1,000) living in NSW, Vic, Qld, WA, SA and the NT had higher hospitalisation rates for injury than did other Australian males (28 per 1,000) and females (20 per 1,000) [80]. Indigenous people were hospitalised for injury at 1.9 times the rate of other Australians. Hospitalisation rates for injury increased slightly between 2004-5 and 2008-09 for both Indigenous people (from 42 to 47 per 1,000) and for non-Indigenous people (from 22 to 24 per 1,000).

Assault was the most frequent cause of hospitalisation for injury of Indigenous people in NSW, Vic, Qld, WA, SA and the NT in 2008-09, responsible for 21% of Indigenous male admissions for injury and for 28% of Indigenous female admissions for injury [80]. The numbers of admissions of Indigenous people for assault were very much higher than the numbers expected from non-Indigenous rates – 6.9 times higher for males and 32.3 times higher for females.

In the two-year period from July 2006 to June 2008, assault was responsible for around 2% of all hospitalisations for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT [44]. The hospitalisation rate for assault for Indigenous people was 11.6 times higher than the rate for other Australians. The highest rates for Indigenous people were among those aged 25-34 years (23 per 1,000, rate ratio of 13.0) and 35-44 years (22 per 1,000, rate ratio of 18.4). Indigenous males aged 35-44 years were hospitalised at 11.1 times the rate of other males, and Indigenous females aged 25-34, 35-44, and 45-54 years were hospitalised at over 40 times the rate of other females. Hospitalisation rates for assault were highest for Indigenous people living in the NT (23 per 1,000), followed by WA (18 per 1,000), and SA (17 per 1,000). Rates of hospitalisation for assault were highest for Indigenous people in remote areas (26 per 1,000), followed by very remote areas (23 per 1,000), and outer regional areas (10 per 1,000).

There were more hospitalisations from family violence-related assaults among Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-09 than among their non-Indigenous counterparts [80]. Indigenous people were hospitalised for assaults relating to family violence at 23 times the rate of other people (4.6 compared with 0.2 per 1,000). The hospitalisation rates from family violence-related assaults were highest for Indigenous males aged 35-44 years (5.5 per 1,000) and for Indigenous females aged 25-34 years (15.1 per 1,000). The hospitalisation rates for Indigenous people increased with remoteness, from 2.1 per 1,000 in major cities to 10.4 per 1,000 in remote areas (compared with 0.1 and 0.3 per 1,000, respectively, for other people).

In NSW, Vic, Qld, WA, SA and the NT in 2008-09, the next most common causes of injury hospitalisation for Indigenous males after assault were falls (18%), and exposure to inanimate mechanical forces (15%) [80]. The next most common causes of injury hospitalisation for Indigenous females after assault were falls (18%), and complications of medical and surgical care (14%). Transport accidents ranked fourth for Indigenous males (12%), and sixth for Indigenous females (6.8%).

Hospitalisation rates for injury for Indigenous people in NSW, Vic, Qld, WA, SA and the NT in 2008-09 increased with remoteness, from 32 per 1,000 in major cities to 71 per 1,000 in remote areas [80]. Hospitalisation rates were: 4.6 times higher in remote areas than in major cities for assault (23 compared with 5.0 per 1,000); almost twice as high in remote areas than in major cities for falls (12 compared with 6.9 per 1,000); almost twice as high in remote areas than in major cities for complications of medical and surgery care (10 compared with 5.5 per 1,000); and nearly two times higher in remote areas than in major cities for transport accidents (5.1 compared with 3.0 per 1,000).

Mortality

Injury was the third most common cause of death among Indigenous people living in NSW, Qld, WA, SA and the NT in 2004-2008, after CVD (27% of all deaths) and cancer (18%) [67]. Injury accounted for 15% of all Indigenous deaths in this period, compared with 5.7% of the deaths of non-Indigenous people; deaths from injury occurred at a rate around 2.4 times higher for Indigenous people than for non-Indigenous people.

Intentional self-harm was the leading cause of death from injury for Indigenous people living in NSW, Qld, WA, SA and the NT in 2004-2008, responsible for 27% of Indigenous deaths from injury (439 deaths) [67]. Transport accidents were responsible for 27% of Indigenous deaths from injury (432 deaths). Other important causes of Indigenous deaths from injury were: accidental poisoning, responsible for 9% of Indigenous deaths from injury (141 deaths); assault 9% (139 deaths); and accidental drowning 7%. Indigenous people died from intentional self-harm at a rate twice that of non-Indigenous people, and from transport accidents at a rate three times that of non-Indigenous people.

In the five-year period 2004-2008, there were 139 Indigenous deaths from assault in NSW, Qld, WA, SA and the NT, representing about 1.3% of all Indigenous deaths [44]. Indigenous people in those jurisdictions died from assault at 8.6 times the rate of non-Indigenous people. Rates were highest for Indigenous males aged 35-44 years (16 per 100,000, rate ratio of 10.6), and for Indigenous females aged 25-34 years (14 per 100,000, rate ratio of 17.4). Death rates of Indigenous people from assault were highest in the NT (17 per 100,000) and WA (12 per 100,000).

Respiratory disease

Respiratory disease, including asthma and pneumonia, represents a significant burden of ill-health and hospitalisation among Indigenous people, particularly among the very young and older people [79]. Respiratory disease is associated with a number of contributing factors, including poor environmental conditions, socioeconomic disadvantage, risky behaviour (particularly cigarette smoking), and previous medical conditions [119, 120]. Infants and children under 5 years of age are particularly susceptible to developing respiratory conditions, due to factors like low levels of childhood immunisation, parental smoking, poor nutrition (including aspects related to infant-feeding and weaning practices), and poor environmental conditions [121-123]. Among Indigenous adults, factors contributing to respiratory disease include tobacco smoking, use of alcohol and other substances, diabetes mellitus, and chronic renal disease [119]. Factors that affect the risk of developing asthma include environmental and related factors (e.g. diet and lifestyle), which may also change the course of the disease or trigger attacks of airway narrowing and symptoms [62]. Factors that can trigger airway narrowing and symptoms in people with asthma include exercise, viral infections, irritants (e.g. smoking and air pollutants), and specific allergens.

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 [57]. 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 slight decreases from those reported to the 2001 NHS: 33% for people living in non-remote areas and 21% for those living in remote areas.

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 [57, 119]. Asthma was reported more frequently by Indigenous people living in non-remote areas (17%) than by those living in remote areas (9%), slight decreases from the rates reported in the 2001 NHS of 19% and 11%, respectively [57].

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 [57, 101].

The lower overall proportion of Torres Strait Islander people (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%) [57].

Hospitalisation

There were 18,342 hospital separations for respiratory disease among Indigenous people living in NSW, Vic, Qld, WA, SA, and the NT in 2009-10, representing 12% of separations identified as Indigenous (excluding dialysis) [50]. During 2006-2008, age-standardised hospitalisation rates for respiratory disease were 2.6 times higher for Indigenous people than for other Australians (41 compared with 16 per 1,000, respectively)[11] [67]. In 2007-2009, Indigenous children aged 0-4 years experienced almost twice the rate of hospitalisation for respiratory disease than did other Australian children [79]. In the same period, Indigenous adults 25 years and older were hospitalised for respiratory disease at rates 2 to 5 times those of other Australians.

Mortality

Disease of the respiratory system was among the leading causes of death for Indigenous people, being responsible for almost 8% of all deaths of Indigenous people living in NSW, Qld, WA, SA and the NT in 2004-2008 [67]. Death rates for respiratory disease declined significantly during 2001-2008 for both Indigenous people (20% decrease) and non-Indigenous people (14% decrease), but the rate for Indigenous people in 2008 was still more than twice that for non-Indigenous people [44]. (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 9% of the excess deaths experienced by Indigenous people in 2004-2008 [67].

The leading specific cause of death from respiratory disease for both Indigenous males and females living in NSW, Qld, WA, SA and the NT during the period 2004-2008 was chronic lower respiratory disease with the age-standardised death rate 3.1 times higher for Indigenous people than for non-Indigenous people (Table 22) [44]. The rate for pneumonia and influenza, the next most common cause of death from respiratory disease, was 2.0 times higher for Indigenous people than for non-Indigenous people.

Table 22. Age-standardised death rates for respiratory disease, Indigenous people, by sex and condition, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2004-2008

	Males		**Females**		**Persons**	
	Rate	**Rate ratio**	**Rate**	**Rate ratio**	**Rate**	**Rate ratio**
Chronic lower respiratory diseases	95	3.0	63	3.2	76	3.1
Pneumonia and influenza	27	2.1	22	1.8	24	2.0
Other respiratory disease	22	1.2	10	0.9	15	1.1
Total respiratory disease	144	2.3	95	2.2	116	2.3

Source: AIHW, 2011 [44]

Notes: 1 Chronic lower respiratory diseases include asthma, bronchitis and emphysema
2 Rates, in deaths per 100,000, are directly age-standardised using the Australian 2001 standard population, by 5-year age-group to 75+

Deaths from respiratory disease were much more common among young Indigenous people than among their non-Indigenous counterparts [64]. Compared with non-Indigenous males and females aged 35-44 years living in Qld, WA, SA and the NT in 2001-2005, death rates from respiratory disease were 22 times higher for Indigenous males in that age-group (63 compared with 3 per 100,000) and 20 times higher for Indigenous females (37 compared with 2 per 100,000).

Indigenous infants were 5.2 times more likely than their non-Indigenous counterparts to die from respiratory disease in NSW, Qld, WA, SA and the NT in 2004-2008 [67].

Eye health

Eye health can be affected by genetic factors, ageing, premature birth, diseases (such as diabetes), smoking, injuries, UV exposure and nutrition [91]. The eye health of Indigenous people has probably improved overall in recent years, but many Indigenous people are still more likely than non-Indigenous people to suffer from preventable eye conditions, such as trachoma (a bacterial infection) [124]. 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 and can impair vision and may cause blindness.

The eye health of many Indigenous people is also limited by difficulty in accessing optometry or specialist ophthalmology services [125]. 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 [126].

Extent of eye health problems among Indigenous people

The National Indigenous Eye Health Survey (NIEHS) was the first national eye health survey among Indigenous Australians since the National Trachoma and Eye Health Program (NTEHP) of the late 1970s [124]. The results of the NIEHS, conducted in 2008 by the Indigenous Eye Health Unit at the University of Melbourne, have been used to make extensive recommendations to governments on improving eye health service provision and coordination, as well as advocating for 'closing the gap' in eye health between Indigenous and other Australians [125]. NIEHS was conducted in all states and territories with the exception of the ACT.

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[11] Based on the under-identification of Indigenous people in the hospital inpatient collections, this ratio is probably higher.

The 2008 NIEHS found that 94% of vision loss among Indigenous people was preventable, but that 35% of adults have never had an eye examination [127]. Blindness rates for Indigenous adults decreased by four times between the late 1970s and the 2008 NIEHS [128], but rates for Indigenous adults in 2008 were still 6.2 times those for other adults [124]. The most common cause of bilateral blindness in adults was cataract (32%), and the most common cause of low vision was uncorrected refractive error (54%). The proportion of blindness caused by corneal diseases (84% of which was due to trachoma) had decreased from 52% in the late 1970s to 9% in 2008.

Only 1.4% of children aged 5-15 years who participated in the 2008 NIEHS were found to have low vision, with more than one-half (56%) due to refractive errors [124]. Vision loss was much less common among Indigenous children than among non-Indigenous children (ratio 0.2).

Eye and sight problems were reported by 30% of Indigenous people who participated in the 2004-2005 NATSIHS, making it the most commonly reported health condition [57]. This level is similar to that documented in 2001. More Indigenous females than males reported eye/sight problems. The age-adjusted levels of eye/sight problems were similar for Indigenous and non-Indigenous females, but the level for Indigenous males was slightly lower than that for non-Indigenous males (ratio 0.9). The proportions of Indigenous people reporting eye/sight problems were slightly lower for very remote areas (23%), but similar for all other levels of remoteness (30% in outer regional and remote; 32% in major cities; 33% in inner regional areas).

Overall, a lower proportion of Torres Strait Islander people (26%) than Aboriginal people (30%) reported having eye/sight problems (the difference is not statistically significant), but the proportion was 31% for Torres Strait Islander people living in the Torres Strait area [57].

The 2008 NATSISS reported that 9.3% of Indigenous children aged 4-14 years had some form of eye or sight problems [129]. The most common forms of these problems were long-sightedness (37%) and short-sightedness (28%) [130].

Trachoma, a bacterial infection that has been virtually eliminated in the developed world, still occurs among Indigenous people and can cause blindness [127]. The NIEHS identified that 60% of Indigenous communities in very remote areas had endemic trachoma (defined as a prevalence of active trachoma of more than 5% in 5-9 year-olds). A similar level was documented in the *Trachoma surveillance report 2009* [131, 132]. This report concluded that trachoma remained a major health problem in Indigenous communities as the prevalence had not changed over the four years of screening, and particularly because there was a large pool of undiagnosed and untreated trachoma among Indigenous children.

Of particular concern is the rise of diabetic retinopathy among Indigenous adults. The NIEHS reported that diabetes was the cause of 13% of low vision and 9% of blindness among Indigenous adults over 40 years of age [124, 127]. Diabetic retinopathy was reported to be 30 times more frequent among Indigenous adults than among non-Indigenous adults in 2008.

Ear health

Ear diseases are classified according to the part of the ear (external, middle, or inner ear) in which the disorder occurs. Disorders of all parts of the ear have the potential to impair hearing, but the most common causes of hearing loss are disorders of the middle ear leading to otitis media (OM) [133]. OM refers to all forms of inflammation and infection of the middle ear, which are nearly always associated with fluid in the middle ear space. Chronic suppurative otitis media (CSOM) is persistent ear discharge through a perforation (hole) in the eardrum. For a diagnosis of CSOM, the tympanic membrane perforation must be able to be seen and large enough to allow the discharge to flow out of the middle ear space.

OM, which often occurs as a result of another illness (such as a cold), can be caused by viruses or bacteria or both [134]. If it is not adequately treated and followed up, OM may become chronic, increasing the risk of permanent hearing loss. 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.

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 [134-136]. OM, particularly in suppurative forms, is associated with some impairment of hearing, with major implications for language development and learning [136, 137]. OM can affect Indigenous babies within weeks of birth and a high proportion of children living in remote communities will continue to suffer from CSOM throughout their developmental years.

Extent of ear disease among Indigenous people

Prevalence

Exceptionally high levels of ear disease and hearing loss have been reported for many years in many Indigenous communities, particularly in remote areas [136, 138-140]. The levels described among children in some remote communities in northern and central Australia are such that they would be classified by the WHO as being 'a massive public health problem' requiring 'urgent attention' [141, p.2]; in 2001, nearly all children (91%) aged 6-30 months in some remote communities had been diagnosed with some form of OM [140].

Australia-wide, ear/hearing problems were reported by 12% of Indigenous people who participated in the 2004-2005 NATSIHS [57]. 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 OM 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, OM was around 2.8 times more common for Indigenous people than for non-Indigenous people. Ear/hearing problems, including total/partial hearing loss and OM, were over three times higher among Indigenous children aged 0-14 years (10%) than among their non-Indigenous counterparts (3%). The levels of complete/partial deafness 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).

The NT Emergency Response (NTER) child health checks conducted in 2007-2009, found that 75% of the 3,165 children who received an audiology check had at least one middle ear condition [142]. The most common conditions were OM with effusion (31%), eardrum perforation (19%), and CSOM (12%). More than one-half (54%) of the children examined had some hearing loss.

The 2008 NATSISS (which collected information on total/partial deafness, OM, ringing in ears (tinnitus), and otitis externa infection of the ear canal) found that 10% of Indigenous children aged 4-14 years experienced an ear or hearing problem [91].

Information collected by the WAACHS in 2001-2002 revealed that 18% of Indigenous children aged 0-17 years were reported by carers as having had recurring ear infections [42]. Children aged 0-3 years (20%) and 4-11 years (20%) were more likely to have recurring ear infections than children aged 12-17 years (14%). Abnormal hearing was reported for 6.8% of the children aged 4-17 years. Of children aged 4-11 years who experienced recurring ear infections with discharge, 28% had abnormal hearing compared with 1.4% of those without ear infections.

General practice attendances and hospitalisation

According to the Bettering the Evaluation of Care and Health (BEACH) survey, GP attendances in Australia for 2004-2005 to 2008-2009 for acute OM/myringitis (inflammation of the tympanic membrane) were similar for Indigenous children and other children aged 0-14 years (8 episodes per 100 encounters compared with 7 per 100, respectively) [44].

There were 4,200 hospitalisations of Indigenous people in 2007-2009 for diseases of the ear and mastoid process (part of the temporal bone behind the ear), representing 0.8% of all Indigenous hospitalisations [79]. In 2008-09, Indigenous children 0-3 years in NSW, Vic, Qld, WA, SA and NT had a higher hospitalisation rate for suppurative and unspecified OM (4.6 per 1,000) than did other children (3.7 per 1,000), but a lower rate of hopitalisation for all diseases of the middle ear and mastoid (9.1 compared with 12.5 per 1,000) [80]. The hospitalisation rate for suppurative and unspecified OM for children aged 0-3 years was higher than for those aged 4-14 years for both Indigenous and other children. In remote areas, Indigenous children aged 0-14 years had a hospitalisation rate for all diseases of the middle ear and mastoid 2.3 times higher (14.7 per 1,000) than that for other children (6.4 per 1,000) in major cities, the rate for Indigenous children aged 0-14 years was lower (5.5 per 1,000) than the rate for other children (7.3 per 1,000).

As with many other areas of Indigenous health, high rates of recurring ear infections are associated with poverty, crowded housing conditions, inadequate access to clean water and functional sewerage systems, nutritional problems, and poor access to health care [80]. Importantly, ear infections can lead to hearing loss which may be a major contributor to poor education and to unemployment, which are risk factors for contact with the justice system [136].

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' ([143] cited in [144, p.55]). 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 [145]. Dental caries is caused by acid-producing bacteria living in the mouth, which proliferate on sweet and sticky food. Caries is reversible in its early stages, but, if untreated, can cause irreversible damage. Periodontal disease (affecting the gums) is caused by bacterial infection associated with poor oral hygiene, infrequent dental visits, age, smoking, low education and income levels, and certain medical conditions [145], especially diabetes mellitus [146] and osteoporosis [147].

Extent of oral health problems among Indigenous people

Caries

Indigenous children experienced more caries in their deciduous (baby) teeth than did non-Indigenous children [148]. The Child Dental Health Survey (CDHS), conducted in 2000-2003[12] 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, for which age nearly twice as many Indigenous children than non-Indigenous children had caries (72% compared with 38%).

Not only did more Indigenous children have caries, but the CDHS found that they had a higher number of decayed teeth at all ages (4-10 years) than did their non-Indigenous counterparts [148]. The biggest difference was for Indigenous four-year-olds who had more than three times the number of decayed teeth than did non-Indigenous children of the same age.

According to the CDHS, poorer oral health for Indigenous children continued when they got their permanent teeth [148]. More Indigenous children aged 6-17 years in NSW, SA and the NT had caries than did their non-Indigenous counterparts; prevalence increased with age from 8.4% for Indigenous children aged 6 years (3.2% for their non-Indigenous counterparts) to 73% for Indigenous 17-year-olds (61% for their non-Indigenous counterparts).

Indigenous children in NSW, SA and the NT also had more severe levels of decay in their permanent teeth than did their non-Indigenous counterparts [148]. The largest difference was for Indigenous 15-year-olds who had 2.7 times the level of decay than did non-Indigenous children of the same age.

The poor oral health of Indigenous children was confirmed by child health checks conducted in 2007-2009 as part of the NTER, which found that 40% of children 0-15 years had untreated caries[13] [142].

More Indigenous adults than non-Indigenous adults experienced caries in Australia in 2004-2006 [149]. According to the National Survey of Adult Oral Health (NSAOH), Indigenous people 15 years and older had 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 experienced by Indigenous adults was also higher than that experienced by their non-Indigenous counterparts in 2004-2006 [149]. 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 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 [148, 149]. Children rarely develop severe periodontal disease, but gingivitis is relatively common, particularly among older children [148]. The prevalence of gingival bleeding, a common symptom of gingivitis, was generally higher for Indigenous children in NSW and SA than for their non-Indigenous counterparts in 2000-2003 (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 living 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. In the course of the NTER child health checks, 5.4% of Indigenous children aged 0-15 years were found to have periodontal disease in 2007-2009 [142].

The 2004-2006 NSAOH found that around 27% of Indigenous adults aged 15-74 years had gingivitis [149]. The prevalence of moderate or severe periodontitis among Indigenous people was about 1.3 times higher than the prevalence among non-Indigenous people.

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[12] Data from each state/territory were collected within a 12 month period, but in different years: data from NSW were obtained from 2000, data from SA were obtained in 2003, and data from the NT were obtained in 2002.

[13] The oral health information provided by the child health checks is not representative of all Indigenous children in the NT.

Similarly, more Indigenous adults had slightly higher levels of deep (4+mm) periodontal pockets and clinical attachment loss than did their non-Indigenous counterparts.

According to the 2004-2006 NSAOH, Indigenous people were affected by periodontal diseases at younger ages than were non-Indigenous people [149, 150]. 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 (14% compared with 7.3%) [149]. The levels of both deep periodontal pockets and clinical attachment loss were 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 was more than twice as high for Indigenous people than it was 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 [149]. The 2004-2006 NSAOH found that edentulism was strongly correlated to age: less than 2% of adults aged 35-54 years had complete tooth loss, but this increased to 36% for people 75 years and older. The age distribution of edentulism for Indigenous people was noticeably different from that of other Australians. For people aged 35-54 years, edentulism was around five times more common among Indigenous people (7.6%) than among non-Indigenous people (1.6%). For people aged 55-74 years, 21% of Indigenous people suffered from edentulism compared with 14% of non-Indigenous people.

Disability

At some point in their lives, most people in a population will experience a disability, defined by the ABS as a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts everyday activities [151]. A 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 [62, 152].

The main source of information about the level of disability at a population level is the ABS's periodic Survey of Disability, Ageing and Carers (SDAC), which also collects information about a person's need for assistance with core activities. Some information about disability at a population level is also collected in Australia's five-yearly censuses. Being based on self-reported information, each of these sources has limitations in capturing precise estimates of disability. This is particularly true for Indigenous people, whose level of participation in surveys and censuses is lower than that of non-Indigenous people [153]. Also, their response in the census to the questions related to disability was lower than that for non-Indigenous people, and some Indigenous people 'find the concept of disability hard to understand or irrelevant' [153, p.532].

Despite these limitations, it is clear that disability is a serious issue for Indigenous people: about 50% of Indigenous adults reported a disability in 2008 [154]. The greater burden of disability experienced by Indigenous people is due to higher levels of morbidity in a range of areas (including mental health, diabetes, CVD, injuries and respiratory diseases), as well as higher levels of socio-economic disadvantage [62, 153].

Extent of disability among Indigenous people

According to information collected by the ABS in the 2006 census, around 19,600 Indigenous people (4.3%) needed assistance with core activities some or all of the time [44].

The need for assistance with core activities generally increased with age for both Indigenous and non-Indigenous people (Table 23) [64]. 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 [44].

The need for assistance with core activities among Indigenous people varied with the remoteness of residence [44]. The highest proportion of Indigenous people requiring assistance with core activities in 2006 was in major cities and inner regional areas (both around 5%), with proportions decreasing slightly with increasing remoteness (around 4% in both outer regional and remote areas, and 3% in very remote areas).

Table 23. Proportions of people aged 18 years or older needing assistance with core activities, by Indigenous status and age-group, Australia, 2006

Age-group (years)	Proportions of Indigenous people (%)	Proportions of non-Indigenous people (%)	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 [64]

Notes: 1 Proportions are expressed as percentages; proportions for 'All ages' have been standardised using the 2001 Australian standard population; ratio is Indigenous proportion divided by the non-Indigenous proportion

2 ABS notes that 'needing assistance with core activities' is conceptually related to the 'presence of a profound/core activity restriction'

More recent information – from the 2008 NATSISS – found similar overall levels of profound/core activity restriction to those reported in the census, but the levels for the younger age-groups were higher for both Indigenous and non-Indigenous people (Table 24) [80]. After adjusting for differences in the age structures of the two populations, Indigenous people were more than twice as likely as their non-Indigenous counterparts to have a need for assistance with core activities some or all of the time (that is, have a profound/core activity restriction). The proportions of Indigenous people needing assistance with core activities were higher than those of non-Indigenous people for all age-groups. A higher proportion of Indigenous people required assistance with a core activity from a younger age (45 years and older) than did non-Indigenous people (55 years and older).

Table 24. Proportions of persons 18 years or older with profound/core activity restriction, persons, by Indigenous status and age-group, and Indigenous:non-Indigenous ratios, non-remote areas of Australia, 2008

Age-group (years)	Proportions of Indigenous people (%)	Proportions of non-Indigenous people (%)	Ratio
18-24	6.3	3.0	2.1
25-34	6.2	2.4	2.6
35-44	6.2	3.0	2.1
45-54	10.2	4.1	2.5
55+	17.7	8.5	2.1
All ages	10.3	4.7	2.2

Source: Steering Committee for the Review of Government Service Provision, 2011 [80]

Notes: 1 Ratio is the Indigenous percentage divided by the non-Indigenous percentage

2 Proportions for 'All ages' is age standardised

3 ABS notes that 'needing assistance with core activities' is conceptually related to the presence of a 'profound/core activity restriction'

In 2008, the proportion of profound or severe core activity restrictions among Indigenous people was slightly higher in remote areas (8.1%) than in non-remote areas (7.9%) [80]. Across all states and territories, the proportion of Indigenous people with a profound or severe core activity restriction in non-remote areas was similar: SA had the highest proportion (13.0%) and Qld the lowest (8.0%).

The proportion of Torres Strait Islander peoples aged 15 years and over with a disability requiring assistance with core activities (7%) was similar to that for all Aboriginal and Torres Strait Islander people (8%) in 2008 [154].

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 [155, 156].

Communicable diseases can be caused by: bacteria (e.g. pertussis (whooping cough) and tuberculosis); viruses (e.g. influenza and HIV); fungi (e.g. tinea); or protozoan parasites (e.g. malaria) [62, 157]. 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 [157]. Risk factors for communicable diseases vary according to the type of disease [155]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some infectious diseases in Australia [62].

Information regarding specific communicable diseases comes from a variety of sources, including individual studies and the 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. Information about some communicable diseases is analysed and published by specialised external agencies, including the Kirby

Institute (formerly the National Centre in HIV Epidemiology and Clinical Research) for sexually transmissible infections, hepatitis and HIV/AIDS, and the National Centre for Immunisation Research and Surveillance for vaccine-preventable diseases.

Tuberculosis

Tuberculosis (TB) is primarily a lung infection caused by inhaling the bacterium *Mycobacterium tuberculosis* [158]. The bacterium can penetrate the lung's tissue and start to multiply, potentially causing a variety of symptoms including coughing, weight loss, loss of appetite, fever, chills, as well as the coughing up of blood or sputum. The main risk factors for TB are poverty, overcrowding, and malnutrition [159, 160], all common among many Indigenous communities. Other risk factors, also common among Indigenous people, are diabetes mellitus, smoking, alcohol use, and advanced kidney disease [160]. Another risk factor for TB is HIV infection [161].

Extent of tuberculosis among Indigenous people

Of the 832 notifications of TB among Australian-born people in Australia in 2003-2007, 172 (21%) were identified as being Indigenous [Derived from 162, 163-166]. Almost one-half (47%) of the new cases among Indigenous people were reported in the NT (80 cases), and one-quarter (25%) in Qld (43 cases) (Table 25). 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).

Table 25. 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	30,329	2.6
Qld	43	136,754	6.3
WA	11	70,945	3.1
SA	9	27,578	6.5
Tas	2	18,333	2.2
ACT	0	4,300	-
NT	80	60,373	26.5
Australia	172	492,677	7.0

Source: Derived from Li, 2004 [162], Roche, 2006 [163], Roche, 2007 [164], Roche, 2008 [165] and Barry, 2009 [166]

Notes: 1 Population figures are for 30 June 2005 (the mid-point of the five-year period, 2003-2007)

2 Rates are crude incidence rates 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 26) [Derived from 162, 163-166]. 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 26. 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 (years)	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 [162], Roche, 2006 [163], Roche, 2007 [164], Roche, 2008 [165] and Barry, 2009 [166]

Notes: 1 Rates are per 100,000 population

2 Any discrepancy between the figures shown for 'All ages' and the sum of the number 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 misuse, other toxins, or an attack by the body's immune system on itself [167]. 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

The hepatitis A virus (HAV) is an infection of the liver predominantly transmitted by the faecal-oral route, either through ingesting contaminated food or water or by direct contact with an infected person (including sexual contact, particularly between men) [168, 169]. HAV is often asymptomatic among young children, but, among older people, symptoms may include fever, fatigue, nausea, diarrhoea, jaundice, and vomiting. Death due to HAV is very rare.

Of the 179 notifications of HAV for people living in WA, SA, and the NT in 2008-2010, 3 (1.7%) were identified as being Indigenous [Derived from 109, 170, 171-173]. The crude notification rate of 0.9 per 100,000 for Indigenous people was slightly less than the rate of 1.1 per 100,000 for non-Indigenous people.

It is likely that the low levels of HAV infection, particularly among Indigenous people, reflect the introduction of hepatitis A vaccination into the national childhood vaccination schedule in 2005 for Indigenous children living in Qld, WA, SA and the NT [174]. The vaccine has been shown to be at least 89% effective among Indigenous people in the NT (compared with 72% effectiveness among non-Indigenous people) [168]. There has not been a notified case of HAV among Indigenous people in the NT since 2006 (there have been 9 cases notified among non-Indigenous people, mostly contracted overseas).

Previously, clinically significant HAV infections were much more common among Indigenous children than among non-Indigenous children, particularly those living in the north Qld, WA, SA and the NT [174]. Children aged 0-4 years were at greatest risk of HAV infection.

Hepatitis B

Transmission of hepatitis B virus (HBV) is from 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 [175]. A mother may also transmit HBV to the foetus during pregnancy or to the child during birth. Only 30-50% of people acutely infected with HBV will experience obvious symptoms, including jaundice, nausea, vomiting, 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 chronic liver disease, cirrhosis, or liver cancer [169, 175, 176].

Of the 162 notifications of HBV for people living in WA, SA, and the NT in 2008-2010, 9 (5.6%) were identified as being Indigenous (Indigenous status was not stated in 1.9% of cases) [Derived from 109, 170, 171-173]. The crude notification rate of 2.7 per 100,000 for Indigenous people was 2.2 times the rate of 1.3 per 100,000 for non-Indigenous people.

For the Indigenous population, the rate of HBV diagnoses in 2010 was highest among those aged 30-39 years [170]. Indigenous people had a considerably higher rate of HBV diagnoses in almost every age-group. Indigenous males were 1.7 times more likely to be diagnosed with HBV than were Indigenous females.

Major cities, very remote, and outer regional areas had the highest rates of newly acquired HBV infection in the Indigenous population [170]. The rate of infection was highest for non-Indigenous people in major cities.

A vaccination program commencing in Indigenous communities in the mid-1980s has had considerable success [177], but some studies suggest that Indigenous children had a sub-optimal response to the HBV vaccine more often than their non-Indigenous counterparts [178, 179]. 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. Despite the sub-optimal response/non-responsiveness of some Indigenous children to the HBV vaccine, it remains an effective means for reducing HBV infection levels in the Indigenous community [177].

Hepatitis C

Transmission of hepatitis C virus (HCV) typically occurs via blood-to-blood contact [180]. Injecting drug use (IDU) is the most common method of contracting the virus and is responsible for the vast majority of cases [170, 181]. The likelihood of transmission of HCV via sexual contact is generally very low [169]. 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 [180]. Some people with HCV can live relatively normal lives, largely unaffected by the virus, while others may develop cirrhosis, liver cancer, or liver failure [182]. Treatment for HCV is available, but its success is dependent on several factors, including the HCV genotype. There is no vaccine to protect people against HCV [180].

Of the 5,784 notifications of HCV for people living in WA, SA, and the NT in 2008-2010, 645 (11%) were identified as Indigenous (8.6% of notifications did not state Indigenous status) [Derived from 109, 170, 171-173]. The crude notification rate of 197 per 100,000 for Indigenous people was 5.1 times the rate of 39 per 100,000 for non-Indigenous people. Over the five-year period 2006 to 2010, notification rates were consistently much lower for Indigenous people living in the NT than for those living in WA and SA [170].

In contrast to other reported communicable diseases, the rate of newly diagnosed HCV infection among Indigenous persons was highest for those living in inner regional areas and major cities [170]. 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.

The age pattern of newly diagnosed HCV was slightly different for the Indigenous and non-Indigenous populations [170]. Among Indigenous people, rates were highest for those in the 20-29 years, 30-39 years, and 40-49 years age-groups. For non-Indigenous people, they were highest in the 30-39 years, 40-49 years, and 50-59 years age-groups. Rates were generally higher for males than for females for both populations.

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 [183]. 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 [184].

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 [185]. Hib notifications in Australia declined from 617 cases reported in 1993-1994 to 32 cases in 2004-2005, with no deaths during 2005 [186].

The incidence of invasive Hib disease has declined sharply, but Indigenous populations continue to be at higher risk of contracting Hib than are non-Indigenous populations [186]. 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. Similarly, in 2003-2006, Indigenous people were 8.8 times more likely to contract Hib than their non-Indigenous counterparts [185].

Pneumococcal disease

Pneumococcal disease, which is caused by the bacterium *Streptococcus pneumonia* (pneumococcus), normally includes upper respiratory tract and lower respiratory tract infection (primarily pneumonia) [187]. 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 [188, 189]. Children aged less than five years are particularly susceptible to pneumococcal disease [190].

Vaccination for pneumococcal disease became available in 1999 for Indigenous adults aged 50 years and older and Indigenous people aged 15-49 years with high-risk conditions [187]. In 2001, nationally-funded vaccination became available for Indigenous infants and young children and for all Australian children with high-risk conditions. From 2005, vaccination has been funded for all Australian infants and for all people aged 65 years and older [187, 188].

Extent of pneumococcal disease among Indigenous people

Indigenous children and adults have a significantly higher incidence of pneumococcal disease than do non-Indigenous people, but detailed data are available only for IPD [189], which has been notifiable Australia-wide since 2001 [188].

Based on notifications for people living in NSW, Vic, Qld, WA, SA, Tas and the NT in 2006-2008, the age-standardised rate of IPD for Indigenous people (46 per 100,000) was more than seven times higher than the rate for other people (6.3 per 100,000)[14] [44]. For

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[14] Indigenous rates have been compared with those for all other people, including those for whom Indigenous status was not known.

Indigenous people, notification rates were highest in the 65 years and older age-group (114 compared with 17 per 100,000) and in the 45-54 years age-group (58 compared with 5.1 per 100,000). Importantly, the incidence for Indigenous people aged 35-44 years and 45-54 years was very high, with rates (50 and 58 per 100,000, respectively) almost 12 times higher than those for other people (4.3 and 5.1 per 100,000, respectively).

Vaccination programs have had a significant impact on the number of cases of IPD among both Indigenous and non-Indigenous people, but notification rates remain higher for Indigenous people than for non-Indigenous people [191, 192]. At the start of the national Indigenous childhood pneumococcal vaccination program in 2001, the rate for Indigenous children aged less than two years (219 per 100,000) was 2.9 times higher than the rate for non-Indigenous children (75 per 100,000) [192]. By 2004, rates for Indigenous and non-Indigenous children under two years were similar (92 and 94 per 100,000, respectively); since that time the rates have remained relatively stable among Indigenous children, but decreased for non-Indigenous children, leading to an increasing gap. There is no current information on children under two years, but Indigenous children 0-4 years had 3.7 times the rate of notification of other children in 2006-2008 [44].

For Indigenous adults, IPD rates decreased after the introduction of vaccination programs in the Kimberley, WA [193] and in north Qld [194], but rates remain higher for Indigenous adults than for non-Indigenous adults nationally [188]. The high rates of IPD notifications for Indigenous people are reflected in hospitalisation rates for pneumococcal septicaemia and meningitis [185].

In terms of mortality, 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 [185].

Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [185]. Manifestations of meningococcal disease include meningitis, meningococcaemia without meningitis, and septic arthritis. The risk of infection increases in crowded housing conditions [195]. In 2009, the most common groups of meningococcus found in Australia were B (88%) and C (5.9%), with proportions similar to those in 2007 and 2008 [196]. Vaccination against serogroup C was funded for all infants from 2003: a catch-up program for all people aged up to 19 years of age ended in 2007.

Extent of meningococcal disease among Indigenous people

The rate of meningococcal disease is higher for Indigenous people than for other Australians, and children aged less than five years are particularly susceptible [185]. Previously recorded outbreaks among Indigenous children north-west Qld were due to serogroup C [197], but the disease in young children is now mainly due to serogroup B [198].

In 2003-2006, 8.4% (106 cases) of the 1,263 cases of meningococcal disease notified in NSW, Vic, WA, SA and the NT were identified as Indigenous [185]. More than 32% of all cases and almost 69% of cases identified as Indigenous occurred among children 0-4 years. The rate of 45 per 100,000 for Indigenous children aged 0-4 years was 4.9 times the rate of 9.2 per 100,000 for their non-Indigenous counterparts. Across all age-groups, the age 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 2003-2005 [185]. One death was of a person identified as Indigenous.

Sexually transmitted infections

Sexually transmissible infections (STIs) are infections that are spread primarily by heterosexual or homosexual contact with an infected person [155]. STIs are caused by microorganisms that are transmitted from one person to another through semen, fluid from the vagina, anal or throat secretions, and blood [199]. Some STIs can also be transmitted under some circumstances via skin to skin contact, or from mother to baby during pregnancy and/or birth. Most STI cases are found among sexually active teenagers and young adults, and unprotected sex is generally the primary risk factor [200].

The majority of STIs are asymptomatic or produce only mild symptoms [155, 200]. Many people affected find out they have an infection through screening and contact tracing [155]. 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: a younger more mobile population; socio-economic disadvantage; poor access to health services; and lack of clinical staff who have the competence and sensitivity to deal with sexual health issues among Indigenous people [67, 201].

The NNDSS collects data on some STIs, including chlamydia, gonorrhoea, syphilis, donovanosis, and HIV/AIDS [62]. 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 [202]. 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 [203]. The high screening rates in some Indigenous communities probably contributes to the higher rates reported for Indigenous people than for non-Indigenous people [67, 204].

Gonorrhoea

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoeae* [205]. In women, gonorrhoea can affect the urethra, cervix, and rectum, and 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.

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 2008-2010: 1,244 cases per 100,000 population (based on 9,919 cases notified) compared with 25 per 100,000 (based on 6,088 cases notified) [Derived from 109, 170, 173]. (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 (32,783 per 100,000) and WA (3,334 per 100,000). Notification rates for gonorrhoea increased slightly for both Indigenous and non-Indigenous people over the five-year period 2006-2010.

In 2010, gonorrhoea notification rates were highest for Indigenous people aged 15-19 years and 20-29 years [206]. For 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 2010 was slightly higher for females than males among Indigenous people, but males contributed 78% of the notifications for non-Indigenous people [170].

In 2006-2010, 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 [170]. For non-Indigenous people, notification rates were also highest in very remote and remote areas.

Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [207]. In the initial stage of the infection, syphilis causes painless ulcers or sores around the mouth or genital area. 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, skin, intestinal tract, and bones [206]. For pregnant women, untreated syphilis poses further serious health threats as the infection can be passed on to the child, possibly resulting in physical deformities and brain damage [208].

Australia-wide, notification rates of syphilis were much higher for Indigenous people than for non-Indigenous people in the three-year period 2008-2010: 27 per 100,000 (based on 439 cases notified) compared with 5.1 per 100,000 (based on 3,249 cases notified) [Derived from 109, 170, 173]. (These rates do not include the 4.4% 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 (51 per 100,000) was 15 times the rate for non-Indigenous people (3.3 per 100,000).

Australia-wide, syphilis notification rates decreased for Indigenous people from 40 per 100,000 in 2006 to 25 per 100,000 in 2010 [170]. Notification rates increased for non-Indigenous people from 3 per 100,000 in 2006 to 5 per 100,000 in 2010.

Syphilis notification rates in 2010 were highest among Indigenous people aged 20-29 years [206]. Among non-Indigenous people, the rate was highest in the 30-39 years age-group. Indigenous males accounted for 61% of the notifications of syphilis among Indigenous people in 2010; males contributed 94% of the notifications among non-Indigenous people [170].

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 [170]. 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 the most common STI among Indigenous people in Australia [67, 209]. The infection in women can cause cervicitis, endometritis, and pelvic inflammatory disease, which can lead to tubal factor infertility and ectopic pregnancy [209]. 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 in notification data.

Notification rates for chlamydia were much higher for Indigenous people living in WA, SA and the NT in the three-year period 2008-2010 than for their non-Indigenous counterparts: 2,726 per 100,000 (based on 8,936 cases notified) compared with 314 per 100,000 (37,537 cases notified) [Derived from 109, 170, 173]. (These rates do not include the 14% of notifications for which Indigenous status was not stated.) Notifications of chlamydia for Indigenous people increased between 2008 and 2010, but the increase was not as great as for non-Indigenous people.

For both Indigenous and non-Indigenous people, notification rates of chlamydia in 2010 were highest for people aged 15-29 years, and higher for females than for males [206]. Notification rates for Indigenous people were much higher in remote and very remote areas than in major cities and inner and outer regional areas [170]. Among non-Indigenous people, notification rates were slightly higher for remote and very remote areas but similar for the other areas.

HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that destroys cells in the body's immune system [206]. Untreated, the virus weakens immune system functioning to the point where minor infections may become fatal. This late stage of HIV is referred to as acquired immune deficiency syndrome (AIDS). At present there is no vaccine to prevent HIV, nor is there a cure, but antiretroviral therapy has dramatically reduced the number of HIV cases progressing to AIDS.

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 [210]. The behaviour that presents the greatest risk of exposure to HIV is 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 are low in comparison with other countries [62]. 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' [211, p.6]. Indigenous people are regarded as being at particular risk of HIV infection due to their higher rates of STIs and more limited access to health care services [212].

Extent of HIV/AIDS among Indigenous people

National surveillance data show the number of newly diagnosed HIV infections in the Indigenous population were almost the same in 2009 and in 2010 (23 and 22 new cases, respectively) [170]. Over the decade 2001-2010, the number of new HIV diagnoses among Indigenous people increased by 57% (14 new cases in 2001), but a year-by-year analysis shows fluctuations in the number of new cases. In 2010, males accounted for 68% of Indigenous HIV diagnoses . 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 2009 to 2010 (1,039 and 1,021 cases, respectively) [Derived from 170]. 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.

Around two-thirds of new HIV infections among the Indigenous population in 2010 were reported in Qld (36%), and NSW (32%) [170]. In terms of exposure to HIV, men who have sex with men accounted for almost two-thirds (60%) of new HIV cases among Indigenous people. Injecting drug use and heterosexual contact were also identified as common exposures to HIV among Indigenous people (20% and 15%, respectively). The majority of new Indigenous HIV infections occurred in major cities; the rate of infection generally declined 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 170]. Most new cases of HIV infections among non-Indigenous people in 2010 were reported in NSW (34%). Vic (27%) and Qld (23%) also accounted for substantial proportions of the new cases. Among non-Indigenous people, 94% of all new cases in 2010 were attributed to the categories 'men who have sex with men' (66%) and 'heterosexual contact' (28%). Injecting drug use was responsible for only 2.0% of new cases among non-Indigenous people.

Overall in Australia, the cumulative number of HIV diagnoses by the end of 2010 was 30,486, of which 207 were among Indigenous people [170] .

Information about the occurrence of AIDS in the Indigenous population in 2010 is not available, but the number of new AIDS cases for the total population in 2009 was only 90 [171]. In 2009, there were nine deaths following AIDS in Australia. The number of new AIDS cases in the Indigenous population in the ten-year period 1997-2006 was low, but Indigenous people had a slightly higher rate of AIDS diagnoses than did non-Indigenous people in 2006 (1.2 compared with 1.0 per 100,000) [213]. The absence of Indigenous status in the most recent AIDS data [171] may be due to the marked decrease in new AIDS diagnoses and deaths in Australia over the past decade.

Skin infections and infestations

Susceptibility to skin infections and infestations increase with poor living conditions and overcrowding [214, 215]. Skin infections in many Indigenous communities reflect serious health inequalities, but have attracted much less professional attention than they deserve [216]. Scabies, a disease caused by the mite *Sarcoptes scabiei* resulting in inflammation and itching [217], is endemic in some remote central and northern Indigenous communities, with prevalence up to 50% in children [218] and up to 25% in adults [219]. The East Arnhem Regional Healthy Skin Program reported that more than 70% of children presented in 2002-2005 with scabies, almost all before they reached 2 years of age [220]. Another study of children in a remote community in the NT in 2007 found that 68% of children had presented with scabies during their first year of life, and 77% had presented in the first two years [221].

Scratching in response to the inflammation and itching of scabies infestation 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 [222]. A study of a remote community in the NT in 2007 found that 82% of children presented with pyoderma in their first year of life and 87% in their first two years [221]. The pyoderma in Indigenous communities commonly involves group A streptococcus (GAS), which is responsible for continuing outbreaks of post-streptococcal glomerulonephritis and acute rheumatic fever [222, 223].

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 [222].

Skin conditions can be linked with serious complications, which can result in hospitalisation and, very uncommonly, death. The most current detailed information about hospitalisation for skin conditions among Indigenous people is for June 2006 to July 2008, during which period they accounted for around 3.9% of hospital admissions (excluding dialysis) of Indigenous people in NSW, Vic, Qld, WA, SA and the NT, at 2.3 times the rate of other people [44].

Factors contributing to Indigenous health

Selected health risk and protective factors

The factors contributing to the poor health status of Indigenous people should be seen within the broad context of the 'social determinants of health' [9, 26]. These 'determinants', which are complex and interrelated, include income, education, employment, stress, social networks and support, working and living conditions, gender and behavioural aspects, all of which are 'integrated' in terms of autonomy and the capacity to participate fully in society [25]. 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 and protective factors', including those summarised in the following sections. These risk and protective 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.

Nutrition

The nutritional status of Indigenous people is influenced by socio-economic disadvantage, and geographical, environmental and social factors [224, 225]. Poor nutrition is a common risk factor for overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [225, 226]. The National Health and Medical Research Council (NHMRC) has endorsed a number of dietary guidelines for children, adolescents, adults, older Australians, women of childbearing age, and pregnant women [225]. 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 [227]. 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, the majority of Indigenous people aged 12 years and over reported eating fruit (86%) and vegetables (95%) on a daily basis [57]. However, 13% of Indigenous respondents reported no usual daily fruit intake (compared with 7% of non-Indigenous respondents) and 5% reported no usual daily vegetable intake (compared with 1% of non-Indigenous respondents).

Levels of fruit and vegetable consumption differed between those living in remote or non-remote areas, at least partly due to the poor accessibility and availability of fruit and vegetables in remote areas [57]. The 2004-2005 NATSIHS found that 42% of Indigenous people aged 12 years or older living in non-remote areas consumed the recommended number of servings of fruit and 10% consumed the recommended number of servings of vegetables per day (Indigenous people in remote areas were not asked how many serves of fruit and vegetables they consumed; the questions 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.

More than three-quarters (76%) 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 19% drinking reduced fat and/or skim milk [57]. The consumption of reduced fat and/or skim milk was very low (6%) among Indigenous people living in remote areas, with 87% reporting that they drank whole milk.

Around 83% of Indigenous people aged 12 years or older living in remote areas reported 'sometimes' or 'usually' adding salt after cooking, compared with two-thirds (66%) of those living in non-remote areas [57].

The 2004-2005 NATSIHS also addressed the question of food security by asking respondents whether they had run out of food in the previous 12 months [67, 228]. Age-adjusted comparisons show that 12% of Indigenous people aged 15 years and older in non-remote areas ran out of food, but were more able to get food by other means in the 12 months before the survey, compared with 3% of non-Indigenous people. Those in remote areas were more likely to report having run out of food but were able to get food by other means than those in non-remote areas (28% of Indigenous people and 4% of non-Indigenous people). Approximately 8% of Indigenous people in non-remote areas reported they went without food when they couldn't afford to buy more, compared with 2% of non-Indigenous people. The proportions of people living in remote areas who went without food when they couldn't afford to buy more were similar to those for people living in non-remote areas: 7% of Indigenous people and 1% of non-Indigenous people.

In attempting to address the issue of food security in the NT, the Australian Government established a licensing regime for community stores as part of the NTER in 2007 [229]. An evaluation of the *Community stores licensing program* published in 2011 concluded that stores licensing has had a positive impact on food security, particularly with regard to the quality, quantity, and range of healthy foods available in the remote stores involved in the project.

The 2004-2005 NATSIHS found an association between dietary behaviour and income, educational attainment, and self-assessed health status [67]. In particular, Indigenous people who reported no usual daily intake of fruit or vegetables were more likely to be in the lowest quintile of income. Low fruit and vegetable intake was also associated with smoking and risky/high risk alcohol consumption.

Physical activity

The *National physical activity guidelines for Australians* recommends moderate physical activity on most, preferably all, days of the week to improve health and reduce the risk of chronic disease and other conditions [230, 231]. For children, at least 60 minutes of activity is recommended, and, for adults, at least 30 minutes is recommended; these amounts can be in blocks of activity or accumulated throughout the day in short bursts [231]. Insufficient levels of physical activity have been shown to be a risk factor for CVD, type 2 diabetes, certain cancers, depression and other social and emotional wellbeing conditions, overweight and obesity, and a weakened musculoskeletal system [91, 230, 231].

The 2008 NATSISS and the 2004-2005 NATSIHS are the two most recent sources of information on the physical activity levels of Indigenous people [57, 91]. For children, data from the 2008 NATSISS reveal that almost two-thirds (64%) of Indigenous children aged 4-14 years had taken part in some form of physical activity or sport in the 12 months prior to the survey [Derived from 232]. Almost three-quarters (74%) of Indigenous children in this age-group had been physically active for at least 60 minutes on every day in the week before the survey, and only 3% had not had any activity [91].

Of all the Indigenous children 4-14 years who participated in some form of physical activity or sport, males had slightly higher levels of participation (52%) than did females (48%) [Derived from 232]. Among Indigenous children, the highest level of participation in physical activity was 45% for children living inner/outer regional areas, followed by those living in major cities (34%), and remote/very remote areas (22%). Of children participating in physical activity, the highest proportions were in NSW and Vic (both 30%), and the lowest in ACT (0.9%).

For adults, self-reported data from the 2008 NATSISS show that almost one-third (30%) of Indigenous people aged 15 years and over had taken part in some type of physical activity or sport in the previous 12 months [Derived from 232]. Participation levels were higher among Indigenous males (38%) than among Indigenous females (23%), and levels decreased with age for both sexes from around 47% for the 15-24 years age-group to around 4% for the 55 years and over age-group. For both sexes, participation levels were highest for people living in inner/outer regional areas (42%), followed by major cities (36%), and remote/very remote areas (23%). The states/territories with the highest participation levels were NSW (30%) followed closely by Qld (27%), and the lowest levels were found in the ACT (1.3%); proportions for both Indigenous males and Indigenous females followed similar trends.

Of all Indigenous people 15 years and older who took part in physical activity, around 89% identified their status as Aboriginal, around 5.6% identified as Torres Strait Islander, and around 5.4% identified as both Aboriginal and Torres Strait Islander [Derived from 232]. The levels of participation in physical activity were similar for each of these Indigenous groups: Aboriginal people (30%), Torres Strait Islanders (33%), and Aboriginal and Torres Strait Islanders (32%).

In the 2004-2005 NATSIHS, after adjusting for differences in the age structures of the Indigenous and non-Indigenous populations, just over half (51%) of Indigenous people surveyed in non-remote areas reported their physical activity level as sedentary (very low or no physical activity) compared with around one-third (33%) of non-Indigenous people [44]. Around one-quarter (27%) of Indigenous people reported low levels of activity compared with over one-third of non-Indigenous people (36%). Only one-fifth (21%) of Indigenous people reported moderate or high levels compared with one-third (31%) of non-Indigenous people.

Indigenous females had a greater proportion of sedentary activity levels than did Indigenous males (51% compared with 42%) [44]. The highest levels of sedentary or low levels of activity were reported among the older age-groups, including 45-54 years (83%) and 55 years and over (85%). The highest levels of moderate to high physical activity levels were reported for age-groups 15-24 years (32%) and 25-34 years (27%). Indigenous people reported higher proportions of sedentary activity levels than did non-Indigenous people across all states and territories, with levels highest for Indigenous people in NSW (78%) and Tas (70%).

Between 2001 and 2004-2005, levels of sedentary physical activity among Indigenous people aged 15 years and older increased from 37% to 47% [44]. The disparity between Indigenous people and non-Indigenous people in relation to sedentary physical activity levels also increased between 2001 and 2004-2005 from 11% to 18%.

Bodyweight

The standard measure for classifying a person's weight for height is body mass index (BMI – weight in kilograms divided by height in metres squared) [62]. Being overweight (BMI 25.0 to 29.9) or obese (BMI more than 30.0) increases a person's risk for CVD, type 2 diabetes, certain cancers, and some musculoskeletal conditions. 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 [227]. Being underweight (BMI less than 18.5) can also have adverse health consequences, including decreased immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bone loss) [62]. The 2003 NHMRC dietary guidelines for adults recommend that adults prevent weight gain by being physically active and eating according to their energy needs [227].

Overweight and obesity contributed 11.4% to the total burden of disease among Indigenous people in 2003, second only to tobacco [233]. It is possible, however, that this may be an under-estimate because optimal BMI cut-offs are still uncertain for the Indigenous population (due to differences in body shape and other physiological factors) [234]. It has been suggested that a BMI of 22 might be a more appropriate than 25 as a measure of acceptable weight for Indigenous people. There is also evidence that measuring the waist to hip ratio (WHR) in Indigenous people is more sensitive and easier to measure than BMI [235].

Based on BMI information collected as a part of the 2004-2005 NATSIHS – and using current BMI criteria – 57% of Indigenous people aged 15 years or older were classified as overweight or obese, with only slight differences according to remoteness of residence (the lowest proportion was 55% in major cities and the highest was 62% in remote areas) [57]. A higher proportion of Indigenous males (34%) than Indigenous females (24%) were overweight, but Indigenous females were more likely than Indigenous males to be obese (34% compared with 28%) [44]. 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 than for their non-Indigenous counterparts [57].

In 2004-2005, Indigenous people aged 18 years or more were more likely to be overweight or obese if [44]:

- their self-reported health status was fair/poor (68%) compared with those whose health was excellent/very good (55%)
- they had three or more long-term health conditions (65% compared with 56% of those with no long-term health conditions)
- they had circulatory problems (72% compared with 57% without circulatory problems)
- they had diabetes (83% compared with 57% of those without diabetes)
- they did not have cancer (60% compared with 42% of those who did have cancer).

The prevalence of overweight and obesity among Indigenous people adults living in non-remote areas has increased steadily from 51% in 1995, to 56% in 2001, and to 60% in 2004-2005 [44].

Overweight and obesity was slightly more common overall among Torres Strait Islander people aged 15 years or older (61%) than among Aboriginal people in that age-range (56%) (the difference is not statistically significant) [57]. 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.

In 2004-2005, around 4.4% of Indigenous people aged 15 years or older were underweight, with about 2.8% of Indigenous men and 6.0% of Indigenous women having a BMI of less than 18.5 [44]. Indigenous adults were also more likely to be underweight if:

- they were current smokers (6.0%), compared with those who were ex-smokers (1.9%) or who had never smoked (3.2%)
- they did not have a non-school qualification (5.7% compared with 2.1% who had achieved a non-school qualification)
- they engaged in low to moderate levels of physical activity (6.6% compared with 0.7% who engaged in high levels of physical activity)
- they reported not eating fruit daily (6.2% compared with 4.1% who reported eating fruit daily)
- they reported not eating vegetables daily (8.3% compared with 4.1% who ate vegetables daily).

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 against vaccine-preventable diseases, which include some extra vaccinations [189].

Data for immunisation levels among Indigenous children and adults come from two main sources: the national Australian Childhood Immunisation Register (ACIR), and self-reported data from the 2004-2005 NATSIHS [44, 57].

The most recently published data for the immunisation coverage for Indigenous children are to 31 December 2009 [44]. Coverage for all vaccines was lower for Indigenous children than for non-Indigenous children across the three recorded age-groups: 1 year (8% lower); 2 years (4% lower); and 5 years (5% lower).

For the 1 year age-group, the greatest difference in all vaccination coverage was in WA, where coverage for Indigenous children was significantly lower (17% lower) than for non-Indigenous children (rate ratio 0.8) [44]. For selected diseases, the greatest difference was for vaccination coverage of polio, which was 8% lower among Indigenous children than among non-Indigenous children (rate ratio 0.9).

For the 2 years age-group, WA also had the greatest difference in vaccine coverage between Indigenous children and non-Indigenous children, being 18% lower for Indigenous children (rate ratio 0.8) [44]. The greatest difference for selected diseases in this age-group was Hib: coverage for Indigenous children was 4% lower than for non-Indigenous children (rate ratio 0.96).

For the 5 years age-group, the ACT recorded the greatest difference in vaccination coverage between Indigenous children and non-Indigenous children, 17% lower for Indigenous children (rate ratio 0.8, not statistically significant) [44]. Coverage for DTP (diphtheria, tetanus, and pertussis) had the greatest differences of the selected diseases, with coverage for Indigenous children 5% lower than for non-Indigenous children (rate ratio 0.95).

Immunisation coverage for Indigenous children has varied over the years [44]. Combined data for NSW, Vic, WA, SA and the NT for 2001-2009 reveal that relative coverage was at its best in 2004 in the 1 year age-group with a rate difference of 6% (lower among Indigenous children than among non-Indigenous children). The rate difference then increased steadily to 10% in 2008, and decreased slightly to 9% in 2009. For the 2 years age-group, the smallest rate difference occurred in 2006 (0.7% difference, lower among Indigenous children than among non-Indigenous children), and steadily increased to a difference of 6% in 2009. The 5/6 year age-group followed a similar pattern, the smallest difference occurred in 2005 (0.3% difference, lower among Indigenous children than among non-Indigenous children), and increased steadily to 5% difference in 2009.[15]

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 [57]. This figure is based on a general question about immunisation, however, and is almost certainly an over-estimate. Information from the available immunisation records suggests the proportion of Indigenous children aged 0-6 years who were fully immunised is lower since the proportions for the separate vaccines were: diphtheria and tetanus (79%), pertussis (whooping cough) (74%), hepatitis B (83%), polio (79%), 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%) [57]. Indigenous females had slightly higher vaccination coverage (61%) than did Indigenous males (58%). All of these levels were higher than that 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%; female: 37%; male: 31%) than that for their non-Indigenous counterparts (20%).

Indigenous people aged 65 years and older reported in the 2004-2005 NATSIHS higher levels of coverage for influenza in the previous 12 months (84%) than has been documented for non-Indigenous people of the same age-group (73%) [44]. Reported coverage of pneumonia vaccination was also slightly higher among Indigenous people 65 years and older (48%) than among non-Indigenous people of the same age-group (43%).

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 [225]. It also has anti-infective properties and contains immunoglobulins, which provide some immunity against early childhood diseases [236]. 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 [237].

According to the 2004-2005 NATSIHS, more than four-fifths (84%) of Indigenous mothers aged 18-64 years reported having breastfed their children, which is similar to the level in 2001 (86%) [57]. The proportion of women who breastfed their children was higher in remote areas (92%) than in non-remote areas (80%).

Two-thirds (66%) of Indigenous children 0-3 years living in non-remote areas were reported to have been breastfed for some period of time [57]. This level is slightly lower than the 72% found among non-Indigenous children. 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 (11% and 14% respectively). Around 13% of Indigenous children 0-3 years were being breastfed at the time of the survey.

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 [42].

The *Footprints in time – the longitudinal study of Aboriginal children* collected data from 11 sites (rural, remote and urban) around Australia in 2008-2009 [238]. Data on breastfeeding from this study showed that 80% of Indigenous children in the study had been breastfed at some time during their early years, 22% of Indigenous infants had been breastfed for at least 12 months. This study found that children in more remote areas has been breastfed for a slightly longer period of time.

Tobacco smoking

Smoking tobacco increases the risk of CVD, some cancers, lung diseases, and a variety of other health conditions [67]. Smoking is also a risk factor for complications during pregnancy and is associated with preterm birth, low birthweight, and perinatal death. Passive smoking is also of concern to health, with children particularly susceptible to problems, including middle ear infections, asthma, and SIDS

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 of disease [239].

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[15] Due to the change in reporting practices from the 6 years age-group to the 5 years age-group, figures for should be viewed with some caution.

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 2010 than among their non-Indigenous counterparts (38% and 18%, respectively) [240].

Almost one-half of Indigenous people (47%) aged 15 years or older reported to the 2008 NATSISS that they were current smokers [241]. The level of smoking among Indigenous people has decreased slightly since 1994 (52%) [242]. Almost two-thirds (62%) of current daily smokers in 2008 reported trying to quit or reduce their smoking in the 12 months prior to interview [154]. More than one-third (34%) of Indigenous people reported in 2008 that they had never smoked [241].

Overall, the proportion of Indigenous men who smoked (49%) was slightly higher than the proportion of Indigenous women who smoked (45%) [241]. The level of smoking was slightly higher for Indigenous people living in remote/very remote areas (53%) than for those living in inner/outer regional areas (47%) or major cities (42%) [243].

The proportions of current smokers were similar for Torres Strait Islanders (44%) and Aboriginal people (47%) [244].

High rates of smoking have been reported for Indigenous mothers. In 2008, smoking during pregnancy was more than three times more common for Indigenous mothers living in NSW, Vic, Qld, WA, SA, Tas, the ACT and the NT than for their non-Indigenous counterparts (51% compared with 14%) [245].

In 2008, 16% of Indigenous children aged 0-3 years and 23% of Indigenous children 4-14 years lived with someone who usually smoked inside the house [129, 246]. For Indigenous people 15 years and older the proportion was 26% [154].

Alcohol use

Alcohol-related harm includes chronic diseases, accidents and injury, and is not limited to the user, extending to families and the broader community [247]. Consumption of alcohol in pregnancy can affect the unborn child leading to foetal alcohol spectrum disorder (FASD), an umbrella term that describes a range of conditions (comprising abnormalities such as growth retardation, characteristic facial features, and central nervous system anomalies (including intellectual impairment)) [248]. These disorders are incurable, but wholly preventable. In 2003, the burden of disease attributable to alcohol among Indigenous people was more than twice that among other Australians (5.4% compared with 2.3%) [239, 249]. Of 11 risk factors, alcohol was the fifth leading cause of the burden of disease among Indigenous people; the highest levels of disease burden attributable to alcohol among Indigenous people were for injury (22%), mental disorders (16%), and cancers (6.3%) [239].

Extent of alcohol use among Indigenous people

Surveys have shown consistently that Indigenous people are less likely to drink alcohol than are non-Indigenous people, but those that do drink are more likely to consume it at hazardous levels [57, 240].

- The 2008 NATSISS found that 35% of Indigenous people aged 15 years or older were abstainers; this level of abstinence is more than 2.5 times that of the Australian population aged 15 years or older reported in the 2007-08 NHS (13%) [250, 251].[16]
- The 2004-2005 NATSIHS found that 24% of Indigenous people aged 18 years or older had never consumed alcohol or had not done so for more than 12 months, compared with 15% for non-Indigenous people [44].
- The 2004-2005 NATSIHS found that 17% 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 [44].
- The 2004-2005 NATSIHS found that the age-standardised ratio of abstinence among the Indigenous population was nearly twice that (1.9) of the non-Indigenous population [44].

Assessing risks from use of alcohol

All of the information presented here relates to alcohol risk based on the NHMRC 2001 guidelines. 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 [247]. 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.

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[16] The 2010 National Drug Strategy Household Survey (NDSHS) reported that 25% of Indigenous people aged 14 years or older were abstainers. However, its relatively small Indigenous sample means that this estimate is much less robust than that from the 2008 NATSISS.

On the other hand, the 2008 NATSISS found that 37% of Indigenous people aged 15 years and over were binge drinking at risky/high risk levels (based on the largest quantity of alcohol used in a single day in the fortnight prior to interview)[17], similar to the level reported in the 2002 NATSISS (35%) [154]. The level of long-term risky/high risk drinking in 2008 (based on daily consumption of alcohol and the frequency of consumption in the previous 12 months)[18] was similar to that reported in 2002 (17% and 15%, respectively). (Rates of risky/high risk alcohol consumption cannot be compared with those for the non-Indigenous population due to differences in the questions asked in the 2007-08 NHS [154].)

Similarly, 38% of Indigenous people aged 15-24 years reported in the 2008 NATSISS binge drinking at risky/high risk levels in the previous fortnight, a level similar to that reported in the 2002 NATSISS (35%) [253]. The level of long-term risky/high risk drinking increased from 11% in 2002 to 16% in 2008 due to a significant rise in the level of risky/high risk drinking among young males (from 11% to 19%).

The most recent comparable Indigenous/non-Indigenous data for risky/high risk alcohol consumption are available from the 2004-2005 NATSIHS and the 2004-2005 NHS. Analysis of these sources found that the proportions of people aged 18 years or older who consumed alcohol at a 'high risk'[19] level were 8.0% for Indigenous people and 5.8% for non-Indigenous people [57]. High risk alcohol consumption was reported for 11% of Indigenous males and 8.2% of non-Indigenous males, and for 5.4% of Indigenous females and 3.0% of non-Indigenous females.

By remoteness of residence, consumption at 'risky/high risk'[20] levels was slightly higher for Indigenous people aged 18 years or older living in non-remote areas (17%) than for those living in remote areas (15%) (the difference is not statistically significant) [57]. Compared with Indigenous results from the 2001 NHS, consumption at 'risky/high risk' levels increased by five percentage points for Indigenous people living in non-remote areas and decreased by two percentage points for those living in 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 Islander people in that age range (13%) (the difference is not statistically significant) [57]. The level of 'risky' or 'high risk' alcohol consumption was even lower among Torres Strait Islander people living in the Torres Strait area (9%).

Analysis of the 2004-2005 NATSIHS found that 55% of Indigenous people were binge drinking (drinking at short-term risky/high risk levels based on the amount of drinks consumed in any one day) and 17% were drinking at long-term risky/high risk levels (based on the amount of drinks consumed per day and the total for the week) [44]. After adjusting for differences in the age structures of the two populations, Indigenous people were found to be twice as likely as non-Indigenous people to have consumed alcohol at short-term risky/high risk levels at least once a week in the previous 12 months. This is likely to be an underestimate of the short-term risky/high risk ratio of drinkers as it does not take into account the higher level of abstinence in the Indigenous population. Overall, Indigenous and non-Indigenous people were equally as likely to drink at long-term risky/high risk levels (15% and 14% respectively). But, when the greater level of abstinence in the Indigenous population is accounted for, Indigenous people are around 1.5 times as likely as non-Indigenous people to drink at long-term risky/high risk levels.

Analysis of information collected by the 2008 NATSISS on alcohol consumption during pregnancy found that 80% of mothers of Indigenous children aged 0-3 years did not drink during pregnancy, 16% drank less alcohol, and 3.3% drank the same or more alcohol during pregnancy [44]. The proportion of mothers who drank the same or more alcohol during pregnancy was greatest in Tas/ACT (6.0%), followed by Vic (5.4%), and WA (5.0%).

Hospitalisation

For Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2006 to June 2008, 1.4% of all hospitalisations were for a principal diagnosis related to alcohol use [44]. Indigenous people were hospitalised for diagnoses related to alcohol use at a rate 4.2 times that of non-Indigenous people (Indigenous males were hospitalised at 4.9 times the rate, and Indigenous females were hospitalised at 3.2 times the rate of non-Indigenous males and females, respectively). Over 80% of hospitalisations related to alcohol use were for ICD 'mental and behavioural disorders due to alcohol use'; acute intoxication was the most common type of mental and behavioural disorder due to alcohol use, followed by dependence syndrome, and withdrawal state. Indigenous people were hospitalised for mental and behavioural disorders due to alcohol use at 4.2 times the rate of non-Indigenous people. Alcoholic liver disease was the principal diagnosis for 10% of hospitalisations related to alcohol use; Indigenous people were hospitalised at 4.7 times the rate of non-Indigenous people for alcoholic liver disease.

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[17] Short-term 'risky/high risk' drinking is defined as 7-10 and more than 10 standard drinks per day for males, and 5-6 and more than 6 standard drinks per day for females [252].

[18] Long-term 'risky/high risk' drinking is defined as more than four and six standard drinks per day for males (more than 28 and more than 42 standard drinks per week), and more than two and four standard drinks per day for females (more than 14 and more than 28 standard drinks per week) [252].

[19] 'High risk' is defined as daily consumption of more than six standard drinks for males and more than four standard drinks for females [57].

[20] 'Risky/high risk' is defined as more than four and six standard drinks per day for males, and more than two and four standard drinks per day for females [57].

An analysis of hospitalisation with a principal diagnosis related to alcohol abuse in NSW, Vic, Qld, WA, SA and the NT in the two-year period June 2007 to June 2009 found that Indigenous people were hospitalised at 4.2 times the rate of non-Indigenous people [44]. There were substantial variations of Indigenous:non-Indigenous rate ratios by remoteness of residence: 3.7 for very remote areas, 8.7 for remote areas, 5.7 for outer regional areas, 5.0 for inner regional areas, and 3.5 for major cities.

Mortality

There were 395 Indigenous deaths related to alcohol use in NSW, Qld, WA, SA, and the NT in the five-year period 2004-2008, representing 3.6% of all Indigenous deaths in these jurisdictions [44]. Almost seven-tenths of these deaths (69%; 274 deaths) were attributed to alcoholic liver disease, a condition for which Indigenous males died at nearly twice the rate of Indigenous females. Overall, the death rate from alcohol-related causes was 6.3 times higher for Indigenous people than for non-Indigenous people; the rate was 5.4 times higher for Indigenous males than for non-Indigenous males, and 9.3 times higher for Indigenous females than for non-Indigenous females. The rate of deaths attributed to alcoholic liver disease and poisoning by alcohol were both 6.1 times higher for Indigenous people than for non-Indigenous people, and the rate of deaths attributed to mental and behavioural disorders due to alcohol use 6.8 times higher.

Illicit drug use

Illicit drug use describes the use of those drugs that are illegal (e.g. cannabis, heroin, ecstasy, and cocaine), the use of volatile substances (e.g. petrol, glue, and solvents), and the non-medical use of prescribed drugs (e.g. pain killers (analgesics)) [62]. Illicit drug use is a risk factor for ill-health, including conditions such as HIV/AIDS, hepatitis, poisoning and self-inflicted injury, and can cause death. Illicit drug use accounted for 2.0% of the overall burden of disease in Australia in 2003; it accounted for 8.0% of the mental health burden of disease, and 3.6% of the injury burden of disease [249]. For the same year, illicit drug use was responsible for 3.4% of the burden of disease among the Indigenous population; the highest level of disease burden attributable to illicit drugs was for mental health (13%) and injury (3.6%) [239].

Extent of illicit drug use among Indigenous people

Almost one-quarter (23%) of Indigenous people aged 15 years or over reported in the 2008 NATSISS that they had used an illicit substance in the 12 months prior to interview [44]. This level was 1.6 times that reported in the 2010 NDSHS for the non-Indigenous population aged 14 years or over (14%) [240], but less than that reported by Indigenous people aged 18 years or over (28%) in the 2004-2005 NATSIHS [57].

According to the 2008 NATSISS, the illicit substances used most commonly by Indigenous Australians aged 15 years or over were cannabis (17% in the previous 12 months and 36% ever), pain killers (4.5% and 7.4%), amphetamines (4.0% and 11%), ecstasy (3.3% and 7.7%), and petrol and other inhalants (0.4% and 5.8%) [44]. The three illicit drugs most commonly used in the previous 12 months were the same in 2008 as those reported in the 2004-2005 NATSIHS, but reported use had declined: cannabis (from 23% in 2004-2005 to 17% in 2008), amphetamines (from 7% to 4.0%), and pain killers (from 6% to 4.5%) [44, 57].

Use of illicit drugs in the previous 12 months was reported more commonly in the 2008 NATSISS by Indigenous people aged 15 years or over living in non-remote areas than by those living in remote areas (24% compared with 17%) [44]. Similarly, the proportion of Indigenous people who had ever used illicit substances was higher for those living in non-remote areas (47%) than in remote areas (31%). There were higher proportions of use for all types of drug among Indigenous people living in non-remote areas compared with those living in remote areas, both for 'use in the last 12 months' and 'for having ever used an illicit substance'.

According to the 2008 NATSISS, illicit drug use in the previous 12 months was highest among Indigenous people aged 18-24 years (32%), 25-34 years (26%), and 35-44 years (20%) [44]. The proportions of people who had used drugs in the previous 12 months were at least one-and-a-half times higher for males than for females within each age-group except the 15-17 years age-group where proportions were similar (16% and 14% respectively).

In non-remote areas, around twice as many males as females had used cannabis (23% compared with 12%), amphetamines (5.4% compared with 2.7%), and ecstasy (4.3% compared with 2.3%) [44]. Between 2002 and 2008, use of cannabis in the previous 12 months decreased slightly from 19% to 17% (due to a drop in use by females from 16% to 12%); use of amphetamines in the previous 12 months decreased slightly from 4.7% to 4.0% (due to a drop in use by females from 4.5% to 2.7%, despite a slight rise in use by males from 4.9% to 5.4%); and use of ecstasy in the previous 12 months increased from 1.9% to 3.3% (due to a doubling in use by males from 2.2% to 4.3% and an increase in use by females from 1.6% to 2.3%).

The 2008 NATSISS found that among Indigenous people aged 15 years or over, a higher proportion of 'recent illicit substance users' were current daily smokers (68%) and risky/high-risk drinkers (8.1) compared with those who had 'never used an illicit substance' (35% and 3.2% respectively) [44]. Similarly, higher proportions of Indigenous people who had experienced stressors in the last 12 months were more likely to be 'recent substance users' than 'never used illicit substances'; of those who experienced violence, around 12% were 'recent substance users' compared with 4.6% who 'never used illicit substances'.

Hospitalisation

Almost 1% of all hospitalisations of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2006 to June 2008 were for a principal diagnosis related to substance use [44]. The leading cause of these was ICD 'mental/behavioural disorders related to cannabinoids', which was responsible for 15% of drug related hospitalisation. Poisoning resulting from 'use of antiepileptic, sedative-hypnotic and anti-Parkinson's drugs', and 'psychotropic drugs (including antidepressants)' were the second equal most common cause of drug related hospitalisation, each accounting for 14% of all these hospitalisations.

Hospitalisations related to drug use of Indigenous people occurred at more than twice the rate of the non-Indigenous population [44]. Indigenous people were hospitalised for poisoning related to substance use at nearly twice the rate of the non-Indigenous population. Hospitalisations for 'mental/behavioural disorders related to substance use' occurred at almost five times the rate of the non-Indigenous population from the 'use of cannabinoids', and at around three times the rate from the 'use of multiple drug and psychoactive substances', and the 'use of other stimulants'. Hospitalisations of Indigenous people from 'use of opioids' occurred at around twice the rate of non-Indigenous people, and at 39 times the rate from the 'use of volatile solvents'.

In relation to remoteness of residence, Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the period June 2007 to June 2009 were hospitalised with a principal diagnosis related to drug use at 2.9 times the rate of non-Indigenous people in major cities, 2.6 times the rate in inner regional areas, 2.1 times the rate in outer regional areas, 2.4 times the rate in remote areas, and 1.3 times the rate in very remote areas [44].

According to the 2008 NATSISS, over 90% of mothers of Indigenous children aged 0-3 years did not use illicit drugs during pregnancy [44]. The proportion of mothers of Indigenous children who did use drugs during pregnancy was highest in Vic (9.3%), followed by WA (8.5%), and SA (6.1%). Around 4% of mothers of Indigenous children in Qld, NSW, Tas/ACT and the NT used illicit drugs during pregnancy.

Mortality

The rate of drug-induced deaths was around 1.5 times higher for Indigenous people living in NSW, Qld, WA, SA and the NT in 2005-2009 than for their non-Indigenous counterparts (7.8 compared with 5.3 per 100,000) (Table 27) [80]. Rates were higher for Indigenous people than for non-Indigenous people in NSW, WA and SA, but similar in Qld. Rates for Indigenous males (9.5 per 100,000) were higher than for Indigenous females (6.1 per 100,000).

Table 27. Rates of drug induced deaths, persons, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA, and the NT, 2005-2009

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	11.5	5.5	2.1
Qld	4.0	4.3	0.9
WA	9.3	5.4	1.7
SA	17.8	6.3	2.8
NSW, Qld, WA, SA and the NT	7.8	5.3	1.5

Source: Steering Committee for the Review of Government Service Provision, 2011 [80]

Notes: 1 Rates are per 100,000 (indirect standardisation)
2 Non-Indigenous does not include deaths where Indigenous status is not stated
3 Separate rates for the NT were not provided due to low numbers of deaths

Sixty-three of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT in 2003-2007 were attributed to drug use [254]. More than one-half (52%) of these deaths were due to accidental poisoning from narcotics, and 17% from accidental poisoning from organic solvents. In comparison, there were 993 drug-related deaths among their non-Indigenous counterparts, 53% of which were due to accidental poisoning from narcotics and 28% from accidental poisoning from antidepressants.

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.[21] Age-standardised death rates for Indigenous people living in WA, SA and the NT declined by around 25% over the period 1991-2008 [44, 117]. The decline for Indigenous females (27%) was somewhat higher than the decline for Indigenous males (23%). The declines in death rates for Indigenous people have resulted in statistically significant closing of the gaps in rates between Indigenous and non-Indigenous people, but the rate ratio was 2.9 in 2008.

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 [255]. 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 the period 1990-2001, but at lesser annual rates of change than documented for the period 1977-1989. Importantly, there have been significant declines in recent years in death rates from avoidable causes.

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 higher than previous estimates, but, as the ABS warns, the apparent improvements are likely to be due largely to revised statistical methods [5].[22]

Indigenous infant mortality rates for WA, SA and the NT declined significantly over the 18-year period 1991-2008 [44]. The Indigenous rate declined by 55% over that period, slightly more than the 43% decline of the rate for non-Indigenous people. The Indigenous:non-Indigenous rate ratio declined by 59% 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 [39]. Importantly, the proportions of low birthweight (less than 2,500 grams) babies born to Indigenous mothers increased by 13% over the 18-year period 1991-2008 and are still around twice those of babies born to other mothers [44]. The proportions of low birthweight babies born to other mothers increased by 7%, resulting in a 19% increase in the difference in proportions between the Indigenous and non-Indigenous populations. The ratio of proportions increased by 6% (this increase is not statistically significant).

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 [256]
- substantial declines in death rates from invasive pneumococcal pneumonia (mostly due to the introduction of vaccination programs) [188]
- reductions in the incidence and severity of trachoma (though inflammatory trachoma remains endemic in some remote communities of central and northern Australia) [124]
- a substantial reduction in the prevalence of HBV infection (since the introduction of vaccination programs) [185]
- a rapid decline in the incidence of invasive Hib disease in Indigenous children (following the introduction of vaccination) [185]
- a reduction in the number of new cases of TB, from 79 in 1984 [257] to an average of around 30 in the mid 2000s [166].

There have also been improvements in a number of areas contributing to health status:

- as well as the contributions that immunisation has made to the declines in the infectious diseases noted above, routine immunisation coverage of Indigenous and other children up to five years of age are similar [44]
- the participation of Indigenous people in sporting and recreational events increased between 2002 and 2008 [80]
- the level of smoking among Indigenous people has decreased slightly in recent years [57, 241]
- there have been some improvements in the performance of Indigenous primary and secondary schoolchildren in recent years, and the proportion of Indigenous young people receiving a year 12 certificate increased between 2001 and 2008 [30, 80].

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

[22] 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.

There is no doubt other evidence of improvement in some measures 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.

There have also been substantial improvements in the availability of information about the health of Aboriginal and Torres Strait Islander people. Such information is crucial for both policy and strategy development and for monitoring progress towards the various targets set recently as a part of the Council of Australian Governments (COAG) commitments to 'closing the gap' in health between Indigenous and other Australians (see below) [258].

The preparation of this overview has benefited greatly from some of these improvements, particularly the introduction of regular reporting about various aspects of Indigenous health. The first of these substantial reports was the 1997 *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples* [259], produced jointly by the ABS and the AIHW. The second was the Indigenous compendium to the annual *Reports on government services* produced by the Steering Committee for the Review of Government Service Provision (SCRGSP), first published by the Productivity Commission in 2003 [260]. This report was complemented by a biennial report on key indicators of Indigenous disadvantage, also produced by the SCRGSP and published by the Productivity Commission (the first report was published in November 2003) [261]. These reports were followed in 2006 with the first report in the *Aboriginal and Torres Strait Islander health performance framework* series [262]. This report, prepared by the AIHW for the Australian Department of Ageing, is accompanied by substantial detailed analyses. Subsequent reports in this series were published in 2008 and 2011 [67, 263].

Along with these substantial reports on Indigenous health and related areas, continuing attention has been directed at improving the various data collections that feed into these and other reports. This work, overseen by the National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (NAGATSIHID), has achieved considerable progress, but the current NAGATSIHID strategic plan acknowledges the need for 'new data collections or enhancing existing collections' … 'so that a comprehensive information base is available to inform policy, practice and service delivery' [258, p.13].

Despite the considerable progress that has been made, it will be very obvious to readers of this overview that many existing collections are in need of enhancement. For a start, the identification of Indigenous people in most of the various health and related data collections is still far from complete. Few of the collections have good national coverage of Indigenous people, and, for many, good information is only available for a minority of jurisdictions and/or is quite dated. The limited information available about cancer among Indigenous people is a good example. Cancer is the second most common cause of death among Indigenous people, but the most recent reasonably comprehensive information available about cancer incidence relates to 2000-2004. There is even less information about deaths from cancer. Readers of this overview will recognise many other areas where there is a need for substantial enhancements.

In view of the commitments made in December 2007 by all Australian governments, through the COAG,[23] to 'closing the gap' in disadvantage between Indigenous and other Australians [264], the need for reliable, up-to-date, comprehensive information about the health of Indigenous people is more important than ever. The 'closing the gap' commitments were stimulated by the *Social Justice Report 2005*, which highlighted the vast gap between the health of Indigenous and other Australians and called on Australian governments to commit to achieving Indigenous health equality within 25 years [265].[24]

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 [266]. 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.

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' [267, p.1].

In March 2008, the Prime Minister also announced establishment of the National Indigenous Health Equality Council,[25] 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' [268, p.546].

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[23] 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)'.

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

[25] The Council was re-named National Aboriginal and Torres Strait Islander Health Equality Council in August 2011.

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
- halve the gap in employment outcomes between Indigenous and non-Indigenous Australians within a decade [269].

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 [269]. Agreement has been reached also on the establishment of a new national Indigenous representative body.

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

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

Importantly, effective, integrated comprehensive strategies and policies will need to be sustained for a long period of 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-adjustment

see **age-standardisation**

age-specific death rate

the 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**

hospitalisation

an episode of admitted patient care, which can be either a patient's total stay in hospital, or part of a patient's stay in hospital that results in a change to the type of care. Hospital separations are more commonly known as 'admissions', but can also be referred to as 'hospitalisations'

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

Indigenous Australians

term used to refer collectively to the two Indigenous sub-populations within Australia – Australian Aborigines and Torres Strait Islanders

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 (IMR)

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

non-Indigenous Australians

a person who is not Aboriginal and/or Torres Strait Islander; also referred to as 'other Australians'

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
ACIR	Australian Childhood Immunisation Register
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
DMS	Diagnostic and statistical manual of mental disorders
DTP	Diphtheria, tetanus, and pertussis
ESRD	End-stage renal disease
FASD	Foetal alcohol spectrum disorder
GAS	Group A streptococcus
GDM	Gestational diabetes mellitus
GP	General practitioner
GSS	General Social Survey
HAV	Hepatitis A virus
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HD	Haemodialysis
Hib	H. *influenzae* type b
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
ICD	International Classification of Diseases - the World Health Organization's internationally accepted classification of death and disease
IDU	Injecting drug use
IMR	Infant mortality rate
IPD	Invasive pneumococcal disease

KRT	Kidney replacement therapy
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
NIEHS	National Indigenous Eye Health Survey
NNDSS	National Notifiable Diseases Surveillance System
NSAOH	National Survey of Adult Oral Health
NSW	New South Wales
NT	Northern Territory
NTEHP	National Trachoma and Eye Health Program
NTER	Northern Territory Emergency Response
OATSIH	Office for Aboriginal and Torres Strait Islander Health
OM	Otitis media
PD	Peritoneal dialysis
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
SDAC	Survey of Disibility, Ageing and Carers
SIDS	Sudden infant death syndrome
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
WHR	Waist to hip ratio

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