Australian Indigenous
Health*InfoNet*

Overview of Australian Indigenous health status 2012

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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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Suggested citation:

MacRae A, Thomson N, Anomie, Burns J, Catto M, Gray C, Levitan L, McLoughlin N, Potter C, Ride K, Stumpers S, Trzesinski A, Urquhart B. *Overview of Australian Indigenous health status, 2012*. Retrieved [access date] from http://www.healthinfonet.ecu.edu.au/overview_2013.pdf

ISBN 0-9580963-1-7

Overview of Australian Indigenous health status 2012

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February 2013

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Contents

Preface

This *Overview* has been prepared by the Australian Indigenous Health*InfoNet* as a part of our contributions 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, students 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 current 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.

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), the Australian Health Ministers Advisory Council (AHMAC) 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, some sections of which have been updated, and the AIHW produced 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 AHMAC in 2006, 2008, 2011 and 2012, 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.

Despite the important advances that have been made in recent years in both the extent and quality of information about the health of Indigenous people, there is substantial scope for further improvement. First, there are deficiencies in the information available for some important areas. Probably the best example is cancer, the second most common cause of death among Indigenous people. The AIHW's recent *Cancer in Australia: an overview 2012* is a welcome addition, but, as that report acknowledges, national data on cancer incidence and mortality among Indigenous people are not available and Indigenous-specific information about screening is only collected for breast cancer and not for cervical and bowel cancer [1]. Second, the important special reports noted above tend to be selective rather than comprehensive in their coverage of the various health topics. Third, the time periods for which detailed information is available tend to vary substantially; this means that documents like this *Overview* need to draw on information from various time periods in attempting to compile a comprehensive picture. Fourth, important data sources, particularly major national surveys, are generally only conducted around every five years; this is inevitable, but it means that relevant information is often quite dated. Finally, changes in aspects like methodology and levels of reporting in publications pose difficulties in the analysis and synthesis of information with a time perspective.

The initial sections of this *Overview* 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.

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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.

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.

Neil Thomson

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

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 redevelopment 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 669,736.
- In 2011, NSW had the highest number of Indigenous people (208,364 people, 31% of the total Indigenous population).
- In 2011, the NT had the highest proportion of Indigenous people in its population (30% of the NT population were Indigenous).
- In 2011, around 33% of Indigenous people lived in a capital city.
- There was a 21% increase in the number of Indigenous people counted in the 2011 Census compared with the 2006 Census.
- The Indigenous population is much younger than the non-Indigenous population.

Births and pregnancy outcome

- In 2011, there were 17,621 births registered in Australia with one or both parents identified as Indigenous (6% of all births registered).
- In 2011, Indigenous mothers were younger than non-Indigenous mothers; the median age was 24.8 years for Indigenous mothers and 30.6 years for all mothers.
- In 2011, total fertility rates were 2,740 births per 1,000 for Indigenous women and 1,884 per 1,000 for all women.
- In 2010, the average birthweight of babies born to Indigenous mothers was 3,190 grams compared with 3,376 grams for babies born to non-Indigenous mothers.
- In 2010, the proportion of low birthweight babies born to Indigenous women was twice that of non-Indigenous women (12.0% compared with 6.0%).

Indigenous mortality

- In 2006-2010, the age-standardised death rate for Indigenous people was 1.9 times the rate for non-Indigenous people.
- Between 1991 and 2010, there was a 33% reduction in the death rates for 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 10-11 years less than the estimates for non-Indigenous males and females.
- In 2007-2011, 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 2009-2011, 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 2010, there were significant declines in infant mortality rates for Indigenous and non-Indigenous infants in WA, SA and the NT.
- For 2006 to 2010, the leading causes of death among Indigenous people were cardiovascular disease, neoplasms (almost entirely cancers), and injury.
- In 2003-2005, maternal mortality ratios were 2.7 times higher for Indigenous women than for non-Indigenous women.

Indigenous hospitalisation

- In 2010-11, 4.0% of all hospitalisations were of Indigenous people.
- In 2010-11, the age-standardised separation rate for Indigenous people was 2.5 times higher than that for other Australians.
- In 2010-11, the main cause of hospitalisation for Indigenous people was for care involving dialysis, responsible for 44% of Indigenous 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 2010-11, Indigenous people were hospitalised for cardiovascular diseases at 1.6 times the rate of non-Indigenous people.
- In 2006-2010, cardiovascular disease was the leading cause of death for Indigenous people, accounting for 26% of Indigenous deaths.
- In 2006-2010, the age-adjusted death rate for Indigenous people was 1.7 times the rate for non-Indigenous people.

Cancer

- In 2004-2008, age-adjusted cancer incidence rates were slightly higher for Indigenous people than for non-Indigenous people.
- In 2004-2008, the most common cancers diagnosed among Indigenous people were lung and breast cancer.

- In 2010-11, age-standardised hospitalisation rates for cancer were lower for Indigenous people than for non-Indigenous people.
- In 2006-2010, the age-standardised death rate for cancer for Indigenous people was 1.4 times higher than that for non-Indigenous people.

Diabetes

- In 2004-2005, 6% of Indigenous people reported having diabetes; after age-adjustment, Indigenous people were 3.4 times more likely to report having some form of diabetes than were non-Indigenous people.
- In 2006-08, age-adjusted hospitalisation rates for diabetes for Indigenous males and females were 3.4 and 5.0 times the rates of other males and females.
- In 2004-2008, Indigenous people died from diabetes at almost seven times the rate of non-Indigenous people.

Social and emotional wellbeing

- In 2008, 79% of Indigenous adults 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 2.6 times as likely as non-Indigenous people to feel high or very high levels of psychological distress.
- In 2008, 90% of Indigenous people reported feeling happy either some, most, or all of the time.
- In 2010-11, after age-adjustment, Indigenous people were hospitalised for ICD 'Mental and behavioural disorders' at 2.1 times the rate for non-Indigenous people.
- In 2010, the death rate for ICD 'Intentional self-harm' (suicide) for Indigenous people was 2.4 times the rate reported for non-Indigenous people.

Kidney health

- In 2006-2010, after age-adjustment, the notification rate of end stage renal disease was 7.2 times higher for Indigenous people than for non-Indigenous people.
- In 2010-11, care involving dialysis was the most common reason for hospitalisation among Indigenous people; Indigenous people were hospitalised at 11.4 times the rate for other Australians.
- In 2006-2010, the age-standardised death rate from kidney disease was four times higher for Indigenous people than for non-Indigenous people.

Injury

- In 2010-11, after age-adjustment, Indigenous people were hospitalised for injury at 2.0 times the rate for other Australians.
- In 2006-08, the hospitalisation rate for assault was 36 times higher for Indigenous women than for other women.
- In 2010, injury was the third most common cause of death among Indigenous people, accounting for 14% 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 2010-11, the age-standardised hospitalisation rate for respiratory disease was 2.8 times higher for Indigenous people than for other Australians.
- In 2010, after age-adjustment, the death rate for Indigenous people was 2.6 times that 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 low vision for Indigenous adults aged 40 years and older was 2.8 times higher than for their non-Indigenous counterparts.
- In 2008, the rate of blindness for Indigenous adults aged 40 years and older was 6.2 times higher than for their non-Indigenous counterparts.

Ear health and hearing

- In 2004-2005, ear/hearing problems were reported by 12% of Indigenous people.
- In 2008-10, the hospitalisation rate for Indigenous people for all ear disease was 1.3 times higher than the non-Indigenous rate.

Oral health

- In 2000-2003, Indigenous children had more caries in their deciduous and permanent teeth than did non-Indigenous children; they also had higher levels of gingivitis.

- In 2004-2006, caries and periodontal diseases were more prevalent among Indigenous adults than among non-Indigenous adults.

Disability

- In 2008, after age-adjustment, Indigenous people were 2.2 times as likely as non-Indigenous people to have a profound/core activity restriction.

Communicable diseases

- In 2005-2009, after age-adjustment, the notification rate for tuberculosis was 11.1 times higher for Indigenous people than for Australian-born non-Indigenous people.
- In 2009-2011, the crude notification rate for hepatitis C for Indigenous people was 3.6 times the notification rate for non-Indigenous people. The crude notification rate for hepatitis B was the same for both populations.
- In 2010, notification rates for *Haemophilus influenza* type b were 20 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 2.6 times higher for Indigenous people than for other Australians; the rate for Indigenous children aged 0-4 years was 4.9 times higher than that for their non-Indigenous counterparts.
- In 2009-2011, Indigenous people had higher crude notification rates for gonorrhoea, syphilis and chlamydia than did non-Indigenous people; Indigenous notification rates ranged from 5.6 to 64 times higher than the rates for non-Indigenous people.
- In 2011, age-standardised rates of human immunodeficiency virus (HIV) diagnosis were similar for Indigenous and non-Indigenous people.
- In some remote 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 vegetables intake (compared with 1% of non-Indigenous people).

Physical activity

- In 2008, 30% of Indigenous adults took part in some type of physical activity or sport in the previous 12 months.
- In 2004-2005, after age-adjustment, 51% of Indigenous people in non-remote areas reported low or very low levels of activity, compared with 33% of non-Indigenous people.

Bodyweight

- In 2004-2005, 57% of Indigenous adults were classified as overweight or obese; 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 breastfed their children; the proportion breastfeeding was higher in remote areas than in non-remote areas.

Tobacco use

- In 2008, 47% of Indigenous adults were current smokers; after age-adjustment, this proportion was 2.3 times higher than the proportion among non-Indigenous adults
- Between 1994 and 2008, there has been a decline in the number of cigarettes smoked daily among Indigenous people.
- In 2009, almost 50% of Indigenous mothers reported smoking during pregnancy; this level is 3.8 times that of their non-Indigenous counterparts.

Alcohol use

- In 2008, 35% of Indigenous adults abstained from alcohol; this level was 2.5 times higher than that among the total Australian population
- In 2004-2005, after age-adjustment, Indigenous people were 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.
- In 2008-10, after age-adjustment, Indigenous males were hospitalised at five times and Indigenous females at four times the rates of their non-Indigenous counterparts for a principal diagnosis related to alcohol use.
- In 2006-2010, the age-standardised death rates alcohol-related deaths for Indigenous males and females were five and eight times higher, respectively, than those for their non-counterparts.

Illicit drug use

- In 2008, 23% of Indigenous adults reported that they had used an illicit substance in the previous 12 months; this is 1.6 times the level among non-Indigenous people in 2010.
- In 2005-2009, the rate of drug-induced deaths was 1.5 times higher for Indigenous people than for non-Indigenous people.

Introduction

This *Overview of Australian Indigenous health status* 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 [2]).

There have been 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 calculating 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 [3, 4]. Despite these efforts, doubts remain about the extent to which official estimates reflect the actual size of the Indigenous population [3, 5].

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 also been directed 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 [6]. 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 [7]. Based on this comparison, the ABS estimated that the Australia-wide level of Indigenous identification in deaths notifications in 2006-2007 was 92% [7], a level much higher than previous estimates (around 56%) [8].

The ABS has estimated that the proportion of Indigenous births identified correctly was 96% in 2002-2006, a significant improvement over the level for previous years [9]. The level of identification in hospital admissions is very variable, with the overall level unlikely to be better than for deaths [10]. 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 disadvantages experienced by Indigenous people and their current health status [11]. These social disadvantages, directly related to dispossession and characterised by poverty and powerlessness, are 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 [12-16]. They did not suffer from smallpox, measles, influenza, tuberculosis, scarlet fever, venereal syphilis and gonorrhoea, diseases that were common in 18th century Europe. Indigenous people probably suffered from hepatitis B, some bacterial infections (including a non-venereal form of 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 18th century Europe.

All of this changed after 1788 with the arrival of introduced illness, initially smallpox and sexually transmissible infections (gonorrhoea and venereal syphilis), and later tuberculosis, influenza, measles, scarlet fever, and whooping cough [13, 14, 17, 18]. These diseases, particularly smallpox, caused considerable loss of life among Indigenous populations, but the impacts were 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 [17, 19, 20]. The initial responses of Indigenous people to the arrival of the First Fleet were apparently quite peaceful. It didn't take long, however, before conflict started to occur – initially over access to fish stocks and then over access to other resources as non-Indigenous people started to plant crops and introduce livestock. This pattern of conflict was almost certainly widespread 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 the most infamous [21], but less well-known massacres occurred across Australia [20]. 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' [20, 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 [22-24]. 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 [13, 14, 17]. 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 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 [25]. 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' [26, 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' [25, 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' [25, 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 [24], but perpetuation of the disadvantages owes much to contemporary structural and social factors, embodied in what have been termed the 'social determinants' of health [11, 27, 28]. 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 considering 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 [29]. 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 therefore 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 2011 Australian Census [30]:

- 92% of 5 year-old Indigenous children were attending an educational institution
- 1.6% of the Indigenous population had not attended school compared with 0.9% of the non-Indigenous population
- 29% of Indigenous people reported year 10 as their highest year of school completion; 25% had completed year 12, compared with 52% of non-Indigenous people
- 26% of Indigenous people reported having a post-school qualification, compared with 49% of non-Indigenous people
- 4.6% of Indigenous people had attained a bachelor degree or higher, compared with 20% of non-Indigenous people.

An ABS school report [31] revealed, in 2011:

- the apparent retention rate for Indigenous students from year 7/8 to year 10 was 99%, from year 7/8 to year 12 it was 49%
- 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 81%.

The 2011 national report on schooling in Australia [32] showed:

- 76% of Indigenous students in year 3 and 66% in year 5 were at or above the national minimum standard for reading, compared with 95% and 93% respectively of all Australian students
- 80% of year 3 Indigenous students and 69% of year 5 Indigenous students were at or above the national minimum standard for persuasive writing, compared with 96% of all year 3 students and 94% of all year 5 students
- 72% of year 3 Indigenous students and 69% of year 5 Indigenous students were at or above the national minimum standard for spelling, compared with 94% of all year 3 students and 93% of all year 5 students
- 71% of year 3 Indigenous students and 65% of year 5 Indigenous students were at or above the national minimum standard for grammar and punctuation, compared with 94% of all year 3 students and 94% of all year 5 students
- 84% of Indigenous students in year 3 and 75% in year 5 were at or above the national minimum standard for numeracy, compared with 96% and 96% respectively of all Australian students.

Employment

According to the 2011 Australian Census [30]:

- 42% of Indigenous people aged 15 years or older were employed and 17% were unemployed. In comparison, 61% of non-Indigenous people aged 15 years or older were employed and 5% were unemployed
- the most common occupation classification of employed Indigenous people was 'labourer' (18%) followed by 'community and personal service workers' (17%). The most common occupation classification of employed non-Indigenous people was 'professional' (22%).

Income

According to the 2011 Australian Census [30]:

- the mean equivalised gross household income for Indigenous persons was around $475 per week – approximately 59% of that for non-Indigenous persons (around $800).

Indigenous population

Based on information collected as a part of the 2011 Census of Population and Housing, the ABS has estimated the Aboriginal and Torres Strait Islander population at 669,736 people at 30 June 2011 [33]. The estimated population for NSW was the highest (208,364 Indigenous people), followed by Qld (188,892), WA (88,277), and the NT (68,901) (Table 1). The NT has the highest proportion of Indigenous people among its population (29.8%) and Vic the lowest (0.9%).

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

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	208,364	31.1	2.9
Vic	47,327	7.1	0.9
Qld	188,892	28.2	4.2
WA	88,277	13.2	3.8
SA	37,392	5.6	2.3
Tas	24,155	3.6	4.7
ACT	6,167	0.9	1.7
NT	68,901	10.3	29.8
Australia	669,736	100	3.0

Notes: 1 Preliminary estimates are subject to revision; population projections are expected to be finalised by 2014
2 Australian population includes Jervis Bay Territory, the Cocos (Keeling) Islands, and Christmas Island
3 Proportions of jurisdiction population have used total population figures estimated from demographic information for June 2011

Source: ABS, 2012 [33]

There was a 21% increase in the number of Indigenous people counted in the 2011 Census[2] compared with the 2006 Census [34]. The largest increases were in the ACT (34%), Vic (26%), NSW (25%) and Qld (22%). For all jurisdictions, the 55 years and over age-group showed the largest relative increase. There are two 'structural' reasons contributing to the growth of the Indigenous population: the slightly higher fertility rates of Indigenous women compared with the rates of other Australian women (see 'Births and pregnancy outcome'); and the significant numbers of Indigenous babies born to Indigenous fathers and non-Indigenous mothers. Two other factors are considered likely to have contributed to the increase in people identifying as Indigenous: changes in enumeration

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[2] There is a difference between the Census 'counts' and 'estimates'. The 'estimates' adjust for a number of factors and are more accurate.

processes (i.e. more Indigenous people are being captured during the census process); and changes in identification (i.e. people who did not previously identify as Indigenous in the census have changed their response).

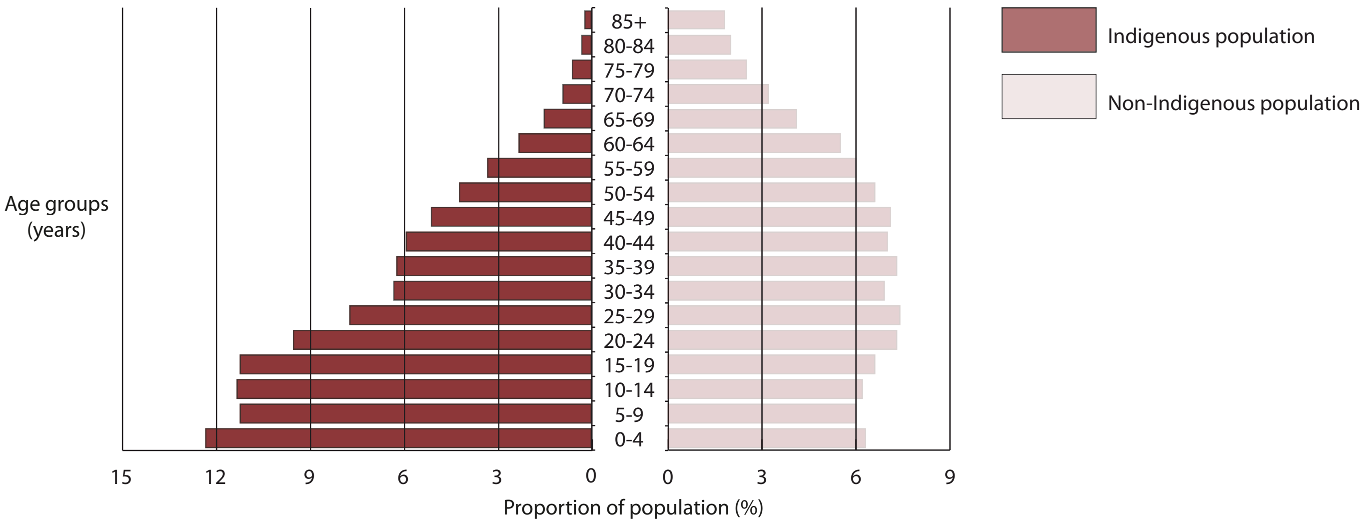
Based on the 2011 Census, around 33% of Indigenous people lived in a capital city [4]. Detailed information about the geographic distribution of the Indigenous population for 2011 is not yet available, but figures from the 2006 Census indicated that the majority of Indigenous people lived in cities and towns [35]. Slightly more than one-half of the Indigenous population lived 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' [36].) Almost one-quarter of Indigenous people lived in areas classified as 'remote' or 'very remote' in relation to having 'very little access to goods, services and opportunities for social interaction' [37, p.3]. Less than 2% of non-Indigenous people lived in 'remote' or 'very remote' areas [35].

In terms of specific geographical areas, more than one-half (53%) of all Indigenous people counted in the 2011 Census lived in nine of the 57 Indigenous regions (based largely on the former Aboriginal and Torres Strait Islander Commission (ATSIC) regions) [4]. The three largest regions were in eastern Australia (Brisbane, NSW Central and the North Coast, and Sydney–Wollongong), which accounted for 29% of the total Indigenous population.

According to the 2011 Census, around 90% of Indigenous people are Aboriginal, 6% are Torres Strait Islanders, and 4% people identified as being of both Aboriginal and Torres Strait Islander descent [4]. Around 63% of Torres Strait Islander people[3] lived in Qld; NSW was the only other state with a large number of Torres Strait Islander people.

The Indigenous population is much younger overall than the non-Indigenous population (Figure 1) [33]. According to estimates from the 2011 Census, at June 2011 about 36% Indigenous people were aged less than 15 years, compared with 18% of non-Indigenous people. About 3.4% 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, 30 June 2011



Source: ABS, 2012 [33]

Births and pregnancy outcome

In 2011, there were 17,621 births registered in Australia with one or both parents identified as Indigenous (6% of all births registered) [38]. 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 estimates that 96% of Indigenous births in 2002-2006 were correctly identified as such [9]. Completeness of identification varied across the country, with only Vic, Qld, WA, SA and the NT having levels above 90%.

In 2011, both parents identified as Indigenous in 31% of Indigenous registered births [38]. Only the mother identified as Indigenous in 42% of Indigenous registered 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 2011, Indigenous women had more babies and had them at younger ages than did non-Indigenous women – teenagers had one-fifth (19%) of the babies born to Indigenous women, compared with only 3.8% of those born to all mothers [38]. The median age of Indigenous mothers was 24.8 years, compared with 30.6 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 all women (Table 2). The fertility rate of teenage Indigenous women (78 babies per 1,000 women) was almost five times that of all teenage women (16 babies per 1,000).

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[3] Includes people who identified as Torres Strait Islanders and those who identified as being of both Aboriginal and Torres Strait Islander descent.

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2011

Status of mother/ age-group (years)	**Jurisdiction**						
	NSW	**Vic**	**Qld**	**WA**	**SA**	**NT**	**Australia**
Indigenous mothers							
15-19	71	54	85	106	72	80	78
20-24	157	117	163	180	153	145	155
25-29	162	128	155	154	147	115	147
30-34	117	111	112	101	103	79	105
35-39	54	64	58	52	38	36	52
40-44	11	n.p.	13	n.p.	10	10	11
All mothers							
15-19	14	9	22	19	15	44	16
20-24	51	37	66	58	51	98	52
25-29	101	90	111	107	105	105	101
30-34	125	123	117	125	121	104	122
35-39	73	74	64	66	62	58	70
40-44	16	16	13	15	13	n.p.	15

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

2 n.p. refers to numbers not available for publication, but included in totals where applicable

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

Source: ABS, 2012 [38]

Total fertility rates

In 2011, total fertility rates were 2,740 births per 1,000 for Indigenous women and 1,884 per 1,000 for all women (Table 3) [38]. The highest total fertility rate for Indigenous women was for WA (3,011 babies per 1,000 women), followed by Qld (2,932 per 1,000) and NSW (2,863 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2011

Status of mother	**Jurisdiction**						
	NSW	**Vic**	**Qld**	**WA**	**SA**	**NT**	**Australia**
Indigenous	2,863	2,486	2,932	3,011	2,611	2,323	2,740
All mothers	1,908	1,748	1,964	1,953	1,847	2,131	1,884

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

Source: ABS, 2011 [38]

Birthweights

The average birthweight of babies born to Indigenous mothers in 2010 was 3,190 grams, almost 190 grams less than the average for babies born to non-Indigenous mothers (3,376 grams) [39]. Babies born to Indigenous women in 2010 were twice as likely to be of low birthweight (LBW) (12.0%) than were those born non-Indigenous women (6.0%). (LBW, defined as a birthweight of less than 2,500 grams, increases the risk of death in infancy and other health problems.)

The LBW proportions for babies born to Indigenous women were highest in SA (16.0%), the NT (13.8%), and WA (13.6%). LBW proportions were higher for Indigenous mothers than for all mothers in all jurisdictions (Table 4) [39].

Table 4. Mean birthweights and percentage of low birthweight for babies born to Indigenous and all mothers, selected jurisdictions, Australia, 2010

	NSW	**Vic**	**Qld**	**WA**	**SA**	**NT**	**Australia**
Indigenous mothers							
Mean birthweight	3,233	3,234	3,199	3,139	3,130	3,119	3,190
% low birthweight	10.7	10.3	11.5	13.6	16.0	13.8	12.0
All mothers							
Mean birthweight	3,376	3,366	3,382	3,353	3,344	3,292	3,369
% low birthweight	5.8	6.3	6.4	6.1	6.8	8.8	6.2

Note: 1 LBW is defined as less than 2,500 grams

Source: Li, Zeki, Hilder, and Sullivan, 2012 [39]

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 impact 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 for women who smoked and 3,416 grams, for women who did not smoke. The impact of tobacco smoking during pregnancy can also be seen also in the proportions of LBW liveborn babies; in 2007 the proportion of LBW babies was twice as high among Indigenous mothers who smoked during pregnancy (16%) as among Indigenous mothers who did not smoke during pregnancy (8.2%) [42]. Similarly, 10% of babies born to non-Indigenous mothers who smoked were of LBW, compared with 5.0% of those whose non-Indigenous mothers did not smoke. In 2009, half (50%) of Indigenous mothers and 13% of non-Indigenous mothers reported smoking during pregnancy [43].

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 [44]. 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 [6]. As a result of the incomplete identification of Indigenous status in death records, the 2,558 deaths registered in 2011 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 [6], but the ABS does make adjustments to the number of registered deaths in preparing their estimates of life expectancy. 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 [7]. Based on this comparison, the ABS estimated that the Australia-wide level of Indigenous identification in deaths notifications in 2006-2007 was 92%, a level much higher than previous estimates (around 56%) [8].

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 some doubt about the actual levels of identification [45]. 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 [6]. 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 using a process known as standardisation.

Age-standardised death rates can be calculated when detailed information about Indigenous deaths, including sex and age, is available [46]. By direct age-standardisation, 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 use indirect standardisation to estimate 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. An SMR is the ratio of the numbers registered and expected.

Age-standardised death rates

After age-adjustment, the death rate for Indigenous people living in NSW, Qld, WA, SA and the NT – the jurisdictions with adequate levels of Indigenous identification – was 1.9 times the rate for non-Indigenous people in 2006-2010 (Table 5) [47]. The rates for Indigenous people were highest in the NT (1,541 per 100,000) and WA (1,431 per 100,000).

Table 5. Age-standardised death rates, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2006-2010

Jurisdiction	Indigenous rate	Non-Indigenous rate	Rate ratio
NSW	962	598	1.6
Qld	1,089	597	1.8
WA	1,431	574	2.5
SA	1,060	615	1.7
NT	1,541	645	2.4
NSW, Qld, WA, SA and the NT	1,151	597	1.9

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 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

Source: Australian Health Ministers' Advisory Council, 2012 [47]

Between 1991 and 2010, there was a 33% reduction in the death rates for Indigenous people in WA, SA and the NT; there was also a significant closing of the gap in death rates between Indigenous and non-Indigenous people during this time period [47].

Expectation of life

In 2009, the ABS revised its estimates for expectation of life at birth for Indigenous people [7]. After adjustment for the underestimate of the number of deaths identified as Indigenous, the ABS estimated 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 [7].

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

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

Source: ABS, 2009 [7]

Age at death

For those jurisdictions with reasonable information about Indigenous deaths, the median age at death[4] in 2011 for Indigenous males ranged from 50.3 years for those living in SA to 58.5 years for those living in NSW [6]. These levels were around 20 years less than those for non-Indigenous males, which ranged from 66.6 years (NT) to 79.7 years (SA). The median age at death for Indigenous females in 2011 ranged from 50.3 years for those living in SA to 66.2 years for those living in NSW. These levels were also around 20 years less than those for non-Indigenous females, which ranged between 73.5 years (NT) and 85.3 years (SA).

In 2007-2011, 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) [6]. (The rate ratios, based on the numbers of deaths registered, vary according to the levels of Indigenous identification (see above).)

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[4] The median age at death is the age below which 50% of people die. Because the measure partly reflects the age structures of the respective populations, it is a less precise measure than age-specific death rates, which are summarised below.

Table 7. Age-specific death rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2007-2011

Age-group (years)	**Indigenous**		**Non-Indigenous**		**Rate ratio**	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
NSW						
0	7	6	5	4	1.5	1.6
1-4	41	34	18	17	2.2	2.0
5–14	13	11	10	7	1.3	1.5
15-24	81	29	45	20	1.8	1.5
25-34	174	102	73	30	2.4	3.4
35-44	391	228	123	67	3.2	3.4
45-54	825	415	279	169	3.0	2.5
55-64	1543	1022	663	391	2.3	2.6
65+	4911	4431	4193	3732	1.2	1.2
Qld						
0	8	7	5	4	1.6	1.7
1-4	50	56	22	17	2.3	3.4
5–14	18	18	12	10	1.5	1.9
15-24	126	71	56	25	2.3	2.9
25-34	249	123	86	34	2.9	3.7
35-44	515	304	128	68	4.0	4.5
45-54	929	562	270	159	3.4	3.5
55-64	1733	1384	640	372	2.7	3.7
65+	6117	4921	3993	3531	1.5	1.4
WA						
0	10	5	3	3	3.4	1.8
1-4	63	48	22	12	2.8	4.0
5–14	38	29	8.8	9.3	4.3	3.1
15-24	241	106	56	26	4.3	4.1
25-34	406	219	89	36	4.6	6.1
35-44	834	510	121	66	6.9	7.7
45-54	1,388	1,021	260	153	5.3	6.7
55-64	2,381	1,671	579	343	4.1	4.9
65+	6,380	5,296	3,819	3,423	1.7	1.5
SA						
0	6	7	4	3	1.5	2.4
1-4	0.0	90	26	14	0.0	6.5
5–14	17	17	7.9	7.4	2.1	2.4
15-24	166	96	55	20	3.0	4.8
25-34	341	188	88	36	3.9	5.3
35-44	684	517	147	79	4.7	6.5
45-54	1,278	873	293	189	4.4	4.6
55-64	2,131	1,496	677	398	3.1	3.8
65+	4,248	3,872	4,359	3911	1.0	1.0
NT						
0	14	11	4	3	3.6	3.3
1-4	78	60	32	15	2.4	4.1
5–14	52	38	20	8.6	2.6	4.4
15-24	296	112	107	39	2.8	2.8
25-34	438	243	88	35	5.0	7.0
35-44	897	638	151	50	6.0	12.8
45-54	1,596	1,211	338	160	4.7	7.6
55-64	2,920	2,004	789	300	3.7	6.7
65+	6,594	5,531	3,412	2563	1.9	2.2

Notes: 1 Rates are per 1,000
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, information for these jurisdictions have been excluded

Source: ABS, 2012 [6]

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. For those jurisdictions with reasonable information about Indigenous deaths in 2009-2011, the highest Indigenous IMRs occurred in the NT; the lowest rate for Indigenous males was in SA (4.3) and for females was in WA (3.7) (Table 8) [6].

Table 8. Infant mortality rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, SA, WA and the NT, 2009-2011

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW	5.1	3.9	4.4	3.4	1.2	1.1
Qld	9.9	6.8	5.2	4.1	1.9	1.7
SA	4.3	6.6	3.6	2.9	1.2	2.3
WA	10.2	3.7	3.3	2.6	3.1	1.4
NT	14.3	11.6	3.0	4.2	4.8	2.8

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 jurisdictions have been excluded

Source: Derived from ABS, 2012 [6]

In the five-year period from 2006 to 2010, Indigenous infants most commonly died from International Classification of Disease (ICD) 'Conditions originating in the perinatal period', including birth trauma, disorders relating to foetal growth, and complications from pregnancy, labour and delivery [47]. Indigenous infants died from ICD 'Conditions originating in the perinatal period' at twice the rate of non-Indigenous infants. The second most common cause of infant death was ICD 'Congenital malformations', for which Indigenous and non-Indigenous infants had similar rates (rate ratio of 1.2). The third most common cause of infant death was for ICD 'Signs, symptoms and ill-defined conditions', which includes sudden infant death syndrome (SIDS); Indigenous infants died at three times the rate of non-Indigenous infants (and, for SIDS alone, twice the rate).

From 1991 to 2010, there have been significant declines in IMRs for Indigenous and non-Indigenous infants in WA, SA and the NT: the rate has declined by 62% for Indigenous infants and by 43% for non-Indigenous infants [47]. The gap between Indigenous and non-Indigenous infants has closed substantially.

Causes of death

For deaths identified as Indigenous in 2006-2010, circulatory diseases (also known as cardiovascular disease, which includes heart disease and stroke) was the most common cause of death for Indigenous people living in NSW, Qld, WA, SA and the NT, accounting for 26% of Indigenous deaths [47]. The next most common causes of death were neoplasms (almost entirely cancer) (19% of Indigenous deaths) and external causes of death (injury) (15% of Indigenous deaths). For all major causes of death, Indigenous people died at higher rates than did non-Indigenous people (Table 9).

Table 9. Age-standardised death rates, by Indigenous status and cause, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2006-2010

Cause of death	Rate		Rate ratio
	Indigenous	Non-Indigenous	
Circulatory diseases	351	201	1.7
Neoplasms	245	178	1.4
Endocrine, metabolic and nutritional disorders (including diabetes)	118	22	5.4
Respiratory diseases	112	49	2.3
External causes	84	37	2.3
Digestive diseases	58	20	2.8
Kidney diseases	40	11	3.5
Nervous system diseases	27	24	1.1
Infectious and parasitic diseases	25	8.7	2.9
Conditions originating in the perinatal period	6.0	2.8	2.2
Other causes	85	43	2.0
All causes	1,151	597	1.9

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
3 Rate ratios are the Indigenous rate divided by the non-Indigenous rate

Source: Australian Health Ministers' Advisory Council, 2012 [47]

In 2010, the leading specific causes of death differed for Indigenous males and females living in NSW, Qld, WA, SA and the NT [48]. For Indigenous male and females, the two leading specific causes of death were coronary heart disease (also known as ischaemic heart disease) followed by diabetes; the third leading causes of death were intentional self-harm (suicide) for Indigenous males and cerebrovascular diseases for Indigenous females. For non-Indigenous males, the leading causes of death were coronary heart disease, lung and related cancers, and cerebrovascular disease. For non-Indigenous females, the leading causes of death were coronary heart disease, cerebrovascular disease, and dementia and Alzheimer's disease.

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) [49].

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) [Derived from 49]. 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

Notes:
1 Maternal mortality ratio is the number of maternal deaths divided by the number of confinements (in 100,000s).
2 Due to some uncertainty about the numbers of Indigenous deaths and confinements, some caution must be exercised in the interpretation of the ratios
3 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

Source: Derived from Sullivan, Hall, King, 2008 [49]

Avoidable mortality

Avoidable mortality refers to deaths that could have been prevented with timely and effective health care, including early detection and effective treatment, as well as appropriate modifications of lifestyle behaviours (such as quitting smoking) [50].

In the five-year period from 2006 to 2010, there were 6,777 deaths from avoidable causes, representing almost three-quarters (74%) of the deaths among Indigenous people aged 0-74 years living in NSW, Qld, WA, SA and the NT (compared with 66% of non-Indigenous deaths) [47].

The age-standardised rates of avoidable deaths for Indigenous people were highest in the NT (787 per 100,000) and lowest in NSW (382 per 100,000) in 2006-2010 [47]. Indigenous people died from avoidable causes at 3.5 times the rate of non-Indigenous people living in NSW, Qld, WA, SA and the NT.

In 2006-2010, the most common conditions contributing to avoidable deaths among Indigenous people living in NSW, Qld, WA, SA and the NT were coronary heart disease (19%), cancer (17%), diabetes (10%), and suicide (8.5%) [47]. 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 coronary heart disease, and 13.5 times as high for diabetes.

Between 1991 and 2010, there was a 24% decline in the death rate from avoidable causes for Indigenous people living in WA, SA and the NT [47]. The difference in rates between Indigenous and non-Indigenous people has decreased.

Hospitalisation

Statistics on hospitalisation provide some insights into ill-health in the population [51]. They are, however, a fairly poor reflection of the extent and patterns of treatable illness in the community because they only represent 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 [51]. 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 hospital data collections 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, defined as 20% or less under-identification [52].

Separation rates[5]

Of the 8.2 million hospital separations for NSW, Vic, Qld, WA, SA and the NT during[6] 2010-11, 327,435 (4.0%) were identified as Indigenous (Table 11) [54]. Around two-fifths (39%) of separations for Indigenous patients were for overnight stays.

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[5] '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) [53]. Hospital separations are more widely known as 'admissions', but can also be referred to as 'hospitalisations' [42,53].

[6] All hospitalisation data for the NT include only public hospitals.

In 2010-11, the overall age-standardised separation rate of 911 per 1,000 for Indigenous people was 2.5 times that for non-Indigenous people (Table 11) [54]. The age-standardised separation rate for Indigenous people living in the NT was 1,704 per 1,000, 7.9 times the rate for non-Indigenous people. About 80% of the difference between these rates was due to higher separations for Indigenous people admitted for renal dialysis.

Table 11. 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, 2010-11

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	64,270	559	2,530,421	336	1.7
Vic	19,112	772	2,352,399	406	1.9
Qld	81,754	806	1,741,797	388	2.1
WA	67,944	1,440	898,089	397	3.6
SA	21,435	1,097	652,000	364	3.0
NT	72,920	1,704	31,513	216	7.9
All jurisdictions	327,435	911	8,206,220	367	2.5

Notes:
1 Rates per 1,000 population
2 Non-Indigenous rates and 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

Source: AIHW, 2012 [54]

Age-specific separation rates

Hospital separation rates were higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2010-11 than for their non-Indigenous counterparts for all age-groups, with the highest ratios in the middle adult years (Table 12) [54].

Table 12. Age-specific hospital separation rates, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2010-11

Age-group (years)	Males			Females		
	Indigenous rate	Non-Indigenous rate	Rate ratio	Indigenous rate	Non-Indigenous rate	Rate ratio
0-4	340	245	1.4	275	187	1.5
5-9	132	102	1.3	104	80	1.3
10-14	106	84	1.3	91	71	1.3
15-19	143	128	1.1	295	174	1.7
20-24	200	129	1.5	492	249	2.0
25-29	265	132	2.0	556	314	1.8
30-34	365	155	2.4	628	380	1.7
35-39	634	189	3.4	751	354	2.1
40-44	906	228	4.0	890	305	2.9
45-49	1,161	279	4.2	1,264	311	4.1
50-54	1,413	363	3.9	1,424	373	3.8
55-59	1,631	480	3.4	2,015	439	4.6
60-64	2,001	661	3.0	2,169	544	4.0
65+	1,947	1,288	1.5	2,083	943	2.2

Notes:
1 Non-Indigenous includes 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

Source: Derived from AIHW, 2012 [54], ABS, 2009 [55], ABS, 2012 [56]

Causes of hospitalisation

In 2010-11, the most common reason for the hospitalisation of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT was for the care involving dialysis, which was responsible for 44% of Indigenous separations (143,306 separations) [57]. Many of these separations involved repeat admissions for the same people, some on an almost daily basis. The ICD '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 24,365 separations (7.4% of all separations, and 13% 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 in 2010-11 were respiratory conditions (responsible for 19,471 separations – 11% of separations excluding those for dialysis) and digestive diseases (16,647 separations – 9.0% of separations excluding those for dialysis) (Table 13) [57].

In 2010-11, Indigenous people were hospitalised at higher rates than non-Indigenous Australians for all major causes except for cancer and diseases of the musculoskeletal system and connective tissue [57].

Table 13. Numbers and proportions for leading causes of Indigenous hospital separations (excluding dialysis), and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2010-11

Principal diagnosis	Number of separations	Proportion of separations (excluding dialysis) (%)	Rate ratio
Injury	24,365	13	2.0
Pregnancy-related	20,524	11	1.6
Respiratory diseases	19,471	11	2.8
Digestive diseases	16,647	9.0	1.1
Symptoms, signs and abnormal clinical and laboratory findings	15,470	8.4	1.5
Mental and behavioural disorders	13,824	7.5	2.1
Circulatory diseases	9,817	5.3	1.6
Genitourinary diseases	8,618	4.7	1.3
Diseases of the skin and subcutaneous tissue	7,730	4.2	2.5
Musculoskeletal system and connective tissue diseases	5,956	3.2	0.8
Infectious/parasitic diseases	5,742	3.1	2.0
Cancers	4,689	2.5	0.7
All causes, excluding dialysis	184,129	100	1.3

Notes:
1 Excludes hospitalisation for dialysis
2 Numbers and 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 (non-Indigenous includes separations for which Indigenous status was not stated)
4 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates

Source: AIHW, 2012 [54], AIHW, 2012 [57]

Selected health conditions

Cardiovascular disease

Cardiovascular disease (CVD; ICD 'Diseases of the circulatory system') includes all diseases and conditions that affect the heart and blood vessels [58]. CVD presents a significant burden for Indigenous people in terms of prevalence, hospitalisation, and mortality [59]. Coronary heart disease (or ischaemic heart disease), cerebrovascular disease, hypertension and rheumatic heart disease are of particular importance to Indigenous people.

Risk factors for CVD are categorised as either modifiable, which can be behavioural and biomedical, or non-modifiable (risk factors that cannot be altered) [60]. Modifiable behavioural factors include tobacco use, physical inactivity, dietary behaviour, and excessive alcohol consumption [60, 61]. Modifiable biomedical factors include hypertension, high blood cholesterol, overweight and obesity, and depression. Certain related health conditions, particularly diabetes and chronic kidney disease, can also increase the risk of developing CVD. Non-modifiable risk factors, such as age, sex, family history, and ethnicity, can influence the risk of CVD.

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 [62, 63]
- environmental and socioeconomic factors, such as poor housing, low education and income [62-64]
- psychosocial stressors, such as death of a family member or close friend, serious injury or disability [63, 65]
- limited access to health care, both preventive and clinical [62, 63, 66].

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) [67]. Around 12% of Indigenous people reported having a long-term heart or related condition, with the proportion being slightly higher for those living in remote areas (14%) than in non-remote areas (11%). The proportions represent a slight increase from those reported in 2001 (11%).

After age-adjustment, heart and circulatory problems/diseases were around 1.3 times more common for Indigenous people than for non-Indigenous people [67]. 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 [67].

At 31 December 2009, there were 1,374 Indigenous people and 105 non-Indigenous people living in the Top End of the NT and the NT part of central Australia who were registered as having rheumatic heart disease (RHD) [42]. Almost two-thirds (65%) of these people were females. After age-adjustment, the prevalences for Indigenous males were 38 times higher in the Top End and 14 times higher in the central Australia part of the NT than the corresponding rates for their non-Indigenous counterparts. Age-adjusted prevalences of RHD for Indigenous females were 23 times higher in the Top End and 20 times higher in central Australia part of the NT than the corresponding prevalences for their non-Indigenous counterparts. The prevalence of RHD for Indigenous people was highest in the 45-54 years age-group (3.5%). The highest Indigenous and non-Indigenous ratios were for the 0-14 years and 25-34 years age-groups – 178 and 108 respectively.

Hospitalisation

There were 9,817 hospital separations for CVD among Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2010-11 [54]. After age-adjustment, Indigenous people were hospitalised for CVD at 1.6 times the rate for non-Indigenous people [57].

There were 7,212 hospital admissions of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2006 to June 2008 for coronary heart disease [42]. Of these admissions, 2,871 were for acute myocardial infarction (heart attack). Admission rates for Indigenous males were 1.7 times higher for coronary 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 coronary 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 1,329 admissions to hospital of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2006-08 [42]. 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 2006-08 were considerably higher than those for non-Indigenous people: 2.6 times higher for males and 2.5 times higher for females [42]. 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.

In 2007-08 in NSW, Vic, Qld, WA, SA and the NT there were 347 Indigenous people hospitalised for RHD/acute rheumatic fever (ARF) [60]. [7] The hospitalisation rate for Indigenous people was 67 per 100,000, eight times the rate for non-Indigenous people.

Mortality

CVD was the leading cause of death for Indigenous people living in NSW, Qld, WA, SA and the NT in 2006-2010, being responsible for 26% of all deaths of Indigenous people [47]. After age-adjustment, the death rate for Indigenous people was 1.7 times that for non-Indigenous people. Coronary heart disease was responsible for 61% of the CVD-related deaths among Indigenous males and for 45% of those among Indigenous females. Cerebrovascular disease was responsible for 15% of deaths from CVD among Indigenous males and for 22% of those among Indigenous females.

RHD was responsible for the deaths of 90 Indigenous people living in NSW, Qld, WA, SA and the NT in 2006-2010 [47]. The age-adjusted death rate from RHD for Indigenous people living in NSW, Qld, WA, SA and the NT in 2004-2008, the most recent period for which details are available, was 5.8 times that of non-Indigenous people [42]. Indigenous males were 4.1 times more likely to die from RHD than non-Indigenous males, and Indigenous females 6.8 times more likely to die from RHD than their non-Indigenous counterparts.

The striking difference between Indigenous people and non-Indigenous people in overall CVD mortality is the much greater impact among young and middle-aged Indigenous adults. In 2002-2005 in Qld, WA, SA and the NT, the death rates for all CVD were 8 to 12 times higher for Indigenous people in the 35–44 years and 45–54 years age-groups than the rates for their non-Indigenous counterparts [59].

Cancer

Cancer is a disease which affects the body's cells [68, 69]. Cells normally grow and multiply in a controlled manner, but when damage occurs in the genetic blueprint (DNA) of a cell, uncontrolled growth can occur; this is cancer. Cancer cells are benign if they 'do not spread into surrounding areas, or to different parts of the body' [68], and are not considered dangerous; however, if these cells 'spread into surrounding areas, or to different parts of the body [metastasise], they are known as malignant' [68]. Cancerous cells can arise from almost any cell, so cancer can occur almost anywhere in the body.

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 [70, 71]. Indigenous identification in the registries has been improving [72, 73], but, due to poor data quality in several jurisdictions, there are currently no national data on cancer incidence among Indigenous people [1]. For those Indigenous patients who are registered with cancer, there is concern that not all are correctly identified as Indigenous [71]. 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 [73]. 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 2010 [74], an apparent ratio of 0.6) rather than by rates has tended to give the erroneous impression that cancer does not have a great impact among Indigenous people. An analysis of rates, rather than comparisons of

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[7] ARF and RHD were reported together.

proportions, reveals that during 2006-2010 the ratio of cancer-related deaths was 1.4 for Indigenous and non-Indigenous people living in NSW, Qld, WA, SA and the NT [1].

Extent of cancer among Indigenous people

Incidence

In the five-year period 2004-2008, an average of 775 Indigenous people living in NSW, Qld, WA and the NT were diagnosed with cancer each year [1].[8] After age-adjustment, the cancer incidence rate was 1.1 times higher for Indigenous people than for non-Indigenous people during this period (461 and 434 cases per 100,000 people, respectively).[9]

The most common cancer diagnosed among Indigenous people living in NSW, Qld, WA and the NT in 2004-2008 was lung cancer (average of 121 cases per year), followed by breast cancer (among Indigenous females) (average of 88 cases per year), and bowel cancer (average of 70 cases per year) [1]. The age-standardised incidence rate for cervical cancer was 2.8 times higher for Indigenous women than for non-Indigenous women (Table 14) [75]. Age-standardised incidence rates for Indigenous people were 1.9 times higher for lung cancer and cancer of the unknown primary site than those for non-Indigenous people, but rates were lower for Indigenous people than for non-Indigenous people for breast cancer, prostate cancer, bowel cancer, non-Hodgkin lymphoma, and melanoma of the skin.

For all types of cancer, the mean age of diagnosis was lower for Indigenous males and females living in NSW, Qld, WA and the NT in 2004-2008 than for their non-Indigenous counterparts [47].

Table 14. Age-standardised incidence rates for selected cancers, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA and the NT, 2004-2008

Site of primary cancer	Indigenous people	Non-Indigenous people	Rate ratio
Lung	80	43	1.9
Breast (females)	82	104	0.8
Prostate (males)	105	148	0.7
Bowel	48	59	0.8
Cervix (females)	18	7	2.8
Pancreas	15	10	1.5
Non-Hodgkin lymphoma	14	16	0.9
Skin (melanoma)	9	32	0.3
Unknown primary site	24	12	1.9

Notes:
1 Rates per 100,000 population
2 Ratio is the Indigenous rate divided by the non-Indigenous rate
3 Rates are age-standardised to the Australian population at 20 June 2001
4 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates
5 Levels of missing data on Indigenous identification for prostate cancer (16%) and melanoma of the skin (41%) were particularly high

Source: AIHW and Australasian Association of Cancer Registries, 2012 [75]

Hospitalisation

There were 4,689 cancer-related hospital separations identified as Indigenous in NSW, Vic, Qld, WA, SA and the NT in 2010-11 [54]. Age-standardised hospitalisation rates for cancer were lower for Indigenous people than for non-Indigenous people (16 and 25 per 1,000, respectively) [57].

In terms of specific cancers, the age-standardised hospitalisation rate for lung cancer for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-09 was 1.5 times higher than for their non-Indigenous counterparts [76]. The hospitalisation rate for cervical cancer for Indigenous women living in NSW, Vic, Qld, WA, SA and the NT for the period 2005-06 to 2009-10 was 3.1 times higher than that for other females [77]

Mortality

In the five-year period 2006-2010, there was an average of 424 deaths from cancer per year among Indigenous people living in NSW, Qld, WA, SA and the NT, the second most common cause of death in this period [1]. The age-standardised death rate for cancer for Indigenous people (249 per 100,000) was 1.4 times higher than the rate for their non-Indigenous counterparts.

In terms of specific cancers, an annual average of 104 cancer-related deaths among Indigenous people living in NSW, Qld, WA, SA and the NT in 2006-2010 was from lung cancer, 27 from cancer of an unknown primary site, 27 from breast cancer (among women), and 22 from bowel cancer [75]. Death rate ratios were higher for Indigenous people than for their non-Indigenous counterparts for cervical cancer (4.4), lung cancer (1.8), cancer of an unknown primary site (1.7), female breast cancer (1.3), and pancreatic cancer (1.3) (Table 15).

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[8] The overall level of missing data on Indigenous status for cancers diagnosed between 2004 and 2008 in NSW, Qld, WA and the NT was 12%.

[9] Cancer incidence rates have been reported previously as lower for Indigenous people than for non-Indigenous people. The current report notes that the changed relativity could be due to differences in the jurisdictions contributing to the various reports, but it may also reflect real changes in the incidence of cancer among Indigenous people.

Table 15. Age-standardised death rates for selected cancers, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2006-2010

Site of primary cancer	Indigenous people	Non-Indigenous people	Rate ratio
Lung	61	34	1.8
Breast (female)	27	22	1.3
Prostate (males)	30	30	1.0
Bowel	15	17	0.9
Pancreas	13	10	1.3
Cervix (females)	8	2	4.4
Non-Hodgkin lymphoma	5	6	0.9
Skin (melanoma)	2	6	0.4
Unknown primary site	17	10	1.7

Notes: 1 Rates per 100,000 population
2 Ratio is the Indigenous rate divided by the non-Indigenous rate
3 Rates age-standardised to the Australian population at 20 June 2001
4 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates
5 Levels of missing data on Indigenous identification for prostate cancer (16%) and melanoma of the skin (41%) were particularly high

Source: AIHW and Australasian Association of Cancer Registries, 2012 [75]

The patterns of Indigenous cancer incidence and mortality are largely explained by the higher level of risk factors, most notably tobacco use [78-80]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat [81].

The slightly higher Indigenous:non-Indigenous ratio for cancer incidence (1.1) than for deaths from cancer (1.4) could be due to a number of factors [71]:

- Indigenous people are significantly more likely to have cancers that have a poor prognosis
- Indigenous people are usually diagnosed with cancer at a later stage (probably due to a combination of later presentation for health care and lower participation in screening programs)
- Indigenous people are less likely to receive optimal treatment.

Diabetes

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [82]. Type 1 diabetes is relatively uncommon in the Indigenous population. On the other hand, type 2 diabetes represents a serious health problem for many Indigenous people, who tend to develop it at earlier ages than do other Australians, and often die from it at younger ages [73]. GDM, which can occur during pregnancy, is more common among Indigenous women than among non-Indigenous women [83].

Statistics on diabetes incidence, prevalence, hospitalisation, and mortality among Indigenous people 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 [82]; self-reported diabetes data may underestimate the prevalence of diabetes by up to 50% [84].

Diabetes can lead to life-threatening health complications, some of which may develop within months of diagnosis, while others may take years to develop [85]. Complications of diabetes include disease of the large blood vessels (macrovascular disease), which can cause heart disease and stroke, and disease of the small blood vessels (microvascular disease), 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 [86].

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 [82]. 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, 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 [82]. Overall, 2.9% of people on the NDR in 2005-2007 were recorded as Indigenous, which is slightly higher than the estimated proportion of Indigenous people in the total population percentage in 2006 (2.5%).

The self-reported prevalence of diabetes/high sugar levels was 6% for Indigenous people who participated in the 2004-2005 NATSIHS

[67]. These problems were reported more frequently by Indigenous people living in remote areas (9%) than by those living in non-remote areas (5%). After age-adjustment, Indigenous people were around 3.4 times more likely than non-Indigenous people to report some form of diabetes. The ratio between Indigenous and non-Indigenous females for self-reported diabetes/high sugar levels (4.1) was higher than that between Indigenous and non-Indigenous males (2.9) in 2004-2005.

In 2004-2005, 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 [67].

The prevalence of diabetes increased with age in 2004-2005 [67]. 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 those 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)	Indigenous (%)	Non-Indigenous (%)	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

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

Source: ABS, 2006 [67]

Diabetes is known to have adverse effects on pregnant women and their babies [83]. 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 [83]. 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 an induced labour, a pre-term birth, caesarean section, hypertension, and longer stay in hospital than were mothers without diabetes in pregnancy.

Adverse outcomes for babies, including pre-term birth, high level resuscitation, admission to special care nursery or neonatal intensive care unit, low Apgar score, and longer hospital stays, were more common for those born to Indigenous mothers with pre-existing diabetes than for those born to Indigenous mothers with GDM or those without diabetes [83].

General practice attendances and hospitalisation

Hospitalisation rates are not necessarily an accurate reflection of the burden of diabetes in the community because, 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, more than double the rate for non-Indigenous people [87].

In the two-year period from July 2007 to June 2009, around 2% of hospitalisations among Indigenous people were for diabetes [87]. 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%, but from a lower base.

Diabetes was recorded as the principal diagnosis in 1.4% of hospital separations for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT from July 2006 to June 2008, representing 4.8% of all hospitalisations for diabetes [42]. After age-adjustment, hospitalisation rates for diabetes for Indigenous males and females were 3.4 and 5.0 times the rates for other males and females. The highest rate ratio for males was for the 35-44 years age-group: the rate for Indigenous males was around nine times that of non-Indigenous males. The highest rate ratio for females occurred in the 45-54 years age-group, with a rate for Indigenous females 13 times higher than that for non-Indigenous females. Around 84% of diabetes-related hospitalisations for Indigenous people were for type 2 diabetes.

After age-adjustment, diabetes hospitalisation rates in NSW, Vic, Qld, WA, SA and the NT in 2007-09 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) [42]. 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, particularly renal complications, but also circulatory and ophthalmic conditions, were the cause of high rates of hospitalisations. Hospitalisation rates for renal complications of diabetes were 11.2 times higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-09 than they were for their non-Indigenous counterparts [88]. 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 to 13.5 per 1,000). Hospitalisation rates for multiple complications of diabetes were 6.5 times higher for Indigenous people than for other Australians in 2008-09 (3.1 compared with 0.5 per 1,000).

Mortality

Diabetes causes a higher proportion of deaths among Indigenous people than it does among non-Indigenous people [42]. In the period 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 age-adjustment, the Indigenous rate (103.4 per 100,000) was 6.9 times the rate of non-Indigenous people. (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 [89].)

Social and emotional wellbeing (including mental health)

Good mental health is essential to the health and wellbeing of individuals, families, and communities [90]. 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 [91].

National 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 [91, 92]. It is influenced by a complex interplay of biological, psychological, social, environmental, and economic factors [90, 91, 93]. People with good mental health are able to contribute to community life, participate in the workforce, and foster meaningful and positive relationships with others [91, 92, 94].

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 [91], 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 [90, 91]. 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 lifetime [90, 91, 94]. 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 [94]. It goes beyond traditional mental health 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 [94, 95]. 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' [96, p.7], but the precise details have been poorly documented up until the 2004-2005 NATSIHS [67], 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 [97].

After age-adjustment, the 2008 NATSISS found that Indigenous people aged 18 years or older were more than 2.6 times as likely as their non-Indigenous counterparts to feel high or very high levels of psychological distress [88]. 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) [42]. 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. An association 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 [98]. 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' [42, 98]. 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

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

Source: AIHW, 2011 [42], ABS, 2011 [98]

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 through the inclusion of measures of positive wellbeing [97]. 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 [88]. The lack of comparable data precludes definitive statements about the positive wellbeing of Indigenous people compared with that of non-Indigenous people, but 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 are influenced by the support a person receives from their social networks [99]. Information collected in the 2008 NATSISS show 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 2010 GSS found that 94% of non-Indigenous people were able to access support at a time of crisis [100].

Removal from one's natural family also has significant implications for a person's social and emotional wellbeing [101]. 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, undertaken in 2001 and 2002, remains the most recent and detailed source of information. The WAACHS reported that 24% of Indigenous children and young people aged 4-17 years were rated by their carers (parent or guardian) as being at high risk of clinically significant emotional or behavioural difficulties (compared with 15% of their counterparts in the general WA population) [102]. 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 many Indigenous people, 13,824 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 2010-11 (7.5% of Indigenous separations, excluding those for dialysis) [57]. After age-adjustment, the hospitalisation rate for Indigenous people was 2.1 times the rate for non-Indigenous people.[10]

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[10] 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'.

Information about hospitalisation for the specific sub-categories within the ICD chapter 'Mental and behavioural disorders' are not available for 2010-11, but data from 2008-09 show hospitalisation rates for each sub-category were generally higher for Indigenous people than for other Australians [88]. For this period, the age-adjusted separation rates for mental and behavioural disorders due to ICD 'Substance use disorder' were 3.8 times higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT than for their non-Indigenous counterparts. Similarly, the rate for Indigenous people for ICD 'Schizophrenia, schizotypal, and delusional disorders' was 2.9 times higher than the rate for other people.

Intentional self-harm, categorised separately to the 'Mental and behavioural disorders' principal diagnosis chapter within the ICD, was responsible for 1.1% of all hospital admissions for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2010-11 [57]. The most recent information available for hospital admission rates for intentional self-harm shows Indigenous people living in NSW, Vic, Qld, WA, SA and the NT were more likely to be admitted for intentional self-harm than were non-Indigenous people in 2008-09 [88]. After age-adjustment, 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 separation rate for intentional self-harm – more than three 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'[11], accounting for 2% of all deaths among Indigenous people [88]. After age-adjustment, the death rate for Indigenous males for '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.

More recent data are available for deaths due to ICD 'Intentional self-harm'[12] (suicide), which is not included among the deaths for ICD 'Mental and behavioural disorders'. In 2010, the death rate for 'Intentional self-harm' for Indigenous people living in NSW, Qld, WA, SA, and the NT was 2.4 times the rate reported for non-Indigenous people [48]. For the period 2006-2010, deaths from intentional self-harm were much higher for Indigenous people living in NSW, Qld, WA, SA, and the NT than for non-Indigenous people, particularly for males. Age-standardised death rates in these jurisdictions ranged from 18 per 100,000 (NSW) to 59 per 100,000 (WA) for Indigenous males; rates for non-Indigenous males ranged from 13 per 100,000 (NSW) to 24 per 100,000 (NT). Rates were highest for Indigenous people living in WA (36 per 100,000) and the NT (28 per 100,000) (Table 18).

Table 18. Age-standardised death rates for intentional self-harm, by Indigenous status and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2006-2010

Jurisdiction	Indigenous	Non-Indigenous	Rate ratio
NSW	10	8	1.2
Qld	22	12	1.9
WA	36	11	3.2
SA	22	11	2.0
NT	28	14	1.9

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

Source: ABS, 2012 [48]

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 do non-Indigenous people. Data for NSW, Qld, WA, SA and the NT in 2006-2010 show the highest death rates for intentional self-harm were among Indigenous people aged 15-24 and 25-34 years (40 and 44 per 100,000 respectively) [48]. The burden of suicide is highest among Indigenous males aged 15-24 and 25-34 years (rates of 55 and 72 per 100,000 respectively), but is also very high among young Indigenous females (Table 19). The suicide rates for Indigenous females aged 15-24, 25-34, and 35-44 years were more than six times higher than the rates for their non-Indigenous female counterparts. The suicide rate for Indigenous females aged 15-24 years was higher than the rates for non-Indigenous males in this age-group.

Table 19. Age-specific death rates for intentional self-harm, by Indigenous status, sex and selected age-groups, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2006-2010

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio	
	Male	Female	Male	Female	Male	Female
15-24	55	24	13	4	4.4	6.5
25-34	72	20	20	3	3.7	6.3
35-44	51	21	24	3	2.1	8.4

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

Source: ABS, 2012 [48]

Research in NSW, Qld, the ACT, and the NT has highlighted the increasing impact of suicide among young Indigenous people [103-105]. 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' [106, 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 [88].

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

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

Kidney health (renal disease)

Kidney disease, renal disease and renal disorders are terms that refer to a variety of different disease processes involving damage to the working units of the kidneys[13] [107, 108]. Of particular importance to Indigenous people is chronic kidney disease (CKD), which is defined as kidney damage or reduced kidney function that lasts for three months or more [109, 110]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [81]. If left untreated, kidney function can decrease to the point where kidney replacement therapy is necessary to avoid death. 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 [109, 111].

A number of risk factors are associated with kidney disease, including diabetes, high blood pressure, infections, LBW, and obesity [110]. These conditions are particularly common among Indigenous people and contribute to high rates of CKD [81, 112].

Extent of kidney disease among Indigenous people

Prevalence

The prevalence of CKD is higher among Indigenous people than among other Australians [42, 81, 113]. After age-adjustment, the Indigenous/non-Indigenous ratio of CKD increased from 5.3 in 2001 to 10.0 in 2004-2005 [81].

With most information on CKD limited to self-reported data, the primary focus in the literature has been on ESRD [110, 113]. The overall incidence rate of ESRD for Indigenous people is consistently reported as being significantly higher than that for non-Indigenous people [108, 113].

Data from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) reveal that the age-standardised notification rate of 702 per 1,000,000 population for Indigenous people in 2006 to 2010 was 7.2 times the rate for non-Indigenous people (Table 20) [Derived from 114, 115-117]. 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 (1,579 per 1,000,000), WA (1,014 per 1,000,000), and SA (924 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, 2006-2010

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	129	284	3,647	98	2.9
Vic	41	464	2,716	103	4.5
Qld	299	730	2,129	103	7.1
WA	222	1,014	1,012	97	10.5
SA	76	924	840	107	8.6
NT	324	1,579	54	79	20.0
Australia	1,104	702	10,914	97	7.2

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

Source: Derived from ANZDATA, 2010 [117], ABS, 2008 [114], ABS, 2001 [115], ABS, 2009 [116]

Of people newly registered with the ANZDATA in 2006-2010, almost two-thirds (62%) of Indigenous people were aged less than 55 years, compared with less than one-third (30%) of non-Indigenous people [Derived from 114, 115-117] (Table 21). Notification rates were higher for Indigenous people than for non-Indigenous people across all ages (except for the 0-14 years age-group). Rate ratios were particularly high for people aged 35-44 years (12.2) and 45-54 years (13.5).

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

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, 2006-2010

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	5	5	134	7	0.7
15-24	19	35	240	17	2.1
25-34	77	206	497	34	6.0
35-44	240	708	880	58	12.2
45-54	348	1,437	1,547	106	13.5
55-64	287	2,106	2,282	191	11.0
65-74	109	1,851	2,775	374	4.9
75+	19	713	2,559	384	1.9
All ages	1,104	702	10,914	97	7.2

Notes: 1 Rates per 1,000,000 population
2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3 Rates for 'All ages' are age-standardised

Source: Derived from ANZDATA, 2010 [117], ABS, 2008 [114], ABS, 2001 [115], ABS, 2009 [116]

Management of ESRD involves dialysis or kidney replacement therapy (KRT), also known as renal replacement therapy (RRT), where transplantation of the kidney is required [118]. In the three-year period 2008 to 2010, 644 Indigenous people commenced treatment for ESRD, accounting for 9% of new registrations [47]. After age-adjustment, the incidence rate of treatment for ESRD was 7.2 times higher for Indigenous people than for non-Indigenous people.

Detailed information from ANZDATA is available for 2009 when a total of 187 Indigenous people commenced dialysis, a decrease from 249 in 2008 and 237 in 2007 [113]. In 2009, 24 new transplant operations were performed for Indigenous recipients compared with 748 operations performed for 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, 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 [113, 119-121]. 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 [113]. For the same period, there were 1,174 prevalent dialysis patients in Australia (including both PD and HD) identified as Indigenous, with a level nearly five times higher for Indigenous people (2,220 per 1,000,000) than for the total population.

Hospitalisation

In 2010-11, care involving dialysis was the most common reason for the hospitalisation of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT [57]. Care involving dialysis was responsible for 143,306 hospital separations among Indigenous people, accounting for 44% of hospital separations. The Indigenous hospitalisation rate of 503 per 1,000 was 11.4 times the rate for other Australians.

Detailed information about dialysis is available for the period 2008-09 for people living in NSW, Vic, Qld, WA, SA and the NT. During this time period, 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 eight times the rate of other males [110]. Hospitalisation rates of Indigenous females for CKD as both principal diagnosis and as an additional diagnosis were between five and seven times the rates for other females[14]. 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 [122].

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 [10].

Mortality

During the five-year period 2006 to 2010, there were 323 Indigenous deaths from kidney disease, accounting for 3% of all Indigenous deaths [47]. After age-adjustment, the death rate for Indigenous people was four times higher than the rate for non-Indigenous people. There was an increase in kidney disease-related mortality among Indigenous people between 2001 and 2010, leading to an increase in the gap between Indigenous and non-Indigenous people.

Detailed information is available for the five-year period from 2003 to 2007 for NSW, Qld, WA, SA and the NT. During this period, there were 1,443 Indigenous deaths from CKD (405 deaths had no record of Indigenous status) [110]. After age-adjustment, the death rate for all CKD-related deaths for Indigenous people (188 per 100,000) was 3.5 times higher than the rate for non-Indigenous people. The Indigenous/non-Indigenous rate ratios were higher for females (4.3) than for males (2.9).

In 2003-2007, death rates where CKD was the underlying cause were 3.7 and 4.7 times higher for Indigenous males and females than for their non-Indigenous counterparts [110]. These figures probably underestimate the contribution of CKD to death rates, however,

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

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 includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [123], but in public health practice attention is almost entirely confined to physical harm [124]. Even restricted to physical harm, 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 [125]. 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 [126]. This system is followed in this section, but it has its limitations (for more details, see [127]).

Understanding injury within an Indigenous context needs to take a diverse range of issues into consideration, including: disruption to culture, and 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 [123, 125].

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 (except for the 0-14 years age-group) [67]. 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 age-adjustment, a long-term condition as a result of an injury or accident was 1.4 times more common 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 among non-Indigenous people, it is somewhat surprising that the proportion of Indigenous people who reported having had an injury in the four weeks prior to the 2004-2005 NATSIHS was slightly less than that for non-Indigenous people (15% compared with 19%) [128]. Indigenous people were 2.8 times as likely as non-Indigenous people to report a recent injury that was the result of an attack by another person and 4.5 times as likely to report being under the influence of alcohol or other substances at the time of injury.

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%) [99]. Victimisation was higher among younger Indigenous people, with males and females aged 15-24 years having the highest reported proportions (29% and 31%, respectively) [129]. 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%) [42]. 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 (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 2010-11, injuries were responsible for 24,365 hospital separations for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT, accounting for 13% of all Indigenous separations (excluding those for dialysis) [54]. The age-standardised separation rate of 51 per 1,000 for Indigenous people was 2.0 times that for other Australians [57].

The leading causes of injury-related hospitalisations in NSW, Vic, Qld, WA, SA and the NT in 2010-11 were ICD 'Complications of medical and surgical care' (24%), assault (19%), falls (17%), and exposure to mechanical forces (14%) [54].

Detailed information on Indigenous injury-related hospitalisation is not available for 2010-11, but in the two-year period from July 2008 to June 2010, age-standardised hospitalisation rates for injury for Indigenous males (52 per 1,000) and females (42 per 1,000) living in NSW, Vic, Qld, WA, SA and the NT were two times the rate for non-Indigenous males and females [47].

In terms of remoteness, hospitalisation rates for injury for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT increased with remoteness in 2008-09 [88]. The rate increased from 32 per 1,000 in major cities to 71 per 1,000 in remote areas. Hospitalisation rates were higher in remote areas than major cities for a number of principal diagnoses:

- for assaults, the rate was 4.5 times higher in remote areas than in major cities
- for falls, the rate was 1.8 times higher in remote areas than in major cities
- for complications of medical and surgery care, the rate was 1.9 times higher in remote areas than in major cities
- for transport accidents, the rate was 1.7 times higher in remote areas than in major cities.

Hospitalisation rates for injury increased by 14% for Indigenous people and by 9% for non-Indigenous people between 2004-05 and 2009-10 [47].

Assaults account for a higher proportion of injury-related hospitalisations among Indigenous people than they do among non-Indigenous people; in NSW, Vic, Qld, WA, SA and the NT in 2010-11, 19% of injury-related hospitalisations among Indigenous people were for assaults compared with 2% among other people [54]. The most recent detailed information is available for the two-year period from July 2006 to June 2008, when assault was responsible for around 2% of all hospitalisations for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT [42]. 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. The hospitalisation rate for assault was 36 times higher for Indigenous women than for other women; 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 living 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 [88]. After age-adjustment, Indigenous people were hospitalised for assaults relating to family violence at 23 times the rate of non-Indigenous people. 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 Australians).

Mortality

Injury was the third most common cause of death among Indigenous people living in NSW, Qld, WA, SA and the NT in 2010, after CVD (26% of all deaths) and cancer (19%) [74]. Injury accounted for 14% of all Indigenous deaths in this period.

Intentional self-harm was the leading cause of death from injury for Indigenous people living in NSW, Qld, WA, SA and the NT in 2010, responsible for 31% of Indigenous deaths from injury [74]. After age-adjustment, the Indigenous death rate was 2.4 times higher than that for non-Indigenous people. Transport accidents were responsible for 23% of Indigenous deaths from injury; the standardised death rate was 2.9 times higher for Indigenous people than for 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 [42]. Indigenous people in these 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

The term ‘respiratory disease’ refers to a number of conditions that affect the lungs or their components; each of these conditions is characterised by some level of impairment of the lungs in performing the essential function of gas exchange [130]. Respiratory disease, which includes asthma, chronic obstructive pulmonary disease (COPD), pneumonia and invasive pneumococcal disease, represents a significant burden of ill-health and hospitalisation among Indigenous people, particularly among the very young and older people [47, 87].

Respiratory disease is associated with a number of contributing factors, including poor environmental conditions, socioeconomic disadvantage, risky behaviour (particularly cigarette smoking, alcohol use, and substance use), and previous medical conditions [131, 132]. Infants and children under the age of 5 years 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 [131, 133-135]. Among Indigenous adults, factors contributing to respiratory disease include tobacco smoking, use of alcohol and other substances, diabetes mellitus, and chronic renal disease [131].

The risk of developing asthma is affected by environmental, lifestyle (e.g. diet and tobacco use), and genetic factors (e.g. allergies) [73]. Asthma attacks can be triggered by exercise, viral infections, irritants (e.g. smoking and air pollutants), and specific allergens. These attacks cause a narrowing of the airways, resulting in symptoms including wheezing and breathlessness. The symptoms of asthma are generally reversible.

COPD is a term for long-term lung diseases for which the symptoms are not fully reversible, and include chronic bronchitis, emphysema, and some cases of asthma [130]. These diseases are characterised by shortness of breath. A major risk factor for COPD is smoking, but exposure to irritants like dust and fumes can also increase the risk of developing COPD [136].

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 [67]. Respiratory conditions were reported more frequently by Indigenous people living in non-remote areas (30%) than by those living in remote areas (17%).

Asthma was reported by 15% of Indigenous people in the 2004-2005 NATSIHS [67]. It was the most commonly reported respiratory condition among Indigenous people, and the second most commonly reported health condition. Asthma was reported more frequently by Indigenous people living in non-remote areas (17%) than by those living in remote areas (9%).

After age-adjustment, 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 [67, 137].

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%) [67].

Hospitalisation

There were 19,471 hospital separations for respiratory disease among Indigenous people living in NSW, Vic, Qld, WA, SA, and the NT in 2010-11, representing 11% of separations identified as Indigenous (excluding dialysis) [54]. During this period, the age-standardised hospitalisation rate for respiratory disease was 2.8 times higher for Indigenous people than for other Australians [57].[15]

In the two-year period from July 2008 to June 2010, Indigenous children aged 0-4 years were hospitalised for respiratory disease at twice the rate of other Australian children [47]. Hospitalisation rates were substantially higher for Indigenous adults than non-Indigenous adults, with rates almost six times higher for Indigenous people aged 45-54 years and more than four times higher for Indigenous people aged 35-44 years and 55-64 years.

In 2008-10, the most common cause of hospitalisation for respiratory disease among Indigenous people was pneumonia (23%), followed by COPD (13%), and asthma (11%) [47].

For Indigenous people living in remote areas, the hospitalisation rate was three times the rate of Indigenous people living in major cities (80 and 27 per 1,000 people respectively) in 2008-10 [47].

Mortality

In 2010, respiratory disease was responsible for the deaths of 194 Indigenous people living in NSW, Qld, SA, WA and the NT, accounting for 7.5% of Indigenous deaths [74]. After age-adjustment, the death rate for Indigenous people was 2.6 times that for non-Indigenous people. Chronic lower respiratory diseases (COPD and asthma) were responsible for 115 Indigenous deaths; the age-adjusted death rate for Indigenous people was 3.0 times higher than that for non-Indigenous people. Influenza and pneumonia were responsible for 44 Indigenous deaths, with a rate 2.8 times higher for Indigenous people than for non-Indigenous people [48].

The most recent detailed information on specific causes of respiratory-related deaths for Indigenous males and females is available for the period from 2004 to 2008. During this time period, the leading specific cause of death from respiratory disease for both Indigenous males and females living in NSW, Qld, WA, SA and the NT was chronic lower respiratory disease (Table 22) [42]. Age-standardised death rates were around three times higher for Indigenous males and females than those for their non-Indigenous counterparts. Death rates for pneumonia and influenza, the next most common cause of death from respiratory disease, were 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
All respiratory disease	144	2.3	95	2.2	116	2.3

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-groups to 75+

Source: AIHW, 2011 [42]

More recent detailed information is not available, but the death rate from chronic lower respiratory disease for Indigenous people aged 55-64 years living in NSW, Qld, SA, WA and the NT in 2006-2010 (57 per 1,000) was 5.5 times higher than the rate for their non-Indigenous counterparts [48]. Among people aged 65-74 years, the rate of 79 per 1,000 for Indigenous people was 4.4 times

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

higher than that for their non-Indigenous counterparts. Indigenous infants were 3.3 times more likely than their non-Indigenous counterparts to die from respiratory disease.

Death rates from respiratory disease are still considerably higher for Indigenous people than for non-Indigenous people, but the disparity has closed over recent decades, largely because of significant decreases in rates among Indigenous people since 1997 [47].

Eye health

Eye health can be affected by a number of factors, including genetics, ageing, premature birth, other diseases (such as diabetes), smoking, injuries, ultra violet (UV) exposure, and nutrition [99]. Poor vision can increase the risk of injury and limit opportunities in education, employment and social engagement, and also be a reason for dependence on services and other people [47, 138, 139]. Even mild vision loss can reduce an individual's ability to live independently and increase the risk of mortality [140, 141].

Extent of eye health problems among Indigenous people

The National Indigenous Eye Health Survey (NIEHS), conducted in 2008, was the first national eye health survey of Indigenous Australians since the *National trachoma and eye health program* (NTEHP) in 1976-1980 [142]. The results of the NIEHS 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 [141].

The NIEHS estimated that 94% of vision loss among Indigenous people nationally was preventable or treatable [140], with the leading eye conditions being cataract, refractive error, optic atrophy, diabetic retinopathy, and trachoma [142-145].

Low vision and blindness among Indigenous children

The NIEHS found that the eyesight of Indigenous children was generally better than that of non-Indigenous children, particularly for children living in remote communities [143]. After adjusting for age and sampling, blindness was five times less common among Indigenous children aged 5-15 years than among non-Indigenous children.

The 2008 NATSISS reported that 9.3% of Indigenous children aged 4-14 years had some form of eye or sight problems [146]. The most common forms of these problems were refractive errors, long-sightedness (37%), and short-sightedness (28%) [147]. Similarly, the 2008 NIEHS reported that more than one-half of low vision (56%) and one-third of blindness (33%) among Indigenous children aged 5-15 years were due to refractive errors [142, 143].

Eye and sight problems among Indigenous adults

Eye and sight problems were reported by 30% of Indigenous people who participated in the 2004-2005 NATSIHS, making it the most commonly reported long-term health condition [67]. This level is similar to that documented in 2001.

The rate of low vision for Indigenous adults aged over 40 years was 2.8 times higher than that for non-Indigenous adults according to the 2008 NIEHS. The most common causes of low vision were uncorrected refractive error (54%), cataract (27%), and diabetic retinopathy (13%) [142, 143].

Eye and sight problems were reported more among Indigenous females than Indigenous males in the 2004-2005 NATSIHS [67]. The age-adjusted levels of eye and 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 or 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) in 2004-2005 [67].

Overall, a lower proportion of Torres Strait Islander people (26%) than Aboriginal people (30%) reported having eye or sight problems in 2004-2005 (the difference is not statistically significant), but the proportion was 31% for Torres Strait Islander people living in the Torres Strait area [67].

Blindness among Indigenous adults

Blindness is more common among Indigenous people than among non-Indigenous people, particularly in the older age-groups [81]. The 2008 NIEHS found that the rate of blindness was 6.2 times higher for Indigenous people aged 40 years or older than for their non-Indigenous counterparts [142]. This disparity represents a decrease from the NTEHP in 1980 when the rate of blindness among people aged 40 years or older was almost 10 times higher for Indigenous people than for non-Indigenous people [148, 149].

The leading cause of blindness among Indigenous adults in 2008 was cataract (32%) (Figure 2), which was 12 times more common among Indigenous adults than among non-Indigenous adults [142]. Reflecting the high levels of cataract-associated blindness, the hospitalisation rate for cataract extraction surgery was more than twice as high for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2010-11 than it was for their non-Indigenous counterparts [54].[16] The median wait for cataract surgery was around 125 days for Indigenous people and around 85 days for non-Indigenous people.

The next leading causes of blindness for Indigenous people were refractive error and optic atrophy (both 14%), followed by diabetic retinopathy (a complication of diabetes) and trachoma (an infectious eye disease) (both 9%). [142]. Blindness caused by corneal diseases (84% of which was due to trachoma) has decreased from 52% in the late 1970s to 9% in 2008 [140].

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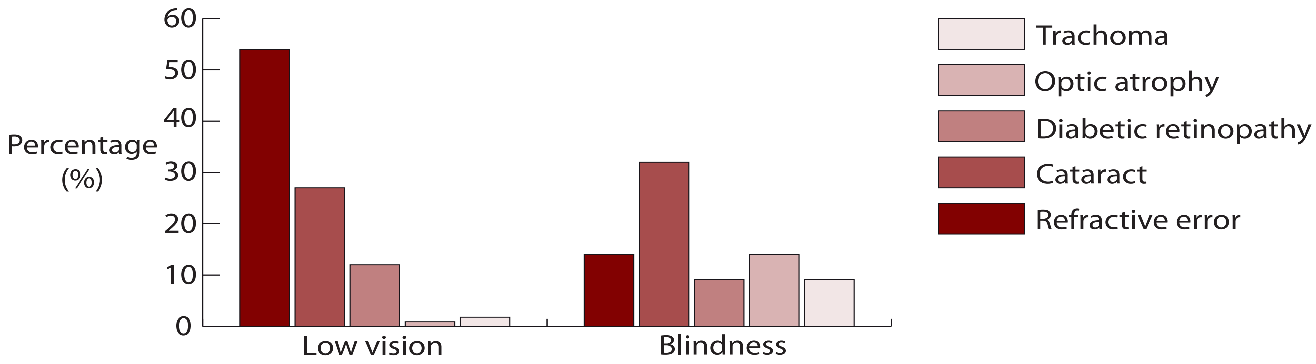
[16] Excluding private hospitals in the NT.

Figure 2. Bilateral vision loss and blindness among Indigenous adults, by type of eye problem, 2008, Australia



Source: NIEHS 2009 [142]

Trachoma has been virtually eliminated in the developed world, but still occurs among Indigenous people [143]. According to the 2008 NIEHS, 60% of Indigenous communities in very remote areas had endemic trachoma.[17] In 2010, the prevalence of endemic trachoma among children was reported at 19% in SA, 12% in the NT and 9% in WA [150].

Diabetic retinopathy, a complication of diabetes that causes damage to the small blood vessels in the retina, can impair vision and cause blindness [151]. This is of increasing concern for many Indigenous people. The 2008 NIEHS reported that diabetic retinopathy was 30 times more common among Indigenous adults than among non-Indigenous adults [142]. Overall, the NIEHS reported that diabetes was the cause of 12% of low vision and 9.1% of blindness among Indigenous adults. Of Indigenous adults with diabetes, only 20% had had an eye exam within the previous year [142, 143].

Uncorrected refractive error was the cause of more than one-half of vision loss (54%) for Indigenous adults in 2008 [142]. Uncorrected refractive error leading to blindness was five times more common among Indigenous adults than among non-Indigenous adults.

Access to eye health care services

A number of factors limit the timely identification, management and treatment of eye health problems for Indigenous people: the factors include geographical location; socio-economic status; lack of access to transport; and lack of access to health services [151]. The limited availability of eye care providers in more remote areas is such that a four-fold increase in services has been suggested as needed to address the shortage [152, 153]. There may be enough eye care providers in urban areas, but they are not fully utilised by Indigenous people.

Overall, Indigenous people are less likely than non-Indigenous people to access eye health practitioners, optometry, or specialist ophthalmology services [144, 154]. The 2008 NEIHS found that 35% of Indigenous adults have never had an eye examination [143]. The rate of eye examinations provided in areas with a high Indigenous population was two-thirds the rate of areas with a low Indigenous population [152, 154].

Ear health and hearing

There are three main parts of the ear (external, middle and inner ear) and diseases of the ear are classified according to the part where the disorder occurs [155]. Inflammation and infection of the middle ear, which are nearly always associated with fluid in the middle ear space, are referred to as otitis media (OM) [156].

OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness such as a cold [155]. It can cause intermittent or persistent hearing impairment; the risk of permanent hearing loss increases if OM becomes chronic and is not adequately treated and followed up. Persistent ear discharge through a perforation (hole) in the eardrum is referred to as chronic suppurative otitis media (CSOM) [156]. 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.

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 [155, 157, 158].

OM, particularly in suppurative forms, is associated with impairment of hearing, with major implications for language development and learning [99, 158, 159]. 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 [159].

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 [158, 160-162]. The levels described among children living 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' [163, p.2]. In 2001, nearly all children (91%) aged 6-30 months living in some remote communities in the NT and central Australia had been diagnosed with some form of OM [162].

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[17] The report defined endemic trachoma as a prevalence of active trachoma of more than 5% in children aged 5-9 years.

Australia-wide, ear/hearing problems were reported by 12% of Indigenous people who participated in the 2004-2005 NATSIHS [67]. 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. The level of OM was higher for Indigenous people living in remote areas (4%) than for those living in non-remote areas (2%).

After age-adjustment, OM was 2.8 times more common for Indigenous people than for non-Indigenous people [67]. The prevalence of ear/hearing problems, including total/partial hearing loss and OM, was over three times higher among Indigenous children aged 0-14 years (10%) than among their non-Indigenous counterparts. The levels of complete/partial deafness were higher for Indigenous people than for non-Indigenous people for all age-groups except people aged 55 years or older (who had similar levels).

The NT Emergency Response (NTER) child health checks conducted in the period from July 2007 to June 2012 found that 67% of the 5,474 children who received an ear, nose, throat (ENT) consultations or audiology service had at least one middle ear condition [164]. More than half (51%) of the 5,184 children aged under 16 years who received an audiology check had hearing loss in at least one ear.

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 [99].

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 [44]. Children aged 0-3 years (20%) and 4-11 years (20%) were more likely to have recurring ear infections than were 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 data, the rates of GP attendances for the period from April 2006 to March 2011 for Indigenous children aged 0-14 years were 1.1 times the non-Indigenous rate for OM/myringitis (inflammation of the tympanic membrane) and 1.2 times the non-Indigenous rate for total diseases of the ear [47].

The hospitalisation rate for diseases of the ear and mastoid process for Indigenous people in 2010-11 was 1.3 times the non-Indigenous rate [57]. For the period from July 2008 to June 2010, the hospitalisation rate for Indigenous people for all ear disease combined was around 1.3 times higher than the non-Indigenous rate [47]. The rate for Indigenous children aged 5-14 years was twice as high as that for non-Indigenous children, but the rate for Indigenous children aged 0-4 years were less than for their non-Indigenous counterparts. The hospitalisation rate for tympanoplasty procedures (a reconstructive surgical treatment for a perforated eardrum) for Indigenous children aged 0-14 years was 7.3 times the rate of other children. In 2009-10, the rate for myringotomy procedures (incision in the eardrum to relieve pressure caused by excessive fluid build-up) was lower for Indigenous people (1.4 per 1,000) than for non-Indigenous people (1.7 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 [88]. Importantly, ear infections can lead to hearing loss, a major contributor to poor education and to unemployment, which are risk factors for contact with the justice system [158].

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’ ([165] cited in [166, p.55]). Therefore, 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 disease [167]. 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 [167], especially diabetes mellitus [168] and osteoporosis [169]

Extent of oral health problems among Indigenous people

Caries

Indigenous children experience more caries in their deciduous (baby) teeth than do non-Indigenous children [170]. The Child Dental Health Survey (CDHS), conducted in 2000-2003[18], found a higher proportion of Indigenous than non-Indigenous children aged 4-10 years in NSW, SA and the NT had caries in their deciduous teeth. The largest difference between Indigenous and non-Indigenous children was for those aged 6 years; 72% of Indigenous six-year-olds had caries compared with 38% of their non-Indigenous counterparts.

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[18] 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.

The CDHS also found that Indigenous children had a higher mean number of decayed teeth at all ages (4-10 years) than did their non-Indigenous counterparts [170]. The biggest difference was for Indigenous four-year-olds who had more than three times the mean 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 [170]. More Indigenous children aged 6-17 years in NSW, SA and the NT had caries than did their non-Indigenous counterparts; the proportion increased with age from 8.4% of Indigenous children aged 6 years (compared with 3.2% of their non-Indigenous counterparts) to 73% of Indigenous 17-year-olds (compared with 61% of 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 [170]. The largest difference was for Indigenous 15-year-olds who had 2.7 times the mean number of decayed permanent teeth than did non-Indigenous children of the same age.

Child health checks conducted as part of the NTER in 2007 to 2012 found high levels of oral health problems among the Indigenous children who received dental treatment [164].[19] Around 60% of the 7,376 children aged 0-15 years who received dental treatment had at least one oral health problem. Untreated caries was the most commonly reported oral health problem, requiring treatment for 52% of the children who received dental care.

More Indigenous adults than non-Indigenous adults experienced caries in Australia in 2004-2006 [171]. According to the National Survey of Adult Oral Health (NSAOH), Indigenous people aged 15 years and older had 2.3 times more untreated caries than did their non-Indigenous counterparts: 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 [171]. 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 [170, 171]. Children rarely develop severe periodontal disease, but gingivitis is relatively common, particularly among older children [170]. Gingival bleeding, a common symptom of gingivitis, was more common among Indigenous children in NSW and SA than among their non-Indigenous counterparts in 2000-2003 (information is not available for other states and territories). Gingival bleeding was around three times more common among Indigenous children aged 13-14 years in NSW than among 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 in the same age-group. Around 60% of Indigenous children living in remote communities showed some evidence of gingivitis and 21% of children were at moderate risk of developing gingivitis. Almost 42% of Indigenous children aged 15-16 years were at moderate risk and 25% were at high risk of developing gingivitis.

The 2004-2006 NSAOH found that around 27% of Indigenous adults aged 15-74 years had gingivitis [171]. The prevalence of moderate or severe periodontitis was about 1.3 times higher for Indigenous people than for non-Indigenous people. Similarly, more Indigenous adults had slightly higher levels of deep (4+mm) periodontal pockets and clinical attachment loss than did their non-Indigenous counterparts.

Indigenous people were affected by periodontal diseases at younger ages than were non-Indigenous people [171, 172]. The NSAOH found that the prevalence of moderate or severe periodontitis was around twice as high among Indigenous people aged 15-34 years than among non-Indigenous people in the same age-group (14% compared with 7.3%) [171]. The prevalence 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 as 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 past surgical approaches to the treatment of oral diseases that relied largely on extractions [171]. 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.

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

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 [173]. 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 [73, 174].

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. Information about disability among Indigenous people has also been collected in the 2002 and 2008 NATSISSs [99, 175]. 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 [176]. The level of response among Indigenous people in the 2006 Census to the questions related to disability was lower than that for non-Indigenous people. Also, some Indigenous people 'find the concept of disability hard to understand or irrelevant' [176, p.532].[20]

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 [177]. 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 [73, 176].

Extent of disability among Indigenous people

According to information collected by the ABS in the 2006 Census[21], around 19,600 Indigenous people (4.3%) needed assistance with core activities some or all of the time [42].

The need for assistance with core activities generally increased with age for both Indigenous and non-Indigenous people in 2006 (Table 23) [81]. 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 [42].

The need for assistance with core activities among Indigenous people varied with the remoteness of residence in 2006 [42]. The highest proportions of Indigenous people requiring assistance with core activities were 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+	20.2	13.4	1.5
All ages	8.4	4.1	2.1

Notes: 1 Proportions are expressed as percentages; proportions for 'All ages' have been standardised using the 2001 Australian standard population
2 Ratio is Indigenous proportion divided by the non-Indigenous proportion
3 ABS notes that 'needing assistance with core activities' is conceptually related to the 'presence of a profound/core activity restriction'

Source: ABS, AIHW 2008 [81]

More recent information – from the 2008 NATSISS – found overall levels of profound/core activity restriction were similar to those reported in the 2006 Census, but the levels for the younger age-groups were higher for both Indigenous and non-Indigenous people (Table 24) [88]. After age-adjustment, 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. Higher proportions 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).

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[20] In attempting to address these conceptual difficulties, there have been some methodological differences in collecting information about disability, particularly related to core activity restriction.

[21] Information on disability collected as part of the 2011 Census is not yet available.

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

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'

Source: Steering Committee for the Review of Government Service Provision, 2011[88]

The proportions of profound or severe core activity restrictions among Indigenous people were similar in 2008 for remote and non-remote areas (8.1% and 7.9% respectively) [88].[22] The proportions of Indigenous people with a profound or severe core activity restriction living in non-remote areas varied slightly across the states and territories, ranging from 8.0% in Qld to 13.0% in SA.

The proportion of Torres Strait Islander people 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 [177].

Services

Increasing the access to disability services for the Indigenous population is one of the priority areas identified by the National Disability Agreement (NDA), developed by the Council of Australian Governments (COAG) to improve the outcomes for Indigenous people with disability [178, 179]. The *National Indigenous access framework* forms part of the NDA and aims to ensure that the needs of Indigenous people with disability are addressed through accessible and appropriate service delivery [180]. Services include accommodation support, community support, community access, respite and employment services [181, 182].

In 2009-10, around 28% of the Indigenous potential population[23] used disability support services provided by the states and territories [181, 183] (Table 25). The highest proportions of use of disability services by the Indigenous potential population was in Vic (62%), followed by SA (46%) [183] . The proportion of the Indigenous potential population requiring support services has increased steadily since 2007-08.

Table 25. Proportion (%) of Indigenous potential population aged 0-64 years accessing state/territory-delivered disability support services, by years and jurisdiction

Years	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
2007-08	14	48	15	26	43	7.3	18	23	20
2008-09	19	63	18	32	49	8.1	27	24	25
2009-10	25	62	19	36	46	12	43	16	28

Source: Steering Committee for the Review of Government Service Provision, 2012 [183]

Communicable diseases

Communicable diseases of particular importance to Indigenous people include, tuberculosis, hepatitis (A, B, and C); sexually transmissible infections, HIV/AIDS, *Haemophilus influenzae* type b (Hib), pneumococcal disease, and meningococcal disease [184].

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) [185, 186]. 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 [186]. Risk factors for communicable diseases vary according to the type of disease [184]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some infectious diseases in Australia [118].

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 the inhalation of the bacterium *Mycobacterium tuberculosis* [187]. The bacterium can penetrate the lungs and start to multiply, potentially causing a variety of symptoms including: coughing; weight loss; loss of appetite; fever; chills; and the coughing up of blood or sputum. The main risk factors for TB are poverty, overcrowding, and

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[22] The proportions quoted here are based on a more limited set of criteria used to identify people with a disability, so are not comparable with the following estimates for the proportions of profound or severe core activity restriction in non-remote areas at a jurisdictional level.

[23] The potential population refers to 'the number of people with the potential to require disability support services, including individuals who meet the service eligibility criteria but who do not demand these services' [182, p.322].

malnutrition [188, 189], all common in many Indigenous communities. Other risk factors also common among Indigenous people are diabetes mellitus, smoking, alcohol use, and advanced kidney disease [189]. Another risk factor for TB is HIV infection [190].

Extent of tuberculosis among Indigenous people

Of the 800 notifications of TB among Australian-born people in Australia in 2005-2009, 152 (19%) were identified as being Indigenous [Derived from 191, 192-194]. Almost one-half (43%) of the new cases among Indigenous people were reported in the NT (65 cases), and around one-third (32%) in Qld (48 cases) (Table 26). Australia-wide, the crude notification rate in 2005-2009 was 5.8 cases per 100,000 population for Indigenous people; the crude notification rate was highest for the NT (20 cases per 100,000 population) [Derived from 116, 191, 192-195]. After age-adjustment, the notification rate for Indigenous people was 11.1 times that for Australian-born non-Indigenous people (Table 27) [Derived from 116, 191, 192-195].[24]

The notification rate of TB was higher for Indigenous people than for Australian-born non-Indigenous people across all age-groups, with rate ratios being highest for the 35-44 years, 45-54 years and 55-64 years age-groups (Table 27) [Derived from 116, 191, 192-195].

Table 26. Numbers of new cases and crude notification rates of tuberculosis among Indigenous people, by jurisdiction, Australia, 2005-2009

Jurisdiction	Number	Rate
NSW	21	2.7
Vic	4	2.3
Qld	48	6.5
WA	6	1.7
SA	6	4.2
Tas	2	2.1
ACT	0	0.0
NT	65	20.0
Australia	152	5.8

Notes: 1 Population figures are for 30 June 2007 (the mid-point of the five-year period, 2005-2009)
2 Rates are crude incidence rates per 100,000 population

Source: Derived from Roche, 2007 [191], Roche, 2008 [192], Barry, 2009 [193], Barry, 2012 [194], ABS, 2007 [195], ABS, 2009 [116]

Table 27. Numbers of new cases and notification rates of tuberculosis, by Indigenous status and age-group, and Indigenous:non-Indigenous rate ratios, Australia, 2005-2009

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-4	5	1.5	55	0.9	1.8
5-14	12	1.8	47	0.4	5.1
15-24	17	3.3	70	0.5	6.6
25-34	25	6.8	71	0.5	14
35-44	30	9.0	47	0.3	29
45-54	31	13.3	62	0.4	31
55-64	19	14.8	60	0.5	29
65+	13	15.8	236	1.7	9.2
All ages	152	5.8	648	0.6	11.1

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 notification 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

Source: Derived from Roche, 2007 [191], Roche, 2008 [192], Barry, 2009 [193], Barry, 2012 [194], ABS, 2007 [195], ABS, 2009 [116]

Hepatitis

Hepatitis, an inflammation of the liver, can be caused by viral infections, alcohol or drug use, other toxins, or an attack by the body's immune system on itself [196]. The viruses identified most frequently have been designated hepatitis A, B, and C (hepatitis types D through G have also been identified, but hepatitis F and G are not regarded as true hepatitis viruses). 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) [197, 198]. HAV is often asymptomatic among young children, but symptoms among older people may include fever, fatigue, nausea, diarrhoea, jaundice, and vomiting. Death due to HAV is very rare.

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[24] Reflecting the fact that the vast majority of new cases of TB in Australia are among people born overseas, particularly relatively recent arrivals from India, Vietnam, the Philippines and China, the analysis here compares the notification rates of Indigenous people with those of Australian-born non-Indigenous people.

Of the 155 notifications of HAV for people living in WA, SA, and the NT in 2009-2011, three (1.9%) were identified as Indigenous [Derived from 116, 199, 200-202]. The crude notification rate of 0.6 per 100,000 for Indigenous people was less than the rate of 1.3 per 100,000 for non-Indigenous people.

It is likely that the lower levels of HAV infection among Indigenous people reflect the introduction in 2005 of HAV vaccination into the national childhood vaccination schedule for Indigenous children living in Qld, WA, SA and the NT [203]. 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) [197]. There has not been a notified case of HAV among Indigenous people in the NT since 2006 (there have been nine 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 northern Qld, WA, SA and the NT [203]. 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 [204]. 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 [198, 204].

Of the 138 notifications of HBV for people living in WA, SA, and the NT between 2009 and 2011, six (4.3%) were among Indigenous people (excludes 1.4% of notifications in which Indigenous status was not reported) [Derived from 116, 199, 200-202]. The crude notification rate was the same for both the Indigenous and non-Indigenous populations at 1.1 per 100,000. Details of notifications by age-group are not available for these jurisdictions, but for the Indigenous population living in NSW, Vic, Qld, WA, SA, Tas and the NT, the rate of HBV diagnoses in 2011 was highest among those aged 30-39 years, with males having a substantially higher notification rate than females in this age-group [205].

Indigenous people residing in outer regional areas and major cities had the highest rates of HBV diagnoses in 2011, 5 and 4 per 100,000 respectively (based on cases notified in NSW, Vic, Qld, WA, SA, Tas, and the NT) [205]. For non-Indigenous people, the highest rate of notification, 2 per 100,000, was observed in remote areas at.

A HBV vaccination program commencing in Indigenous communities in the mid-1980s has had considerable success in protecting Indigenous children from HBV infection [206], but several studies suggest that some Indigenous children had a sub-optimal response to the HBV vaccine, thus raising concerns about their immunity to HBV [207, 208]. Possible explanations for the sub-optimal response of the vaccine include a failure in the cold-chain (maintaining the vaccine within a sufficiently cool temperature range), genetic factors, and extrinsic environmental factors, such as heavy smoking among pregnant women [207]. 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 [206].

Hepatitis C

Transmission of hepatitis C virus (HCV) typically occurs via blood-to-blood contact [209]. Injecting drug use is the most common method of contracting the virus and is responsible for the vast majority of cases [199, 210]. The likelihood of transmission of HCV via sexual contact is generally very low [198]. 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 [209]. Some people with HCV can live relatively normal lives, largely unaffected by the virus, but others may develop cirrhosis, liver cancer, or liver failure [211]. 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 [209].

Indigenous people accounted for approximately 13% of the 5,010 notifications of HCV among people living in WA, SA, and the NT in 2009-2011 (excluding 6.8% of notifications for which Indigenous status was not reported) [Derived from 116, 199, 200-202]. In these jurisdictions, the crude notification rate for HCV was significantly higher for Indigenous people than for non-Indigenous people (128 and 36 per 100,000 respectively). Over the three-year period from 2009-2011, notification rates were much lower for Indigenous people living in the NT than for those living in WA and SA.

The age pattern of newly diagnosed HCV was slightly different for the Indigenous and non-Indigenous populations in WA, SA, Tas, and the NT in 2011 [205]. Among Indigenous people, rates were highest for those in the 20-29, 30-39, and 40-49 years age-groups. For non-Indigenous people, the rates were highest in the 30-39, 40-49, and 50-59 years age-groups. Rates were generally higher for males than for females for both populations.

In contrast to some other reported communicable diseases, the rate of newly diagnosed HCV infection among Indigenous people were highest for those living in inner regional areas and major cities (for WA, SA, Tas, and the NT in 2011) [205]. These rates were 7.2 and 7.8 times the rates reported for non-Indigenous people in the same areas. For non-Indigenous people, the rate of HCV increased in accordance with remoteness.

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 [185, 212, 213]. Infants and children are particularly susceptible to Hib [185, 212, 214], 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 [215].

Extent of Hib disease among Indigenous people

Hib notifications in Australia declined steeply following the commencement of nationally funded infant vaccination in 1993; only 32 cases were reported in 2004-2005 compared with 617 in 1993-1994 [185, 216]. The disease persists at low levels, but Indigenous children, particularly those aged under one year, continue to be at higher risk of contracting Hib than are non-Indigenous children [185, 215-217].

In 2010, there were 24 notifications for Hib, with the crude notification rate 20 times higher for Indigenous people (1.4 per 100,000) than for non-Indigenous people [218]. The ratio has fluctuated on a year-by-year basis because of the small number of notifications, but has been consistently much higher than the pre-vaccination ratio of 2.7 in 1993-1994 [216, 218].

Pneumococcal disease

Pneumococcal disease results from infection by the bacterium *Streptococcus pneumoniae* (also known as pneumococcus) which may cause pneumonia when in the respiratory tract [214]. Invasive pneumococcal disease (IPD) occurs when the bacterium infects other normally sterile sites, such as blood and cerebrospinal fluid, causing bacteraemia, septicaemia and meningitis [185, 214]. Rates of IPD are highest in infants and the elderly. Recognised risk factors for pneumococcal disease include: diabetes; chronic respiratory; cardiac and renal diseases; other immune-compromised conditions; tobacco use; and high levels of alcohol consumption [185, 219, 220]. In children, recurrent or chronic OM and attendance at childcare increases susceptibility to IPD.

Nationally-funded vaccination for pneumococcal disease was made available to Indigenous adults aged 50 years and older and to Indigenous people aged 15-49 years at high risk in 1999 [214]. In 2001, vaccination was funded for Indigenous infants and young children and for all Australian children medically at risk. From 2005, nationally-funded vaccination was made available to all Australian infants and to all people aged 65 years and older, in addition to those populations eligible since 1999 [185, 214, 219].

Extent of invasive pneumococcal disease among Indigenous people

Detailed data are available for IPD, which has been notifiable Australia-wide since 2001 [219]. Indigenous children and adults have a significantly higher incidence of IPD than do non-Indigenous children and adults [42, 219, 221]. 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 7.3 times higher than the rate for other people [42]. Nationally, age-standardised notification rates for Indigenous people were 5.8 times higher in 2007 and 4.6 times higher in 2008 than those for their non-Indigenous counterparts [219].

Among Indigenous people living in NSW, Vic, Qld, WA, SA, Tas and the NT, notification rates for IPD in 2006-2008 were highest in the 65 years and older age-group (114 per 100,000), followed by the 45-54 years age-group (58 per 100,000) [42]. Importantly, rates for Indigenous people aged 35-44 and 45-54 years (50 and 58 per 100,000, respectively) were almost 12 times higher than those for other people.

There are no national pre-vaccination data available for Indigenous people because vaccination programs for pneumococcal began prior to national notification of IPD, but regional data and data after 2001 indicate that vaccination programs have had a significant impact on the number of cases of IPD among both the Indigenous and non-Indigenous populations [219-223]. Vaccination has reduced the burden of IPD in Australia, but the number of cases of non-vaccine type IPD has increased – this is most pronounced in non-Indigenous children [218, 219, 224] – and the recent increase in IPD in Indigenous adults has raised some concerns that the adult vaccination program may be less than adequate [219, 220].

At the start of the national Indigenous childhood pneumococcal vaccination program in 2001, the rate of IPD for Indigenous children aged less than 2 years (219 per 100,000) was 2.9 times higher than the rate for non-Indigenous children [225]. By 2004, rates for Indigenous children under 2 years had decreased to 92 per 100,000, similar to rates for non-Indigenous children [225]; since that time, rates have remained relatively stable among Indigenous children but have decreased for non-Indigenous children, leading to an increasing gap [226]. The notification rate of IPD for Indigenous children aged 0-4 years was 3.7 times higher than that for other children in 2006-2008 [42]. In 2008, Indigenous children aged less than one year had 4.2 times the rate of IPD of non-Indigenous children, and Indigenous children aged one year had 3.0 times the rate of non-Indigenous children of the same age [219]. (It should be noted that there were small numbers of notifications of Indigenous children in the younger age-groups.)

IPD rates for Indigenous adults decreased after the introduction of vaccination programs in the Kimberley, WA [222] and in north Qld [223]. Rates for Indigenous and non-Indigenous people aged over four years in regional NSW were similar in 2007-2009 [221]. The higher rates of IPD notifications for Indigenous people are reflected in hospitalisation rates for pneumococcal septicaemia and meningitis [213].

National case fatality rates for IPD for Indigenous people were lower than those for non-Indigenous people in 2007-2008 (4.6% compared with 8.7% respectively) [Derived from 219]. Of the 224 reported deaths from IPD in 2007-2008, 15 were identified as Indigenous (deaths from IPD may be under-reported).

Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [214]. Manifestations of meningococcal disease include meningitis, meningococcaemia without meningitis, and septic arthritis. The risk of infection increases in crowded housing conditions [227]. In 2011, the most common groups of meningococcus found in Australia were B (84%) and C (4.2%), with proportions similar to those reported since 2007 [228, 229]. Vaccination against serogroup C was funded for all infants from 2003; a catch-up program for all people aged up to 19 years ended in 2007 [228].

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 5 years are particularly susceptible [213]. The most recent information that includes Indigenous status is from 2003-2006. During that period, 106 (8.4%) of the 1,263 cases of meningococcal disease notified in NSW, Vic, WA, SA and the NT were identified as Indigenous [213]. Around one-third (32%) of all cases, and 69% of cases identified as Indigenous, occurred among children aged 0-4 years. The rate of 45 per 100,000 for Indigenous children aged 0-4 years was 4.9 times the rate for their non-Indigenous counterparts. The age-standardised rate of 5.1 per 100,000 for Indigenous people was 2.6 times the rate of other Australians.

Previously recorded outbreaks among Indigenous children in north-west Qld were due to serogroup C [230], but the disease in young children is now mainly due to serogroup B [228].

There were 21 deaths from meningococcal disease for people living in Qld, WA, SA and the NT in 2003-2005 [213]. 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 [184]. 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 [231]. 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 adolescents and young adults, and access to and use of condoms is regarded as fundamental in preventing STI transmission [232, 233].

The majority of STIs are asymptomatic or produce only mild symptoms [234, 235]. Many people affected find out they have an infection through screening and contact tracing. STIs can usually be effectively treated if diagnosed early, but, if left untreated, they may lead to complications [184].

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 [236, 237].

The NNDSS collects data on some STIs, including chlamydia, gonorrhoea, syphilis, donovanosis, and HIV/AIDS [73, 238]. 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 [238]. Variations in notification rates over time may reflect real changes in incidence, but can also be due to the introduction of easier and more sensitive testing procedures, greater targeted screening, and public awareness campaigns [239]. The high level of screening in some Indigenous communities probably contributes to the higher STI rates reported for Indigenous people than for non-Indigenous people.

Gonorrhoea

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoeae* [240]. 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. Untreated gonorrhoea can lead to infertility in both women and men.

For the period 2009-2011, Indigenous people accounted for 72% of gonorrhoea notifications in Qld, WA, SA, and the NT (excluding 14% of notifications for which Indigenous status was not stated) [Derived from 116, 199-202]. The crude notification rate was substantially higher for Indigenous people in these jurisdictions than for their non-Indigenous counterparts, 1,093 and 17 per 100,000 respectively. The jurisdictions with the highest rates among Indigenous people were the NT (2,402 per 100,000) and WA (1,271 per 100,000).

In 2011, the majority of gonorrhoea notifications in the Indigenous population occurred in the 15-29 years age-group (78% of notifications in Vic, Qld, WA, SA, Tas, and the NT) [199]. In the non-Indigenous population, gonorrhoea was more common among slightly older people, with those aged 20-39 years accounting for 65% of gonorrhoea notifications. In the same year, Indigenous females were only marginally more likely to be diagnosed with gonorrhoea than were Indigenous males (1.2 times more likely); in the non-Indigenous population, the number of diagnoses for males was four times the number reported for females. This suggests the transmission of gonorrhoea occurs largely through heterosexual contact in the Indigenous population, whereas sex between males is an important mode of transmission among non-Indigenous people [205].

In 2007-2011, crude notification rates for gonorrhoea were highest for remote and very remote areas of residence for both Indigenous and non-Indigenous people [199]. The rate of diagnosis for Indigenous people in these areas was 61 and 33 times higher than the rate for non-Indigenous people.

Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [241]. 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 [205]. 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 [242].

In 2009-2011, 449 (13%) of the 3,479 people newly diagnosed with syphilis were identified as Indigenous (excludes notifications from the ACT and the 4.9% of notifications for which Indigenous status was not stated) [Derived from 116, 199-202]. The crude notification rate for Indigenous people was 5.7 times the rate for non-Indigenous people (27 and 4.7 per 100,000 respectively). In the Indigenous population, the jurisdictions with the highest notification rates were the NT (51 per 100,000) and Qld (43 per 100,000).

Syphilis is more common among adolescents and young adults in the Indigenous population, with those aged 15-29 years accounting for 65% of syphilis diagnoses in all health jurisdictions in 2011 [199]. Among non-Indigenous people, over 80% of syphilis cases occurred in people aged 20-49 years. This pattern of diagnosis has remained relatively consistent from 2007-2011 for both populations, but the number of diagnoses among Indigenous people aged 15-19 years in 2011 was more than 3.5 times the number reported in 2009 (67 and 18 respectively).

In 2011, the number of syphilis diagnoses in the Indigenous population was similar for both males and females (95 and 101 respectively) [199]. A different pattern was observed in the non-Indigenous population with males accounting for 93% of diagnoses (male to female ratio 16:1). This suggests differences in modes of transmission for syphilis in the Indigenous and non-Indigenous populations [205].

The rates of syphilis notifications were highest among Indigenous people living in remote and very remote areas in 2007-2011 [199]. In 2011, notification rates for Indigenous people living in remote and very remote areas were 119 and 19 times the rates for their non-Indigenous counterparts. Notification rates for non-Indigenous people were highest in major cities and in very remote areas.

Chlamydia

Chlamydia is caused by the bacterium *Chlamydia trachomatis* [234]. In women it can cause cervicitis, endometritis, and pelvic inflammatory disease, which can lead to tubal factor infertility and ectopic pregnancy. In men, it can cause urethritis, epididymo-orchitis, and prostatitis. Due to the lack of obvious symptoms for many cases of the disease, the incidence of chlamydia is underestimated in notification data. Chlamydia is the most common STI among Indigenous people in Australia [236], but when considering only the jurisdictions with reasonable Indigenous identification[25] it is second to gonorrhoea [199].

Indigenous people accounted for 20% of the notifications of chlamydia during 2009-2011 (based on 49,380 cases notified in WA, SA, Tas, and the NT, and excluding 13% of notifications for which Indigenous status was not stated) [Derived from 116, 199-202]. The crude notification rate for chlamydia was considerably higher for Indigenous people than for non-Indigenous people in 2009-2011: 1,643 per 100,000 compared with 296 per 100,000. The highest rate of chlamydia notifications was for Indigenous people living in the NT (2,089 per 100,000).

Chlamydia is typically diagnosed among adolescents and young adults in both the Indigenous and non-Indigenous populations [199]. In 2011, persons aged 15-29 years accounted for 82% of chlamydia notifications in both populations (notifications in Vic, WA, SA, Tas, and the NT). There were notable increases between 2007 and 2011 in the number of chlamydia notifications among Indigenous people aged 15-19 and 20-29 years, with increases of 29% and 41% respectively.

For both the Indigenous and non-Indigenous populations, females accounted for a greater proportion of chlamydia diagnoses than did males in 2011 (62% and 58% of the diagnoses respectively) [199]. The female to male ratio was 1.7:1 for Indigenous people, and 1.4:1 for non-Indigenous people.

As is the case for other STIs, Indigenous people living in remote and very remote areas had the highest rates of chlamydia diagnoses in 2011 (3,345 and 3,053 per 100,000, respectively) [199]. For the Indigenous population, inner regional, outer regional, and major cities reported the largest increases in chlamydia notification rates over the five-year period 2007-2011, with the greatest increase observed in inner regional areas (182%). For non-Indigenous people, notification rates were highest in very remote areas and in major cities in 2011.

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[25] Jurisdictions where Indigenous status is reported for more than 50% of diagnoses.

HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that destroys cells in the body's immune system [243]. Untreated, the virus weakens immune system functioning to the point where minor infections may become fatal [244]. 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 anti-retroviral therapy has dramatically reduced the number of HIV cases progressing to AIDS [209, 243].

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 [245]. Unprotected anal sex presents the greatest risk of exposure to HIV. Other 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 [73, 205]. 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' [243, p.6]. Indigenous people are regarded as being at particular risk of HIV infection due to their higher rates of STIs, limited access to health care, and over-representation in prisons and juvenile detention [246].

Extent of HIV/AIDS among Indigenous people

National surveillance data show that in 2011 there were 1,137 cases of newly diagnosed HIV infection of which 22 (1.9%) were among Indigenous people [199]. Age-standardised rates of HIV diagnosis were similar for Indigenous and non-Indigenous people at 4.4 and 5.0 per 100,000 respectively [205]. There has been a marginal increase in the rate of HIV diagnosis among Indigenous people from 3.9 per 100,000 in 2007 to 4.4 per 100,000 in 2011. In this period, a nominal increase was also observed in the diagnosis rate among non-Indigenous people.

In 2011, males accounted for 77% of new HIV cases among Indigenous people [199]. The median age of diagnosis for Indigenous males was 33 years. In comparison, non-Indigenous males accounted for a larger proportion of new HIV cases among non-Indigenous people (88%), and the median age of diagnosis among non-Indigenous males was 37 years [Derived from 199]. The diagnosis rate of HIV has remained relatively consistent over the five years from 2007 to 2011 for both Indigenous and non-Indigenous males, with a lower rate of diagnosis observed among Indigenous males (5.9 per 100,000 in 2007, 6.3 per 100,000 in 2011) than among non-Indigenous males (7.7 per 100,000 in 2007, 8.0 in 2011) [205].

More than 80% of new HIV infections among the Indigenous population in 2011 were reported in Qld (36%), NSW (23%), and WA (23%) [199]. Indigenous people living in major cities and in very remote areas had the highest rates of new HIV diagnoses, 8 and 6 per 100,000 respectively. In terms of exposure to HIV, men who have sex with men accounted for two-thirds (67%) of new HIV cases among Indigenous people in 2011 [199]. Heterosexual contact was also identified as a common form of exposure to HIV among Indigenous people (24%). The percentage of new HIV cases attributed to injecting drug use decreased substantially from 2010 to 2011, with just 4.8% of new HIV cases coming from injecting drug use in 2011 compared with 20% in 2010.

The patterns of new HIV infections are slightly different for Indigenous and non-Indigenous people [Derived from 199]. Most new cases of HIV infections among non-Indigenous people in 2011 were reported in NSW (34%), Vic (29%) and Qld (19%). Among the non-Indigenous population, those residing in major cities had the highest rate of HIV infection (7 per 100,000) [199]. The rates of diagnosis were much lower for the remaining areas of residence, ranging from 1 to 3 per 100,000.

Among non-Indigenous people, 94% of all new HIV cases in 2011 were attributed to the categories 'men who have sex with men' (71%) and 'heterosexual contact' (23%) [Derived from 199]. Injecting drug use was responsible for 1.8% of new cases among non-Indigenous people.

Overall in Australia, the cumulative number of HIV diagnoses by the end of 2011 was 31,645, of which 219 were among Indigenous people [199].

Information about the occurrence of AIDS in the Indigenous population in 2011 is not available, but the number of new AIDS cases for the total population in 2009 was only 90 [201]. 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) [247]. The absence of reporting by Indigenous status in the most recent AIDS data [201] 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 increases with poor living conditions and overcrowding [248, 249]. Skin infections in many Indigenous communities reflect serious health inequalities, [53] but biomedical research has been limited in recent years [250].

Scabies – a disease caused by the mite *Sarcoptes scabiei*, resulting in inflammation and itching [251] – is endemic in some remote central and northern Indigenous communities, with prevalence up to 50% in children [252] and up to 25% in adults [253]. 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 [254]. 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 [255].

Scratching in response to the inflammation and itching of scabies infestation can result in pyoderma (also referred to as impetigo or skin sores), a bacterial infection of the skin that can lead to kidney disease and possibly heart disease [256]. 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 [255]. The pyoderma in Indigenous communities commonly involves group A streptococcus (GAS), which is responsible for continuing outbreaks of acute post-streptococcal glomerulonephritis and ARF [256, 257].

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 [256].

Skin conditions can be linked with serious complications, which can result in hospitalisation and, very uncommonly, death. ICD 'Diseases of the skin and subcutaneous tissue' was responsible for 7,730 hospital separations among Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2010-11, accounting for 4.2% of all Indigenous hospitalisations (excluding those from dialysis) [57]. After age-adjustment, the Indigenous separation rate of 16 per 1,000 was 2.5 times higher than that of other Australians. In 2006-2010, 10% of medical admissions to Mt Isa Hospital for children aged under 5 years were due to scabies or pyoderma, and all were Indigenous [258]. At Alice Springs Hospital in 2003-2006, *Staphylococcus aureus* bacteraemia (SAB) was recorded at a mean annual incidence rate of 161 per 100,000 for Indigenous and 8 per 100,000 for non-Indigenous inpatients; SAB was community-acquired in over 70% of both patient groups, and pyoderma or scabies was identified in 32% and 4% respectively of Indigenous patients [259].

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' [11, 28]. 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 [27]. 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 [11, 28].

Information about some of these determinants is available (see 'The context of Indigenous health'), but 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 [260, 261]. Poor nutrition is a common risk factor for overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [261, 262]. 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 [261]. 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 [263]. 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 [67]; 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 were different for Indigenous people living in remote and non-remote areas, at least partly due to the poor accessibility and availability of fruit and vegetables in remote areas [67]. 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 living 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.

The *Footprints in time: longitudinal study of Indigenous children* reported that levels of relative isolation affected the diet of study children aged between 2-7 years in 2010 [264]. Cereals, protein, and fruit and vegetables were the types of food eaten by most children across all locations, but children in areas of high isolation were more likely to have eaten protein and bush tucker, and less likely to have eaten snacks and dairy food. Around 78% of all the children drank water and 7.1% ate bush tucker.

More than three-quarters (76%) of Indigenous people aged 12 years or older living in non-remote areas reported in the 2004-2005 NATSIHS that they usually drank whole milk (including full-cream powdered milk), with only 19% drinking reduced fat and/or skim milk [67]. 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 in the 2004-2005 NATSIHS [67].

The 2004-2005 NATSIHS also addressed the question of food security by asking respondents aged 15 years and older whether they had run out of food in the previous 12 months [265]. 'Running out of food but able to get food by other means' was reported by 28% of Indigenous people living in remote areas (seven times more common than among non-Indigenous people) and by 12% of Indigenous people living in non-remote areas (four times more common than among non-Indigenous people) [236]. 'Going without food when they could not afford to buy more' was reported by approximately 8% of Indigenous people living in non-remote areas (four times more common than among non-Indigenous people), and by approximately 7% of those living in remote areas (seven times more common than among non-Indigenous people).

The 2004-2005 NATSIHS examined associations between dietary behaviour and income, educational attainment, and self-reported health [236]. 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 tobacco and risky/high risk alcohol consumption.

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 [266]. An evaluation of the *Community stores licensing program* concluded that licensing had positively impacted food security, particularly with regard to the quality, quantity, and range of healthy foods available in the remote stores involved in the project. The licensing program was extended in 2012 to operate throughout the NT, except in major centres [267].

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 [268, 269]. At least 60 minutes of activity is recommended for children, and at least 30 minutes for adults; these amounts can be in blocks of activity or accumulated throughout the day in short bursts [269]. Low 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 [99, 268, 269].

The 2008 NATSISS and the 2004-2005 NATSIHS are the two most recent sources of information on the physical activity levels of Indigenous people [67, 99]. 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 270]. 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 [99].

Of all 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 270]. Among Indigenous children, the highest level of participation in physical activity was for children living in inner/outer regional areas (45%), 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 270]. Participation levels were higher among Indigenous males (38%) than among Indigenous females (23%); 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 270]. 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 age-adjustment, 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 [42]. 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%) [42]. 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% [42]. 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) [73]. Being overweight (BMI 25.0 to 29.9) or obese (BMI of 30.0 or more) 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 [263]. 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) [73]. The 2003 NHMRC dietary guidelines for adults recommend that adults prevent weight gain by being physically active and eating according to their energy needs [263].

Overweight and obesity contributed 11% to the total burden of disease among Indigenous people in 2003, second only to tobacco [271]. 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) [272]. 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 [273, 274].

Based on BMI information collected as a part of the 2004-2005 NATSIHS, 57% of Indigenous people aged 15 years or older were classified as overweight or obese, with slight differences according to remoteness of residence (the lowest proportion was 55% in major cities and the highest was 62% in remote areas) [67]. A higher proportion of Indigenous males (34%) than Indigenous females (24%) was overweight, but Indigenous females were more likely than Indigenous males to be obese (34% compared with 28%) [42]. After age-adjustment, the level of being overweight or obese was 1.2 times higher for Indigenous people than for their non-Indigenous counterparts [67].

In 2004-2005, Indigenous people aged 18 years or more were more likely to be overweight or obese if [42]:

- 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% of those without circulatory problems)
- they had diabetes (83% compared with 57% of those without diabetes).

The prevalence of overweight and obesity among Indigenous adults living in non-remote areas increased steadily from 51% in 1995, to 56% in 2001, and to 60% in 2004-2005 [42].

Overweight and obesity were 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) [67]. 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.

A 2012 study of Indigenous youths in the Torres Strait (aged 5 to17 years) found that 46% were overweight or obese and 35% had central obesity[26] [275]. Females had higher levels of central obesity (50%) than did males (18%). The study also found a consistent association between overweight/obesity and low levels of physical activity.

A study in central Australia found that 21% of Indigenous youths (aged 3 to 17 years) were overweight and 5.4% were obese (there was no difference between males and females) [276]. In comparison, the NHS 2007-2008 reported 17% of all Australian children aged 5 to 17 years were overweight and 8% obese [277].

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 [42]. 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).

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[26] Central obesity (a high waist circumference) indicates an accumulation of fat around body organs such as the heart, liver, kidney and pancreas. Individuals with central obesity are at high risk of developing chronic diseases such as heart disease and diabetes.

Immunisation

Vaccination has been very successful in contributing to improvements in Indigenous health and child mortality in recent decades, but some vaccine-preventable diseases are still experienced at higher rates among Indigenous people than among non-Indigenous people [185]. In response, the immunisation recommendations for Indigenous people differ from those for the general population for certain diseases, such as invasive pneumococcal disease and influenza among adults, and TB, HAV, Hib, and pneumococcal disease among children.

Data for immunisation levels among Indigenous children and adults come from two main sources: the Australian Childhood Immunisation Register (ACIR), and self-reported data from the 2004-2005 NATSIHS [42, 67].

The most recently published information about immunisation coverage for Indigenous children are to 31 December 2009 [42]. Coverage for all vaccines was lower for Indigenous children than for non-Indigenous children across the three recorded age-groups: 1 year (7.9% lower); 2 years (4.0% lower); and 5 years (4.6% lower).

For the 1 year age-group, the greatest difference in overall vaccination coverage was in WA, where coverage for Indigenous children was significantly lower (17% lower) than for non-Indigenous children (rate ratio 0.8) [42]. Nationally, the greatest difference in vaccine coverage was for polio, which was 7.7% 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 vaccination, with coverage for Indigenous children 18% lower that for non-Indigenous children (rate ratio 0.8) [42]. Nationally, the greatest difference in vaccine coverage was for Hib; coverage for Indigenous children was 3.6% lower than for non-Indigenous children (rate ratio 0.96).

For the 5 years age-group, the greatest difference in overall vaccination was in the ACT, where coverage was 17% lower for Indigenous children than for non-Indigenous children, (rate ratio 0.8, not statistically significant) [42]. Nationally, the greatest difference in vaccine coverage was for diphtheria, tetanus, and pertussis (DTP), with coverage for Indigenous children 4.5% lower than for non-Indigenous children (rate ratio 0.95).

Immunisation coverage for Indigenous children has varied over the years [42]. 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 6.3% (lower among Indigenous children than among non-Indigenous children). The rate difference then increased steadily to 10% in 2008, and decreased slightly to 9.0% 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 6.1% 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 4.5% difference in 2009.[27]

The 2004-2005 NATSIHS reported that 88% of Indigenous children aged 0-6 years living in non-remote areas were fully immunised against the diseases included in the NHMRC vaccination schedules [67]. 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: the proportions for the separate vaccines were diphtheria and tetanus (79%), pertussis (whooping cough) (74%), HBV (83%), polio (79%), Hib (73%), and measles, mumps, and rubella (MMR) (85%).

Three-fifths (60%) 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%) [67]. Indigenous females had slightly higher vaccination coverage (61%) than did Indigenous males (58%). These levels were higher than those for non-Indigenous people (46%). Similarly, vaccination levels for pneumonia in the previous 5 years were higher for Indigenous adults aged 50 years or older (remote: 56%; non-remote: 26%; all: 34%; female: 37%; male: 31%) than those for their non-Indigenous counterparts (20%).

According to the 2004-2005 NATSIHS, Indigenous people aged 65 years or older had higher levels of coverage for influenza in the previous 12 months (84%) than did non-Indigenous people of the same age-group (73%) [42]. Reported coverage of pneumonia vaccination was also slightly higher among Indigenous people 65 years or older (48%) than among their non-Indigenous counterparts (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 [261]. It also has anti-infective properties and contains immunoglobulins, which provide some immunity against early childhood diseases [278]. The NHMRC recommends that as many infants as possible are exclusively breastfed until 6 months-of-age and that mothers then continue breastfeeding until 12 months-of-age [279].

According to the 2010 Australian National Infant Feeding Survey, breastfeeding initiation levels were similar among Indigenous and non-Indigenous mothers (87% and 90%, respectively), but levels of exclusive breastfeeding declined more rapidly among Indigenous mothers [280]. At 6 months of age, only 11% of Indigenous babies were exclusively breastfed, compared with 27% of non-Indigenous babies. Around 60% of Indigenous children aged 0-6 months were being breastfed at the time of the survey compared with 68% of non-Indigenous babies.

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[27] 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.

The more comprehensive 2004-2005 NATSIHS found that 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%) [67]. The proportion of women who breastfed their children was higher in remote areas (92%) than in non-remote areas (80%).

According to the 2004-2005 NATSIHS, two-thirds (66%) of Indigenous children aged 0-3 years living in non-remote areas were reported to have been breastfed for some period of time [67]. 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 6-12 months (19% and 22% respectively) and for 12 months or more (11% and 14% respectively). Around 13% of Indigenous children aged 0-3 years were being breastfed at the time of the survey.

The findings of the 2000-2002 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 [44].

The *Footprints in time – the longitudinal study of Aboriginal children* collected data from eleven sites (rural, remote and urban) around Australia in 2008-2009 [281]. 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, and 22% of Indigenous infants had been breastfed for at least 12 months. This study found that children living in more remote areas had been breastfed for a slightly longer period of time than those living in other areas.

Tobacco use

Tobacco use increases the risk of chronic disease, including CVD, certain cancers, and lung diseases, as well as a variety of other health conditions [47]. Tobacco use is also a risk factor for complications during pregnancy and is associated with preterm birth, LBW, and perinatal death. Environmental tobacco smoke (passive smoking) is of notable concern to health, with children particularly susceptible to problems that include middle ear infections, asthma, and SIDS.

In 2003, tobacco use was the leading cause of burden of disease and injury among Indigenous people, responsible for 12% of the total burden of disease [271]. Tobacco use accounted for one-in-five deaths in the Indigenous population.

According to the 2008 NATSISS, almost one-half (47%) of Indigenous people aged 15 years or older reported that they were current smokers [282]. Almost two-thirds (62%) of Indigenous current daily smokers reported trying to quit or reduce their smoking in the 12 months prior to interview [177]. More than one-third (34%) of Indigenous people reported that they had never smoked [282]. The proportion of Indigenous men who were current smokers (49%) was slightly higher than the proportion of Indigenous women who were current smokers (45%). A higher proportion of Indigenous people living in remote/very remote areas (53%) reported being current smokers than those living in inner/outer regional areas (47%) or major cities (42%) [283]. The proportions of current smoking were similar for Torres Strait Islanders (44%) and Aboriginal people (47%) [284]. After age-adjustment, the proportion of current smokers among Indigenous people was 2.3 times higher than the proportion among non-Indigenous people [99]. This ratio is similar to that reported for the 2010 National Drug Strategy Household survey (NDSHS) [285].

The overall proportion of Indigenous smokers in 2008 (47%) represents a slight decline from the levels in 1994 (52%) and 2002 (51%) [175, 282]. Importantly, this overall decline has been accompanied by a decline in smoking intensity [286]. Heavy tobacco use, defined as smoking more than 20 cigarettes per day, declined among Indigenous people from 17% in 1994 to 9.4% in 2008; light tobacco use (smoking one to 10 cigarettes per day) increased from 17% to 22% over the same period; there was no significant difference in the smoking of 11 to 20 cigarettes per day.

High rates of smoking have been reported for Indigenous mothers [43]. In 2009, almost 50% of Indigenous mothers reported smoking during pregnancy; this level is 3.8 times that of their non-Indigenous counterparts.

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 [146, 287]. For Indigenous people aged 15 years and older the proportion was 26% [177].

Alcohol use

Alcohol-related harm, which includes chronic diseases, accidents and injury, is not limited to the user, but extends to families and the broader community [288]. 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)) [289]. 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%) [290, 291]. Of 11 selected risk factors, alcohol was the fifth leading cause of the burden of disease among Indigenous people [290]. The highest levels of disease burden attributable to alcohol among Indigenous people were for injury (22%), mental disorders (16%), and cancers (6.3%).

Assessing risks from use of alcohol

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 revised 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 [288]. 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 aged under 15 years and delaying alcohol for those aged 15 to 17 years. Guideline four recommends pregnant and breast feeding women avoid alcohol.

Extent of alcohol use among Indigenous people

Surveys have shown consistently that Indigenous people are less likely to drink alcohol than non-Indigenous people, but those who do drink are more likely to consume it at harmful levels [67, 285]:

- 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 2007-2008 NHS (13%) [277, 292].
- 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; after age-adjustment, abstinence was 1.9 times more common among Indigenous people than among non-Indigenous people [42].
- 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 [42].
- The 2008 NATSISS found that 37% of Indigenous people aged 15 years and over reported binge drinking at risky/high risk levels (based on the largest quantity of alcohol used in a single day in the two weeks prior to interview), similar to the level reported in the 2002 NATSISS (35%) [177].
- The level of long-term risky/high risk drinking among Indigenous people in 2008 (17%) (based on daily consumption of alcohol and the frequency of consumption in the previous 12 months) was similar to that reported in 2002 (15%) [177]. Long-term risky/high risk drinking was reported by 16% of Indigenous young people aged 15-24 years in 2008, an increase from 11% in 2002, which was due to a significant rise in the level of risky/high risk drinking among young males (from 11% in 2002 to 19% in 2008) [293]. Comparable estimates are not available for non-Indigenous people, due to differences in the questions asked in the 2007-08 NHS.)

The most recent comparable Indigenous/non-Indigenous information for risky/high risk alcohol consumption is available from the 2004-2005 NHS and the 2004-2005 NATSIHS, which 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) [42]. After age-adjustment, Indigenous people were 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 ratio of short-term risky/high risk drinkers, however, 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 were 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 than usual, and 3.3% drank the same or more alcohol during pregnancy [42]. 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 2008 to June 2010, 2% of all hospitalisations were for a principal diagnosis related to alcohol use (excluding dialysis) [47]. After age-adjustment, Indigenous males were hospitalised at five times and Indigenous females at four times the rates of their non-Indigenous counterparts. Almost nine-tenths (86%) of hospitalisations related to alcohol use were for ICD 'Mental and behavioural disorders due to alcohol use', including acute intoxication, dependence syndrome, and withdrawal state. The hospitalisation rate for alcoholic liver disease among Indigenous people was six times the rate for non-Indigenous people.

Hospitalisation rates with a principal diagnosis related to alcohol use for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-10 varied by level of remoteness. Rates were highest for Indigenous people living in remote areas (14 per 1,000) and lowest for those living in very remote areas (7 per 1,000) [47].

Mortality

There were 382 Indigenous deaths related to alcohol use in NSW, Qld, WA, SA and the NT in the five-year period 2006-2010 [47]. After age-adjustment death rates for Indigenous males and females were five and eight times higher respectively than those for their non-counterparts. Almost seven-tenths (68%; 261 deaths) of deaths were attributed to alcoholic liver disease, with a death rate six times higher for Indigenous people than for non-Indigenous people. The death rate for alcohol-related deaths attributed to mental and behavioural disorders was seven times higher and the rate for alcohol-related deaths attributed to alcohol poisoning five times higher than those of non-Indigenous people.

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)) [73]. 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 [291]. 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%) [290].

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 [42]. This level was 1.6 times that reported in the 2010 NDSHS for the non-Indigenous population aged 14 years or over (14%) [285], but less than that reported by Indigenous people aged 18 years or over (28%) in the 2004-2005 NATSIHS [67].

According to the 2008 NATSISS, the illicit substances used most commonly by Indigenous Australians aged 15 years or over were cannabis (17% used in the previous 12 months and 36% ever used), 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%) [42]. 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%) [42, 67].

Use of illicit drugs in the previous 12 months was reported more by Indigenous people aged 15 years or over living in non-remote areas than by those living in remote areas (24% compared with 17%) in the 2008 NATSISS [42]. 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%) [42]. The proportions of people who had used drugs in the previous 12 months were at least 1.5 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%) in the previous 12 months [42]. Between 2002 and 2008, use of cannabis decreased slightly from 19% to 17% (due to a decrease 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 decrease 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) [42]. 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 had experienced violence, around 12% were 'recent substance users' compared with 4.6% who 'never used illicit substances'.

Hospitalisation

Between July 2008 and June 2010, there were 4,537 hospital separations related to substance use among Indigenous people in NSW, Vic, Qld, WA, SA and the NT, accounting for around 1% of all Indigenous hospitalisations (excluding those for dialysis) [47]. Detailed information is not available for 2008-10, but in the two-year period July 2006 to June 2008, the leading cause of substance use-related hospitalisations was ICD 'Mental/behavioural disorders related to cannabinoids', which was responsible for 15% of drug related hospitalisations [42]. 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 substance use among Indigenous people occurred at more than twice the rate of the non-Indigenous population in 2008-10 and 2006-08 [42, 47]. Detailed information is not available for 2008-10, but in 2006-08 hospitalisations of Indigenous people 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 [42].

According to the 2008 NATSISS, 95% of mothers of Indigenous children aged 0-3 years did not use illicit drugs during pregnancy [42]. Around 4% of mothers of Indigenous children in NSW, Qld, Tas/ACT and the NT used illicit drugs during pregnancy. 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%).

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 28) [88]. 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 those for Indigenous females (6.1 per 100,000).

Table 28. Rates of drug induced deaths, by Indigenous status, 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

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

Source: Steering Committee for the Review of Government Service Provision, 2011 [88]

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 [294]. 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* that Indigenous people remain the least healthy sub-population in Australia. Being a 'snapshot' of the most recent indicators of health status – with limited attention to trends – the *Overview* doesn't, however, fully reflect the evidence that the health status of Australia's Indigenous people continues to improve slowly.

For a start, there is evidence of reductions in mortality in recent years in a number of jurisdictions.[28] Age-standardised death rates for Indigenous people living in WA, SA and the NT, the only jurisdictions with adequate data quality for long-term analysis, declined by around 33% over the 20-year period 1991-2010 [47]. The gap in death rates between Indigenous and non-Indigenous people declined significantly both absolutely and relatively over that period. Much of the decline appears to have been in the first half of the 20-year period, however, as the pattern in WA, SA and the NT in 2001-2010 has been very similar to that documented for NSW, Qld, WA, SA and the NT combined, for which jurisdictions the rates declined by only 5%.

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 [295]. In the twelve-year period 1990-2001, the death rate for COPD 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, death rates for coronary 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. A later analysis of deaths from acute myocardial infarction in the NT in the 13-year period 1992-2004 revealed that the increase in death rates for Indigenous people was due to a marked increase in the incidence of coronary heart disease, which had been partly moderated by an increase in survival [296].

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 [7].[29]

Indigenous infant mortality rates for WA, SA and the NT declined significantly over the 20-year period 1991-2010 [47]. The Indigenous rate declined by 62% over that period, slightly more than the 43% decline of the rate for non-Indigenous people. The gap between Indigenous and other Australians closed significantly, both absolutely (67%) and relatively (35%).

The long-term declines in infant mortality rates have occurred despite the lack of parallel changes in the birthweights of babies born to Indigenous mothers – the mean weight of babies born in 2010 to Indigenous mothers was still around 200 grams less than the weights of babies born to non-Indigenous mothers [39]. Importantly, the proportions of LBW babies born to Indigenous mothers increased by 11% over the 19-year period 1991-2009 and the gap in proportions between babies born to Indigenous and non-Indigenous mothers widened. These long-term estimates may conceal some recent improvements, however, as analysis of births in the 10-year period 2000-2009 suggests a significant decline in the proportion of LBW babies born to Indigenous mothers [47].

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 [297]
- substantial declines in death rates from invasive pneumococcal pneumonia (mostly due to the introduction of vaccination programs) [298]
- reductions in the incidence and severity of trachoma (even though inflammatory trachoma remains endemic in some remote communities of central and northern Australia) [142]
- a substantial reduction in the prevalence of HBV infection (since the introduction of vaccination programs) [213]
- a rapid decline in the incidence of invasive Hib disease in Indigenous children (following the introduction of vaccination) [213]
- a reduction in the number of new cases of TB, from 79 in 1984 [299] to an average of around 30 in the mid-2000s [193].

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 5 years of age are similar [42]
- the participation of Indigenous people in sporting and recreational events increased between 2002 and 2008 [88]
- the prevalence of smoking among Indigenous people has decreased slightly in recent years [67, 282], and there has been a decline in the number of cigarettes smoked daily among Indigenous people [286]
- 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 2011 [30, 31].

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

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[28] Reflecting the uncertainty and probable variation in the levels of under-identification of Indigenous status, some caution should be exercised in assessing trends in death rates.

[29] 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.

targets set recently as a part of the COAG commitments to 'closing the gap' in health between Indigenous and other Australians (see below) [300].

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* [301], 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 [302]. 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) [303]. These reports were followed in 2006 with the first report in the *Aboriginal and Torres Strait Islander health performance framework* series [304]. These reports, prepared by the Australian Health Ministers Advisory Council (AHMAC) in 2006, 2008, 2011 and 2012, are accompanied by substantial detailed analyses.

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' [300, p.13].

Despite the important advances that have been made in recent years in both the extent and quality of information about the health of Indigenous people, it will be very obvious to readers of this version of the *Overview* that there is substantial scope for further improvement.

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 health issues, good information is only available for a minority of jurisdictions and/or is quite dated. Probably the best example is cancer, the second most common cause of death among Indigenous people. The AIHW's recent *Cancer in Australia: an overview 2012* is a welcome addition, but, as that report acknowledges, national data on cancer incidence and mortality among Indigenous people are not available and Indigenous-specific information about screening is only collected for breast cancer and not for cervical and bowel cancer [1]. 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,[30] to 'closing the gap' in disadvantage between Indigenous and other Australians [305], 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 [306]. [31]

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 [307]. 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' [308, p.1].

In March 2008, the Prime Minister also announced establishment of the National Indigenous Health Equality Council,[32] which 'advises the [Australian Government's] Minister for Health and Ageing... on the achievement of equitable and sustainable health outcomes for Aboriginal and Torres Strait Islander peoples' [309, p.546].

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 [310]:

- close the life expectancy gap within a generation
- halve the gap in mortality rates for Indigenous children under 5 years within a decade
- ensure access to early childhood education for all Indigenous 4 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.

In addressing these targets, COAG, through the Australian and state and territory governments, allocated $4.6 billion over four years

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[30] 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)'.

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

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

across early childhood development, health, housing, economic participation, and remote service delivery. COAG also achieved a number of supportive commitments by the corporate and community sectors [310].

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

Glossary references

Concise medical dictionary (1980) Oxford University Press, Oxford
Dorland's Illustrated Medical Dictionary (1985) 26th edition, WB Saunders, Philadelphia
Last, J.M. (ed.) (2000) *A dictionary of epidemiology*. 4th edition. Oxford University Press, New York

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
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
ASGC	Australian Standard Geographical Classification
ARF	Acute rheumatic fever
ATSIC	Aboriginal and Torres Strait Islander Commission
BEACH	Bettering the Evaluation and Care of Health
BMI	Body mass index
CDHS	Child Dental Health Survey
CKD	Chronic kidney disease
COAG	Council of Australian Governments
CSOM	Chronic suppurative otitis media
CVD	Cardiovascular disease
DSM	Diagnostic and Statistical Manual of Mental Disorders
DTP	Diphtheria, tetanus, and pertussis
ENT	Ear, nose, throat
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	Haemophilus influenzae type b
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
ICD	International Classification of Diseases
IMR	Infant mortality rate
IPD	Invasive pneumococcal disease
KRT	Kidney replacement therapy
LBW	Low birthweight
MMR	Measles, mumps, rubella
NACCHO	National Aboriginal Community Controlled Health Organisation
NATSIHS	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
SA	South Australia
SAB	Staphylococcus aureus bacteraemia
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

References

1. Australian Institute of Health and Welfare and Australasian Association of Cancer Registries (2012) *Cancer in Australia: an overview 2012*. (AIHW Catalogue no CAN 70, cancer series no 74) Canberra: Australian Institute of Health and Welfare
2. Thomson N (2003) The need for Indigenous health information. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:1-24
3. Biddle N (2012) *CAEPR Indigenous population project 2011 census papers: population and age structure*. (2011 Census Papers No 5) Canberra: Centre for Aboriginal Economic Policy Research
4. Australian Bureau of Statistics (2012) *Census of population and housing - counts of Aboriginal and Torres Strait Islander Australians, 2011*. (ABS Catalogue no. 2075.0) Canberra: Australian Bureau of Statistics
5. Taylor J and Biddle N (2008) *Locations of Indigenous population change: what can we say?* (CAEPR Working Paper no. 43/2008) Canberra: Centre for Aboriginal Economic Policy Research
6. Australian Bureau of Statistics (2012) *Deaths, Australia, 2011*. (ABS Catalogue no 3302.0) Canberra: Australian Bureau of Statistics
7. Australian Bureau of Statistics (2009) *Experimental life tables for Aboriginal and Torres Strait Islander Australians: 2005-2007*. (ABS Catalogue no. 3302.0.55.003) Canberra: Australian Bureau of Statistics
8. Australian Bureau of Statistics (2006) *Deaths, Australia, 2005*. (ABS Catalogue no. 3302.0) Canberra: Australian Bureau of Statistics
9. Australian Bureau of Statistics (2007) *Births, Australia, 2006*. (ABS Catalogue no. 3301.0) Canberra: Australian Bureau of Statistics
10. Australian Institute of Health and Welfare (2009) *Australian hospital statistics 2007-08*. (Health services series no. 33, AIHW Catalogue no. HSE 71) Canberra: Australian Institute of Health and Welfare
11. Carson B, Dunbar T, Chenhall RD and Bailie R, eds. (2007) *Social determinants of Indigenous health*. Crows Nest, NSW: Allen and Unwin
12. Jackson LR and Ward JE (1999) Aboriginal health: why is reconciliation necessary? *Medical Journal of Australia*;170(9):437-440
13. Butlin NG (1993) *Economics and the dreamtime : a hypothetical history*. Melbourne: Cambridge University Press
14. Campbell J (2002) *Invisible invaders: smallpox and other diseases in Aboriginal Australia 1780-1880*. Melbourne: Melbourne University Press
15. Webb S (2009) *Palaeopathology of Aboriginal Australians: health and disease across a hunter-gatherer continent*. Cambridge: Cambridge University Press
16. Anderson W (2007) The colonial medicine of settler states: comparing histories of Indigenous health. *Health and History*;9(2):144-154
17. Butlin NG (1983) *Our original aggression : Aboriginal populations of southeastern Australia, 1788-1850*. Sydney: Allen & Unwin
18. Thomson N (1991) Tuberculosis among Aborigines. In: Proust AJ, ed. *History of tuberculosis in Australia, New Zealand and Papua New Guinea*. Canberra, ACT: Brolga Press:61-67
19. Reynolds H (1982) *The other side of the frontier: Aboriginal resistance to the European invasion of Australia*. Ringwood, Victoria: Penguin Books
20. Elder B (2003) *Blood on the wattle: massacres and maltreatment of Aboriginal Australians since 1788*. 3rd ed. Frenchs Forest, N.S.W: New Holland
21. Harrison B (1978) The Myall Creek massacre. In: McBryde I, ed. *Records of times past : ethnohistorical essays on the culture and ecology of the New England tribes*. Canberra: Australian Institute of Aboriginal Studies:17-51
22. Howitt R (2001) *Rethinking resource management : justice, sustainability and Indigenous peoples*. London: Routledge
23. Hunter E (1993) *Aboriginal health and history: power and prejudice in remote Australia*. Cambridge: Cambridge University Press
24. Saggers S and Gray D (1991) *Aboriginal health and society: the traditional and contemporary Aboriginal struggle for better health*. North Sydney: Allen and Unwin
25. National Inquiry into the Separation of Aboriginal and Torres Strait Islander Children from their Families (1997) *Bringing them home: report of the National Inquiry into the Separation of Aboriginal and Torres Strait Islander Children from their Families*. Human Rights and Equal Opportunity Commission Retrieved 17 November 2011 from http://www.humanrights.gov.au/pdf/social_justice/bringing_them_home_report.pdf
26. Long JPM (1970) *Aboriginal settlements: a survey of institutional communities in eastern Australia*. Canberra: Australian National University Press
27. Marmot M (2004) *The status syndrome: how social standing affects our health and longevity*. New York: Holt Paperbacks
28. Wilkinson R and Marmot M (2003) *Social determinants of health: the solid facts*. (2nd ed) Denmark: World Health Organization
29. National Aboriginal Health Strategy Working Party (1989) *A national Aboriginal health strategy*. Canberra: Department of Aboriginal Affairs
30. Australian Bureau of Statistics (2012) *Census of population and housing: characteristics of Aboriginal and Torres Strait Islander Australians, 2011*. (ABS Catalogue no 2076.0) Canberra: Australian Bureau of Statistics
31. Australian Bureau of Statistics (2011) *Schools, Australia, 2010*. (ABS Catalogue No. 4221.0) Canberra: Australian Bureau of Statistics

32. Australian Curriculum Assessment and Reporting Authority (2011) *National Assessment Program - Literacy and Numeracy: achievement in reading, persuasive writing, language conventions and numeracy: national report for 2011*. Sydney: Australian Curriculum Assessment and Reporting Authority
33. Australian Bureau of Statistics (2012) *Australian demographic statistics, March quarter 2012*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
34. Yap M and Biddle N (2012) *Indigenous fertility and family formation: CAEPR Indigenous population project: 2011 census papers*. (CAEPR census paper no 2/2012) Canberra: Centre for Aboriginal Economic Policy Research
35. Australian Bureau of Statistics (2010) *Population characteristics, Aboriginal and Torres Strait Islander Australians, 2006 (reissue)*. (ABS Catalogue no 4713.0) Canberra: Australian Bureau of Statistics
36. Australian Bureau of Statistics (2001) *Statistical geography, volume 1: Australian Standard Geographical Classification (ASGC), 2001*. (ABS Catalogue No. 1216.0) Canberra: Australian Bureau of Statistics
37. Department of Health and Aged Care (2001) *Measuring remoteness: Accessibility/Remoteness Index of Australia (ARIA), revised edition*. (Occasional papers: new series no. 14) Canberra: Commonwealth Department of Health and Aged Care
38. Australian Bureau of Statistics (2012) *Births, Australia, 2011*. (ABS Catalogue no 3301.0) Canberra: Australian Bureau of Statistics
39. Li Z, Zeki R, Hilder L and Sullivan EA (2012) *Australia's mothers and babies 2010*. (AIHW Catalogue no PER 57, perinatal statistics series no 27) Canberra: Australian Institute of Health and Welfare
40. Ashdown-Lambert JR (2005) A review of low birth weight: predictors, precursors and morbidity outcomes. *Journal of the Royal Society for the Promotion of Health*;125(2):76-83
41. Leeds K, Gourley M, Laws P, Zhang J, Al-Yaman F and Sullivan EA (2007) *Indigenous mothers and their babies, Australia 2001-2004*. (AIHW Catalogue no. PER 38) Canberra: Australian Institute of Health and Welfare
42. Australian Institute of Health and Welfare (2011) *Aboriginal and Torres Strait Islander health performance framework 2010: detailed analyses*. (AIHW Catalogue no IHW 53) Canberra: Australian Institute of Health and Welfare
43. Li Z, McNally L, Hilder L and Sullivan EA (2011) *Australia's mothers and babies 2009*. (AIHW Catalogue no PER 52) Canberra: Australian Institute of Health and Welfare
44. Zubrick SR, Lawrence DM, Silburn SR, Blair E, Milroy H, Wilkes T, Eades S, D'Antoine H, Read AW, Ishiguchi P and Doyle S (2004) *The health of Aboriginal children and young people*. (The Western Australian Aboriginal Child Health Survey, v. 1) Perth: Telethon Institute for Child Health Research
45. Australian Institute of Health and Welfare (2011) *Principles on the use of direct age-standardisation in administrative data collections: for measuring the gap between Indigenous and non-Indigenous Australians*. (AIHW Catalogue no CSI 12) Canberra: Australian Institute of Health and Welfare
46. Australian Bureau of Statistics (2011) *Deaths, Australia, 2010*. (ABS Catalogue no 3302.0) Canberra: Australian Bureau of Statistics
47. Australian Health Ministers' Advisory Council (2012) *Aboriginal and Torres Strait Islander health performance framework: 2012 report*. Canberra: Office for Aboriginal and Torres Strait Islander Health, Department of Health and Ageing
48. Australian Bureau of Statistics (2012) *Causes of death, Australia, 2010: Deaths of Aboriginal and Torres Strait Islander Australians*. Australian Bureau of Statistics Retrieved 20 March 2012 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&3303.0_12%20deaths%20of%20aboriginal%20and%20torres%20strait%20islander%20australians.xls&3303.0&Data%20Cubes&0BC29ACBD5D3F0D5CA257A24001D97D6&0&2010&22.06.2012&Previous
49. Sullivan E, Hall B and King J (2008) *Maternal deaths in Australia 2003-2005*. (AIHW Catalogue no. PER 42) Canberra: Australian Institute of Health and Welfare
50. Page A, Tobias M, Glover J, Wright C, Hetzel D and Fisher E (2006) *Australian and New Zealand atlas of avoidable mortality*. Adelaide: Public Health Information Development Unit, University of Adelaide
51. Thomson N and Ali M (2003) Births, deaths, and hospitalisation. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:44-74
52. Australian Institute of Health and Welfare (2010) *Indigenous identification in hospital separations data-quality report*. (AIHW Catalogue no. HSE 85, Health Services Series no. 35) Canberra: Australian Institute of Health and Welfare
53. Australian Institute of Health and Welfare (2011) *Australian hospital statistics 2009-10*. (AIHW Catalogue no HSE 107) Canberra: Australian Institute of Health and Welfare
54. Australian Institute of Health and Welfare (2012) *Australian hospital statistics 2010-11*. (Health services series no. 43. Cat. no. HSE 117) Canberra: Australian Institute of Health and Welfare
55. Australian Bureau of Statistics (2009) *Experimental estimates and projections, Aboriginal and Torres Strait Islander Australians 1991 to 2021*. (ABS Catalogue no. 3238.0) Canberra: Australian Bureau of Statistics
56. Australian Bureau of Statistics (2012) *Australian demographic statistics, September quarter 2011*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
57. Australian Institute of Health and Welfare (2012) *Australian hospital statistics 2010-11 supplementary tables*. (AIHW Catalogue no HSE 117) Canberra: Australian Institute of Health and Welfare
58. Baker IDI (2012) *Cardiovascular disease*. Baker IDI Retrieved 2012 from http://www.bakeridi.edu.au/health_fact_sheets/cardiovascular_disease/

59. Penm E (2008) *Cardiovascular disease and its associated risk factors in Aboriginal and Torres Strait Islander peoples 2004-05*. (Cardiovascular disease series no. 29. Cat. no. CVD 41) Canberra: Australian Institute of Health and Welfare

60. Australian Institute of Health and Welfare (2011) *Cardiovascular disease: Australian facts 2011*. (AIHW Catalogue no. CVD 53, cardiovascular disease series no. 35) Canberra: Australian Institute of Health and Welfare

61. World Heart Federation (2012) *Cardiovascular disease risk factors*. World Heart Federation Retrieved 2012 from *http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/*

62. Thrift AG and Hayman N (2007) Aboriginal and Torres Strait Islander peoples and the burden of stroke. International Journal of Stroke;2(1):57-59

63. Brown A (2004) The context of Indigenous cardiovascular disease. *Central Australian Rural Practitioners Association Newsletter*;(36):7-14

64. Marmot M (2005) Social determinants of health inequalities. *The Lancet*;365(9464):1099-1104

65. Bunker SJ, Colquhoun DM, Esler MD, Hickie IB, Hunt D, Jelinek VM, Oldenburg BF, Peach HG, Ruth D, Tennant CC and Tonkin AM (2003) "Stress" and coronary heart disease: psychosocial risk factors: National Heart Foundation of Australia position statement update. *Medical Journal of Australia*;178(6):272-276

66. National Health and Medical Research Council (2007) *Cardiac rehabilitation geographic information system: geographic information system of cardiac rehabilitation services for Aboriginal and Torres Strait Islander peoples*. Canberra: National Health and Medical Research Council

67. Australian Bureau of Statistics (2006) *National Aboriginal and Torres Strait Islander Health Survey: Australia, 2004-05*. (ABS Catalogue no. 4715.0) Canberra: Australian Bureau of Statistics

68. Cancer Council Australia (2012) *What is cancer*? : Cancer Council Australia Retrieved 2 November 2012 from http://www.cancer.org.au/about-cancer/what-is-cancer/

69. Australian Cancer Research Foundation (2012) *What is cancer*? : Australian Cancer Research Foundation Retrieved 2 November 2012 from http://www.acrf.com.au/on-cancer/

70. Roder D (2007) *Epidemiology of cancer in Indigenous Australians: implications for service delivery*. Paper presented at the 9th National Rural Health Conference: standing up for rural health: learning from the past, action in the future 7-10 March 2007, Albury, NSW

71. Cunningham J, Rumbold AR, Zhang X and Condon JR (2008) Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *Lancet Oncology*;9(6):585-595

72. Zhang X, Condon JR, Rumbold AR, Cunningham J and Roder DM (2011) Estimating cancer incidence in Indigenous Australians. *Australian and New Zealand Journal of Public Health*;35(5):477-485

73. Australian Institute of Health and Welfare (2010) *Australia's health 2010: the twelfth biennial report of the Australian Institute of Health and Welfare*. (AIHW Catalogue no AUS 122, Australia's health no. 12) Canberra: Australian Institute of Health and Welfare

74. Australian Bureau of Statistics (2012) *Causes of death, Australia, 2010*. (ABS Catalogue no 3303.0) Canberra: Australian Bureau of Statistics

75. Australian Institute of Health and Welfare and Australasian Association of Cancer Registries (2012) *Cancer in Australia: an overview 2012: supplementary tables*. (AIHW Catalogue no CAN 70, cancer series no 74) Canberra: Australian Institute of Health and Welfare

76. Australian Institute of Health and Welfare and Cancer Australia (2011) *Lung cancer in Australia: an overview*. (AIHW Catalogue no CAN 58) Canberra: Australian Institute of Health and Welfare

77. Australian Institute of Health and Welfare (2012) *Gynaecological cancers in Australia: an overview*. (AIHW Catalogue no CAN 66, cancer series no. 70) Canberra: Australian Institute of Health and Welfare

78. Threlfall TJ and Thompson JR (2009) *Cancer incidence and mortality in Western Australia, 2007*. (Statistical Series Number 86) Perth: Department of Health, Western Australia

79. Condon JR, Barnes T, Cunningham J and Armstrong BK (2004) Long-term trends in cancer mortality for Indigenous Australians in the Northern Territory. *Medical Journal of Australia*;180(10):504-511

80. Condon J (2004) *Cancer, health services and Indigenous Australians.* (Consultant report no.5) Canberra: Office for Aboriginal and Torres Strait Islander Health, Cooperative Research Centre for Aboriginal and Tropical Health

81. Australian Bureau of Statistics and Australian Institute of Health and Welfare (2008) *The health and welfare of Australia's Aboriginal and Torres Strait Islander Peoples 2008*. (ABS Catalogue no. 4704.0 and AIHW Catalogue no. IHW 21) Canberra: Australian Bureau of Statistics and Australian Institute of Health and Welfare

82. Australian Institute of Health and Welfare (2009) *Insulin-treated diabetes in Australia 2000–2007*. (AIHW Catalogue no. CVD 45) Canberra: Australian Institute of Health and Welfare

83. Australian Institute of Health and Welfare (2010) *Diabetes in pregnancy: its impact on Australian women and their babies*. (AIHW Catalogue no CVD 52, diabetes series no. 14) Canberra: Australian Institute of Health and Welfare

84. Australian Institute of Health and Welfare (2011) *Key indicators of progress for chronic disease and associated determinants: data report*. (AIHW Catalogue no PHE 142) Canberra: Australian Institute of Health and Welfare

85. Australian Institute of Health and Welfare (2011) *Prevalence of Type 1 diabetes in Australian children, 2008*. (AIHW Catalogue no CVD 54, Diabetes series no.15) Canberra: Australian Institute of Health and Welfare

86. National Aboriginal Community Controlled Health Organisation (2005) *Evidence base to a preventive health assessment in Aboriginal and Torres Strait Islander peoples*. Melbourne: The Royal Australian College of General Practitioners

87. Australian Institute of Health and Welfare (2011) *The health and welfare of Australia's Aboriginal and Torres Strait Islander people: an overview 2011*. (AIHW Catalogue no IHW 42) Canberra: Australian Institute of Health and Welfare

88. Steering Committee for the Review of Government Service Provision (2011) *Overcoming Indigenous disadvantage: key indicators 2011*. Canberra: Productivity Commission, Australia

89. Dixon T and Webbie K (2005) *Diabetes-related deaths in Australia, 2001-2003*. (Bulletin no. 32) Canberra: Australian Institute of Health and Welfare

90. Department of Health and Ageing (2009) *National mental health policy 2008*. Canberra: Commonwealth of Australia

91. Australian Health Ministers (2003) *National Mental Health Plan 2003-2008*. Canberra: Australian Government

92. World Health Organization (2009) *Mental health: strengthening mental health promotion*. WHO Retrieved September 2007 from http://www.who.int/mediacentre/factsheets/fs220/en/index.html

93. Fourth National Mental Health Plan Working Group (2009) *Fourth National Mental Health Plan: an agenda for collaborative government action in mental health 2009-2014*. Canberra: Australian Government Department of Health and Ageing

94. Garvey D (2008) *Review of the social and emotional wellbeing of Indigenous Australian peoples*. Australian Indigenous HealthInfoNet Retrieved 2008 from http://www.healthinfonet.ecu.edu.au/other-health-conditions/mental-health/reviews/our-review

95. Vicary D and Westerman TG (2004) *'That's just the way he is': some implications of Aboriginal mental health beliefs*. Retrieved 2004 from http://www.atypon-link.com/EMP/doi/pdf/10.5172/jamh.3.3.103

96. Swan P and Raphael B (1995) *"Ways forward": national Aboriginal and Torres Strait Islander mental health policy national consultancy report*. Canberra: Department of Health and Ageing, Australia

97. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey: users' guide, 2008*. Australian Bureau of Statistics Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/mf/4720.0?OpenDocument

98. Australian Bureau of Statistics (2011) *General social survey: summary results, Australia, 2010 : Personal stressors [data cube]*. Australian Bureau of Statistics Retrieved 30 September 2011 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&4159do011_gss2010.xls&4159.0&Data%20Cubes&0EEA50189835C2CCCA25791A00146784&0&2010&30.09.2011&Latest

99. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008*. Australian Bureau of Statistics Retrieved 11 April 2011 from http://www.abs.gov.au/ausstats/abs@.nsf/mf/4714.0?OpenDocument

100. Australian Bureau of Statistics (2011) *General social survey: summary results: 2010*. (ABS Catalogue no 4159.0) Canberra: Australian Bureau of Statistics

101. Australian Bureau of Statistics (2010) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples, Oct 2010: Social and emotional wellbeing [data cube].* Australian Bureau of Statistics Retrieved 29 October 2010 from http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&social%20and%20emotional%20wellbeing%20data%20cube.xls&4704.0&Data%20Cubes&F0C653AD3494AB79CA2577CA00138F43&0&Oct%202010&29.10.2010&Previous

102. Zubrick SR, Silburn SR, Lawrence DM, Mitrou FG, Dalby RB, Blair EM, Griffin J, Milroy H, De Maio JA, Cox A and Li J (2005) *The social and emotional wellbeing of Aboriginal children and young people: vol 2*. (The Western Australian Aboriginal Child Health Survey, v. 2) Perth: Telethon Institute for Child Health Research and Curtin University of Technology

103. Hunter E, Reser J, Baird M and Reser P (2001) *An analysis of suicide in Indigenous communities of North Queensland: the historical, cultural and symbolic landscape*. Cairns: University of Queensland, Department of Social and Preventive Medicine, Gurriny Yealamucka Health Service & the Yarrabah Community Council, James Cook University of North Queensland, School of Psychology and Sociology

104. Tatz C (2001) *Aboriginal suicide is different: a portrait of life and self-destruction [1st ed.]*. Canberra: Aboriginal Studies Press

105. Measey ML, Li SQ, Parker R and Wang Z (2006) Suicide in the Northern Territory, 1981-2002. *Medical Journal of Australia*;185(6):315-319

106. Tatz C (2005) *Aboriginal suicide is different: a portrait of life and self-destruction [2nd ed.]*. 2nd ed. Canberra: Aboriginal Studies Press

107. National Kidney and Urologic Diseases Information Clearinghouse (2009) *The kidneys and how they work*. National Kidney and Urologic Diseases Information Clearinghouse Retrieved 2009 from http://kidney.niddk.nih.gov/kudiseases/pubs/pdf/yourkidneys.pdf

108. Australian Institute of Health and Welfare (2009) *An overview of chronic kidney disease in Australia, 2009*. (AIHW Catalogue no. PHE 111) Canberra: Australian Institute of Health and Welfare

109. Kidney Health Australia (2010) *The economic impact of end-stage kidney disease in Australia - projections to 2020*. Melbourne: Kidney Health Australia

110. Australian Institute of Health and Welfare (2011) *Chronic kidney disease in Aboriginal and Torres Strait Islander people 2011*. (AIHW Catalogue no PHE 151) Canberra: Australian Institute of Health and Welfare

111. Australian Institute of Health and Welfare (2009) *Health care expenditure on chronic kidney disease in Australia 2004-05*. (AIHW Catalogue no. PHE 117) Canberra: Australian Institute of Health and Welfare

112. Steering Committee for the Review of Government Service Provision (2011) *Report on government services 2011: Indigenous compendium*. Canberra: Productivity Commission

113. Australia and New Zealand Dialysis and Transplant Registry (2010) *The thirty third report: Australia and New Zealand Dialysis and Transplant Registry: 2010*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry

114. Australian Bureau of Statistics (2008) *Australian Demographic Statistics: June quarter 2008*. (ABS Catalogue no. 3101.0) Canberra: Australian Bureau of Statistics

115. Australian Bureau of Statistics (2001) *Australian demographic statistics: June quarter 2001*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics

116. Australian Bureau of Statistics (2009) *Experimental estimates and projections, Aboriginal and Torres Strait Islander Australians: Projected population, Aboriginal and Torres Strait Islander Australians, Australia, states and territories, 2006-2021 series [data cube]*. Australian Bureau of Statistics Retrieved 8 September 2009 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&32380ds002_2006.srd&3238.0&Data%20Cubes&E79A5308D989173FCA25762A001CE1C3&0&1991%20to%202021&08.09.2009&Latest

117. Australian and New Zealand Dialysis and Transplant Registry (2011) *End stage renal disease notifications, by Indigenous status, age, jurisdiction and year [unpublished]*. Adelaide: Australian and New Zealand Dialysis and Transplant Registry

118. Australian Institute of Health and Welfare (2012) *Australia's health 2012*. (AIHW Catalogue no AUS 156) Canberra: Australian Institute of Health and Welfare

119. Preece C (2010) *Developing a model of care to improve the health and well-being for Indigenous people receiving renal dialysis treatment*. Queensland University of Technology, Brisbane

120. Prout S and Yap M (2010) *Indigenous temporary mobilities and service delivery in regional service centres: a West Kimberley case study*. (Working Paper 66 / 2010) Canberra: Centre for Aboriginal Economic Policy Research

121. Agar JWM, Hawley CM, George CRP, Mathew TH, McDonald SP and Kerr PG (2010) Home haemodialysis in Australia — is the wheel turning full circle? *Medical Journal of Australia*;192(7):403-406

122. Australian Institute of Health and Welfare (2010) *Chronic kidney disease hospitalisations in Australia 2000–01 to 2007–08*. (AIHW Catalogue no PHE 127) Canberra: Australian Institute of Health and Welfare

123. National Public Health Partnership (2005) *The national Aboriginal and Torres Strait Islander safety promotion strategy*. Canberra: National Public Health Partnership

124. National Public Health Partnership (2005) *The national injury prevention and safety promotion plan: 2004-2014*. Canberra: National Public Health Partnership

125. Clapham K, O'Dea K and Chenhall R (2007) Interventions and sustainable programs. In: Carson B, Dunbar T, Chenhall RD and Bailie R, eds. *Social determinants of Indigenous health*. Crows Nest, NSW: Allen and Unwin:271-295

126. World Health Organization (2009) *International Classification of Diseases (ICD)*. World Health Organization Retrieved 2009 from http://www.who.int/classifications/icd/en/

127. Moller J (1996) Understanding national injury data regarding Aboriginal and Torres Strait Islander peoples. *Australian Injury Prevention Bulletin*;14(December):1-8

128. Australian Institute of Health and Welfare (2008) *Aboriginal and Torres Strait Islander health performance framework, 2008 report: detailed analyses*. (AIHW Catalogue no. IHW 22) Canberra: Australian Institute of Health and Welfare

129. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008: law and justice [data cube]*. Australian Bureau of Statistics Retrieved 30 October 2009 from http://www.abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&law%20and%20justice%20-tables%201-11.xlsx&4714.0&Data%20Cubes&26DE78465527D0A2CA2577FA0011C50E&0&2008&16.12.2010&Latest

130. Thomson N, Kirov E and Ali M (2003) Respiratory system disorders. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:224-246

131. Chang AB and Torzillo PJ (2008) Respiratory infection (including Bronchiectasis). In: Couzos S and Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:355-385

132. Australian Institute of Health and Welfare (2010) *Asthma, chronic obstructive pulmonary disease and other respiratory diseases in Australia*. (AIHW Catalogue no ACM 20) Canberra: Australian Institute of Health and Welfare

133. Chang AB, Masel JP, Boyce NC and Torzillo PJ (2003) Respiratory morbidity in central Australian Aboriginal children with alveolar lobar abnormalities. *Medical Journal of Australia*;178(10):490-494

134. Pierce R, Antic R, Chang A, Howard M, James A, Maguire G, Matthiesson A, Musk B, Roseby R, Simpson G and Torzillo P (2010) *Respiratory and sleep health in Indigenous Australians*. Sydney: Thoracic Society of Australia and New Zealand

135. O'Grady K-AF, Taylor-Thomson DM, Chang AB, Torzillo PJ, Morris PS, Mackenzie GA, Wheaton GR, Bauert PA, De Campo MP, De Campo JF and Ruben AR (2010) Rates of radiologically confirmed pneumonia as defined by the World Health Organization in Northern Territory Indigenous children. *Medical Journal of Australia*;192(10):592-595

136. McKenzie DK, Abramson M, Crockett AJ, Glasgow N, Jenkins S, McDonald C, Wood-Baker R and Frith PA (2011) The COPD-X plan: *Australian and New Zealand guidelines for the management of chronic obstructive pulmonary disease*. (COPD-X Plan Version 2.26) Bowen Hills, Qld: The Australian Lung Foundation

137. Australian Institute of Health and Welfare (2008) *Australia's health 2008: the eleventh biennial health report of the Australian Institute of Health and Welfare*. (AIHW Catalogue no. AUS 99) Canberra: Australian Institute of Health and Welfare

138. Access Economics (2010) *Clear focus: the economic impact of vision loss in Australia in 2009*. Melbourne: Vision 2020 Australia

139. Disability Services Commission (2008) *Disability Services Commission reconciliation action plan 2008-10*. Perth: Disability Services Commission

140. Australian Institute of Health and Welfare (2011) *Eye health in Aboriginal and Torres Strait Islander people*. (AIHW Catalogue no IHW 49) Canberra: Australian Institute of Health and Welfare

141. Taylor HR, Boudville A, Anjou M and McNeil R (2011) *The roadmap to close the gap for vision: summary report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne

142. Taylor HR and National Indigenous Eye Health Survey Team (2009) *National Indigenous eye health survey: minum barreng (tracking eyes): full report*. Melbourne: Indigenous Eye Health Unit, The University of Melbourne

143. Taylor HR and National Indigenous Eye Health Survey Team (2009) *National Indigenous eye health survey: minum barreng (tracking eyes): summary report*. Melbourne: Indigenous Eye Health Unit, The University of Melbourne

144. Commonwealth of Australia (2005) *National framework for action to promote eye health and prevent avoidable blindness and vision loss*. Canberra: Commonwealth of Australia

145. Vos T and Taylor HR (2012) Contribution of vision loss to the Indigenous health gap. *Clinical & Experimental Ophthalmology*;Accepted Article(http://dx.doi.org/10.1111/j.1442-9071.2012.02852.x)

146. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey, 2008: Table 11. Indigenous children aged 4-14 years, by sex [data cube]*. Australian Bureau of Statistics Retrieved 21 April 2010 from http://www.abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&4714.0_aust_011_2008.xls&4714.0&Data%20Cubes&F3D13C41FD47C376CA25770B0016F79E&0&2008&21.04.2010&Previous

147. Australian Bureau of Statistics (2010) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples, 2010*. (ABS Catalogue no 4704.0) Canberra: Australian Bureau of Statistics

148. Taylor HR, Xie J, Fox S, Dunn RA, Arnold A-L and Keeffe JE (2010) The prevalence and causes of vision loss in Indigenous Australians: the National Indigenous Eye Health Survey. *Medical Journal of Australia*;192(6):312-318

149. Royal Australian College of Ophthalmologists (1980) *The national trachoma and eye health program of the Royal Australian College of Ophthalmologists*. Sydney: Royal Australian College of Opthalmologists

150. The Kirby Institute (2011) *Australian trachoma surveillance report 2010*. Sydney: The Kirby Institute, University of New South Wales

151. Office for Aboriginal and Torres Strait Islander Health (2001) *Specialist eye health guidelines for use in Aboriginal and Torres Strait Islander populations*. Canberra: Commonwealth Department of Health and Aged Care

152. Taylor HR, Dunt D, Hsueh Y and Brando A (2011) *Projected needs for eye care services for Indigenous Australians*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne

153. Turner A, Mulholland W and Taylor HR (2009) *Outreach eye services in Australia*. Melbourne: Indigenous Eye Health Unit

154. Kelaher M, Ferdinand A, Ngo S, Tambuwla N and Taylor HR (2010) *Access to eye health services among Indigenous Australians: an area level analysis*. Melbourne: Indigenous Eye Health Unit, Melbourne School of Population Health

155. Burrow S and Thomson N (2003) Ear disease and hearing loss. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:247-272

156. Darwin Otitis Guidelines Group (2010) *Recommendations for clinical care guidelines on the management of otitis media in Aboriginal and Torres Strait Islander populations*. Darwin: Menzies School of Health Research

157. Access Economics (2008) *The cost burden of otitis media in Australia*. Canberra: Access Economics

158. Couzos S, Metcalf S and Murray R (2008) Ear health. In: Couzos S and Murray R, eds. *Aboriginal primary health care: an evidence-based approach. 3rd ed*. South Melbourne: Oxford University Press:308-354

159. Burrow S, Galloway A and Weissofner N (2009) *Review of educational and other approaches to hearing loss among Indigenous people*. Australian Indigenous Health*InfoNet* Retrieved from http://www.healthinfonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review-education

160. Senate Community Affairs References Committee (2010) *Hear us: inquiry into hearing health in Australia*. Canberra: Parliament of Australia: Senate

161. Gunasekera H, Morris PS, Daniels J, Couzos S and Craig JC (2009) Otitis media in Aboriginal children: the discordance between burden of illness and access to services in rural/remote and urban Australia. *Journal of Paediatrics and Child Health*;45(7-8):425–430

162. Morris PS, Leach AJ, Silberberg P, Mellon G, Wilson C, Hamilton E and Beissbarth J (2005) *Otitis media in young Aboriginal children from remote communities in Northern and Central Australia: a cross-sectional survey*. Retrieved 5 April 2012 from http://dx.doi.org/10.1186/1471-2431-5-27

163. WHO/CIBA (2000) *Prevention of hearing impairment from chronic otitis media*. (WHO/PDH/98.4) Geneva: WHO

164. Australian Institute of Health and Welfare (2012) *Northern Territory emergency response child health check initiative - follow-up services for oral and ear health: final report 2007-2012*. (AIHW Catalogue no DEN 223) Canberra: Australian Institute of Health and Welfare

165. UK Department of Health (1994) *An oral health strategy for England*. London: Department of Heath

166. Dental and Ophthalmic Services Division (2005) *Choosing better oral health: an oral health plan for England*. London: Department of Health, UK

167. Australian Institute of Health and Welfare (2002) *Chronic diseases and associated risk factors in Australia, 2001*. (ISBN 1 74024 153 3) Canberra: Australian Institute of Health and Welfare

168. Genco RJ (1996) Current view of risk factors for periodontal diseases. *Journal of Periodontology*;67(10):1041-1049

169. Jeffcoat MK and Chestnut C (1993) Systemic osteoporosis and oral bone loss: evidence shows increased risk factors. *Journal of the American Dental Association*;124(11):49-56

170. Jamieson LM, Armfield JM and Roberts-Thomson KF (2007) *Oral health of Aboriginal and Torres Strait Islander children*. (AIHW Catalogue no. DEN 167) Canberra: Australian Research Centre for Population Oral Health (ARCPOH)

171. Slade GD, Spencer AJ and Roberts-Thomson KF (2007) *Australia's dental generations: the national survey of adult oral health 2004-06*. (AIHW Catalogue no. DEN 165) Canberra: Australian Institute of Health and Welfare

172. Harford J, Spencer J and Roberts-Thomson K (2003) Oral health. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:313-338

173. Australian Bureau of Statistics (2010) *Disability, ageing and carers, Australia: summary of findings, 2009*. (ABS Catalogue no 4430.0) Canberra: Australian Bureau of Statistics

174. World Health Organization (2002) *Towards a common language for functioning, disability and health: ICF, the international classification of functioning, disability and health*. Geneva: World Health Organization

175. Australian Bureau of Statistics (2004) *National Aboriginal and Torres Strait Islander Social Survey, 2002*. (ABS Catalogue no. 4714.0) Canberra: Australian Bureau of Statistics

176. Productivity Commission (2011) *Disability within the Indigenous community*. Canberra: Productivity Commission

177. Australian Bureau of Statistics (2010) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples, Oct 2010*. (ABS Catalogue no 4704.0) Canberra: Australian Bureau of Statistics

178. Council of Australian Governments (2009) *National disability agreement*. Canberra: Council of Australian Governments

179. Council of Australian Governments (2012) *National disability agreement: intergovernmental agreement on federal financial relations*. Canberra: Council of Australian Governments

180. Disability Policy & Research Working Group (2012) *National Indigenous access framework*. Sydney: Disability Policy & Research Working Group

181. COAG Reform Council (2012) *Disability 2010–11: comparing performance across Australia*. Sydney: COAG Reform Council

182. Steering Committee for the Review of Government Service Provision (2012) *Report on government services 2012: Indigenous compendium*. Canberra: Productivity Commission

183. Steering Committee for the Review of Government Service Provision (2012) *Report on government services 2012: attachment tables*. Productivity Commission Retrieved 31 January 2012 from http://www.pc.gov.au/gsp/rogs/2012

184. Burns J, Burrow S, Genovese E, Pumphrey M, Sims E and Thomson N (2003) Other communicable diseases. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:397-441

185. National Health and Medical Research Council (2008) *The Australian immunisation handbook*. Canberra: National Health and Medical Research Council

186. Central Australian Rural Practitioners Association (2010) *CARPA standard treatment manual [5th ed.]*. 5th ed. Alice Springs: Central Australian Rural Practitioners Association

187. National Institute of Allergy and Infectious Diseases (2009) *Tuberculosis (TB): detailed explanation of TB*. National Institute of Allergy and Infectious Diseases Retrieved 6 March 2009 from http://www.niaid.nih.gov/topics/tuberculosis/Understanding/WhatIsTB/Pages/detailed.aspx

188. Baker M, Das D, Venugopal K and Howden-Chapman P (2008) Tuberculosis associated with household crowding in a developed country. *Journal of Epidemiology and Community Health*;62(8):715-721

189. Krause V (2008) Tuberculosis (TB). In: Couzos S and Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:674-707

190. World Health Organization (2009) *Global tuberculosis control - epidemiology, strategy, financing: WHO report 2009*. Geneva: World Health Organization

191. Roche P, Bastian I and Krause V (2007) *Tuberculosis notifications in Australia, 2005*. *Communicable Diseases Intelligence*;31(1):71-80

192. Roche PW, Krause V, Konstantinos A, Bastian I, Antic R, Brown L, Christensen A, Gebbie S, Hurwitz M, Misrachi A and Waring J (2008) Tuberculosis notifications in Australia, 2006. *Communicable Diseases Intelligence*;32(1):1-11

193. Barry C, Konstantinos A and National Tuberculosis Advisory Committee (2009) Tuberculosis notifications in Australia, 2007. *Communicable Diseases Intelligence*;33(3):1-12

194. Barry C, Waring J, Stapledon R and Konstantinos A (2012) Tuberculosis notifications in Australia, 2008 and 2009. *Communicable Diseases Intelligence*;36(1):82-94

195. Australian Bureau of Statistics (2007) *Australian demographic statistics, June quarter 2007*. (ABS Catalogue no. 3101.0) Canberra: Australian Bureau of Statistics

196. Hepatitis Australia (2010) *About hepatitis*. Hepatitis Australia Retrieved 18 November 2011 from http://www.hepatitisaustralia.com/about-hepatitis

197. Markey P (2010) Nearing elimination of hepatitis A in the Northern Territory following immunisation of Indigenous infants. *Northern Territory Disease Control Bulletin*;17(3):1-6

198. Australasian Society for HIV Medicine (2010) *Australasian contact tracing manual : a practical handbook for health care providers managing people with HIV, viral hepatitis, STIs and HIV-related tuberculosis*. Sydney: Australasian Society for HIV Medicine

199. The Kirby Institute (2012) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2012*. Sydney: University of New South Wales

200. The Kirby Institute (2011) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2011*. Sydney: University of New South Wales

201. National Centre in HIV Epidemiology & Clinical Research (2010) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2010*. Sydney, NSW: National Centre in HIV Epidemiology & Clinical Research, University of New South Wales

202. Australian Bureau of Statistics (2011) *Australian demographic statistics, March quarter 2011*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics

203. MacIntyre CR, Burgess M, Isaacs D, MacIntyre PB, Menzies R and Hull B (2007) Epidemiology of severe hepatitis A in Indigenous Australian children. *Journal of Paediatrics and Child Health*;43(5):383-387

204. Department of Health and Ageing (2008) *The Australian Immunisation Handbook 9th edition 2008: 3.6 Hepatitis B*. The Australian Immunisation Handbook 9th edition 2008. Canberra: Immunise Australia Program, Department of Health and Ageing, Australia:15

205. The Kirby Institute (2012) *Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander people: surveillance and evaluation report 2012*. Sydney: University of New South Wales

206. Sullivan JS and Hanna JN (1999) A genetic marker associated with non-response to recombinant hepatitis B vaccine by indigenous Australian children [letter]. *Journal of Paediatrics and Child Health*;35(4):412-3

207. Hanna J, Faoagali J, Buda P and Sheridan J (1997) Further observations on the immune response to recombinant hepatitis B vaccine after administration to Aboriginal and Torres Strait Island children. *Journal of Paediatrics and Child Health*;33(1):67-70

208. Dent E, Selvey CE, Bell A, Davis J and McDonald MI (2010) Incomplete protection against hepatitis B among remote Aboriginal adolescents despite full vaccination in infancy. *Communicable Diseases Intelligence*;34(4):435-439

209. Communicable Diseases Section DoHS (2005) *The blue book - guidelines for the control of infectious diseases*. Melbourne: Victorian Government Department of Human Services

210. Hepatitis C Virus Projections Working Group (2006) *Estimates and projections of the hepatitis C virus epidemic in Australia 2006*. Canberra: Ministerial Advisory Committee on AIDS, Sexual Health and Hepatitis C Sub-Committee

211. Wilson H, Hopwood M, Hull P, Lavis Y, Newland J, Bryant J and Treloar C (2010) *Treatment decisions: what makes people decide to have treatment for hepatitis C*? Brisbane: Hepatitis Council of Queensland

212. Horby P, Gilmour R, Wang H and McIntyre P (2003) Progress towards eliminating Hib in Australia: an evaluation of Haemophilus influenzae type b prevention in Australia, 1 July 1993 to 30 June 2000. *Communicable Diseases Intelligence*;27(3):324-341

213. Menzies R, Turnour C, Chiu C and McIntyre P (2008) *Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia, 2003 to 2006*. (Volume 32, supplement) Canberra: Department of Health and Ageing

214. Chiu C, Dey A, Wang H, Menzies R, Deeks S, Mahajan D, Macartney K, Brotherton J, Jardine A, Quinn H, Jelfs J, Booy R, Lawrence G, Jayasinghe S, Roberts A, Senanayake S, Wood N and McIntyre P (2010) *Vaccine preventable diseases in Australia, 2005 to 2007*. (Volume 34 supplement) Canberra: Australian Department of Health and Ageing

215. Jacups SP, Morris PS and Leach AJ (2011) Haemophilus influenzae type b carriage in Indigenous children and children attending childcare centers in the Northern Territory, Australia, spanning pre- and post-vaccine eras. *Vaccine*;29(16):3083-3088

216. Wang H, Deeks S, Glasswell A and McIntyre P (2008) Trends in invasive Haemophilus influenzae type b disease in Australia, 1995-2005. *Communicable Diseases Intelligence*;32(3):316-325

217. Brotherton J, McIntyre P, Puech M, Wang H, Gidding H, Hull BP, Lawrence G, MacIntyre R, Wood N and Armstrong D (2004) *Vaccine preventable diseases and vaccination coverage in Australia, 2001 to 2002*. (AIHW catalogue no. VPD-2) Canberra: National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases, Australian Institute of Health and Welfare, Department of Health and Ageing

218. NNDSS Annual Report Writing Group (2012) Australia's notifiable diseases status, 2010: annual report of the National Notifiable Diseases Surveillance System. *Communicable Diseases Intelligence*;36(1):1-69

219. Barry C, Krause VL, Cook HM and Menzies RI (2012) Invasive pneumococcal disease in Australia 2007 and 2008. *Communicable Diseases Intelligence*;36(2):E151-E165

220. Jacups SP and Cheng A (2011) The epidemiology of community acquired bacteremic pneumonia, due to streptococcus pneumoniae, in the top end of the Northern Territory, Australia - over 22 years. *Vaccine*;29(33):5386-5392

221. Massey PD, Kerry T, Osbourn M, Taylor K and Durrheim DN (2011) Invasive pneumococcal disease in New South Wales, Australia: reporting Aboriginal and Torres Strait Islander status improves epidemiology: surveillance report. *Western Pacific Surveillance and Response*;2(3):1-4

222. Mak DB (2004) Invasive pneumococcal disease in the Kimberley, 1995-2001. *Australian Journal of Rural Health*;12(6):237-240

223. Hanna JN, Humphreys JL and Murphy DM (2006) Invasive pneumococcal disease in Indigenous people in north Queensland, 1999-2004. *Medical Journal of Australia*;184(3):118-121

224. Fitzgerald T, Masseya PD and Islama F (2012) Changes in invasive pneumococcal disease serotypes in a regional area of Australia following three years of 7vPCV introduction. *Western Pacific Surveillance and Response Journal*;3(2):1-6

225. Roche PW, Krause VL, Bartlett M, Coleman D, Cook H, Davis C, Fielding JE, Holland R, Giele C, Gilmour R, Kampen R, Brown M, Gilbert L, Hogg G and Murphy D (2006) Invasive pneumococcal disease in Australia, 2004. *Communicable Diseases Intelligence*;30(1):80-92

226. Roche P, Krause V and Cook H (2007) Invasive pneumococcal disease in Australia, 2005. *Communicable Diseases Intelligence*;31(1):86-100

227. Standing Committee on Aboriginal and Torres Strait Islander Health and Statistical Information Management Committee (2006) *National summary of the 2003 and 2004 jurisdictional reports against the Aboriginal and Torres Strait Islander health performance indicators*. (AIHW Category no. IHW 16) Canberra: Australian Institute of Health and Welfare

228. Lahra MM and Enriquez RP (2012) Annual report of the Australian Meningococcal Surveillance Programme, 2011. *Communicable Diseases Intelligence*;36(3):E251–E262

229. Australian Meningococcal Surveillance Programme (2010) Annual report of the Australian Meningococcal Surveillance Programme, 2009. *Communicable Diseases Intelligence*;34(3):291-302

230. Pearce M, Sheridan J, Jones D, Lawrence G, Murphy D, Masutti B, McCosker C, Douglas V, O'Keefe A, Young F, Thomson M, Gorman B, Hansman D and Hill P (1995) Control of group C meningococcal disease in Australian Aboriginal children by mass rifampicin chemoprophylaxis and vaccination. *Lancet*;346(8966):20-23

231. Family Planning Association of WA (2010) *Sexually transmissible infections (STI) and blood-borne viruses (BBV): a guide for health professionals, educators, and general practitioners*. Northbridge, WA: Family Planning Association of WA

232. de Wit J, Holt M and Treloar CE (2012) *HIV/AIDS, hepatitis and sexually transmissible infections in Australia: annual report of trends in behaviour 2012*. (Monograph 6/2012) Sydney: National Centre in HIV Social Research, The University of New South Wales

233. Australasian Society for HIV Medicine (2009) *Toward a second national sexually transmissible infections strategy 2009 - 2013*. Sydney: Australasian Society for HIV Medicine

234. Bowden FJ, Tabrizi SN, Garland SM and Fairley CK (2002) Sexually transmitted infections: new diagnostic approaches and treatments. *Medical Journal of Australia*;176(11):551-557

235. Australian Department of Health and Ageing (2010) *Second national sexually transmissible infections strategy 2010 - 2013*. Canberra: Department of Health and Ageing, Australia

236. Australian Health Ministers' Advisory Council (2011) *Aboriginal and Torres Strait Islander health performance framework: 2010 report*. Canberra: Office for Aboriginal and Torres Strait Islander Health, Department of Health and Ageing

237. National Centre in HIV Epidemiology & Clinical Research (2010) *Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander people: surveillance and evaluation report 2010*. Sydney, NSW: National Centre in HIV Epidemiology & Clinical Research, University of New South Wales

238. Australian Institute of Health and Welfare (2006) *Australia's health 2006: the tenth biennial health report of the Australian Institute of Health and Welfare*. (AIHW Catalogue no. AUS 73) Canberra: Australian Institute of Health and Welfare

239. NNDSS Writing Group (2011) Australia's notifiable diseases status, 2009: annual report of the National Notifiable Diseases Surveillance System. *Communicable Diseases Intelligence*;35(2):61-131

240. Family Planning Association of WA (2006) *Gonorrhoea*. Perth, WA: FPWA Sexual Health Services

241. Western Australia Communicable Disease Control PH (2009) *Syphilis [fact sheet]*. Perth, WA: Western Australia Department of Health, Public Health

242. Merianos A, Bowden F, Krause V, Savage J and Wallace T (2001) Communicable diseases. In: Condon JR, Warman G and Arnold L, eds. *The health and welfare of Territorians*. Darwin: Territory Health Services:71-86

243. Australian National Council on AIDS Hepatitis C and Related Diseases (2000) *The management of HIV/AIDS: a resource guide for Indigenous primary health care organisations*. Canberra: ANCAHRD, Commonwealth Department of Health and Aged Care

244. Western Australian Department of Health (2008) *HIV model of care*. Perth, WA: Health Networks, Western Australian Department of Health

245. Western Australia Communicable Disease Control (2008) *HIV & AIDS [fact sheet]*. Perth, WA: Western Australia Department of Health

246. Australian Department of Health and Ageing (2010) *Sixth national HIV strategy 2010-2013*. Canberra: Department of Health and Ageing, Australia

247. National Centre in HIV Epidemiology and Clinical Research (2007) *HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2007*. (AIHW Catalogue no. PHE 92) Sydney: Australian Institute of Health and Welfare

248. McDonald E, Bailie R, Brewster D and Morris P (2008) *Are hygiene and public health interventions likely to improve outcomes for Australian Aboriginal children living in remote communities? A systematic review of the literature*. Retrieved 8 May 2008 from http://www.biomedcentral.com/1471-2458/8/153

249. Currie B and Couzos S (2008) Skin infections. In: Couzos S and Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:410-444

250. Mounsey K, Ho MF, Kelly A, Willis C, Pasay C, Kemp DJ, McCarthy JS and Fischer K (2010) A tractable experimental model for study of human and animal scabies. *PLoS Neglected Tropical Diseases*;4(7):e756 (1-6)

251. Walton SF, D. Beroukas D, Roberts-Thomson P and Currie BJ (2008) New insights into disease pathogenesis in crusted (Norwegian) scabies: the skin immune response in crusted scabies. *British Journal of Dermatology*;158(6):1247-1255

252. Hengge UR, Currie BJ, Jäger G, Lupi O and Schwartz RA (2006) Scabies: a ubiquitous neglected skin disease. *The Lancet Infectious Diseases*;6(12):769-779

253. Carapetis JR, Connors C, Yarmirr D, Krause V and Currie BJ (1997) Success of a scabies control program in an Australian Aboriginal community. *Pediatric Infectious Disease Journal*;16(5):494-499

254. Clucas DB, Carville KS, Connors C, Currie B, Carapetis J and Andrews R (2008) Disease burden and health-care clinic attendances for young children in remote Aboriginal communities of northern Australia. *Bulletin of the World Health Organization*;86(4):275-281

255. McMeniman E, Holden L, Kearns T, Clucas DB, Carapetis JR, Currie BJ, Connors C and Andrews RM (2011) Skin disease in the first two years of life in Aboriginal children in East Arnhem Land. *Australasian Journal of Dermatology*;52(4):270–273

256. Currie BJ and Carapetis JR (2000) Skin infections and infestations in Aboriginal communities in northern Australia. *Australasian Journal of Dermatology*;41(3):139-145

257. McDonald M, Currie BJ and Carapetis JR (2004) Acute rheumatic fever: a chink in the chain that links the heart to the throat? *Lancet Infectious Diseases*;4(4):240-245

258. Whitehall J, Kuzulugil D, Sheldrick K and Wood A (2013) Burden of paediatric pyoderma and scabies in North West Queensland. *Journal of Paediatrics and Child Health*;Early view(http://dx.doi.org/10.1111/jpc.12095)

259. Hewagama S, Einsiedel L and Spelman T (2012) Staphylococcus aureus bacteraemia at Alice Springs Hospital, Central Australia, 2003-2006. *Internal Medicine Journal*;42(5):505–512

260. Gracey MS (2007) Nutrition-related disorders in Indigenous Australians: how things have changed. *Medical Journal of Australia*;186(1):15-17

261. National Health and Medical Research Council (2000) *Nutrition in Aboriginal and Torres Strait Islander peoples: an information paper*. Canberra: National Health and Medical Research Council

262. National Public Health Partnership (2001) *National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000-2010 and first phase activities 2000-2003*. Canberra: National Public Health Partnership

263. National Health and Medical Research Council (2003) *Dietary guidelines for Australian adults*. Canberra: National Health and Medical Research Council

264. Footprints in Time (2012) *Footprints in Time: the longitudinal study of Indigenous children: key summary report from Wave 3*. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs

265. Australian Bureau of Statistics (2006) *National Aboriginal and Torres Strait Islander Health Survey: Australia, 2004-05: user's guide*. (ABS Catalogue no. 4715.0.55.004) Canberra: Australian Bureau of Statistics

266. Cultural and Indigenous Research Centre Australia (2011) *Evaluation of the Community Stores Licensing Program - final report*. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs

267. Commonwealth of Australia (2012) *Stronger futures in the Northern Territory Act 2012 - C2012A00100*. Commonwealth of Australia Retrieved from http://www.comlaw.gov.au/Details/C2012A00100/Html/Text#_Toc329244469

268. Department of Health and Ageing (2005) *National physical activity guidelines for adults*. Canberra: Department of Health and Ageing

269. Department of Health and Ageing (2010) *Physical activity guidelines*. Department of Health and Ageing Retrieved 1 October 2010 from http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines

270. Australian Bureau of Statistics (2011) *National Aboriginal and Torres Strait Islander Social Survey, 2008: Tables 1 and 2: whether participated in sporting, social or community activities in last 12 months [unpublished]*. Canberra: Australian Bureau of Statistics

271. Vos T, Barker B, Stanley L and Lopez A (2007) *Burden of disease and injury in Aboriginal and Torres Strait Islander peoples: 2003*. Brisbane: Centre for Burden of Disease and Cost-Effectiveness: School of Population Health, University of Queensland

272. Daniel M, Rowley K, McDermott R and O'Dea K (2002) Diabetes and impaired glucose tolerance in Aboriginal Australians: prevalence and risk. *Diabetes Research and Clinical Practice*;57:23-33

273. Gracey M, Burke V, Martin DD, Johnston RJ, Jones T and Davis EA (2007) Assessment of risks of "lifestyle" diseases including cardiovascular disease and type 2 diabetes by anthropometry in remote Australian Aborigines. *Asia Pacific Journal of Clinical Nutrition*;16(4):688-697

274. Li M and McDermott RA (2010) Using anthropometric indices to predict cardio-metabolic risk factors in Australian Indigenous populations. *Diabetes Research and Clinical Practice*;87(3):401-406

275. Valery PC, Ibiebele T, Harris M, Green AC, Cotterill A, Moloney A, Sinha AK and Garvey G (2012) *Diet, physical activity, and obesity in school-aged Indigenous youths in northern Australia*. Retrieved 28 March 2012 from http://www.hindawi.com/journals/jobes/2012/893508/abs/

276. Shultz R (2012) *Prevalences of overweight and obesity among children in remote Aboriginal communities in central Australia*. Retrieved 9 March 2012 from http://www.rrh.org.au/articles/showarticlenew.asp?ArticleID=1872

277. Australian Bureau of Statistics (2009) *National Health Survey: summary of results, 2007-2008 (reissue)*. (ABS Catalogue no. 4364.0) Canberra: Australian Bureau of Statistics

278. Engeler T, McDonald M, Miller M, Groos A, Black M and Leonard D (1998) *Review of current interventions and identification of best practice currently used by community based Aboriginal and Torres Strait Island health service providers in promoting and supporting breastfeeding and appropriate infant nutrition*. Canberra: Commonwealth Department of Health and Family Services

279. National Health and Medical Research Council (2003) *Dietary guidelines for children and adolescents in Australia incorporating the infant feeding guidelines for health workers.* Canberra: National Health and Medical Research Council

280. Australian Institute of Health and Welfare (2011) *2010 Australian national infant feeding survey: indicator results*. (AIHW Catalogue no PHE 156) Canberra: Australian Institute of Health and Welfare

281. Department of Families Housing Community Services and Indigenous Affairs (2009) *Footprints in time: the longitudinal study of Indigenous children—key summary report from Wave 1*. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs

282. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey, 2008: Table 10. Indigenous persons aged 15 years and over, by age groups by sex [data cube]*. Australian Bureau of Statistics Retrieved from http://abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&4714.0_aust_010_2008.xls&4714.0&Data%20Cubes&6959208EE47E867DCA25770B0016F56D&0&2008&21.04.2010&Previous

283. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008: Table 02. Indigenous persons aged 15 years and over, by remoteness area [data cube]*. Australian Bureau of Statistics Retrieved from http://abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&47140do002_2008.xls&4714.0&Data%20Cubes&7481083DD9F3B635CA25765E00153062&0&2008&30.10.2009&Previous

284. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008: Table 01. Indigenous persons aged 15 years and over, by Aboriginal or Torres Strait Islander origin [data cube]*. Australian Bureau of Statistics Retrieved from http://abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&47140do001_2008.xls&4714.0&Data%20Cubes&54C4C4C9B713B0C9CA25765E00152DF5&0&2008&30.10.2009&Previous

285. Australian Institute of Health and Welfare (2011) *2010 National Drug Strategy Household Survey report*. (Drug statistics series no. 25. Cat. no. PHE 145) Canberra: Australian Institute of Health and Welfare

286. Thomas DP (2012) Changes in smoking intensity among Aboriginal and Torres Strait Islander people, 1994–2008. *Medical Journal of Australia*;197(9):503-506

287. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008; Table 09. Indigenous children aged 0-3 years, by state or territory of usual residence [data cube]*. Australian Bureau of Statistics Retrieved from http://abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&47140do009_2008.xls&4714.0&Data%20Cubes&CAAA9C3AC720772ACA25765E001541A1&0&2008&30.10.2009&Previous

288. National Health and Medical Research Council (2009) *Australian guidelines to reduce health risks from drinking alcohol*. Canberra: National Health and Medical Research Council

289. Western Australian Department of Health (2010) *Fetal alcohol spectrum disorder model of care*. Perth, WA: Health Networks, Western Australian Department of Health

290. Vos T, Barker B, Stanley L and Lopez A (2007) *Burden of disease and injury in Aboriginal and Torres Strait Islander peoples: summary report*. Brisbane: Centre for Burden of Disease and Cost-Effectiveness: School of Population Health, University of Queensland

291. Begg S, Vos T, Barker B, Stevenson C, Stanley L and Lopez A (2007) *The burden of disease and injury in Australia 2003*. (AIHW cat. no. PHE 82) Canberra: Australian Institute of Health and Welfare

292. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey, Australia: summary booklet, 2008*. (ABS Catalogue no 4714.0.55.003) Canberra: Australian Bureau of Statistics

293. Australian Bureau of Statistics (2011) *Aboriginal and Torres Strait Islander wellbeing: a focus on children and youth, Apr 2011*. (ABS Catalogue no 4725.0) Canberra: Australian Bureau of Statistics

294. Australian Institute of Health and Welfare (2011) *Substance use among Aboriginal and Torres Strait Islander people*. (AIHW Catalogue No IHW 40) Canberra: Australian Institute of Health and Welfare

295. Thomas DP, Condon JR, Anderson IP, Li SQ, Halpin S, Cunningham J and Guthridge SL (2006) Long-term trends in Indigenous deaths from chronic diseases in the Northern Territory: a foot on the brake, a foot on the accelerator. *Medical Journal of Australia*;185(3):145-149

296. You J, Condon JR, Zhao Y and Guthridge S (2009) Incidence and survival after acute myocardial infarction in Indigenous and non-Indigenous people in the Northern Territory, 1992–2004. *Medical Journal of Australia*;190(6):298-302

297. Australian Indigenous HealthInfoNet (2005) *Review of respiratory disease among Indigenous peoples*. Australian Indigenous Health*InfoNet* Retrieved from http://www.healthinfonet.ecu.edu.au/chronic-conditions/respiratory/reviews/our-review

298. Roche PW, Krause V, Cook H, Barralet J, Coleman D, Sweeny A, Fielding J, Giele C, Gilmour R, Holland R, Kampen R, Brown M, Gilbert L, Hogg G and Murphy D (2008) Invasive pneumococcal disease in Australia, 2006. *Communicable Diseases Intelligence*;32(1):18-30

299. Penny M and Thomson N (1987) A preliminary analysis of Aboriginal tuberculosis, 1984. *Aboriginal Health Information Bulletin*;8:15-18

300. National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (2011) *National Advisory Group on Aboriginal and Torres Strait Islander Health Information strategic plan 2011-2015*. (AIHW Catalogue no IHW 57) Canberra: Australian Institute of Health and Welfare

301. Australian Bureau of Statistics and Australian Institute of Health and Welfare (1997) *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples*. (ABS catalogue no. 4704.0) Canberra: A joint program of the Australian Bureau of Statistics and the Australian Institute of Health and Welfare

302. Steering Committee for the Review of Commonwealth Service Provision (2003) *Report on Government services 2003: Indigenous compendium*. Melbourne: Productivity Commission

303. Steering Committee for the Review of Commonwealth Service Provision (2003) *Overcoming Indigenous disadvantage: key indicators 2003 report*. Canberra: Productivity Commission

304. Australian Health Ministers' Advisory Council (2006) *Aboriginal and Torres Strait Islander health performance framework: 2006 report*. Canberra: Department of Health and Ageing

305. Council of Australian Governments (2009) *National Indigenous reform agreement (closing the gap)*. Canberra: Council of Australian Governments

306. Aboriginal and Torres Strait Islander Social Justice Commissioner (2005) *Social justice report 2005*. Sydney: Human Rights & Equal Opportunity Commission

307. Calma T (2009) *Close the gap campaign for Aboriginal and Torres Strait Islander health equality by 2030: a community guide*. Canberra: Australian Human Rights Commission

308. Australian Government (2008) *Statement of intent*. Paper presented at the Indigenous Health Equality Summit: Close the Gap 20 March 2008, Canberra

309. Anderson I (2009) Close the Gap: National Indigenous Health Equality Council. *Medical Journal of Australia*;190(10):546

310. Department of Families Housing Community Services and Indigenous Affairs (2009) *Closing the gap on Indigenous disadvantage: the challenge for Australia*. Canberra: Commonwealth of Australia

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