



Australian Indigenous
HealthInfoNet

Overview of Australian Indigenous health status 2013



Core funding is
provided by the
Australian Department
of Health



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.

Director: Professor Neil Drew

Address: Australian Indigenous Health/InfoNet
Edith Cowan University
2 Bradford Street
Mount Lawley, WA 6050

Telephone: (08) 9370 6336

Facsimile: (08) 9370 6022

Email: healthinfonet@ecu.edu.au

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

Suggested citation:

Australian Indigenous Health/InfoNet (2014) *Overview of Australian Indigenous health status, 2013*. Retrieved [access date] from <http://www.healthinfonet.ecu.edu.au/health-facts/overviews>

Overview of Australian Indigenous health status, 2013

Publication team

Project director

Neil Thomson

Project coordinator

Jane Burns

Contributing authors

Anomie

Jane Burns

Michelle Catto

Stephanie Colbert

Belinda D'Costa

Michelle Ellwell

Caitlin Gray

Joanne Hoareau

Andrea MacRae

Christine Potter

Kathy Ride

Neil Thomson

Avinna Trzesinski

Library services and design

Graham Barker

Leah Levitan

Lawrence Rutherford

June 2014

Australian Indigenous Health*InfoNet*

Perth, Western Australia

Contents

Preface	iv
Acknowledgements	iv
Art work	iv
Key facts	v
Introduction	1
<i>Sources of information</i>	1
<i>Limitations of the sources of Indigenous health information</i>	1
The context of Indigenous health	2
<i>Historical context and social determinants of Indigenous health</i>	2
<i>The historical context of Indigenous health</i>	2
<i>The importance of contemporary social determinants and cultural concepts of Indigenous health</i>	3
<i>Indicators of Indigenous social disadvantage</i>	3
<i>Indigenous population</i>	4
Births and pregnancy outcome	5
<i>Age of mothers</i>	6
<i>Total fertility rates</i>	6
<i>Birthweights</i>	7
Mortality	7
<i>Age-standardised death rates</i>	8
<i>Expectation of life</i>	8
<i>Age at death</i>	9
<i>Infant mortality</i>	11
<i>Causes of death</i>	11
<i>Maternal mortality</i>	12
<i>Avoidable mortality</i>	12
Hospitalisation	13
<i>Separation rates</i>	13
<i>Age-specific separation rates</i>	14
<i>Causes of hospitalisation</i>	14
<i>Potentially preventable hospitalisations</i>	15
Selected health conditions	15
<i>Cardiovascular disease</i>	15
<i>Cancer</i>	17
<i>Diabetes</i>	19
<i>Social and emotional wellbeing (including mental health)</i>	21
<i>Kidney health (renal disease)</i>	24
<i>Injury</i>	26
<i>Respiratory disease</i>	28
<i>Eye health</i>	29
<i>Ear health and hearing</i>	31

<i>Oral health</i>	32
<i>Disability</i>	34
<i>Communicable diseases</i>	36
<i>Tuberculosis</i>	36
<i>Hepatitis</i>	37
<i>Haemophilus influenzae type b</i>	39
<i>Pneumococcal disease</i>	39
<i>Meningococcal disease</i>	40
<i>Sexually transmitted infections</i>	40
<i>HIV/AIDS</i>	42
<i>Skin diseases, infections and infestations</i>	43
<i>Factors contributing to Indigenous health</i>	43
<i>Selected health risk and protective factors</i>	43
<i>Nutrition</i>	44
<i>Physical activity</i>	44
<i>Bodyweight</i>	45
<i>Immunisation</i>	46
<i>Breastfeeding</i>	47
<i>Tobacco use</i>	47
<i>Alcohol use</i>	48
<i>Illicit drug use</i>	49
<i>Concluding comments</i>	51
<i>Glossary</i>	53
<i>Abbreviations</i>	55
<i>References</i>	57

Preface

The main purpose of the *Overview* is to provide a comprehensive summary of the most recent indicators of the health and current health status of Australia's Indigenous people¹. It has been prepared by the Australian Indigenous HealthInfoNet 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.

The initial sections of this *Overview* provide information about the context of Indigenous health, Indigenous population, and various measures of population health status. Most of the subsequent sections about specific health conditions comprise an introduction about the condition and evidence of the current burden of the condition among Indigenous people. Where available and appropriate; information is provided for each state and territory and for demographics such as gender and age.

While it provides a comprehensive review of key indicators across a range of health topics, it is beyond the scope of the *Overview* to provide detailed information on other aspects, such as the availability and use of services (including barriers to their use) and strategies and policies related to specific health topics. Interested readers should refer to the topic-specific reviews that are available on the HealthInfoNet's website. Additional, more in depth, information about the topics summarised in this *Overview* is included in the corresponding sections of the HealthInfoNet's website (www.healthinonet.ecu.edu.au).

We welcome feedback about the *Overview*.



Neil Drew, Director, on behalf of the HealthInfoNet team

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

Acknowledgements

Particular thanks are extended to:

- other staff of the Australian Indigenous HealthInfoNet for their assistance, support and encouragement in the preparation of this *Overview*.
- previous staff members of the Australian Indigenous HealthInfoNet who have contributed to earlier versions of the *Overview*.
- the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) for the provision of the notification data on end-stage renal disease (ESRD).
- The Department of Health for their ongoing support of the work of the HealthInfoNet.

Art work



Bibdjool

Donna Lei Rioli - a Western Australian Indigenous artist - was commissioned by the HealthInfoNet 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 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 the Australian Indigenous HealthInfoNet in contributing to improving the health and wellbeing of Indigenous Australians.

Key facts

Population

- At 30 June 2013, the estimated Australian Indigenous population was 698,583 people.
- For 2013, it was estimated that NSW had the highest number of Indigenous people (216,612 people, 31% of the total Indigenous population).
- For 2013, it was estimated that 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 2012, there were 18,295 births registered in Australia with one or both parents identified as Indigenous (6% of all births registered).
- In 2012, Indigenous mothers were younger than non-Indigenous mothers; the median age was 24.8 years for Indigenous mothers and 30.7 years for all mothers.
- In 2012, total fertility rates were 2,710 births per 1,000 for Indigenous women and 1,933 per 1,000 for all women.
- In 2011, the average birthweight of babies born to Indigenous mothers was 3,187 grams compared with 3,375 grams for babies born to non-Indigenous mothers.
- In 2011, the proportion of low birthweight babies born to Indigenous women was twice that of non-Indigenous women (12.6% compared with 6.0%).

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 2010-2012, life expectancy was estimated to be 69.1 years for males and 79.7 years for females, around 10-11 years less than the estimates for non-Indigenous males and females.
- In 2008-2012, 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 2010-2012, 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.

Hospitalisation

- In 2011-12, 4.0% of all hospitalisations were of Indigenous people.
- In 2011-12, the age-standardised separation rate for Indigenous people was 2.5 times higher than that for other Australians.
- In 2011-12, the main cause of hospitalisation for Indigenous people was for care involving dialysis, responsible for 45% of Indigenous separations.

Selected health conditions

Cardiovascular disease

- In 2012-2013, 12% of Indigenous people reported having a long-term heart or related condition; after age-adjustment, these conditions were around 1.2 times more common for Indigenous people than for non-Indigenous people.
- In 2010-11, Indigenous males were hospitalised for coronary heart disease at 1.9 times the rate of non-Indigenous males and Indigenous females were hospitalised at 3.1 times the rate of non-Indigenous females.
- In 2012, cardiovascular disease was the leading cause of death for Indigenous people, accounting for 25% 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 2012, the age-standardised death rate for cancer for Indigenous people was 1.5 times higher than that for non-Indigenous people.

Diabetes

- In 2012-2013, 8% of Indigenous people reported having diabetes; after age-adjustment, Indigenous people were 3.3 times more likely to report having some form of diabetes than were non-Indigenous people.
- In 2008-10, age-adjusted hospitalisation rates for diabetes for Indigenous males and females were 3.9 and 5.7 times the rates of other males and females.
- In 2012, Indigenous people died from diabetes at almost seven times the rate of non-Indigenous people.

Social and emotional wellbeing

- In 2012-2013, 69% of Indigenous adults experienced at least one significant stressor in the previous 12 months.
- In 2012-2013, after age-adjustment, Indigenous people were 2.7 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 2011-12, after age-adjustment, Indigenous people were hospitalised for ICD 'Mental and behavioural disorders' at 2.1 times the rate for non-Indigenous people.
- In 2012, the death rate for ICD 'Intentional self-harm' (suicide) for Indigenous people was 2.0 times the rate reported for non-Indigenous people.

Kidney health

- In 2008-2012, after age-adjustment, the notification rate of end stage renal disease was 7.3 times higher for Indigenous people than for non-Indigenous people.
- In 2011-12, care involving dialysis was the most common reason for hospitalisation among Indigenous people; Indigenous people were hospitalised at almost 12 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 2011-12, after age-adjustment, Indigenous people were hospitalised for injury at 2.0 times the rate for other Australians.
- In 2008-10, the hospitalisation rate for assault was 34 times higher for Indigenous women than for other women.
- In 2012, injury was the third most common cause of death among Indigenous people, accounting for 15% of Indigenous deaths.

Respiratory disease

- In 2004-2005, 27% of Indigenous people reported having a respiratory condition, after age-adjustment, the levels of respiratory disease were similar for Indigenous and non-Indigenous people.
- In 2012-2013, 18% of Indigenous people reported having asthma.
- In 2011-12, the age-standardised hospitalisation rate for respiratory disease was 2.7 times higher for Indigenous people than for other Australians.
- In 2012, after age-adjustment, the death rate for Indigenous people was 2.2 times that for non-Indigenous people.

Eye health

- In 2012-2013, eye and sight problems were reported by 33% 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 2012-2013, ear/hearing problems were reported by 12% of Indigenous people.
- In 2011-12, the hospitalisation rate for Indigenous people for 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 2010-2012, the crude notification rate for hepatitis C for Indigenous people was 3.8 times higher for Indigenous people than for non-Indigenous people. The crude notification rate for hepatitis B was 3.1 times higher for Indigenous people than non-Indigenous people.
- In 2007-2010, notification rates for *Haemophilus influenza* type b were 15.7 times higher for Indigenous people than for non-Indigenous people.
- In 2007-2010, the age-standardised rate of invasive pneumococcal disease was 3.6 times higher for Indigenous people than for other Australians.
- In 2007-2010, the age-standardised notification rate of meningococcal disease was 2.7 times higher for Indigenous people than for other Australians; the rate for Indigenous children aged 0-4 years was 3.8 times higher than that for their non-Indigenous counterparts.
- In 2010-2012, Indigenous people had higher crude notification rates for gonorrhoea, syphilis and chlamydia than did non-Indigenous people.
- In 2012, 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 2012-2013, less than one half of Indigenous people reported eating an adequate amount of fruit (43%) and only one-in-twenty ate enough vegetables (5%) on a daily basis.

Physical activity

- In 2012-2013, 46% of Indigenous adults met the target of 30 minutes of moderate intensity physical activity on most days.
- In 2012-2013, after age-adjustment, 62% of Indigenous people in non-remote areas reported that they were physically inactive, a similar level to that of non-Indigenous people.

Bodyweight

- In 2012-2013, 66% of Indigenous adults were classified as overweight or obese; after age-adjustment, the level of obesity/overweight was 1.1 times higher for Indigenous people than for non-Indigenous people.

Immunisation

- In 2011, 87% of Indigenous children aged 5 years were fully immunised against the recommended vaccine-preventable diseases.

Breastfeeding

- In 2010, breastfeeding initiation levels were similar among Indigenous and non-Indigenous mothers (87% and 90% respectively).

Tobacco use

- In 2012-2013, 43% of Indigenous adults were current smokers; after age-adjustment, this proportion was 2.4 times higher than the proportion among non-Indigenous adults.
- Between 2002 and 2013, there has been a decline in the number of cigarettes smoked daily among Indigenous people.
- In 2011, 50% of Indigenous mothers reported smoking during pregnancy.

Alcohol use

- In 2012-2013, 23% of Indigenous adults abstained from alcohol; this level was 1.6 times higher than that among the non-Indigenous population.
- In 2012-2013, after age-adjustment, lifetime drinking risk was similar for both the Indigenous and non-Indigenous population. 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 for 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 2012-2013, 22% of Indigenous adults reported that they had used an illicit substance in the previous 12 months.
- 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 Islander people.

Sources of information

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).

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:

- The *Overcoming Indigenous disadvantage* reports, 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, prepared by AHMAC since 2006 are accompanied by substantial detailed analyses.
- 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 health and welfare of Australia's Aboriginal and Torres Strait Islander peoples series*, produced since 1997 by the ABS and the AIHW. The ABS produced an online version in 2010, some sections of which have been updated, and the AIHW produced an overview version in 2011.

Along with these substantial reports, 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' [1, p.13].

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. It also draws 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.

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 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 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.

The Indigenous mortality project involved linking death registrations with 2011 Census records with the aim to assess the consistency of Indigenous status across the two datasets [6]. It was estimated that the Australia-wide rate of Indigenous identification in deaths notifications was 62%. For the jurisdictions for which results could be reported, the Northern Territory (NT) had the highest rate of consistent reporting (95%) and Victoria (Vic) had the lowest rate (29%). In relation to age-groups, the lowest rate of consistent identification was for people over the age of 70 years. Consistent identification of Indigenous status for both the Census and death registrations was lowest in major cities (44%) and highest in remote areas (92%).

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 [7].

The level of identification in hospital admissions is variable, but overall it has been estimated that 88% of Indigenous patients were correctly identified in Australian public hospital admission records in 2011–12 [8].

The levels of Indigenous identification in many of the other health-related data collections are generally so incomplete as to preclude reasonably accurate estimates. With these uncertainties, there must be some doubt about the precision of the various estimates of Indigenous health status. The differences between Indigenous and non-Indigenous people in the levels of most of these estimates are so great, however, that the slight imprecision in some estimates is of little practical importance.

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. For example:

- 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 [9].
- The important special reports noted above tend to be selective rather than comprehensive in their coverage of the various health topics.
- 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.
- 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.
- 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 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 [10]. 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 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 1788² than most people living in Europe [11–15]. 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 from non-Indigenous people, initially smallpox and sexually transmissible infections (gonorrhoea and venereal syphilis), and later tuberculosis, influenza, measles, scarlet fever, and whooping cough [12, 13, 16, 17]. 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 by non-Indigenous people also contributed substantially to Indigenous mortality [16, 18, 19]. The initial responses of Indigenous people to the arrival of the First Fleet were apparently quite peaceful. It didn't take long, however,

² The Australian colony was formally proclaimed in 1788.

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, New South Wales (NSW)) is the most infamous [20], but less well-known massacres occurred across Australia [19]. 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' [19, 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 [21-23]. 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 [12, 13, 16]. 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 [24]. 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' [25, 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' [24, p.2]. The *National Inquiry into the separation of Aboriginal and Torres Strait Islander children from their families* 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' [24, 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 [23], but perpetuation of the disadvantages owes much to contemporary structural and social factors, embodied in what have been termed the 'social determinants' of health [10, 26, 27]. 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 [28]. 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 the 2011 Australian Census [29]:

- 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 [30] revealed, in 2013:

- the apparent retention rate for Indigenous students from year 7/8 to year 10 was 98%, from year 7/8 to year 12 it was 55%
- for non-Indigenous students, the apparent retention rate from year 7/8 to year 10 was 102%; and from year 7/8 to year 12 it was 83%.

The 2013 national report on schooling in Australia [31] showed:

- 82% of year 3 Indigenous students and 83% of year 5 Indigenous students were at or above the national minimum standard for reading, compared with 96% of year 3 non-Indigenous students and 97% of year 5 non-Indigenous students
- 79% of year 3 Indigenous students and 66% of year 5 Indigenous students were at or above the national minimum standard for persuasive writing, compared with 96% of year 3 non-Indigenous students and 93% of year 5 non-Indigenous students
- 76% of year 3 Indigenous students and 73% of year 5 Indigenous students were at or above the national minimum standard for spelling, compared with 95% of year 3 non-Indigenous students and 94% of year 5 non-Indigenous students
- 79% of year 3 Indigenous students and 75% of year 5 Indigenous students were at or above the national minimum standard for grammar and punctuation, compared with 96% of year 3 non-Indigenous students and 96% of year 5 non-Indigenous students
- 82% of year 3 Indigenous students and 73% of year 5 Indigenous students were at or above the national minimum standard for numeracy, compared with 97% of year 3 non-Indigenous students and 95% of year 5 non-Indigenous students.

Employment

According to the 2011 Australian Census [29]:

- 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 [29]:

- 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

ABS projections from the 2011 Census of the numbers of Aboriginal and Torres Strait Islander people suggest an Indigenous population of 698,583 people at 30 June 2013 [32]. The projection for NSW is the highest (216,612 Indigenous people), followed by Queensland (Qld) (198,206), Western Australia (WA) (91,898), and the NT (71,111) (Table 1). The NT has the highest proportion of Indigenous people among its population (29.5%) and Victoria (Vic) the lowest (0.9%).

Table 1. Estimated Indigenous population, by jurisdiction, Australia, 30 June 2013

Jurisdiction	Indigenous population (number)	Proportion of Australian Indigenous population (%)	Proportion of jurisdiction population (%)
NSW	216,612	31.0	2.9
Vic	49,715	7.1	0.9
Qld	198,206	28.4	4.3
WA	91,898	13.2	3.6
SA	38,981	5.6	2.3
Tas	25,269	3.6	4.9
ACT	6,517	0.9	1.7
NT	71,111	10.2	29.5
Australia	698,583	100.0	3.0

Notes: 1 Australian population includes Jervis Bay Territory, the Cocos (Keeling) Islands, and Christmas Island

2 Proportions of jurisdiction population have used total population figures estimated from demographic information for June 2013

Source: ABS, 2014 [32]

There was a 21% increase in the number of Indigenous people counted in the 2011 Census compared with the 2006 Census³ [33]. The largest increases were in the Australian Capital Territory (ACT) (34%), Vic (26%), NSW (25%) and Qld (22%) [34]. For all jurisdictions, the 55 years and over age-group showed the largest relative increase (i.e. the Indigenous population is ageing) [33]. There are a number of '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')

³ There is a difference between the Census 'counts' and 'estimates'. The 'estimates' adjust for a number of factors and are more accurate.

- a higher proportion of Indigenous people are in their childbearing years compared with the non-Indigenous population
- the significant numbers of Indigenous babies born to Indigenous fathers and non-Indigenous mothers.

Three other factors are considered likely to have contributed to the increase in the Indigenous population in the 2011 Census:

- changes in enumeration processes (i.e. more Indigenous people are being correctly identified in the census process)
- changes in identification (i.e. people who did not previously identify as Indigenous in the census have changed their response)
- historically there may have been under-estimates of the number of Indigenous people missed in previous censuses.

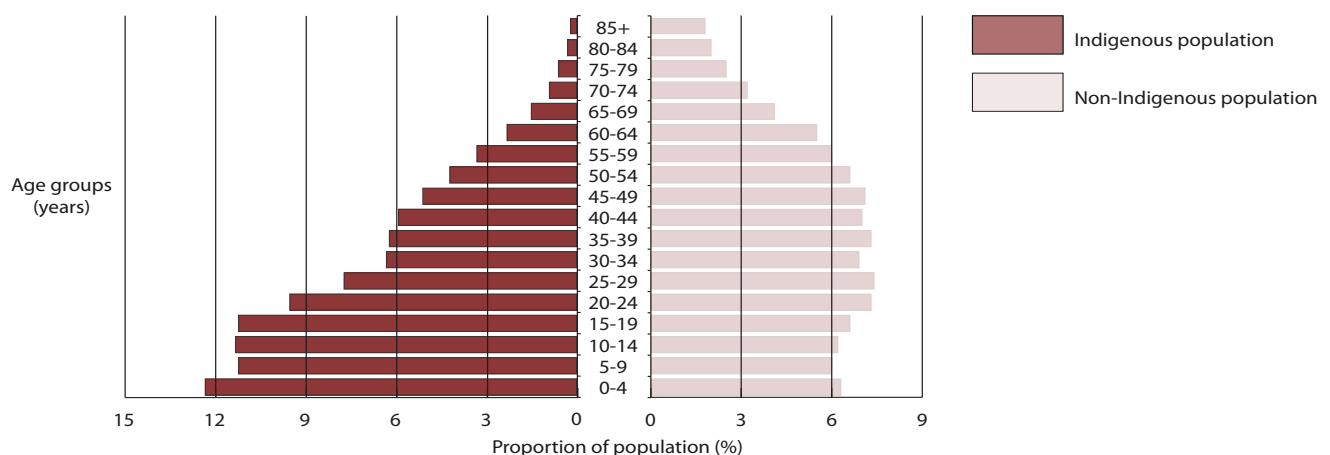
According to the 2011 Census, around 33% of Indigenous people lived in a capital city [4]. Detailed information about the geographic distribution of the Indigenous population for 2011 is not yet available, but figures from the 2006 Census indicated that the majority of Indigenous people lived in cities 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].) Over 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' [35, 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 people⁴ 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) [38]. According to estimates from the 2011 Census, at 30 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 [38]

Births and pregnancy outcome

In 2012, there were 18,295 births registered in Australia with one or both parents identified as Indigenous (6% of all births registered) [39]. This number 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 [7]. Completeness of identification varied across the country, with only Vic, Qld, WA, South Australia (SA) and the NT having levels above 90%.

In 2012, both parents identified as Indigenous in 30% of those registered as Indigenous, only the mother in 42% (including births where paternity was not acknowledged and those where the father's Indigenous status was unknown), and only the father in 28% (including births where the mother's Indigenous status was unknown) [39].

⁴ Includes people who identified as Torres Strait Islanders and those who identified as being of both Aboriginal and Torres Strait Islander descent.

Box 1: About births and fertility

In Australia, all births are required by law to be registered with the Registrar of Births, Deaths and Marriages in the state/territory in which the birth occurred. The information collected through registration is limited from a health perspective, so health authorities have established parallel maternal/perinatal collections. These collections are based on data recorded by midwives and other staff attending births and include information about the nature, duration, and complications of the pregnancy, labour, and puerperium periods, and details about the baby (including weight, length, condition at birth, and complications). Information from the two collections is collated and reported nationally - by the ABS (for registration information) and the AIHW's National Perinatal Statistics Unit (for maternal/perinatal information).

The study of birth information is known as fertility analysis, where 'fertility' refers to the number of babies born alive. This meaning is different to the lay use of the word, which means the capacity to bear children. The technical term for the capacity to bear children is 'fecundity'.

The actual numbers of births are of limited use for public health purposes. To be useful, the actual numbers of births must be related to the population in which they occur. There are a number of general measures of births and fertility, but detailed analysis involves the use of age-specific rates. These rates are the annual number of births per 1,000 women in five-year age-groups from 15 to 44 years. (The relatively small numbers of births to women aged less than 15 years are included in the 15-19 years age-group, and those older than 44 years in the 40-44 years age-group.) The summary measure of fertility is the total fertility rate, which is the sum of age-specific fertility rates multiplied by five (since five-year age-groups are involved). It estimates the number of children that would be born to 1,000 women if each woman experienced current age-specific fertility rates at each age of her reproductive life.

Age of mothers

In 2012, 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 3.7% of those born to all mothers [39]. The median age of Indigenous mothers was 24.8 years, compared with 30.7 years for all mothers. The highest birth rates (known technically as fertility rates) were for the 20-24 years age-group for Indigenous women and for the 30-34 years age-group for all women (Table 2). The fertility rate of teenage Indigenous women (79 babies per 1,000 women) was almost five times that of all teenage women (16 babies per 1,000).

Table 2. Age-specific fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2012

Status of mother/age-group (years)	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous mothers							
15-19	67	68	84	106	68	90	79
20-24	149	133	165	170	138	137	151
25-29	143	143	159	161	133	113	144
30-34	106	105	112	114	89	77	103
35-39	49	65	56	56	49	37	52
40-44	14	12	14	14	6.3	10	13
All mothers							
15-19	14	11	22	19	16	51	16
20-24	52	42	66	57	52	99	53
25-29	102	96	112	102	108	106	103
30-34	127	133	123	124	124	112	127
35-39	74	80	63	67	65	58	72
40-44	17	17	13	14	13	15	15

Notes: 1 Rates per 1,000 women in each age-group; the 15-19 years age-group includes births to women aged 14 years or younger, and the 40-44 years age-group includes births to women aged 45 years or older

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

Source: ABS, 2013 [39]

Total fertility rates

In 2012, total fertility rates were 2,710 births per 1,000 for Indigenous women and 1,933 per 1,000 for all women (Table 3) [39]. The highest total fertility rate for Indigenous women was for WA (3,103 babies per 1,000 women), followed by Qld (2,953 per 1,000) and NSW (2,652 per 1,000).

Table 3. Total fertility rates, by Indigenous status of mother, selected jurisdictions, Australia, 2012

Status of mother	Jurisdiction						
	NSW	Vic	Qld	WA	SA	NT	Australia
Indigenous	2,652	2,635	2,953	3,103	2,411	2,322	2,710
All mothers	1,932	1,891	1,997	1,913	1,898	2,206	1,933

Notes: 1 Total fertility rate is the number of children born to 1,000 women at the current level and age pattern of fertility (see Box 1)

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, 2013 [39]

Birthweights

The average weight of babies born to Indigenous mothers in 2011 was 3,187 grams, 187 grams less than the average for babies born to non-Indigenous mothers (3,375 grams) [40]. Babies born to Indigenous women in 2011 were more than twice as likely to be of low birthweight (LBW) (12.6%) than were those born to 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 proportions of LBW babies born to Indigenous women were highest in the ACT (27%)⁵, the NT (16%), and SA (15%) [40]. The proportions of babies of LBW were higher for Indigenous mothers than for all mothers in all jurisdictions (Table 4).

Table 4. Mean birthweights and percentage of low birthweight for babies born to Indigenous and all mothers, selected jurisdictions, Australia, 2011

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Indigenous mothers									
Mean birthweight	3,229	3,246	3,215	3,144	3,116	3,206	2,929	3,089	3,187
% low birthweight	11.6	12.6	11.2	13.0	15.2	13.2	27.2	15.6	12.6
All mothers									
Mean birthweight	3,372	3,371	3,377	3,355	3,340	3,381	3,343	3,275	3,367
% low birthweight	5.8	6.3	6.4	6.0	6.9	7.6	8.1	9.6	6.3

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

Source: Li, Zeki, Hilder, Sullivan, 2013 [40]

Risk factors for LBW include socioeconomic disadvantage, the size and age of the mother, the mother's nutritional status, illness and stress during pregnancy, and domestic violence [41]. A mother's alcohol consumption and use of tobacco and other drugs during pregnancy also impact on the birthweight of her baby. Tobacco, in particular, has a major impact on birthweight. In 2011, one-half (50%) of Indigenous mothers and 12% of non-Indigenous mothers reported smoking during pregnancy [40].

The impact of tobacco smoking during pregnancy can be seen in the proportions of LBW babies; in 2009, the proportion of LBW babies was twice as high among Indigenous mothers who smoked during pregnancy (15%) than among those who did not smoke during pregnancy (7.6%) [42]. Similarly, 10% of babies born to non-Indigenous mothers who smoked were of LBW, compared with less than 5% of those whose mothers did not smoke.

The mean birthweight of live babies born in 2001-2004 to Indigenous women who used tobacco was 3,037 grams, 253 grams lighter than those born to Indigenous women who did not use tobacco (3,290 grams) [43]. The comparable figures for live babies born to non-Indigenous women were 3,210 grams for women who smoked and 3,416 grams for women who did not smoke.

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), and 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 [45]. As a result of the incomplete identification of Indigenous status in death records, the 2,620 deaths registered in 2012 where the deceased person was identified as Indigenous is certainly an underestimate of the actual number of Indigenous deaths.

Based on a linkage study of Indigenous identification in deaths registration and the 2011 Census undertaken by the ABS in revising its estimates of the expectation of life of Indigenous people (see 'Life expectancy'), it is likely that the overall identification of Indigenous people in death registrations was around 87% [46].

The levels of under-identification, which differed by age-group, jurisdiction and remoteness of residence, were taken account of in the new estimates of Indigenous life expectancy. The ABS noted that correction of the under-estimates of death numbers and rates would need similar adjustments. These findings confirm the caution that the ABS notes should be exercised in the interpretation of the estimates of Indigenous mortality, particularly estimates of trends over time [45]. This caution is reflected in recent ABS publications

⁵ Information about LBW babies in the ACT includes information of non-ACT residents (28% of Indigenous women who gave birth in the ACT were non-residents). In 2011, 16% of babies born to Indigenous women who were ACT residents were of LBW.

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.

Box 2: 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. (The process is also referred to as age-adjustment.)

Direct standardisation, the preferred method, applies detailed information about Indigenous deaths, including sex and age, to a 'standard' population [47]. (In Australia, the 2001 Australian estimated resident population (ERP) is generally used as the standard population.) Direct standardisation enables accurate comparisons of Indigenous and non-Indigenous rates, and time-series analyses.

If detailed information is not available, it is still possible to use indirect standardisation to estimate standardised mortality ratios (SMRs). 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 population or, preferably, the non-Indigenous population. The SMR is the ratio of the numbers of deaths (or of other health measures) registered/observed to the number expected.

Age-standardised death rates

There were 2,620 deaths in Australia in 2012 where the deceased person was identified as Indigenous [48]. For NSW, Qld, WA, SA and the NT, the only jurisdictions with adequate identification of Indigenous status, the age-standardised death rate of 1,128 per 100,000 population for Indigenous people was 2.0 times the rate for their non-Indigenous counterparts.

More detailed information about death rates is available for the five-year period 2006-2010 for people living in NSW, Vic, Qld, WA, SA and the NT [42]. After age-adjustment, the death rate for Indigenous people living in those jurisdictions was 1.9 times the rate for non-Indigenous people (Table 5) [42]. 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 estimated resident 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
 - 4 Caution should be exercised in the interpretation of Qld rates because of recent changes to birth and death registrations

Source: AIHW, 2013 [42]

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 [49].

Expectation of life

In 2013, the ABS published revised estimates for expectation of life at birth for Indigenous people [46]. After adjustment for the underestimate of the number of deaths identified as Indigenous, the ABS estimated that Indigenous males born in Australia in 2010-2012 could expect to live to 69.1 years, 10.6 years less than the 79.7 years expected for non-Indigenous males. The expectation of life at birth of 73.7 years for Indigenous females born in Australia in 2010-2012 was 9.5 years less than the expectation of 83.1 years for non-Indigenous females.

Revised estimates were also published for Indigenous people living in NSW, Qld, WA and the NT (Table 6) [46]. (It should be noted that the table includes two estimates for Australia. The 'headline' estimate includes adjustments based on Australia-wide census-related information. The headline estimates should be used in all situations except those requiring comparisons with the estimates for the states and territories, for which Australia-wide census-related information could not be applied. The unadjusted Australian estimate should be used in situations requiring such a comparison.)

Table 6. Expectation of life at birth in years, by Indigenous status and sex, selected jurisdictions, Australia, 2010-2012

Jurisdiction	Indigenous status/sex		
	Indigenous	Non-Indigenous	Difference
Males			
NSW	70.5	79.8	9.3
Qld	68.7	79.4	10.8
WA	65.0	80.1	15.1
NT	63.4	77.8	14.4
Australia (unadjusted)	67.4	79.8	12.4
Australia (headline)	69.1	79.7	10.6
Females			
NSW	74.6	83.1	8.5
Qld	74.4	83.0	8.6
WA	70.2	83.7	13.5
NT	68.7	83.1	14.4
Australia (unadjusted)	72.3	83.2	10.9
Australia (headline)	73.7	83.1	9.5

Notes: 1 This table includes two estimates for Australia. The 'headline' estimate includes adjustments based on Australia-wide census-related information. The headline estimates should be used in all situations except those requiring comparisons with the estimates for the states and territories, for which Australia-wide census-related information could not be applied. The unadjusted Australian estimate should be used in situations requiring such a comparison.
2 Australian estimates are based on deaths in all states and territories
3 Differences are based on unrounded estimates

Source: ABS, 2013 [46]

Age at death

The median age at death⁶ in 2012 for Indigenous males ranged from 49.9 years for those living in the NT to 60.6 years for those living in NSW (Table 7) [45]. These levels were around 20 years less than those for non-Indigenous males, which ranged from 67.1 years (NT) to 80.2 years (SA).

The median age at death for Indigenous females in 2012 ranged from 52.8 years for those living in the NT to 63.9 years for those living in NSW and Qld (Table 7) [45]. These levels were also around 20 years less than those for non-Indigenous females, which ranged between 74.0 years (NT) and 85.6 years (SA).

Table 7. Median age at death, by Indigenous status and sex, NSW, Qld, WA, SA and the NT, 2012

Jurisdiction	Indigenous		Non-Indigenous	
	Male	Female	Male	Female
NSW	60.6	63.9	79.3	84.9
Qld	56.1	63.9	77.6	84.2
WA	54.8	61.1	77.9	84.4
SA	53.0	61.3	80.2	85.6
NT	49.9	52.8	67.1	74.0
All jurisdictions	55.0	61.3	78.7	84.7

Notes: 1 Information is not available for the other jurisdictions because of the relatively small numbers of deaths
2 Median age of death is the age below which 50% of deaths occur

Source: ABS, 2013 [45]

In 2008-2012, 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 8) [45]. (The rate ratios, based on the numbers of deaths registered, vary according to the levels of Indigenous identification (see above).)

⁶ 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 8. Age-specific death rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2008-2012

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio	
	Male	Female	Male	Female	Male	Female
NSW						
0	4	4	4	3	0.9	1.1
1-4	35	30	16	16	2.2	1.9
5-14	12	11	10	7	1.2	1.5
15-24	83	39	47	20	1.8	2.0
25-34	187	92	73	31	2.6	3.0
35-44	398	237	122	67	3.3	3.6
45-54	780	428	276	165	2.8	2.6
55-64	1,426	994	645	386	2.2	2.6
65+	4,730	4,371	4,119	3,676	1.1	1.2
Qld						
0	8	7	5	4	1.7	1.7
1-4	39	63	22	18	1.8	3.5
5-14	17	16	12	9	1.4	1.8
15-24	124	63	54	26	2.3	2.4
25-34	244	125	86	35	2.8	3.6
35-44	509	278	129	68	3.9	4.1
45-54	951	527	264	160	3.6	3.3
55-64	1,753	1,370	627	363	2.8	3.8
65+	5,957	4,844	3,871	3,449	1.5	1.4
WA						
0	9	5	3	3	3.1	1.7
1-4	90	53	19	15	4.7	3.6
5-14	36	36	9	10	4.3	3.7
15-24	238	125	59	26	4.0	4.8
25-34	377	201	93	35	4.1	5.7
35-44	771	499	124	66	6.2	7.6
45-54	1,329	980	254	153	5.2	6.4
55-64	2,314	1,606	575	334	4.0	4.8
65+	6,257	5,295	3,698	3,351	1.7	1.6
SA						
0	6	6	3	3	1.7	2.0
1-4	0	73	25	15	0.0	4.9
5-14	17	18	8	8	2.1	2.2
15-24	174	99	53	21	3.3	4.8
25-34	300	166	84	35	3.6	4.8
35-44	725	500	144	82	5.0	6.1
45-54	1,298	903	299	187	4.3	4.8
55-64	2,070	1,297	665	396	3.1	3.3
65+	4,352	3,927	4,262	3,895	1.0	1.0
NT						
0	14	11	4	4	3.5	3.0
1-4	82	79	35	9	2.4	8.6
5-14	39	52	23	9	1.7	6.0
15-24	311	114	101	34	3.1	3.4
25-34	454	216	93	28	4.9	7.7
35-44	902	647	134	46	6.7	13.9
45-54	1,612	1,253	333	144	4.8	8.7
55-64	2,997	1,933	735	308	4.1	6.3
65+	6,844	5,235	3,221	2,431	2.1	2.2
All jurisdictions						
0	7	6	4	3	1.8	1.7
1-4	48	53	19	16	2.5	3.3
5-14	21	22	10	8	2.1	2.7
15-24	155	73	52	23	3.0	3.2
25-34	284	144	81	33	3.5	4.4
35-44	588	367	127	68	4.6	5.4
45-54	1,063	683	272	164	3.9	4.2
55-64	1,893	1,346	633	373	3.0	3.6
65+	5,530	4,738	4,007	3,597	1.4	1.3

Notes: 1 Rates are per 1,000
2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
3 Information is not available for Vic, Tas and the ACT because of the small number of deaths registered in those jurisdictions

Source: ABS, 2013 [45]



Infant mortality

The infant mortality rate (IMR) is the number of deaths of children aged less than one year in a calendar year per 1,000 live births in the same calendar year. In NSW, Qld, WA, SA and the NT in 2010-2012, the Indigenous IMR (6.4 per 1,000) was around twice as high as the non-Indigenous IMR [45]. The highest Indigenous IMRs occurred in the NT (15.6 for male infants and 11.7 for female infants); the lowest occurred in NSW (3.8 for both male and female infants) (Table 9).

Table 9. Infant mortality rates, by Indigenous status and sex, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2010-2012

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio	
	Males	Females	Males	Females	Males	Females
NSW	3.8	3.8	4.0	3.0	1.0	1.3
Qld	7.5	6.2	4.8	4.1	1.6	1.5
WA	8.5	4.4	2.8	2.5	3.0	1.8
SA	7.1	5.9	3.2	2.8	2.2	2.1
NT	15.6	11.7	3.5	4.0	4.5	2.9

- 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: ABS, 2013 [45]

In the five-year period 2006-2010, Indigenous infants most commonly died from the International Classification of Diseases (ICD): 'Certain conditions originating in the perinatal period', including birth trauma, disorders relating to foetal growth, and complications from pregnancy, labour and delivery [42]. Indigenous infants died from 'Certain 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 [42]. The gap between Indigenous and non-Indigenous infants has closed substantially.

Causes of death

Cardiovascular disease was the leading cause of death of Indigenous people in 2012, being responsible for 25% of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT [48]. The next most common causes of death were neoplasms (mainly cancers) being responsible for 21% of deaths, followed by ICD 'External causes' (injury) (15%), ICD 'Endocrine, nutritional and metabolic diseases' (including diabetes) (9%) and ICD 'Diseases of the respiratory system' (8%). The information needed to make a valid comparison of the relative impacts of these causes among Indigenous and non-Indigenous people in 2012 is not available, so the following comparisons are restricted to some specific causes within each group.⁷

In terms of specific conditions, coronary heart disease was the leading cause of death of Indigenous people living in NSW, Qld, WA, SA and the NT in 2012 at a rate 2.1 times that of their non-Indigenous counterparts (Table 10) [48]. The other leading specific causes of death of Indigenous people were diabetes (rate ratio: 7.0), lung cancer (2.3) and chronic lower respiratory disease (2.9).

Table 10. Numbers and rates of the leading causes of Indigenous deaths and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2012

Cause of death	Number	Rate	Rate ratio
Coronary heart disease	338	165	2.1
Diabetes mellitus	201	106	7.0
Lung cancer	138	73	2.3
Chronic lower respiratory disease	123	74	2.9
Suicide	117	22	2.0
Cerebrovascular disease	108	67	1.5
Land transport accidents	88	20	3.4
Symptoms signs and ill-defined conditions	79	22	3.4
Cirrhosis and other liver diseases	72	23	4.1
Diseases of the urinary system	63	34	2.5

- Notes: 1 See source for the ICD codes for the causes of death
 2 Rates are deaths per 100,000, standardised to the Australian 2001 Estimated Resident Population
 3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate (not shown)

Source: ABS, 2014 [48]

⁷ The list of specific causes, published in the *Bulletin of the World Health Organization* [50], was developed to enable comparisons between countries, but basic tabulation lists were acknowledged as better for monitoring disease over time.

More detailed information about Indigenous mortality is available for the five-year period 2006-2010 for people living in NSW, Vic, Qld, WA, SA and the NT [42]. During that time period, cardiovascular disease was the most common cause of death for Indigenous people living in those jurisdictions, followed by ICD 'Neoplasms' (almost entirely cancer) (19% of Indigenous deaths) and ICD '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 11).

Table 11. 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 estimated resident population
3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate

Source: AIHW, 2013 [42]

In 2011, the leading specific causes of death differed for Indigenous males and females living in NSW, Qld, WA, SA and the NT [51]. For Indigenous males 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 cause of death was suicide for Indigenous males and chronic lower respiratory 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 (including 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) [52].

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 12) [Derived from 52]. 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 12. 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 [52]

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) [53].

In 2012, almost 1,500 of the deaths of Indigenous people living in NSW, Qld, WA, SA and the NT were avoidable [48]. After age-adjustment, the rate of avoidable deaths was 3.7 times higher for Indigenous people than for their non-Indigenous counterparts.

More details about avoidable deaths are not available for 2012, but there were 6,777 deaths from avoidable causes among Indigenous people living in NSW, Qld, WA, SA and the NT in the five-year period 2006-2010 [42]. Age-adjusted rates for avoidable deaths of Indigenous people were highest in the NT (787 per 100,000) and lowest in NSW (382 per 100,000). 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%) [42]. The death rates from avoidable causes were around two times higher for Indigenous people than for non-Indigenous people for cancer and suicide, four times higher for coronary heart disease, and 13.5 times higher for diabetes.

Between 1997 and 2010, there was a 24% decline in the death rate from avoidable causes for Indigenous people living in WA, SA and the NT [49]. 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 [54]. 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 [54]. 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. A study of the quality of Indigenous identification in records of public hospital separations in Australia's states and territories found that nationally 88% of Indigenous patients in public hospitals were correctly identified as such in 2011-12 [8]. The accuracy of the identification of Indigenous people varied between states and territories, from 98% in the NT to 58% in the ACT. The accuracy of identification also varied with remoteness level, from 99% in very remote areas to 77% in major cities. In comparison to a similar study conducted in 2007-2008, there had been little if any improvement to Indigenous identification in public hospital records [55]. In 2007-08, an estimated 89% of Indigenous patients were correctly identified in the records of public hospitals. Since 2007-08, there had been slight improvements to the accuracy of Indigenous identification in Qld, SA, Tasmania (Tas), and the NT [8]. The accuracy of Indigenous identification in NSW, Vic, WA, and the ACT had decreased between 2007-08 and 2011-12.

Separation rates⁸

Of the 9.3 million hospital separations in Australia⁹ during 2011-12, 366,118 (4.0%) were identified as Indigenous (Table 13) [57]. Around 92% of Indigenous hospital separations were of Aboriginal people, 4% were of Torres Strait Islander people, and 4% were of people who identified as being of both Aboriginal and Torres Strait Islander descent. Around two-fifths (38%) of separations for Indigenous patients were for overnight stays.

In 2011-12, the overall age-standardised separation rate of 973 per 1,000 for Indigenous people was 2.5 times that for non-Indigenous people (Table 13) [57]. The age-standardised separation rate for Indigenous people living in the NT (1,779 per 1,000) was 5.7 times the rate for non-Indigenous people. Around 80% of the difference between national Indigenous and non-Indigenous rates was due to higher separations for Indigenous people admitted for kidney dialysis.

Table 13. 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, 2011-12

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	72,489	614	2,658,253	350	1.8
Vic	20,459	807	2,441,124	419	1.9
Qld	88,667	839	1,813,736	404	2.1
WA	75,306	1,563	949,156	408	3.8
SA	23,366	1,162	673,929	375	3.1
NT	78,416	1,779	33,707	314	5.7
All jurisdictions	366,118	973	8,890,051	385	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; separate numbers and rates not included for Tas or the ACT, but included in totals where applicable

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, 2013 [57]

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

⁹ All hospitalisation data for the NT include only public hospitals.

Age-specific separation rates

Nationally in 2011-12, hospital separation rates were higher for Indigenous people than for non-Indigenous people in all age-groups, with the highest ratios in the middle adult years (Table 14) [Derived from 38, 57, 58, 59].

Table 14. Age-specific hospital separation rates, by sex and Indigenous status, and Indigenous:non-Indigenous rate ratios, Australia, 2011-12

Age-group (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
0-4	365	269	1.4	307	208	1.5
5-9	143	109	1.3	115	86	1.3
10-14	112	89	1.3	104	76	1.4
15-19	145	137	1.1	319	193	1.7
20-24	210	142	1.5	536	272	2.0
25-29	281	142	2.0	598	340	1.8
30-34	414	167	2.5	633	413	1.5
35-39	648	202	3.2	867	382	2.3
40-44	1,008	246	4.1	970	329	2.9
45-49	1,278	301	4.2	1,311	337	3.9
50-54	1,472	379	3.9	1,526	393	3.9
55-59	1,863	513	3.6	2,185	465	4.7
60-64	2,003	691	2.9	2,521	579	4.4
65+	2,033	1,291	1.6	2,317	1,006	2.3

Notes: 1 Rates per 1,000 population

2 Non-Indigenous includes separations for which Indigenous status was not stated

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

4 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, 2013 [57], ABS, 2009 [58], ABS, 2012 [38], ABS, 2013 [59]

Causes of hospitalisation

In 2011-12, the most common reason for the hospitalisation of Indigenous people in Australia was for care involving dialysis, which was responsible for 45% of Indigenous separations (162,993 separations) [57]. Many of these separations involved repeat admissions for the same people, some on an almost daily basis. 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, responsible for 26,426 separations (7% of all separations, and 13% of separations excluding those for dialysis).

Excluding separations for pregnancy-related conditions (most of which involved normal deliveries), the next leading causes of hospitalisation for Indigenous people in 2011-12 were respiratory conditions (responsible for 21,265 separations; 11% of separations excluding those for dialysis) and digestive diseases (18,297 separations; 9% of separations excluding those for dialysis) (Table 15) [57].

In 2011-12, Indigenous people were hospitalised at higher rates than non-Indigenous Australians for all major causes except for neoplasms (almost entirely cancers) and diseases of the musculoskeletal system and connective tissue [57].

Table 15. Numbers and proportions (%) of leading causes of Indigenous hospital separations (excluding dialysis), and Indigenous:non-Indigenous rate ratios, Australia, 2011-12

Principal diagnosis	Number of separations	Proportion (%) of separations (excluding dialysis)	Rate ratio
Injury, poisoning and certain other consequences of external causes	26,426	13	2.0
Pregnancy, childbirth and the puerperium	21,989	10.8	1.5
Diseases of the respiratory system	21,265	10.5	2.7
Diseases of the digestive system	18,297	9.0	1.0
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	17,438	8.6	1.5
Mental and behavioural disorders	15,009	7.4	2.1
Diseases of the circulatory system	10,992	5.4	1.7
Diseases of the genitourinary system	9,387	4.6	1.2
Diseases of the skin and subcutaneous tissue	7,994	3.9	2.5
Diseases of the musculoskeletal system and connective tissue	6,880	3.4	0.9
Certain infectious and parasitic diseases	5,990	2.9	1.9
Endocrine, nutritional and metabolic diseases	5,269	2.6	2.6
Neoplasms	5,240	2.6	0.7
All causes (excluding dialysis)	203,125	100	1.3

Notes: 1 Excludes hospitalisation for dialysis

2 Information for the NT is for public hospitals only

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

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, 2013 [57]

Potentially preventable hospitalisations

Potentially preventable hospitalisations are admissions which 'could have been avoided with access to quality primary care and preventive care' [60, p.4]. Rates for potentially preventable hospitalisations, including those for chronic conditions and vaccine-preventable conditions, may be used as an indirect measure of problems with access to care and effective primary care.

In the two-year period from July 2008 to June 2010, there were 87,750 potentially preventable hospitalisations of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT; after age-adjustment, the Indigenous hospitalisation rate for potentially preventable admissions was 4.7 times higher than that for non-Indigenous people [42].

During 2008-10, rates for potentially preventable hospitalisations were higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT than for their non-Indigenous counterparts in all age-groups [42]. Indigenous:non-Indigenous rate ratios were particularly high for the 45-54 years and 55-64 years age-groups (9.6 and 9.3, respectively).

The most common causes of potentially preventable hospitalisations of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-10 were complications of diabetes followed by convulsions and epilepsy, and chronic obstructive pulmonary disease (Table 16) [42]. The highest Indigenous:non-Indigenous rate ratios were for: vaccine preventable conditions (rate ratio of 4.6); potentially preventable chronic conditions (7.0); and potentially preventable acute conditions (2.4).

Table 16. Numbers and age-standardised rates of top 10 diagnoses of potentially preventable hospitalisation, Indigenous people, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT, 2008-10

Diagnosis of potentially preventable hospitalisation	Number of Indigenous admissions	Indigenous rate	Rate ratio
Diabetes complications	41,949	79	12.2
Convulsions and epilepsy	6,404	7.2	5.2
Chronic obstructive pulmonary disease	5,675	12.5	5.0
Dental conditions	4,839	3.4	1.3
Ear, nose and throat infections	4,764	3.4	2.2
Asthma	4,112	3.6	2.1
Pyelonephritis (type of kidney disease)	4,072	6.2	2.7
Cellulitis	4,033	4.6	2.9
Dehydrations and gastroenteritis	3,515	4.2	1.5
Congestive heart failure	2,728	6.0	3.2

Notes: 1 Numbers and rates for the NT are for public hospitals only
2 Rates per 1,000 population, directly age-standardised using the 2001 Australian standard population
3 Rate ratio is the Indigenous rate divided by the non-Indigenous rate

Source: AIHW, 2013 [42]

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 [61]. CVD presents a significant burden for Indigenous people in terms of prevalence, hospitalisation, and mortality [62]. Coronary heart disease (or ischaemic heart disease), cerebrovascular disease (including stroke), hypertension and rheumatic heart disease (RHD) 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) [63]. Modifiable behavioural factors for CVD (except for RHD) include tobacco use, physical inactivity, dietary behaviour, and excessive alcohol consumption [63, 64]. 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.

RHD, which is rare among non-Indigenous Australians, is different to other CVD: it is often the result of repeated episodes of acute rheumatic fever (ARF) resulting in damage to the heart valves. ARF is caused by an untreated bacterial throat infection, particularly with group A streptococcus, or streptococcal skin sores [65-67].

The persistence of ARF and RHD highlights the need for the various factors contributing to all CVD to be considered within a broad social determinants of health framework; the following aspects are important contributors to the development of CVD disease among Indigenous people:

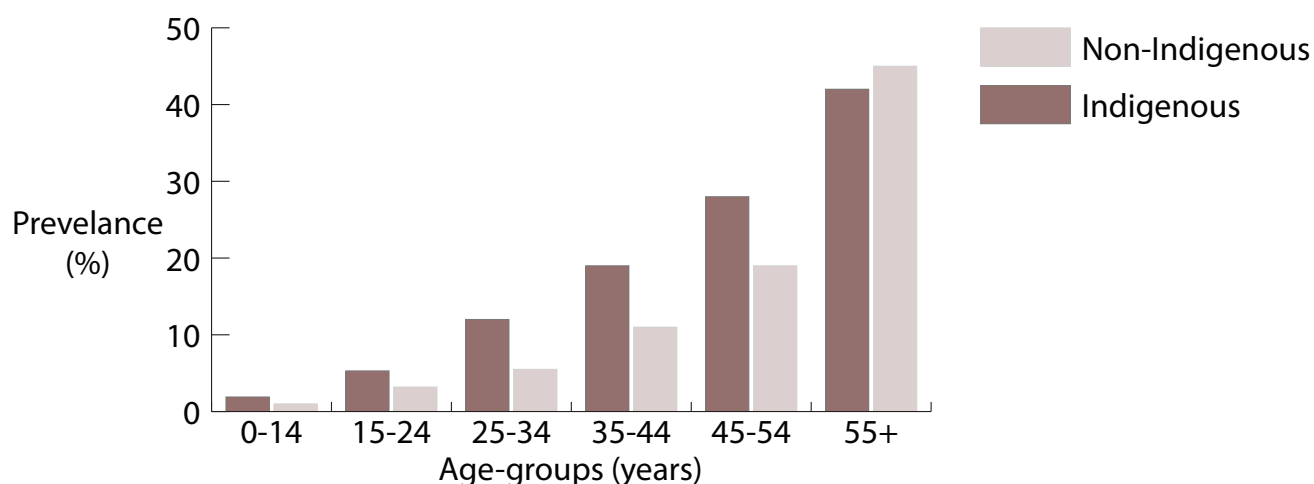
- cultural and historical factors, such as loss of land, and disruptions to culture, language and identity [68, 69]
- environmental and socioeconomic factors, such as poor housing, low education and income [68-70]
- psychosocial stressors, such as death of a family member or close friend, serious injury or disability [69, 71]
- limited access to health care, both preventive and clinical [68, 69, 72].

Extent of cardiovascular disease among Indigenous people

Prevalence of cardiovascular disease

Around 12% of Indigenous people reported in the 2012-2013 *Australian Aboriginal and Torres Strait Islander health survey* (AATSIHS) that they had some form of CVD [73]. The disease was reported more commonly by Indigenous females (13%) than by Indigenous males (11%). After age-adjustment, CVD was reported 1.2 times more commonly by Indigenous people than by non-Indigenous people. CVD increased with age for both Indigenous and non-Indigenous people; the prevalence was higher for Indigenous people than that for non-Indigenous people in all age-groups except those aged 55 years or older (Figure 2). Indigenous people living in remote areas (17%) were more likely to report having heart disease than were those living in non-remote areas (11%).

Figure 2. Prevalence (%) of people reporting cardiovascular disease as a long-term health condition, by Indigenous status and age-group, Australia, 2012-2013



Note: Prevalences are expressed as percentages

Source: ABS 2013, ABS 2012 [73, 74]

Hypertensive heart disease was the form of CVD most commonly reported by Indigenous people (5%) in 2012-2013, a level 0.9 time that of non-Indigenous people after age-adjustment (Table 17) [73]. The greatest disparities between Indigenous and non-Indigenous males and females for age-adjusted ratios (1.5 and 1.8 respectively) were for 'heart, stroke and vascular disease', which includes ischaemic and cerebrovascular diseases (including stroke) and heart failure.

Table 17. Prevalence (%) of cardiovascular disease, Indigenous people by sex and type, and Indigenous:non-Indigenous age-adjusted ratios, Australia, 2012-2013

Cardiovascular disease type	Males		Females	
	Prevalence	Ratio	Prevalence	Ratio
Hypertensive heart disease	5.0	0.9	5.0	0.9
Heart, stroke and vascular diseases	3.8	1.5	3.9	1.8
Other cardiovascular disease	2.6	0.8	5.9	0.9
All cardiovascular disease	10.6	1.2	13.5	1.2

Notes: 1 Prevalences are expressed as percentages

2 See source for details of specific conditions included in each CVD type

Source: ABS 2013 [73], ABS 2012 [74]

Around 4% of Indigenous people reported that they had heart, stroke and/or vascular diseases in 2012-2013 [73]. Heart disease, stroke and/or vascular diseases were reported by the same proportion for Indigenous males and females (both 4%). Heart, stroke and/or vascular diseases were prevalent from about 35 years of age onwards; 5% of Indigenous people aged 35-44 years reported heart, stroke and/or vascular disease, compared with 11% of those aged 45-54 years and 19% of those aged 55 years and over.

Around 5% of Indigenous people reported that they had hypertensive heart disease [73]. Hypertensive heart disease was reported by the same proportion for Indigenous males and females (both 5%). Hypertensive disease increased in prevalence from about 25 years of age onwards; 11% of Indigenous people aged 25 years and over reported hypertensive heart disease with rates ranging from 4% of those aged 25-34 years to 20% of those aged 55 years and over.

Prevalence of rheumatic heart disease and incidence of acute rheumatic fever

The prevalence of RHD in Australia is not high, but there were 1,379 Indigenous people and 100 non-Indigenous people living in the NT who were registered at 31 December 2010 as having RHD [42]. Two-thirds (66%) of the people with RHD were females and around one-third (34%) were males. After age-adjustment, the prevalence of RHD was 36 times higher among Indigenous males living in the Top End, and 13 times higher among those living in the central Australian part of the NT, than the prevalence among non-Indigenous males. The age-adjusted prevalence of RHD was 28 times higher among Indigenous females living in the Top End, and 17 times higher

among those living in the central Australian part of the NT, than the prevalence among non-Indigenous females. The prevalence of RHD in Indigenous people was highest in the 45-54 years age-group (3.6%). The greatest disparities in Indigenous:non-Indigenous RHD prevalence ratios were in the 15-24 years and 25-34 years age-groups (120 and 131 respectively).

Of the 226 new and recurrent cases of ARF among people living in the NT in 2007-2010, 221 were identified as Indigenous people [42]. As is the case for RHD, the proportion of the cases among Indigenous people was greater for females (63%) than males (37%). After age-adjustment, the rate of 0.8 cases per 1,000 population for Indigenous females was 75 times that for non-Indigenous females. The rate of 0.4 per 1,000 for Indigenous males was 70 times that for non-Indigenous males. The numbers and rates of new and recurrent cases of ARF were highest in the 5-14 years age-group for both Indigenous females (81 cases; 2.8 per 1,000) and Indigenous males (54 cases; 1.8 per 1,000). The incidence of ARF was the same for Indigenous people living in the Central Australian and the Top End regions of the NT (0.6 per 1,000). Reflecting the higher proportion of female cases in Central Australia (79%), the incidence rate for Indigenous females living in that region (0.9 per 1,000) was slightly higher than that for their Top End counterparts (0.7 per 1,000).

Hospitalisation

There were 10,992 hospital separations for diseases of the circulatory system among Indigenous people in 2011-12, accounting for 5.4% of separations identified as Indigenous (excluding dialysis) [57].

There were 7,712 hospital admissions of Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the two-year period July 2008 to June 2010 for coronary heart disease [42]. Of these admissions, 3,437 were for acute myocardial infarction (heart attack). Admission rates for Indigenous males were 1.9 times higher for coronary heart disease and 2.5 times higher for acute myocardial infarction than for non-Indigenous males. Rates for Indigenous females were 3.1 times higher for coronary heart disease and 3.6 times higher for acute myocardial infarction than for non-Indigenous females. For cerebrovascular disease (including stroke), there were 1,464 admissions to hospital of Indigenous people [42]. Admission rates for Indigenous males were 1.8 times higher for cerebrovascular disease and 1.9 times higher for stroke than the corresponding rates for non-Indigenous males. The admission rates for Indigenous females for stroke were 2.2 and 2.4 times higher, respectively, than those for non-Indigenous females. Hospitalisation rates for hypertension for Indigenous people were considerably higher than those for non-Indigenous people: 2.7 times higher for males and 3.0 times higher for females [42]. The highest ratios were for the 25-34 and 35-44 years age-groups where Indigenous rates were 5.2 and 6.5 times higher, respectively, than the non-Indigenous rates.

In 2007-08 in NSW, Vic, Qld, WA, SA and the NT there were 347 Indigenous people hospitalised for RHD/ ARF [63].¹⁰ 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 of Indigenous people in 2012, being responsible for 25% of the deaths of people identified as Indigenous living in NSW, Qld, WA, SA and the NT [48].

For the period 2006-2010, CVD was the leading cause of death for Indigenous people living in NSW, Qld, WA, SA and the NT, being responsible for 26% of all deaths of Indigenous people [49]. 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 [42]. The age-adjusted death rate from RHD for Indigenous people living in NSW, Qld, WA, SA and the NT in 2006-2010 was 4.7 times that of non-Indigenous people. Indigenous males were 3.5 times more likely to die from RHD than non-Indigenous males, and Indigenous females 5.3 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 [62].

Cancer

Cancer is the term used for a variety of diseases that cause damage to the genetic blueprint (DNA) of the cells resulting in uncontrolled growth (cells normally grow and multiply in a controlled manner) [75, 76]. If these damaged cells 'spread into surrounding areas, or to different parts of the body [metastasis], they are known as malignant' [76]. Cancerous cells can arise from almost any cell, so cancer can occur almost anywhere in the body.

Until recently, the impact of cancer on Indigenous people has attracted much less attention than it deserves: there are two main reasons for this. First, the level of identification of Indigenous people in cancer notifications is known to be incomplete [77, 78]. Indigenous identification in the cancer registries has been improving [79, 80], but, due to incompleteness of Indigenous identification cancer notifications in several jurisdictions, there is currently no national information on cancer incidence among Indigenous people [9]. Provision for the identification of Indigenous people is not yet included on all pathology forms [81], and the extent to which Indigenous cancer patients are identified in hospital inpatient statistics varies across Australia [80]. Second, cancer has often been

¹⁰ ARF and RHD were reported together.

reported in terms of the proportions of deaths it causes rather than by rates; the comparison of proportions of deaths under-estimates the relative impact of cancer on Indigenous and non-Indigenous people.

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 [9, 81].¹¹ After age-adjustment, the cancer incidence rate was slightly higher for Indigenous people than that for non-Indigenous people (461 and 434 cases per 100,000 people, respectively).

Cancer incidence rates were significantly higher for males than for females for both the Indigenous and non-Indigenous populations [81]. After age-adjustment, the rates for Indigenous people were slightly higher than those for non-Indigenous people for both males (549 and 525 per 100,000, respectively) and females (400 and 361 per 100,000, respectively). These rates were significantly different for females, but not for males.

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 (females only) (average of 88 cases per year), bowel cancer (average of 70 cases per year) and prostate cancer (males only) (average of 58 per year) (Table 18) [81]. The highest Indigenous:non-Indigenous rate ratios were for liver cancer (rate ratio 3.0), cancer of the cervix (2.8), lung cancer (1.9) and cancer of unknown site (1.9).

Table 18. 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
Bowel	48	59	0.8
Prostate (males)	105	148	0.7
Unknown primary site	24	12	1.9
Non-Hodgkin lymphoma	14	16	0.9
Cervix (females)	18	7	2.8
Uterus (females)	24	15	1.6
Liver	15	5	3.0
Pancreas	15	10	1.5
All cancers	461	434	1.1

- Notes:
- 1 Cancers are ordered by numbers among Indigenous people (not shown in table)
 - 2 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001
 - 3 Ratio is the Indigenous rate divided by the non-Indigenous rate
 - 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 and Australasian Association of Cancer Registries, 2013 [81]

For all types of cancer combined, incidence rates were higher for Indigenous people living in NSW, Qld, WA and the NT in 2004-2008 than for their non-Indigenous counterparts for all age-groups except for people aged less than 45 years [81].

Hospitalisation

There were 5,240 hospital separations for cancer among Indigenous people in 2011-12, representing 2.6% of separations identified as Indigenous (excluding dialysis) [57]. For the period 2006-07 to 2010-11, the age-standardised hospitalisation rates for cancer for Indigenous people living in NSW, Vic, Qld, WA, SA and NT were lower than for their non-Indigenous counterparts (113 and 170 per 100,000, respectively) [81].

In terms of specific cancers, the age-standardised hospitalisation rate for liver cancer and lung cancer for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT during the period 2006-07 to 2010-11 were respectively 2.0 and 1.6 times higher than those for their non-Indigenous counterparts [81]. The hospitalisation rate for cervical cancer for Indigenous women was three times higher than that for other females.

Mortality

Cancer was responsible for one-in-five deaths (524 deaths) of Indigenous people living in NSW, Qld, SA, WA and the NT in 2012 [48]. After age-adjustment, the death rate for Indigenous people was 1.5 times higher than that for their non-Indigenous counterparts. Cancers of the trachea, bronchus and lung cancers were the third leading cause of death for Indigenous people (138 deaths: 77 males and 61 females), with the overall death rate 2.3 times that for non-Indigenous people.

In the five-year period 2007-2011, there was an average of 439 deaths from cancer per year among Indigenous people living in NSW, Qld, WA, SA and the NT [81]. After age-adjustment, the death rate for cancer was 1.5 times higher for Indigenous people than that for their non-Indigenous counterparts (Table 19).

¹¹ 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%.

In terms of specific cancers, the annual average numbers of cancer-related deaths among Indigenous people living in NSW, Qld, WA, SA and the NT in 2007-2011 were 110 from lung cancer, 29 from liver cancer, 28 from breast cancer (among women), 26 from cancer of unknown site, and 24 from bowel cancer [81]. The highest Indigenous:non-Indigenous death rate ratios were for cancer of the cervix (rate ratio 3.9), liver cancer (3.3), cancer of the oesophagus (2.3), lung cancer (1.9), and cancer of unknown site (1.6) (Table 19).

Table 19. Age-standardised death rates for selected cancers, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2007-2011

Site of primary cancer	Indigenous people	Non-Indigenous people	Rate ratio
Lung	64	33	1.9
Liver	17	5	3.3
Breast (female)	28	21	1.3
Unknown primary site	16	10	1.6
Bowel	13	16	0.8
Pancreas	13	9	1.4
Oesophagus	11	5	2.3
Prostate (males)	31	30	1.0
Stomach	7	4	1.7
Cervix (females)	7	2	3.9
All cancers	252	172	1.5

- Notes:
- 1 Cancers are ordered by numbers among Indigenous people (not shown in table)
 - 2 Rates per 100,000 population, age-standardised to the Australian population at 30 June 2001
 - 3 Ratio is the Indigenous rate divided by the non-Indigenous rate
 - 4 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true difference between Indigenous and non-Indigenous rates
 - 5 Rates for 2007-2009 are final, 2010 are revised and 2011 are preliminary

Source: AIHW and National Mortality Database, 2013 [81]

The patterns of Indigenous cancer incidence and mortality are largely explained by the higher level of risk factors, most notably tobacco use [82-84]. For example, high rates of smoking are the likely cause of a high incidence of cancers of the lung, mouth and throat [85].

The higher Indigenous:non-Indigenous ratio for deaths from cancer (1.5) than for cancer incidence (1.1) could be due to a number of factors:

- 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 [78].

Diabetes

There are several types of diabetes, of which the most frequently occurring are type 1, type 2 and gestational diabetes mellitus (GDM) [86]. Type 1 diabetes is relatively uncommon in the Indigenous population [80]. Type 2 diabetes, however, 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. GDM, which can occur during pregnancy, is more common among Indigenous women than among non-Indigenous women [87].

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 [88]; self-reported diabetes data may underestimate the prevalence of diabetes by up to 50% [89].

Diabetes can lead to life-threatening health complications, some of which may develop within months of diagnosis while others may take years to develop [90]. 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 [91].

Diabetes is known to have adverse effects on pregnant women and their babies [87]. Outcomes that may occur for the mother include: pre-term birth; pre-term induced labour; caesarean section; hypertension; and increased length of stay in hospital. Outcomes that may occur for the infant include: higher rates of stillbirth, pre-term birth; higher birthweight; low Apgar score; high level of resuscitation; admission to special care unit; and increased length of stay in hospital.

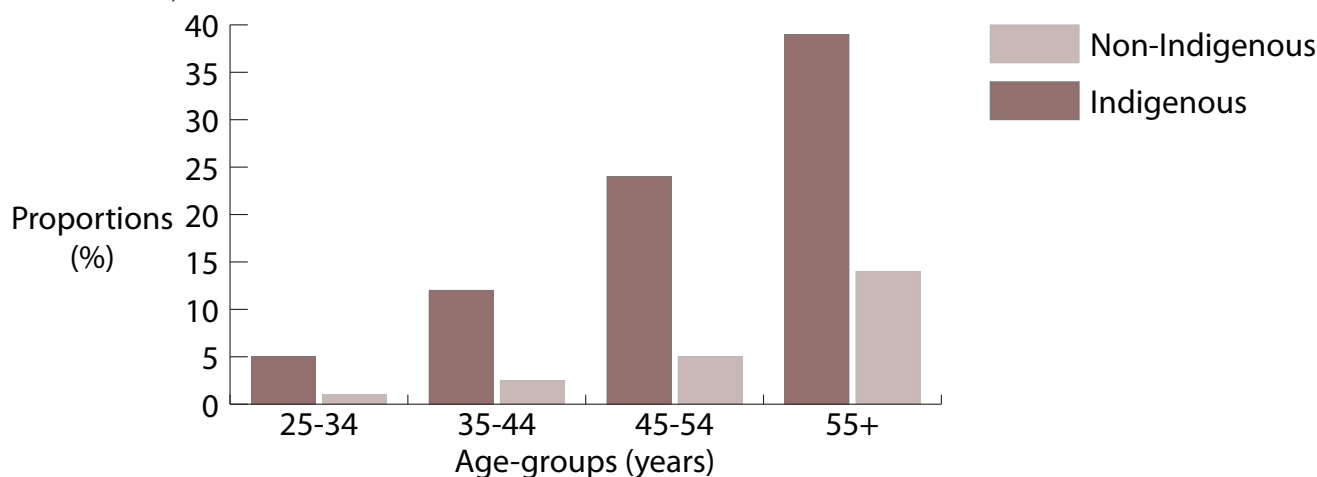
Extent of diabetes among Indigenous people

Incidence and prevalence

Around 8.2% of Indigenous people reported in the 2012-2013 AATSIHS that they had diabetes and/or high sugar levels in their blood or urine [73]. After age-adjustment, the level of diabetes and/or high sugar levels among Indigenous people was 3.3 times higher among Indigenous people than that among non-Indigenous people. Diabetes and/or high sugar was reported by a higher proportion of Indigenous females (10%) than Indigenous males (7%).

The prevalence of diabetes and/or high sugar levels increased with age for all age-groups over 25 years [73]. The prevalence ranged from 5% for Indigenous people aged 25-34 years to 39% for those aged over 55 years (Figure 3). The age-specific levels were between three and five times higher than those for non-Indigenous people.

Figure 3. Proportions (%) of people reporting diabetes/high sugar levels as a long-term health condition, by Indigenous status, and age-group, Australia, 2012-2013



Note: Proportions are expressed as percentages

Source: ABS 2013 [73]

The prevalence of diabetes/high sugar levels was lower for Indigenous people living in non-remote areas (7.3%) than among those living in remote areas (11.2%) [73].

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 is for all Australians who have commenced using insulin for diabetes since 1999 [88]. In 2005-2007, Indigenous people aged 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.

In the period 2005-06 to 2007-08, almost 7% of Indigenous mothers in NSW, Vic, Qld, WA, SA and the NT had diabetes during pregnancy: 0.1% had pre-existing type 1 diabetes; 1.5% had pre-existing type 2 diabetes; and 5.0% had GDM [87]. Indigenous women who gave birth were 3.2 times more likely than their non-Indigenous counterparts to have pre-existing diabetes and 1.6 times more likely to have GDM.

General practice attendances and hospitalisation

Hospitalisation rates are not an accurate reflection of the burden of diabetes in the community because, as is the case for most chronic health conditions, the treatment of diabetes is well supported by primary health care from doctors, nurses, and allied health professionals. In the period 2006-07 to 2010-11, diabetes problems were managed at a rate of 76 per 1,000 general practitioner (GP) encounters for Indigenous people, about three times the rate for non-Indigenous people; this was mainly due to the higher management rate of type 2 diabetes [42]. GP encounters for gestational diabetes for Indigenous females were managed at 1.5 times the rate of encounters for other females.

There were 5,269 hospital separations for ICD 'Endocrine, nutritional and metabolic diseases' (which includes diabetes) among Indigenous people in 2011-12, accounting for 2.6% of separations identified as Indigenous (excluding dialysis) [57].

For the two year period July 2008 to June 2010, diabetes accounted for almost 8,000 episodes of hospitalisation, and was the principal diagnosis for 1.4% of all hospital separations for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT [42]. Around 84% of diabetes-related hospitalisations among Indigenous people were for type 2 diabetes. After age-adjustment, rates of hospitalisation with a principal diagnosis of type 2 diabetes were 3.9 and 5.7 times higher for Indigenous males and females, respectively, than those for their non-Indigenous counterparts [42]. The rate of hospitalisation for type 1 diabetes was around twice as high for Indigenous people as that for non-Indigenous people. Hospitalisation rates increased with age, particularly for Indigenous people. The Indigenous:non-Indigenous rate ratios were around 9 for males in the 35-44 years and 45-54 years age-groups, and more than 9 for all age-groups of females between 35 and 64 years.

For Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the period July 2008 to June 2010, diabetes hospitalisation rates were highest for remote areas (21.5 per 1,000), very remote (19.3 per 1,000), and outer regional areas (17.1 per 1,000) [42]. The lowest rates were for the major cities (8.8 per 1,000) and inner regional areas (11.4 per 1,000).

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 those for non-Indigenous people [92]. The hospitalisation rate for multiple complications of diabetes was 6.5 times higher for Indigenous people than that for other Australians in 2008-09 (3.1 compared with 0.5 per 1,000).

Mortality

Diabetes was responsible for one-in-twelve deaths (201 deaths) of Indigenous people living in NSW, Qld, SA, WA and the NT in 2012 [48]. Diabetes was the second leading specific cause of death for Indigenous people, with an overall death rate 7.0 times higher than that for 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 [88].)

Social and emotional wellbeing (including mental health)

Good mental health is essential to the health and wellbeing of individuals, families, and communities [93]. 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, which exists within the field [94].

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 [94, 95]. Mental health is influenced by a complex interplay of biological, psychological, social, environmental, and economic factors [93, 94, 96]. People with good mental health are able to contribute to community life, participate in the workforce, and foster meaningful and positive relationships with others [94, 95, 97].

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 [94], 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 [93, 94]. 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 [93, 94, 97]. 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 [97]. It goes beyond traditional mental health concepts 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 [97, 98]. It is the preferred terminology by many Indigenous people because of its more positive and holistic connotations.

Box 3: Sources of information about mental illness and mental health problems

Historically, the extent of mental illness and mental health problems in the Indigenous population have been poorly documented [99]. It was not until the 2004-05 *National Aboriginal and Torres Strait Islander Health Survey* (NATSIHS) that information on the social and emotional wellbeing of Indigenous people was systematically collected at a national level [100, 101]. More comprehensive information has since been provided by the 2008 NATSISS [102]. More recently, the 2012-13 AATSIHS sought to provide a broad understanding of the social and emotional wellbeing of Indigenous people aged 18 years and over by collecting information on psychological distress, personal stressors, positive wellbeing, discrimination, social support, cultural identification, and personal control beliefs [73, 103].

As well as the valuable information collected by these major national surveys, useful information about mental illness and mental health problems can be derived from health services utilisation and death data.

Extent of mental illness and mental health problems among Indigenous people

Prevalence

The 2012-2013 AATSIHS found that the social and emotional wellbeing of many Indigenous people was compromised: 30% of respondents aged 18 years or over reported high or very high levels of psychological distress in the four weeks prior to the interview, an increase of more 10% since the 2004-2005 NATSIHS [92, 99].¹² After age-adjustment, the proportion of Indigenous people reporting high or very high distress levels in 2012-2013 was more than 2.7 times that of non-Indigenous people [99]. There were variations in psychological distress levels within the Indigenous population in terms of sex and remoteness. More than one-third (36%) of Indigenous females and one-quarter (24%) of Indigenous males reported high or very high levels of psychological distress in the four weeks prior to the survey; the proportion of Indigenous people reporting high or very high distress levels was higher for people living in non-remote areas than for those living in remote areas (32% and 24% respectively).

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 2012-2013 AATSIHS, 69% of Indigenous people aged 15 years and over experienced one or more specific stressors in the 12 months prior to the survey [104]. After age-adjustment, this was almost 1.4 times the proportion of non-Indigenous people reporting experiencing one or more specific stressors. The most prevalent stressors for Indigenous people included: death of a family member or close friend; serious illness; unable to get a job; alcohol or drug related problems; and mental illness (Table 20). These specific stressors were also the most commonly reported stressors in the non-Indigenous population, but at lower levels. The greatest disparities in the frequency of the reported stressors were for 'trouble with the police' and 'gambling problems'; after age-adjustment, Indigenous people were five times and almost six times more likely, respectively, than non-Indigenous people to report these stressors.

Among Indigenous people, a greater proportion of females than males reported experiencing one or more specific stressors (72% and 65% respectively) [104]. The most commonly reported stressors were fairly consistent for both females and males, and for each of the age cohorts. Across the age-groups, a steady increase was observed in the proportion of Indigenous people reporting one or more specific stressor, with the exception of the 55 years and over age-group where the proportion of people reporting one or more specific stressor was at its lowest (62%).

Table 20. Proportion (%) of stressors reported by Indigenous people in the previous 12 months and Indigenous:non-Indigenous ratios, by stressor type, Australia, 2012-2013

Type of stressor	Proportion	Ratio
Death of a family member or close friend	37	1.9
Serious illness	23	1.4
Not able to get a job	23	2.5
Alcohol or drug related problems	18	3.6
Mental illness	16	1.7
Trouble with the police	13	5.0
Involuntary loss of job	9	2.4
Divorce or separation	8	1.0
Gambling problems	8	5.8
Witness to violence	8	3.9
Abuse or violent crime	7	3.4
Serious accident	7	1.8
Serious disability	6	2.3
Total reporting specific stressor(s)	69	1.4

Notes: 1 Proportions are expressed as percentages

2 Ratios are based on age-adjusted prevalences from the 2012-2013 AATSIHS and the 2011-2013 Australian Health Survey

Source: ABS, 2013 [104]

Psychological distress and the contributing life stressors are just one aspect of social and emotional wellbeing. Also providing an indication of a person's state of social and emotional wellbeing is the degree to which they experience positive feelings. In the 2008 NATSISS, survey respondents reported on feelings of calmness and peacefulness, happiness, fullness of life, and energy [92].¹³ Nine-tenths (90%) of Indigenous people reported feeling happy either some, most, or all of the time, but considerable proportions responded 'a little/none of the time' to questions relating to having 'lots of energy' (21%), a sense of calmness and peacefulness (16%), and fullness of life (17%). The absence of comparable data precludes definitive statements about the relative positive wellbeing of Indigenous and non-Indigenous people, but the greater frequency of psychological distress in the Indigenous population, together with the types and numbers 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 [102]. Information collected in the 2008 NATSISS showed that 89% of Indigenous people aged 15 years and over were able to obtain emotional, physical, or

¹² The percentage increase in psychological distress levels is based on age-standardised data as the actual prevalence was not available for 2004-2005

¹³ The 2012-2013 AATSIHS collected data on positive wellbeing, but information was not available at the time this report was prepared.

financial help from someone else during a time of crisis. Non-Indigenous people experience similar levels of social support: the 2010 *General social survey* (GSS) found that 93% of non-Indigenous people were able to access support at a time of crisis [105].

Removal from one's natural family also has significant implications for a person's social and emotional wellbeing [106]. The 2008 NATSISS revealed that Indigenous people who had been removed, or had 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. About 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. Almost one-third (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) [107]. 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 than children of Indigenous carers who had not been forcibly separated from their families. Around 71% 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 23% had experienced seven or more such events.

Hospitalisation

Reflecting the high levels of distress experienced by many Indigenous people, 15,009 of the hospital separations in 2011-12 with a principal diagnosis of ICD 'Mental and behavioural disorders' were identified as Indigenous (7.4% of Indigenous separations, excluding those for dialysis) [108]. After age-adjustment, the hospitalisation rate for Indigenous people was 2.1 times the rate for non-Indigenous people.¹⁴

Information about hospitalisation for the specific sub-categories within the ICD chapter 'Mental and behavioural disorders' are not available for 2011-12, but data from 2008-10 show hospitalisation rates for each sub-category were generally higher for Indigenous people than for other Australians [42]. For this period, the age-adjusted separation rates for mental and behavioural disorders due to ICD 'Psychoactive substance use disorders' were 3.7 times higher for Indigenous people living in NSW, Vic, Qld, WA, SA and the NT than those for their non-Indigenous counterparts. Similarly, the rate for Indigenous people for ICD 'Schizophrenia, schizotypal, and delusional disorders' was 3.0 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 in 2011-12, excluding care involving dialysis [57, 108]. Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in 2008-10 were more likely to be admitted for intentional self-harm than were their non-Indigenous counterparts [42]. After age-adjustment, separation rates were 2.9 times higher for Indigenous males and 2.1 times higher for Indigenous females than those for their non-Indigenous counterparts. Indigenous people living in remote areas had a particularly high separation rate for intentional self-harm – more than 3.7 times the rate reported for their non-Indigenous counterparts.

Mortality

The most recent detailed information about Indigenous mortality as a result of mental health related conditions is for Indigenous people living in NSW, Qld, WA, SA, and the NT in 2006-2010: there were 312 deaths of Indigenous people (147 males and 165 females) (Table 21) [42].¹⁵ After age-adjustment, the death rates were 1.7 times higher for Indigenous males and 1.3 times higher for Indigenous females than those for their non-Indigenous counterparts.

Table 21. Numbers and rates of deaths from mental health related conditions, excluding intentional self-harm, and Indigenous:non-Indigenous rate ratios, by sex and condition, NSW, Qld, WA, SA, and the NT, 2006-2010

Cause of death	Males			Females		
	Number	Rate	Ratio	Number	Rate	Ratio
Mental disorders due to substance use	79	14	5.7	36	5	6.7
Organic mental disorders	55	30	1.6	104	38	1.4
Other mental disorders	13	6	0.7	25	9	0.7
All mental disorders	147	49	1.7	165	52	1.3

Notes: 1 Details of death from intentional self-harm are not included in this table, see Tables 22 and 23.

2 'Mental disorders due to substance use' comprises ICD codes F10-F19, 'Organic mental disorders' ICD codes F00-F09, and 'Other mental disorders' ICD codes F20-F99, G30, G47.0, G47.1, G47.2, G47.8, G47.9, O99.3, R44, R45.0, R45.1, R45.4, R48.

3 Rates are deaths per 100,000 standardised using the Australian 2001 ERP

Source: AIHW (2013) [42]

14 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'.

15 Under the ICD, intentional self-harm is classified under 'External causes of morbidity and mortality' (codes X60-X84): details are provided separately.

More recent data are available for deaths due to ICD 'Intentional self-harm' (suicide) (not included among the deaths for mental health related conditions shown in Table 22). In 2012, the death rate for ICD 'Intentional self-harm' for Indigenous people living in NSW, Qld, WA, SA, and the NT was 2.0 times the rate reported for non-Indigenous people [109]. It was the fifth leading specific cause of death among Indigenous people.

For the period 2008-2012, deaths from intentional self-harm were much higher for Indigenous people living in NSW, Qld, WA, SA, and the NT than those for their non-Indigenous counterparts, with age-standardised death rates ranging from 14 per 100,000 (NSW) to 39 per 100,000 (WA) [109]. Death rates were higher for Indigenous males than for Indigenous females (in those jurisdictions for which details for females were available).

Table 22. Age-standardised death rates for intentional self-harm, Indigenous people by sex and jurisdiction, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2008-2012

Jurisdiction	Indigenous			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
NSW	14	24	n.p.	1.6	1.8	n.p.
Qld	22	30	14	1.8	1.6	2.6
WA	39	55	22	3.3	3.1	4.1
SA	25	35	n.p.	2.2	2.0	n.p.
NT	29	47	n.p.	2.4	2.3	n.p.

Notes: 1 Rate per 100,000 population, standardised to the Australian 2011 ERP
 2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
 3 n.p.: not published
 4 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true differences between Indigenous and non-Indigenous people

Source: ABS, 2014 [109]

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. Combined data for NSW, Qld, WA, SA and the NT in 2008-2012 show the highest death rates for intentional self-harm were among Indigenous people aged 15-24 and 25-34 years (43 and 45 deaths per 100,000, respectively) (Table 23) [109]. The burden of suicide is highest among Indigenous males aged 15-24 and 25-34 years (rates of 62 and 66 per 100,000, respectively), but is also very high among young Indigenous females. The suicide rates for Indigenous females in the 1-14 years to 35-44 years age-groups ranged from more than two to around 16 times the rates for their non-Indigenous female counterparts. Even more striking is the fact that suicide rates for Indigenous females in the 1-14 years to 35-44 years age-groups were all higher than the rates for non-Indigenous males in those age-groups.

Table 23. Age-standardised death rates for intentional self-harm, Indigenous people by sex and age-group, and Indigenous:non-Indigenous rate ratios, NSW, Qld, WA, SA and the NT, 2008-2012

Age-group (years)	Indigenous			Rate ratios		
	Persons	Males	Females	Persons	Males	Females
1-14	2	1	2.2	10.3	6.3	16.2
15-24	43	62	23	5.2	5.2	5.2
25-34	45	66	23	3.5	3.3	4.4
35-44	32	49	17	2.0	1.9	2.4
45+	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
All ages	22	33	n.p.	2.1	2.0	n.p.

Notes: 1 Rate per 100,000 population, standardised to the Australian 2011 ERP
 2 Rate ratio is the Indigenous rate divided by the non-Indigenous rate
 3 n.p.: not published
 4 Due to the incomplete identification of Indigenous status, these figures probably under-estimate the true differences between Indigenous and non-Indigenous people

Source: ABS, 2014 [109]

Research in NSW, Qld, the ACT, and the NT has highlighted the increasing impact of suicide among young Indigenous people [110-112]. 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' [113, p.88], but it is certainly a manifestation of mental health problems. The level of intentional self-harm has been recognised as a key indicator of Indigenous disadvantage [92].

Kidney health (renal disease)

Kidney disease, renal and urologic disease, and renal disorder are terms that refer to a variety of different disease processes involving damage to the working units of the kidneys and associated structures [114, 115]. 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 [116, 117]. CKD is inclusive of different conditions, including diabetic nephropathy, hypertensive renal disease, glomerular disease, chronic renal failure, and end-stage renal disease (ESRD) [85]. If left untreated, kidney function can decrease to the point where kidney replacement therapy, in the form of dialysis (mechanical filtering of the blood to help maintain functions normally performed by the kidneys) or transplantation (implantation of a kidney from either a living or recently deceased donor) is necessary to avoid death [118]. ESRD 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 [116, 119].

A number of risk factors are associated with kidney disease, including diabetes, high blood pressure, infections, LBW, and obesity [117]. These conditions are particularly common among Indigenous people and contribute to high rates of CKD [85, 120].

Extent of kidney disease among Indigenous people

Prevalence

Around 1.7% of Indigenous people reported that they had kidney disease as a long-term health condition in the 2012-2013 AATSIHS [73, 121]. After age-adjustment, the prevalence of kidney disease as a long-term health condition was 3.7 times higher for Indigenous people than for non-Indigenous people. The proportions of Indigenous people reporting kidney disease were similar for males and females, but the age-adjusted Indigenous:non-Indigenous prevalence ratio was slightly higher for males (4.0) than for females (3.5). The reported prevalence of kidney disease was less than 1% for Indigenous people aged less than 45 years, but around 6% for those aged 45 years or older.

With most information on CKD limited to self-reported data, the primary focus in the literature has been on ESRD [117, 122]. The overall incidence rate of ESRD for Indigenous people is consistently reported as being significantly higher than that for non-Indigenous people [117, 123].

Data from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) for the five-year period 2008-2012 reveal that the age-standardised notification rate of ESRD for Indigenous people was 693 per 1,000,000 population, 7.3 times the rate for non-Indigenous people (Table 24) [Derived from 124, 125-128]. Notification rates of ESRD were higher for Indigenous people than those for non-Indigenous people in all states and territories, with the highest rates recorded for Indigenous people living in the NT (1,537 per 1,000,000), WA (1,046 per 1,000,000), and SA (946 per 1,000,000).

Table 24. 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, 2008-2012

Jurisdiction	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
NSW	159	349	3,709	96	3.7
Vic	48	463	2,845	96	4.8
Qld	284	606	2,109	96	4.8
WA	239	1,046	1,054	93	11.3
SA	80	946	877	94	10.1
NT	338	1,537	70	96	15.9
Australia	1,163	693	11,179	95	7.3

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, 2013 [127], ABS, 2010 [128], ABS, 2001 [125], ABS, 2009 [126]

Of people newly registered with the ANZDATA in 2008-2012, 61% of Indigenous people were aged less than 55 years, compared with 30% of non-Indigenous people. Notification rates were higher for Indigenous people than for non-Indigenous people across all age-groups (except for the 0-14 years age-group) (Table 25) [Derived from 124, 125-127]. Rate ratios were particularly high for people aged 35-44 years (12.1) and 45-54 years (13.7).

Table 25. Numbers of notifications and notification rates of end-stage renal disease, by Indigenous status and age-group, and Indigenous:non-Indigenous rate ratios, Australia, 2008-2012

Age-group (years)	Indigenous		Non-Indigenous		Rate ratio
	Number	Rate	Number	Rate	
0-14	5	5	159	8	0.6
15-24	21	36	259	17	2.1
25-34	67	170	515	33	5.2
35-44	241	698	896	58	12.1
45-54	373	1,436	1,568	105	13.7
55-64	327	2,147	2,401	192	11.2
65-74	107	1,621	2,794	348	4.7
75+	20	785	2,587	374	2.1
All ages	1,163	693	11,179	95	7.3

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, 2013 [127], ABS, 2010 [128], ABS, 2001 [125], ABS, 2009 [126]

Detailed information from ANZDATA is available for 2011 when a total of 250 Indigenous people commenced dialysis, an increase from the numbers in 2009 and 2010, but similar to those for 2007 and 2008 [123]. In 2011, 28 new transplant operations were performed for

Indigenous recipients, compared with 770 operations performed for non-Indigenous recipients. At 31 December 2010, 49 (4%) of the 1,190 patients on the waiting list for a transplantation were Indigenous [129]. Detailed information about the age and residence of the Indigenous patients on the waiting list is not known for 2011, but of the 977 patients aged less than 65 years on the transplant waiting list in Australia at 31 December 2009, 39 (4%) were Indigenous [130]. The highest number of Indigenous patients on the waiting list lived in WA and NSW (36% and 33% respectively 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 [131-134]. In 2011, HD accounted for the majority of treatment (90%) [123, 131], with only 10% of Indigenous dialysis patients receiving peritoneal dialysis (PD) [123, 135]. The majority of non-Indigenous dialysis patients also received HD, but 19% of non-Indigenous dialysis patients received PD. In 2011, there were 1,302 prevalent dialysis patients in Australia (including both PD and HD) identified as Indigenous, with a level 4.6 times higher for Indigenous people (2,269 per 1,000,000) than that for non-Indigenous people (493 per 1,000,000) [123].

Hospitalisation

In 2011-12, care involving dialysis was the most common reason for the hospitalisation of Indigenous people in Australia [136]. Care involving dialysis was responsible for 162,993 hospital separations, accounting for 45% of all separations of Indigenous people. After age-adjustment, the separation rate for Indigenous people was almost 12 times that for other Australians.

More detailed information about dialysis is available for the two-year period July 2008 to June 2010 for people living in NSW, Vic, Qld, WA, SA and the NT [42]. During this time period, Indigenous females had the highest rate of regular dialysis hospitalisations, more than 15 times that of other females; Indigenous males were hospitalised for regular dialysis, more than eight times the rate of other males.

The hospitalisation rate of Indigenous females for CKD excluding those for dialysis was more than five times that of other females; the rate for Indigenous males was more than four times that of other males [42].¹⁶ Contributing factors to the 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 [137].

Mortality

There were 63 deaths from disease of the urinary system among Indigenous people living in NSW, Qld, WA, SA and the NT in 2012, accounting for 2.6% of all Indigenous deaths in those jurisdictions [109].¹⁷ After age-adjustment, the death rate for Indigenous people was 2.5 times that for non-Indigenous people.

During the five-year period 2006 to 2010, 323 Indigenous people living in NSW, Qld, WA, SA and the NT died from kidney disease (accounting for 3% of all Indigenous deaths in those jurisdictions) [42, 49]. After age-adjustment, the death rate for Indigenous people was four times the rate for non-Indigenous people. There was an average annual increase of 2.1% 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.

More detailed information is available for people living in NSW, Qld, WA, SA and the NT in the five-year period 2003-2007. During this period, there were 1,443 Indigenous deaths from CKD (405 deaths had no record of Indigenous status) [117]. After age-adjustment, the death rate for all CKD-related deaths for Indigenous people 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, respectively, than those for their non-Indigenous counterparts [117]. These figures probably underestimate the contribution of CKD to death rates, however, as deaths involving CKD can occur in the context of other chronic conditions. For example, deaths where kidney failure was reported in 2003-2007 as an associated cause of death (e.g. with diabetes) occurred at three times the rate for Indigenous people than for non-Indigenous people.

Injury

Injury includes both physical harm to a person's body and non-physical harm, including grief, loss and suffering [138], but in public health practice attention is almost entirely confined to physical harm [139]. 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 [140] other than those collected as part of population surveys, such as the ABS *national health surveys* (NHS). 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 [141].¹⁸ Understanding injury in an Indigenous context needs to take into consideration a diverse range of issues, including: disruption to culture, 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 [138, 140].

¹⁶ 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.

¹⁷ Disease of the urinary system includes disorders of the bladder and urethra, as well as those specifically of the kidneys and ureters.

¹⁸ This system is followed in this section, but it has its limitations (for more details, see [142]).

Extent of injury among Indigenous people

Prevalence

The most recent source of detailed information about injury among Indigenous people is the 2004-2005 NATSIHS, which found that 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) [101].¹⁹ Reporting of injury-caused health conditions increased substantially among Indigenous people 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%) [42]. 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.

In relation to violence, almost one-quarter (23%) of Indigenous people reported to the 2008 NATSISS that they had been a victim of physical or threatened violence in the previous 12 months [102]. Victimization was higher among younger Indigenous people, with males and females aged 15-24 years having the highest reported proportions (29% and 31%, respectively) [143]. Victimization 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%). Across all levels of remoteness, more than 30% of Indigenous females experienced victimisation.

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

There were 26,426 hospital separations for injuries for Indigenous people in 2011-12, representing 13% of all Indigenous separations (excluding those for dialysis) [57]. After age-adjustment, the separation rate for injury was twice as high for Indigenous people than for other Australians. The leading external causes of injury-related hospitalisations in 2011-12 were ICD 'Complications of medical and surgical care' (25%), assault (18%), falls (17%), and exposure to mechanical forces (14%).

Detailed information on Indigenous injury-related hospitalisation is not available for 2011-12, but in the two-year period 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 twice those for non-Indigenous males and females [49].

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 [92]. 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.

Assaults account for a higher proportion of injury-related hospitalisations among Indigenous people than among non-Indigenous people; in 2011-12, 18% of injury-related hospitalisations among Indigenous people were for assaults compared with 2% among other people [57]. The most recent detailed information for males and females is available for the two-year period July 2008 to June 2010, when assault was responsible for 21% of all hospitalisations for Indigenous males and 28% for Indigenous females living in NSW, Vic, Qld, WA, SA and the NT [42]. Indigenous males and females were 8 and 34 times, respectively, more likely to be hospitalised for assault than were non-Indigenous males and females.

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 [92]. 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 females aged 25-34 years (15.1 per 1,000) and for Indigenous males aged 35-44 years (5.5 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).

¹⁹ The injury-related information collected by the 2012-2013 AATSIHS is due for release in 2014.

Mortality

Injury was the third leading cause of death among Indigenous people living in NSW, Qld, WA, SA and the NT in 2012, accounting for 15.4% of all Indigenous deaths [48]. Important specific causes of injury deaths were intentional self-harm (117 deaths, 4.7% all Indigenous deaths) and land transport accidents (88 deaths, 3.6%). After age-adjustment, deaths from intentional self-harm were around twice as common for Indigenous people than for other Australians, and those from land transport accidents more than three times as common. After age-adjustment, the death rate for injury from assault was 8.9 times higher (8.9 per 100,000) than for non-Indigenous people (1.0 per 100,000).

The most recent detailed information for death from injury is available for the five-year period 2006-2010, in which period there were 1,667 Indigenous deaths in NSW, Qld, WA, SA and the NT, representing 15% of all Indigenous deaths [42]. Indigenous people died from injury at 2.3 times the rate of non-Indigenous people. Death rates for injury were particularly high among Indigenous people aged 25-34 years (122 per 100,000) and 35-44 years (124 per 100,000 respectively). After age-adjustment, the death rates from injury were 2.3 times higher for Indigenous males and females than those for their non-Indigenous counterparts.

Respiratory disease

'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 [144]. Respiratory disease, which includes chronic obstructive pulmonary disease (COPD), asthma, 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 [49, 145].

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 some previous medical conditions [146, 147]. Infants and children under the age of 5 years are particularly susceptible to developing respiratory conditions, due to factors like exposure to tobacco smoking, poor environmental conditions, and poor nutrition [146, 148, 149].

COPD relates to long-term lung diseases for which the symptoms are not fully reversible, and includes chronic bronchitis, emphysema, and some cases of asthma [144]. 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 [150].

The risk of developing asthma is affected by environmental, lifestyle (e.g. diet and tobacco use) and genetic factors (e.g. allergic tendency) [151]. 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, which may be life threatening for some people.

Among Indigenous adults, factors contributing to pneumonia include smoking tobacco, use of alcohol and other substances, diabetes mellitus, and chronic renal disease [146].

Extent of respiratory disease among Indigenous people

Prevalence

Detailed information about respiratory disease is not yet available from the 2012-2013 AATSIHS, but 27% of Indigenous people who participated in the 2004-2005 NATSIHS reported having a long-term respiratory condition [101]. Respiratory conditions were reported more frequently by Indigenous people living in non-remote areas (30%) than by those living in remote areas (17%).

Information about asthma is available from the 2012-2013 AATSIHS, in which it was reported by 18% of Indigenous people [73]. It was the most commonly reported respiratory condition among Indigenous people, and the second most commonly reported long-term condition [121]. Asthma was reported more commonly by females (20%) than by males (15%) and by Indigenous people living in non-remote areas (20%) than by those living in remote areas (10%). After age-adjustment, the level of asthma among Indigenous people was 1.9 times higher than that among non-Indigenous people.

Hospitalisation

There were 21,265 hospital separations for respiratory disease among Indigenous people in 2011-12, representing 10.5% of separations identified as Indigenous (excluding those for dialysis) [57]. After age-adjustment, the hospitalisation rate for respiratory disease was 2.7 times higher for Indigenous people than for other Australians [57].

In the two-year period July 2008 to June 2010, in NSW, Vic, Qld, WA, SA and NT, Indigenous children aged 0-4 years were hospitalised for respiratory disease at twice the rate of other children [42]. Hospitalisation rates were substantially higher for Indigenous adults than those for non-Indigenous adults: 4.3 times higher for the 35-44 years age-group, 5.5 times higher for the 45-54 years age-group, and 4.9 times higher for the 55-64 years age-group. For Indigenous people living in remote areas, the hospitalisation rate for respiratory disease was three times the rate of Indigenous people living in major cities (80 and 27 per 1,000 respectively). The most common cause of hospitalisation for respiratory disease among Indigenous people was pneumonia (23%), followed by COPD (13%), and asthma (11%) [42].

Mortality

In 2012, respiratory disease was responsible for the deaths of 194 Indigenous people living in NSW, Qld, SA, WA and the NT, accounting for 7.9% of Indigenous deaths [48]. After age-adjustment, the death rate for Indigenous people was 2.2 times higher than that for non-Indigenous people. Chronic lower respiratory diseases (including asthma, bronchitis, emphysema, and other COPD) were responsible for 123 Indigenous deaths; the age-adjusted death rate for Indigenous people was 2.9 times higher than that for non-Indigenous people.

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 2008-2012 (95 per 1,000) was 5.6 times higher than the rate for their non-Indigenous counterparts [109]. Among people aged 65-74 years, the rate of 283 per 1,000 for Indigenous people was 3.8 times higher than that for their non-Indigenous counterparts. Influenza and pneumonia were responsible for 34 Indigenous deaths, with a rate 1.9 times higher for Indigenous people than that for non-Indigenous people.

The most recent detailed information on specific causes of respiratory-related deaths for Indigenous males and females is for the period 2006 to 2010. 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 26) [42]. Age-adjusted death rates were around three times higher for Indigenous males and females than those for their non-Indigenous counterparts. COPD accounted for 87% of the deaths of Indigenous people caused by chronic lower respiratory disease. Death rates for pneumonia and influenza, the next most common cause of death from respiratory disease, were 2.1 times higher for Indigenous people than those for non-Indigenous people.

Table 26. 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, 2006-2010

	Males		Females		Persons	
	Rate	Rate ratio	Rate	Rate ratio	Rate	Rate ratio
Chronic lower respiratory diseases	88	2.9	65	3.2	75	3.0
Pneumonia and influenza	24	2.4	16	1.8	19	2.1
Other respiratory disease	24	1.2	14	1.2	18	1.2
All respiratory disease	135	2.3	95	2.4	112	2.3

Notes: 1 Chronic lower respiratory diseases include, asthma, bronchitis, emphysema and other COPD

2 Rates, in deaths per 100,000, are directly age-standardised using the Australian 2001 estimated resident population, by 5-year age-groups to 75+

Source: AIHW, 2013 [42]

Indigenous infants living in NSW, Qld, WA, SA and NT in 2006-2010 were 3.3 times more likely than their non-Indigenous counterparts to die from respiratory disease [42].

Eye health

Eye health can be affected by a number of factors, including genetics, ageing, premature birth, diseases (such as diabetes), injuries, ultra-violet (UV) exposure, nutrition and tobacco use [102, 152]. Poor vision can limit opportunities in education, employment and social engagement; it can also increase the risk of injury and be a reason for dependence on services and other people [49, 153]. Even mild vision loss can reduce an individual's ability to live independently and increase the risk of mortality [49, 154].

Nationally, eye and vision health issues: are responsible for 11% of years of life lost to disability (YLD) for Indigenous people; constitute the fourth leading cause of the gap in health between Indigenous and non-Indigenous people; and increase mortality at least two-fold [155, 156]. Around 94% of vision loss among Indigenous people nationally is preventable or treatable, with the leading eye conditions being cataract, refractive error, optic atrophy, diabetic retinopathy, and trachoma [157].

Box 4: Sources of information about eye health

The most recent comprehensive source of information about the eye health of Indigenous Australians is the *National Indigenous eye health survey* (NIEHS), conducted in 2007-2009 by the Indigenous Eye Health Unit at the University of Melbourne in collaboration with the Centre for Eye Research Australia and the Vision Cooperative Research Centre [157, 158]. The survey examined all children aged from 5 to 15 years and adults 40 years and older living in 30 communities across Australia; with a total of 2,883 Indigenous participants.

Eye health data were also collected in the ABS's 2004-2005 NATSIHS [101], 2008 NATSISS, [102] and the 2012-2013 AATSIHS [73].

Extent of eye health problems among Indigenous people

Eye and sight problems were reported by one-third (33%) of Indigenous people who participated in the 2012-2013 AATSIHS, making it the most commonly reported long-term health condition [159]. Eye and sight problems were reported by 38% of Indigenous females and by 29% of Indigenous males [160]. The age-adjusted levels of eye and sight problems were slightly lower for both Indigenous males and females than those for their non-Indigenous counterparts (ratio 0.9) [161]. The proportion of Indigenous people reporting eye or sight problems was lower among those living in remote areas (28%) than among those living in non-remote areas (35%) [121].

Low vision and blindness among Indigenous children

The 2008 NIEHS found that the eyesight of Indigenous children was generally better than that of non-Indigenous children, particularly for children living in remote communities [157]. After adjusting for age and sampling, blindness was five times less common among Indigenous children aged 5-15 years than among non-Indigenous children.

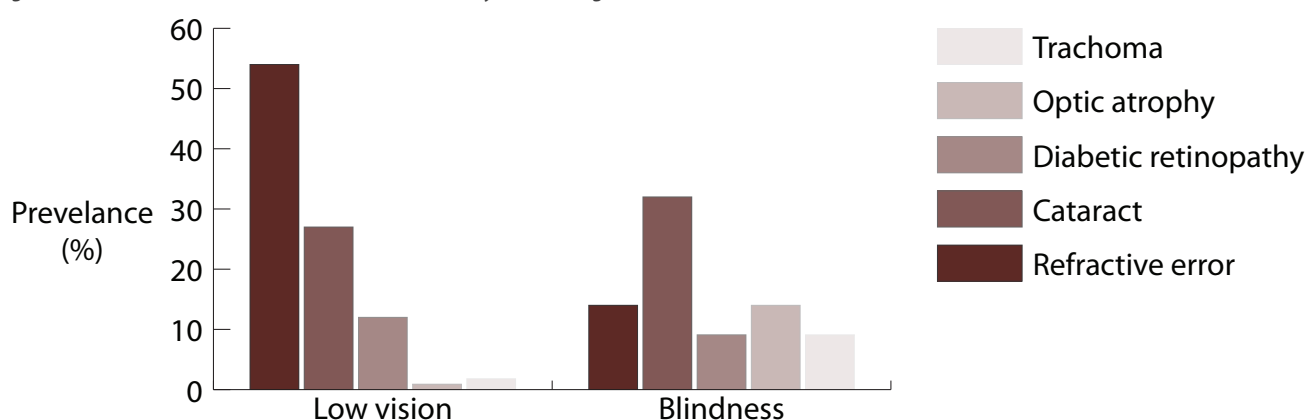
The 2008 NATSISS reported that 9% of Indigenous children aged 4-14 years had some form of eye or sight problems [162]. The most common forms of these problems were refractive errors: long-sightedness (37%) and short-sightedness (28%) [163]. The 2008 NIEHS reported that more than one-half of low vision (56%) among Indigenous children aged 5-15 years was due to refractive error [158]. Of the three children who were blind, one child was blind due to refractive error.

Low vision and blindness among Indigenous adults

According to the 2008 NIEHS, low vision was 2.8 times more common among Indigenous adults aged over 40 years than among their non-Indigenous counterparts [158]. The most common causes of low vision were uncorrected refractive error (54%), cataract (27%), and diabetic retinopathy (12%).

The 2008 NIEHS found that 1.9% of Indigenous adults were blind, a level 6.2 times higher than that for non-Indigenous adults [158]. The leading cause of blindness among Indigenous adults was cataract (32%) (Figure 4), which was 12 times more common among Indigenous adults than among non-Indigenous adults [158]. The next leading causes of blindness among 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%) [158].

Figure 4. Prevalence (%) of vision loss and blindness, by cause, Indigenous adults, Australia, 2008



Source: NIEHS 2009 [158]

Specific eye conditions

Refractive error is a common eye condition that is easily corrected with glasses. Refractive error was the cause of more than one-half of low vision (54%) and 14% of blindness among Indigenous adults in the 2008 NIEHS [158]. Uncorrected refractive error leading to blindness was five times more common among Indigenous adults than among non-Indigenous adults. Impaired distance vision (hyperopia) affected 5% of Indigenous adults. Only 20% of Indigenous adults wore glasses for distance vision, compared with 56% of non-Indigenous adults [164]. Around 39% of Indigenous adults were not able to read normal size print (difficulty with near vision or myopia) [158].

As noted above, cataract was the leading cause of blindness among Indigenous adults and the second most common cause of low vision [158]. Reflecting the high levels of cataract-associated blindness, the hospital separation rate ratio for cataract extraction surgery in public hospitals was more than twice as high for Indigenous people in 2011-12 than it was for their non-Indigenous counterparts [165]. The median wait for cataract surgery in 2012-13 was 140 days for Indigenous people and around 90 days for non-Indigenous people [166].

Diabetic retinopathy, a complication of diabetes that causes damage to the small blood vessels in the retina, can impair vision and cause blindness [167]. The 2008 NIEHS reported that blinding diabetic retinopathy was 30 times more common among Indigenous adults than among non-Indigenous adults [158]. 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.

Vision loss and blindness from diabetic eye diseases are up to 98% preventable [157] with regular screening and timely treatment [168]. Annual screening is recommended for Indigenous people with diabetes [169]. Prevention measures include the management of diabetes (blood glucose control, blood pressure and lipids) and following a healthy lifestyle (maintaining a normal BMI, nutritious diet, and regular exercise) [170].

Trachoma has been virtually eliminated in the developed world, but still occurs among Indigenous people [157]. According to the 2008 NIEHS, 60% of Indigenous communities in very remote areas had endemic trachoma [158].²⁰ The overall prevalence of active trachoma among Indigenous children aged 5-15 years was 3.8%, ranging from 0.6% in major cities to 7.3% in very remote coastal inland areas. The highest prevalence was 23% in very remote inland NT.

At around the same time as the NIEHS, the overall prevalence of active trachoma was found among 14% of children aged 5-9 years living in 289 specifically-screened communities in the NT, SA and WA [171, 172]. In 2012, the overall prevalence of active trachoma among these children had decreased to 4% (4% in the NT and WA, 2% in SA and nil in Qld) [171]. The level of trachoma was endemic in 25% and hyper-endemic²¹ in 8% of the screened communities [171].

In 2012, trichiasis was detected in 2% of Indigenous adults aged 40 years and older living in 108 at-risk communities in WA, SA and the NT [171]. A total of 94 cases were reported (22 in WA, 11 in SA and 61 in the NT). In the 2008 NIEHS, the overall prevalence of trichiasis was 1.4%, the highest level of 15% being found in very remote inland areas of Australia [158].

Access to eye health care services

A number of factors (including geographical location, socio-economic status, lack of access to transport, and lack of access to health services) limit the timely identification, management and treatment of eye health problems for Indigenous people [167]. The limited availability of eye care providers in more remote areas is such that a four-fold increase in services is needed to address the shortage [173, 174]. 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 [175, 176]. The 2008 NIEHS found that 35% of Indigenous adults have never had an eye examination [157]. The rate of eye examinations provided in areas with a high Indigenous population was two-thirds the rate for areas with a low Indigenous population [176].

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 [177]. 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) [178].

OM can be caused by viruses or bacteria or both, and often occurs as a result of another illness such as a cold [177]. It can cause intermittent or persistent hearing impairment and 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 tympanic membrane (eardrum) is referred to as chronic suppurative otitis media (CSOM) [178]. 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 [177, 179, 180].

OM, particularly in suppurative forms, is associated with impairment of hearing, with major implications for language development and learning [102, 180-182]. 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 [181].

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 [180, 183-185]. 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' [186, 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 [185].

Diseases of the ear and mastoid and/or hearing problems were reported as a long-term health condition by 12% of Indigenous people who participated in the 2012-2013 AATSIHS [73]. Ear/hearing problems were reported by the same proportion of Indigenous people in non-remote areas and remote areas (both 12%). Ear/hearing problems were reported by 13% of Indigenous males and by 12% of Indigenous females. After age-adjustment, there were statistically significant differences between rate ratios for Indigenous people and non-Indigenous people for ear and mastoid and/or hearing problems (rate ratio 1.3: rate ratio of 1.2 for males and a rate ratio 1.5 for females), and in all age-groups under 55 years.

The proportion of Indigenous people with ear/hearing problems increased with age, ranging from 7% of Indigenous children aged 0-14 years, to 28% of those aged 55 years and over [73]. The same proportions of Indigenous children aged 0-14 years were reported to have hearing loss (3%) and OM (3%). Hearing loss was the most commonly reported ear/hearing problem in all other age-groups, affecting between 7% of Indigenous people aged 15-24 years and 26% of those aged 55 years and over.

²⁰ In 2008, endemic trachoma was defined as a prevalence of active trachoma of more than 5% in children aged 5-9 years [154]. In 2012 endemic trachoma was defined as a prevalence of active trachoma of 5% or more in children aged 1-9 years and a prevalence of trichiasis in at least 0.1% of the adult population [171].

²¹ In 2012, hyper-endemic trachoma was defined as a prevalence of 20% or more in children aged 1-9 years [171].

Hearing health services delivered under the National partnership agreement on stronger futures in the Northern Territory in 2012-13 provided audiology services to 1,541 Indigenous children: 72% of children who received audiology services were diagnosed with at least one type of middle ear condition [187]. The most common condition among the Indigenous children was otitis media with effusion (OME) (25%) followed by Eustachian tube dysfunction (17%), CSOM (13%), dry perforation (12%), and acute OM (AOM) (8%). Of the children who received audiology services 51% had some form of hearing loss: 36% had bilateral hearing loss; 15% had loss in one ear; and around 10% had moderate, severe or profound hearing impairment.

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 ear, nose and throat (ENT) consultations or audiology services had at least one middle ear condition [188]. More than one-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 [102].

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 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 [49].

There were 2,584 hospital separations for diseases of the ear and mastoid process (portion of the temporal bone of the skull behind the ear) among Indigenous people in 2011-12, representing 0.7% of separations identified as Indigenous (excluding dialysis) [57]. The hospitalisation rate was 1.3 times the non-Indigenous rate. 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 [49]. 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 was lower 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 [92]. Importantly, ear infections can lead to hearing loss, which may be a major contributor to poor education and to unemployment, which are risk factors for contact with the justice system [180].

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' ([189] cited in [190, p.1]). That is, oral health 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.

The two most common oral diseases are caries and periodontal disease [191]. Dental caries is caused by acid-producing bacteria living in the mouth, which proliferate on foods high in sugar. Caries is reversible in its early stages, but, if untreated, can cause pain, abscesses and eventually lead to tooth loss. Periodontal disease (affecting the gums) is caused by bacterial infection associated with poor oral hygiene, infrequent dental visits, age, tobacco use, and certain health conditions (such as diabetes and CVD).

Extent of oral health problems among Indigenous people

Prevalence

Oral health problems were reported by 32% of Indigenous children aged 0-14 years in the 2008 NATSISS [42]. Almost one-half (46%) of those for whom oral health problems were reported were aged 10-14 years. The prevalence of reported oral health problems differed by jurisdiction, ranging from 38% in Vic to 20% in the NT. The prevalence of reported oral health problems was higher for children living in non-remote areas (34%) than for those living in remote areas (24%).

According to the 2004-2005 NATSIHS, 78% of Indigenous people aged 15 years and older had lost fewer than five adult teeth in their lifetime; the number of teeth lost increased with age (Table 27) [101]. The proportion of Indigenous people aged 55 years or older who reported using dentures was higher for non-remote areas than for remote areas (55% and 19%, respectively); the proportion requiring dentures was higher in remote areas than in non-remote areas (19% and 10%).

Table 27. Proportions (%) of Indigenous people reporting numbers of lost teeth and denture use, by age-group and type of condition, Australia, 2004-2005

	Age-group (years)					
	15-24	25-34	35-44	45-54	55+	All ages
Number of teeth lost						
0	80	50	27	17	8	45
1-4	18	40	48	37	22	33
5-9	1	6	16	21	14	9
10-14	-	1	2	7	10	3
15+	1	1	4	15	37	8
Uses/requires dentures						
Uses dentures	1	2	8	23	45	10
Requires dentures	1	4	10	12	13	6

Notes: 1 Some low proportions should be viewed with caution

2 '-' refers to nil or rounded to zero

Source: ABS, 2006 [101]

Caries

A higher proportion of Indigenous people than non-Indigenous people experience caries. *The child dental health survey* (CDHS), conducted in 2000-2003²², found the prevalence of caries in deciduous teeth (first set of teeth) was higher among Indigenous children aged 4-10 years living in NSW, SA and the NT than that among their non-Indigenous counterparts [192]. The greatest 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. Across all ages between 4 and 10 years, the mean number of decayed teeth was higher for Indigenous children than for their non-Indigenous counterparts [192]. The greatest difference was for four-year-olds, where the mean number of decayed teeth was more than three times higher for Indigenous children than for non-Indigenous children.

According to the CDHS, poorer oral health for Indigenous children continued when they got their permanent teeth [192]. A higher proportion of Indigenous children aged 6-17 years living 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 the CDHS also had more severe levels of decay in their permanent teeth than did non-Indigenous children [192]. The greatest difference was for Indigenous 15-year-olds who had 2.7 times the mean number of decayed permanent teeth than did non-Indigenous 15-year-olds.

According to the *National survey of adult oral health* (NSAOH), Indigenous adults had more caries than non-Indigenous adults in 2004-2006 [193]. Indigenous people aged 15 years or 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 teeth affected.

The severity of decay experienced by Indigenous adults was also higher than that experienced by their non-Indigenous counterparts in 2004-2006 [193]. 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 [192, 193]. Children rarely develop severe periodontal disease but gingivitis is relatively common, particularly among older children [192]. Gingival bleeding, a common symptom of gingivitis, was generally more common among Indigenous children living in NSW and SA in 2000-2003 than among their non-Indigenous counterparts (information is not available for other states and territories). Gingival bleeding was around three times more common among Indigenous children aged 13-14 years living in NSW than among their non-Indigenous counterparts. Almost one-half (49%) of Indigenous 12 year-olds living in SA had gingival bleeding, compared with 23% of non-Indigenous 12 year-olds. 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 27% of Indigenous people aged 15 years and older had gingivitis [193]. The prevalence of moderate or severe periodontitis was about 1.3 times higher for Indigenous people than that 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 are affected by periodontal diseases at younger ages than are non-Indigenous people [193, 194]. 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%) [193]. The prevalence of both deep periodontal

²² Data from each state/territory were collected within a 12 month period, but in different years: data from NSW were obtained in 2000, data from the NT were obtained in 2002, and data from SA were obtained in 2003.

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-group (1.3% compared with 0.6%).

Edentulism

Edentulism, or complete tooth loss, reflects both extensive oral disease and past surgical approaches to the treatment of oral diseases that relied largely on extractions [193]. The 2004-2006 NSAOH found that edentulism increased with age for both Indigenous and the non-Indigenous people, but the age distribution of edentulism among Indigenous people was noticeably different from that of other Australians. Edentulism was almost five times more common among Indigenous people (7.6%) aged 35-54 years than among their non-Indigenous counterparts (1.6%). For people aged 55-74 years, 21% of Indigenous people suffered from edentulism compared with 14% of non-Indigenous people.

Hospitalisation

In 2008-10, there were 3,224 hospital separations for oral health problems among Indigenous people living in NSW, Vic, Qld, WA, SA and the NT [42]. The hospitalisation rates for children aged 0-4 and 5-14 years were higher for Indigenous children than those for non-Indigenous children (Table 28). There were similar hospitalisation rates for Indigenous and non-Indigenous people aged 15-24 and 34-44 years, but the rates for those aged 45 years and older were lower for Indigenous people than those for their non-Indigenous counterparts. After age-adjustment, the overall hospitalisation rates were similar for Indigenous and non-Indigenous people.

Table 28. Age-specific hospital separation rates for dental problems, by Indigenous status, and Indigenous:non-Indigenous rate ratios, NSW, Vic, Qld, WA, SA and the NT combined, 2008-10

Age-group (years)	Indigenous	Non-Indigenous	Rate ratio
0-4	9.4	4.2	2.2
5-14	6.5	4.4	1.5
15-24	0.6	0.7	0.8
24-34	0.7	0.7	1.0
35-44	0.7	0.8	0.8
45-54	0.6	1.0	0.5
55-64	0.4	1.2	0.4
65+	0.3	1.0 ¹	0.3
All ages	3.1	1.6	1.2 *

Notes: 1 Rates per 1,000 population

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

3 Rate ratio for 'All ages' directly age-standardised using the 2001 Australian standard population (*)

Source: AIHW, 2013 [42]

Disability

Disability can be defined as a limitation, restriction or impairment which has lasted, or is likely to last, for at least six months and restricts everyday activities [195]. It can be considered in terms of the nature of the impairment (such as sight and hearing impairments, difficulties with mobility, or brain damage) and the interaction between the individual's health condition and their environment [80, 196]. A profound or severe core-activity limitation refers to 'a specified condition for which the person requires help or supervision in one or more core activities (e.g. self-care, mobility or communication)' [103].

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 details about a person's need for assistance with core activities [195]. Information about disability at a population level is also collected in Australia's five-yearly censuses [29]. Information about disability among Indigenous people was also collected in the 2008 NATSISS [102]. 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 [197]. 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' [197, p.532].²³

Despite these limitations, it is clear that disability is a serious issue for Indigenous people: about 50% of Indigenous people aged 15 years and over reported a disability or a long-term health condition in 2008 [42]. The greater burden of disability experienced by Indigenous people is associated with poorer physical and mental health, increased exposure to risk factors, and higher levels of socio-economic disadvantage [80, 197].

Extent of disability among Indigenous people

According to counts collected by the ABS as part of the 2011 Census, around 29,559 Indigenous people (5.4%) needed assistance with core activities (i.e. had a profound/core activity restriction) [198]. The need for assistance with core activities generally increased with

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

age among both Indigenous and non-Indigenous people, with the proportions requiring assistance higher among Indigenous people than those among their non-Indigenous counterparts for all age-groups (Table 29). The proportion of Indigenous males needing assistance with core activities was higher than that of Indigenous females up to the 65 years and older age-group, but the reverse was true beyond that age.

Table 29. Prevalence (%) of people needing assistance with core activities, by sex, Indigenous status age-group, and Indigenous:non-Indigenous ratios, Australia, 2011

Age-group (years)	Males			Females			Persons		
	Indigenous	Non-Indigenous	Ratio	Indigenous	Non-Indigenous	Ratio	Indigenous	Non-Indigenous	Ratio
0-4	1.7	1.2	1.4	1.1	0.7	1.5	1.4	1.0	1.4
5-14	4.8	3.3	1.5	2.6	1.6	1.6	3.7	2.5	1.5
15-19	3.8	2.3	1.7	2.6	1.4	1.8	3.2	1.9	1.7
20-24	3.4	1.5	2.2	2.1	1.1	1.9	2.8	1.3	2.1
25-34	3.4	1.4	2.4	2.7	1.2	2.3	3.0	1.3	2.3
35-44	5.2	1.9	2.7	4.8	1.9	2.6	5.0	1.9	2.6
45-54	8.8	3.0	2.9	8.8	3.2	2.8	8.8	3.1	2.8
55-64	15	5.5	2.7	14	5.1	2.8	15	5.3	2.7
65+	25	15	1.7	29	20	1.4	27	18	1.5
All ages	5.7	4.3	2.0	5.1	5.0	1.9	5.4	4.6	1.9

- Notes: 1 Prevalences are expressed as percentages
2 Ratio is Indigenous proportion divided by the non-Indigenous proportion
3 Ratios for 'All ages' have been standardised using the 2001 Australian estimated resident population
4 ABS notes that 'needing assistance with core activities' is conceptually related to the 'presence of a profound/core activity restriction'
5 The information in this table is based on counts from the 2011 Census

Source: Derived from ABS, 2013 [198], ABS, 2001 [125]

According to the NATSISS, around 7.9% of all Indigenous people aged 15 years and older had a profound/core activity limitation in 2008 [42]. After age-adjustment, Indigenous people living in non-remote areas were more than twice as likely as their non-Indigenous counterparts to have a need for assistance with core activities (Table 30).²⁴ The proportions of Indigenous people with profound/severe core activity limitation 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).

Table 30. Prevalence (%) of people aged 15 years or older living in non-remote areas with profound/severe core activity limitation, by Indigenous status and age-group, and Indigenous:non-Indigenous ratios, Australia, 2008

Age-group (years)	Indigenous	Non-Indigenous	Ratio
15-24	5.3	2.5	2.1
25-34	6.2	2.4	2.6
35-44	6.2	3.0	2.1
45-54	10	4.1	2.5
55+	18	8.5	2.1
All ages	9.9	4.5	2.2

- Notes: 1 Ratio is the Indigenous percentage divided by the non-Indigenous percentage
2 Proportions for 'All ages' are age-standardised
3 Needing assistance with core activities is conceptually related to the presence of a profound/core activity restriction

Source: AIHW, 2013 [42]

The proportion of profound/core activity restriction among Indigenous people varied slightly with the remoteness of residence in 2008 [42]. The highest proportions of Indigenous people with a profound/severe core activity restriction were in major cities (9.0%) and very remote areas (8.9%); the lowest proportion was in remote areas (6.7%).

There were differences in the proportions by state and territory of Indigenous people living in non-remote areas with profound/core activity restrictions in 2008 [42].²⁵ After age-adjustment, the proportions were highest among Indigenous people living in Tas (16%) and SA (13%); the lowest proportion was in Qld (7.5%). Proportions among non-Indigenous people were consistently between 4.5% to 5.0% in all states and territories, with Indigenous:non-Indigenous ratios ranging from 3.3 in Tas to 1.6 in WA.

The 2008 NATSISS provided information broad categories of types of disability: sight/hearing/speech; physical; intellectual; psychological; type not specified [103]. Among Indigenous people aged 15 years and over, 33% reported a physical disability, 17% reported a disability affecting sight/hearing/speech, and 7.7% reported an intellectual disability [42].

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

²⁴ Data are not available for a comparison of the prevalences for all Indigenous and non-Indigenous people, including those living in remote areas
²⁵ Information was not available for the NT.

disability [199, 200]. 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 [201]. NDA services include accommodation support, community support, community access, respite and employment services [202].

Box 5: Assessing the level of use of disability support services

As is the case with all health and related services, not all people who could benefit from the use of disability support services actually access them. To assess the level of use of disability services by Indigenous people (and other 'special needs' groups), attention is directed to the 'potential population' of users: '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' [202, p.14.18].

In 2010-11, around 41% of the Indigenous potential population²⁶ aged 0-64 years used NDA disability support services provided by the states and territories (Table 31) [202]. The highest proportions of disability support service use by the Indigenous potential population were in SA (66%), followed by the ACT (65%). The proportion of the Indigenous potential population requiring support services has increased steadily since 2008-09.

Table 31. Proportions (%) of Indigenous potential population aged 0-64 years accessing NDA state/territory-delivered disability support services, by jurisdiction and year, Australia, 2008-2011

Years	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
2008-09	24	79	23	43	64	10	35	33	33
2009-10	31	79	24	49	61	16	56	22	36
2010-11	36	64	26	53	66	20	65	55	41

Source: SCRGSP, 2013 [202]

The NDA specialist disability support service most commonly used by Indigenous people in 2010-11 was community support services (36% of the potential population) (Table 32) [202]. A higher proportion of Indigenous people than non-Indigenous people used community support services.

Table 32. Proportion (%) of Indigenous potential population aged 0-64 years accessing NDA specialist disability support services, by Indigenous status and type of specialist service and Indigenous:non-Indigenous ratios, Australia, 2010-11

Type of specialist service	Indigenous	Non-Indigenous	Ratio
Accommodation support	6.8	6.8	1.0
Community support	36	26	1.4
Community access	8.1	9.5	0.9

Notes: 1 'Potential' users are people aged 0-64 years with the 'potential to require disability support services, including individuals who meet the service eligibility criteria but who do not demand these services'
 2 Ratio is the Indigenous proportion divided by the non-Indigenous proportion
 3 Information not available for respite services

Source: SCRGSP, 2013 [202]

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, meningococcal disease and skin infections [203]. Communicable diseases can be caused by bacteria (e.g. pertussis (whooping cough) and tuberculosis), viruses (e.g. influenza and HIV), fungi (e.g. tinea), protozoan parasites (e.g. malaria) and larger parasites (e.g. head lice) [204, 205]. Risk factors for communicable diseases vary according to the type of disease [203]. Improvements to sanitation, and the increased use of vaccination and antibiotics (for bacterial infections), have markedly reduced some infectious diseases in Australia [151].

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* [206]. 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 malnutrition [207, 208], all common in many Indigenous communities. Other risk factors also common among Indigenous people are diabetes, tobacco use, alcohol use and advanced kidney disease [208]. Another risk factor for TB is HIV infection [209].

²⁶ 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' [202, p.14.18].

Extent of tuberculosis among Indigenous people

The most recent information about TB among Indigenous people is for 2005-2009, for which period 152 (19%) of the 800 notifications of TB among Australian-born people in Australia were identified as Indigenous [Derived from 210, 211-213].²⁷ 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 33). 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 126, 210-213, 216]. After age-adjustment, the notification rate for Indigenous people was 11.1 times that for Australian-born non-Indigenous people (Table 34) [Derived from 126, 210-213, 216].²⁸

The notification rate of TB was higher for Indigenous people than that 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 34) [Derived from 126, 210-213, 216].

Table 33. 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 [210], Roche, 2008 [211], Barry, 2009 [212], Barry, 2012 [213], ABS, 2009 [126], ABS, 2007 [216]

Table 34. 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 [210], Roche, 2008 [211], Barry, 2009 [212], Barry, 2012 [213], ABS, 2009 [126], ABS, 2007 [216]

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 [217]. 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) [218, 219]. 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.

27 The National Tuberculosis Advisory Committee recognised in its strategic plan for 2011-2015 that there was a need to improve TB control among Indigenous people [214], but the Committee's 2012 report provided no indication of its intentions about ongoing reporting of new cases [215].

28 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.

Extent of HAV among Indigenous people

The impact of HAV among Indigenous people has declined markedly since 2000, particularly after the introduction in 2005 of HAV vaccination into the national childhood vaccination schedule for Indigenous children living in Qld, WA, SA and the NT [220, 221]. 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 [220]. Children aged 0-4 years were at greatest risk of HAV infection. 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) [218].

The great decline among Indigenous people is reflected in notification figures for the three-year period 2009-2011. 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 126, 222-225]. 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.

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 [226]. 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 [219, 226].

Extent of HBV among Indigenous people

Of the 609 people diagnosed with newly acquired HBV in Australia in the three-year period 2010-2012, 53 (8.7%) were identified as Indigenous [Derived from 227, 228].²⁹ The crude rate of newly diagnosed HBV of 2.7 per 100,000 for Indigenous people was 3.1 times the rate of 0.9 per 100,000 for non-Indigenous people. Details of the ages of the people with newly diagnosed HBV are not available for 2010-2012, but the majority of diagnoses in 2012 for both Indigenous and non-Indigenous people were among those aged 20 years or older (84% and 97%, respectively) [229]. The male to female ratio of diagnoses of newly acquired HBV is generally around 3 in the non-Indigenous population, but the ratio for Indigenous people was 0.4 in 2012 [228, 229].

The highest rate of diagnosis on newly acquired HBV for Indigenous people in 2012 was for those living in very remote areas; the next highest rates were for people living in outer regional areas and major cities [229]. For non-Indigenous people, the rates are very similar across all areas of residence, with rates for remote areas being marginally higher than the rates for other areas.

A HBV vaccination program commencing in Indigenous communities in the mid-1980s has had considerable success in protecting Indigenous children from HBV infection [230], 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 [231, 232]. 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 tobacco use among pregnant women [231]. 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 [230].

Hepatitis C

Transmission of hepatitis C virus (HCV) typically occurs via blood-to-blood contact [233]. Injecting drug use is the most common method of contracting the virus and is responsible for the vast majority of cases [222, 234]. The likelihood of transmission of HCV via sexual contact is generally very low [219]. 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 [233]. Some people with HCV can live relatively normal lives, largely unaffected by the virus, but others may develop cirrhosis, liver cancer, or liver failure [235]. 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 [233].

Extent of HCV among Indigenous people

Unlike the case for HBV, the identification of Indigenous status in notifications of HCV is not good: the proportions of notifications in 2012 for which Indigenous status was not reported was more than 20% for all jurisdictions except WA (3%), SA (6%) and the NT (4%) [228].

Of the 5,316 people diagnosed with HCV in WA, SA and the NT in the three-year period 2010-2012, 729 (14%) were identified as Indigenous [Derived from 227, 228]. In these jurisdictions, the crude notification rate for HCV was significantly higher for Indigenous people than that for non-Indigenous people (137 and 36 per 100,000, respectively). Over the three-year period 2010-2012, the notification rate was much lower for Indigenous people living in the NT (44 per 100,000) than that for Indigenous people living in WA (177 per 100,000) and SA (151 per 100,000).

29 (1) These figures include diagnoses from all jurisdictions except the ACT, for which details of the small number of new diagnoses were not available. (2) Reporting of Indigenous status continues to improve: for 2012, the proportions of diagnoses without Indigenous status being reported was less than 10% for all other jurisdictions except for NSW (14%) and Qld (36%).

In line with these overall notification rates, age-specific rates were much higher for Indigenous people living in WA, SA, Tas, and the NT in 2012 than those for their non-Indigenous counterparts, particularly in the ten-year age-groups between 20 and 49 years [229]. The median age of notifications was around 10 years lower for Indigenous people than that for non-Indigenous people. Notification rates were generally higher for males than for females for both populations.

In contrast to some other reported communicable diseases, the rates of newly diagnosed HCV infection for Indigenous people were highest for those living in inner regional areas and major cities (for WA, SA, Tas, and the NT in 2011) [236]. These rates were between 7 and 10 times the rates reported for non-Indigenous people in the same areas. For non-Indigenous people, the rate of HCV increased by remoteness of residence.

Haemophilus influenzae type b

Haemophilus influenzae type b (Hib) is a bacterium that can cause meningitis, epiglottitis, pneumonia, bacteraemia, cellulitis, osteomyelitis, pericarditis, and septic arthritis [204, 237, 238]. Infants and children are particularly susceptible to Hib, which is serious in its invasive form [204, 221, 237, 239]. High rates of Hib carriage in the upper respiratory tract have been noted prior to cases of invasive disease [240]. Higher rates in Indigenous populations worldwide suggest socioeconomic disadvantage, particularly high rates of tobacco use and crowded living conditions, as the probable cause [221].

Extent of Hib disease among Indigenous people

Notifications of invasive Hib disease in Australia decreased by more than 95% following the commencement of nationally funded infant vaccination in 1993 [204, 239]. The decline has been markedly evident in Indigenous children, but they continue to be at higher risk of contracting Hib than are non-Indigenous children [239].

In 2007-2010, 25 (29%) of the 85 cases of invasive Hib disease notified in all jurisdictions were identified as Indigenous [221]. Children (Indigenous and other) aged 0-4 years accounted for 40% of all cases; Indigenous children aged 0-4 years accounted for 18% of all cases and 60% of cases identified as Indigenous. The age-specific rate of 5.6 per 100,000 for Indigenous children aged 0-4 years was 15.7 times that for other children, with rates higher for Indigenous people in every age-group. After age-adjustment, the overall notification rate was 12.9 times higher for Indigenous people than that for other Australians.

There were no deaths coded as *Haemophilus meningitis* (likely to be due to Hib) for people living in NSW, NT, Qld, SA and WA in 2006-2010 [221].

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 [221]. Invasive pneumococcal disease (IPD) occurs when the bacterium infects other normally sterile sites, such as blood and cerebrospinal fluid, causing bacteraemia and meningitis. Rates of IPD are highest in infants and older people. 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 [241-243]. In children, recurrent or chronic OM and attendance at childcare increases susceptibility to IPD [241, 243].

Nationally-funded vaccination for pneumococcal disease was made available in 1999 to Indigenous adults aged 50 years and older and to Indigenous people aged 15-49 years at high risk [243]. 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 eligible since 1999.

Extent of invasive pneumococcal disease among Indigenous people

Detailed data are available for IPD because it has been notifiable Australia-wide since 2001 [241]. Indigenous people have a significantly higher incidence of IPD than do non-Indigenous people [221]. Based on notifications for all jurisdictions in 2007-2010, the age-adjusted rate of IPD was 3.6 times higher for Indigenous people than that for other people. Among Indigenous people, age-specific rates for IPD were highest in the 50 years and older age-group (53 per 100,000), followed by the 0-4 years age-group (51 per 100,000). Importantly, age-specific rates for Indigenous people aged 25-49 (45 per 100,000) were almost 12 times higher than those for their non-Indigenous counterparts. To some degree, the high rate ratio in this age-group corresponds to the difference in the prevalence of adult risk factors between Indigenous and non-Indigenous people.

After age-adjustment, the IPD hospitalisation rate for Indigenous people living in NSW, NT, Qld, SA, Vic and WA between 2005 and 2010 was 6.0 times higher than the rate for their non-Indigenous counterparts [221]. Among Indigenous people, age-specific rates of hospitalisations for IPD were highest in the 0-4 years age-group (27 per 100,000), followed by the 25-49 years (25 per 100,000) and the 50 years and older age-groups (24 per 100,000). Indigenous people aged 25-49 years were hospitalised at a rate 14.2 times higher than that of other people. Hospitalisation rates for pneumococcal pneumonia (not identified as IPD) were more than twice those for IPD for Indigenous adults and almost four times as high for Indigenous people aged 50 years and older, indicating the overall burden of pneumococcal disease among Indigenous people is higher for adults and older people than for infants and young children.

Regional data and national data after 2001 reveal that vaccination programs have had a significant impact on the incidence of IPD among both the Indigenous and non-Indigenous populations [241, 244, 245]. Vaccination has reduced the overall burden of IPD in Australia, but the number of cases of non-vaccine type disease has increased, particularly among non-Indigenous children [241, 246, 247]. The 58% increase between 2002 and 2010 in IPD notifications among Indigenous adults aged 50 years and over has raised concerns that the adult vaccination program may be less than adequate [221, 241, 242].

The notification rate of IPD for Indigenous children aged less than 2 years (219 per 100,000) at the start of the national Indigenous childhood pneumococcal vaccination program in 2001 was 2.9 times the rate for non-Indigenous children [248]. By 2004, rates for Indigenous children under 2 years had decreased to 92 per 100,000, similar to that for non-Indigenous children [248]. Since the start of the universal childhood pneumococcal vaccination program in 2005, rates have remained relatively stable among Indigenous children but have decreased dramatically for non-Indigenous children [249]: in 2007-2010, the rate of IPD for Indigenous children aged 0-4 years was 2.9 times higher than that for other children [221]. Reflecting the wide distribution of serotypes of IPD among Indigenous people, new vaccines with wider coverage of serotypes would be required to remove the IPD gap between Indigenous and non-Indigenous people.

In 2006-2010, of the 575 reported deaths from IPD for people living in NSW, NT, Qld, SA and WA, 34 (6%) were identified as Indigenous [221]. In children under 5 years of age, there were 30 deaths notified; five (17%) of which were of Indigenous children.

Meningococcal disease

Meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also known as meningococcus) [221]. Manifestations of meningococcal disease include meningitis, bacteraemia without meningitis, pneumonia and septic arthritis. Meningococcus often causes serious disease that progresses swiftly, with fatality rates of 10-15%; those who survive have a 10-20% probability of lasting sequelae. Meningococcal disease is more common in infants and young children [221, 243, 250]. Possible risk factors for the disease include living in crowded housing conditions, exposure to smokers, recent illness and multiple kissing partners [243].

The most common groups of meningococcus found in Australia are B and C, with B responsible for most disease in both Indigenous and other people [221, 250]. Vaccination against serogroup C was funded nationally for all infants from 2003; a catch-up program for all people aged up to 19 years ended in 2007 [250]. Vaccination has reduced the burden of serogroup C meningococcal disease in Australia, but there is no vaccination program for serogroup B [221]. A newly licensed vaccination for this serogroup has the potential to reduce the gap in meningococcal disease between Indigenous and other Australians.

Extent of meningococcal disease among Indigenous people

Notification rates for both serogroups of meningococcal disease are higher for Indigenous people than for other Australians [221]. In 2007-2010, 104 (10%) of the 1,079 cases of meningococcal disease notified in all jurisdictions were identified as Indigenous. Around one-third (36%) of all cases, and 60% of cases identified as Indigenous, occurred among children aged 0-4 years; rates generally decreased with age for both Indigenous and non-Indigenous people. The average annual age-specific rate of 23 per 100,000 for Indigenous children aged 0-4 years was 3.8 times that for their non-Indigenous counterparts; the rate for Indigenous children aged 5-14 years was 4.1 times higher than that for other children. After age-adjustment, the overall rate for Indigenous people was 2.7 times that of other Australians.

Of the 2,230 recorded hospitalisations for meningococcal disease for people living in NSW, NT, Qld, SA, Vic and WA in 2005-10, 189 (9%) were identified as Indigenous [221]. Over one-third (37%) of all cases, and 67% of cases identified as Indigenous, occurred among children aged 0-4 years. After age-adjustment, the hospitalisation rate for meningococcal disease was 2.2 times higher for Indigenous people than that for non-Indigenous people. Average annual age-specific rates for Indigenous people were highest in the 0-4 years' age-group (41 per 100,000); a rate 3.5 times higher than that for other children.

There were 42 deaths from meningococcal infection for people living in NSW, NT, Qld, SA and WA in 2006-2010 [221]. Among Indigenous people, up to four deaths³⁰ occurred in the 0-4 years and 5-49 years age-groups; no deaths were recorded for those aged 50 years and older.

Sexually transmitted infections

Sexually transmissible infections (STIs) are infections that are spread primarily by heterosexual or homosexual contact with an infected person [203]. 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 [251]. 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 [252, 253].

The majority of STIs are asymptomatic or produce only mild symptoms [254, 255]. 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 [203].

30 The ABS only provides a range for numbers of deaths when actual numbers are low.

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 [256, 257].

Human papilloma virus (HPV) and genital herpes are common STIs in Australia, but they are not notifiable diseases [151]. 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 [258]. 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* [259]. 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.

Extent of gonorrhoea among Indigenous people

For the period 2010-2012, Indigenous people accounted for 59% of gonorrhoea notifications in Qld, WA, SA, and the NT (excluding 14% of notifications for which Indigenous status was not stated) [Derived from 32, 227-229]. The crude notification rate was substantially higher for Indigenous people in these jurisdictions than that for their non-Indigenous counterparts (1,028 and 25 per 100,000, respectively). The jurisdictions with the highest rates among Indigenous people were the NT (2,369 per 100,000) and WA (1,371 per 100,000).

In 2012, 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) [228]. In the non-Indigenous population, gonorrhoea was more common among slightly older people, with those aged 20-39 years accounting for 68% 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 3.6 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 [229].

In 2012, in the Indigenous population the rate of gonorrhoea diagnosis was 43 and 24 times higher than the rate in the non-Indigenous population [229].

Syphilis

Syphilis, caused by the organism *Treponema pallidum*, is a complex infection that has four identified stages: primary, secondary, latent, and tertiary [260]. 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 [229]. 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 [261].

Extent of syphilis among Indigenous people

In 2010-2012, 492 (13%) of the 3,169 people newly diagnosed with syphilis were identified as Indigenous (excluding notifications from the ACT and the 6.1% of notifications for which Indigenous status was not stated) [Derived from 32, 227-229]. The crude notification rate for Indigenous people was 5.1 times the rate for non-Indigenous people (25 and 4.9 per 100,000, respectively). In the Indigenous population, the jurisdictions with the highest notification rates were Qld (52 per 100,000) and the NT (39 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 2012 [228]. Among non-Indigenous people, 78% of syphilis cases occurred in people aged 20-49 years.

In 2012, the number of syphilis diagnoses in the Indigenous population was similar for males and females (87 and 80, respectively) [228]. A different pattern was observed in the non-Indigenous population with males accounting for 95% of diagnoses (male to female ratio of 19). This suggests differences in modes of transmission for syphilis in the Indigenous and non-Indigenous populations [229].

The rates of syphilis notifications were highest among Indigenous people living in remote and very remote areas in 2012, with rates 83 and 64 times those of their non-Indigenous counterparts [229]. Notification rates for non-Indigenous people were highest in major cities.

Chlamydia

Chlamydia is caused by the bacterium *Chlamydia trachomatis* [254]. 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 [42], but when considering only the jurisdictions with reasonable Indigenous identification³¹ it is second to gonorrhoea [228].

31 Jurisdictions where Indigenous status is reported for more than 50% of diagnoses.

Extent of chlamydia among Indigenous people

Chlamydia was the most reported notifiable disease in Australia in 2010-2012 [228]. Indigenous people accounted for 19% of the notifications of chlamydia in WA, SA, Tas and the NT in 2010-2012 (based on 44,604 cases for which Indigenous status was known) [Derived from 32, 227-229]. The crude notification rate for chlamydia was considerably higher for Indigenous people than that for non-Indigenous people (1,566 per 100,000 compared with 328 per 100,000). The highest rate of chlamydia notifications was for Indigenous people living in the NT (671 per 100,000).

Chlamydia is typically diagnosed among adolescents and young adults in both the Indigenous and non-Indigenous populations [228]. In 2012, people aged 15-29 years accounted for around 80% of chlamydia notifications in both populations.

For both the Indigenous and non-Indigenous populations, females accounted for a greater proportion of chlamydia diagnoses than did males in 2012 (65% and 61% of the diagnoses, respectively) [228]. The female to male ratio was 1.8 for Indigenous people and 1.6 for non-Indigenous people.

Indigenous people living in outer regional, remote and very remote areas had the highest rates of chlamydia diagnoses in 2012 [229]. For non-Indigenous people, notification rates in 2012 did not vary much across all geographical areas.

HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that destroys cells in the body's immune system [262]. Untreated, the virus weakens immune system functioning to the point where minor infections may become fatal [263]. 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 [233, 262].

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 [264]. 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 [80, 229].

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' ([262], 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 [265].

Extent of HIV/AIDS among Indigenous people

National surveillance data show that in 2012 there were 1,253 cases of newly diagnosed HIV infection of which 32 (2.6%) were among Indigenous people [228]. Age-standardised rates of HIV diagnosis were similar for Indigenous and non-Indigenous people at 5.5 and 5.4 per 100,000 respectively [229]. Prior to this period, there was a marginal increase in the rate of HIV diagnosis among Indigenous people from around 4.5 per 100,000 in 2003 to 5.5 per 100,000 in 2012. In this period, a nominal increase was also observed in the diagnosis rate among non-Indigenous people. Overall in Australia, the cumulative number of HIV diagnoses by the end of 2012 was 34,029, of which 225 were among Indigenous people [222].

In 2012, males accounted for 81% of new HIV cases among Indigenous people [228]. The median age of diagnosis for Indigenous males was 27 years.

In comparison, non-Indigenous males accounted for a larger proportion of new HIV cases among non-Indigenous people (81%), and the median age of diagnosis among non-Indigenous males was 36 years [Derived from 228].

Three quarters of new HIV infections among the Indigenous population in 2012 were reported in Qld (41%) and NSW (34%) [229]. Indigenous people living in major cities had the highest rates of new HIV diagnoses, 12 per 100,000. The patterns of new HIV infections are slightly different for Indigenous and non-Indigenous people [Derived from 228]. Most new cases of HIV infections among non-Indigenous people in 2012 were reported in NSW (37%), Vic (25%) and Qld (21%). Among the non-Indigenous population, those residing in major cities had the highest rate of HIV infection (7 per 100,000) [222]. The rates of diagnosis were much lower for the remaining areas of residence, ranging from 2 to 3 per 100,000.

In terms of exposure to HIV, men who have sex with men accounted for over two-thirds (71%) of new HIV cases among Indigenous people in 2012 [229]. Heterosexual contact was also identified as a common form of exposure to HIV among Indigenous people (19%). The percentage of new HIV cases attributed to injecting drug use decreased substantially from 2010 to 2011, with just 4.5% of new HIV cases coming from injecting drug use in 2011 compared with 20% in 2010; rates then rose to 6.5% in 2012. Among non-Indigenous people, 94% of all new HIV cases in 2012 were attributed to the categories 'men who have sex with men' (70%) and 'heterosexual contact' (24%) (Derived from [222]). Injecting drug use was responsible for 2.3% of new cases among non-Indigenous people.

Information about the occurrence of AIDS in the Indigenous population in 2012 is not available, but the number of new AIDS cases

for the total population in 2009 was only 90 [224]. 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) [266]. The absence of reporting by Indigenous status in the most recent AIDS data [228] may be due to the marked decrease in new AIDS diagnoses and deaths in Australia over the past decade.

Skin diseases, infections and infestations

Susceptibility to skin infections and infestations increases with poor living conditions and overcrowding [267, 268]. The significant public health problem posed by skin infections in many remote Indigenous communities, particularly among Indigenous children, requires appropriate education, improved hygiene and reduced overcrowding [269].

Extent of skin diseases, infections and infestations among Indigenous people

Scabies

Scabies is a skin disease caused by the mite *Sarcoptes scabiei* and produces skin inflammation and itching [270]. It is endemic in some remote central and northern Indigenous communities, with prevalence of up to 50% in children [271] and up to 25% in adults [272]. The *East Arnhem regional healthy skin program* reported that more than 70% of children had presented to the clinic with scabies at least once in the period 2002-2005, almost all before they reached 2 years of age [273]. 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 [269].

Pyoderma

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 [274]. A study of a remote community in the NT in 2007 found that 82% of children had presented with pyoderma in their first year of life and 87% in their first two years [269]. The pyoderma in Indigenous communities commonly involves group A streptococcus (GAS), which is responsible for continuing outbreaks of acute post-streptococcal glomerulonephritis and ARF [274, 275].

Other skin infections

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 [274].

A review of non-infectious skin diseases in Indigenous people found the prevalences of psoriasis, type 1 hypersensitivity reactions, and skin cancer were lower than among non-Indigenous people, but the levels of lupus and kava dermatopathy higher [276].

Hospitalisation

Skin conditions can be linked to serious complications, which can result in hospitalisation and, very uncommonly, death. ICD 'Diseases of the skin and subcutaneous tissue' was responsible for 7,994 hospital separations among Indigenous people nationally in 2011-12, accounting for 3.9% of all Indigenous hospitalisations (excluding those from dialysis) [57]. After age-adjustment, the separation rate was 2.5 times higher for Indigenous people than that for 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 children [277]. An analysis of admissions to the Alice Springs Hospital in 2003-2006 found the mean annual incidence rate of *Staphylococcus aureus* bacteraemia (SAB) was around 20 times higher for Indigenous people than that for non-Indigenous people (161 per 100,000 compared with 8.1 per 100,000) [278]. SAB was community-acquired in over 70% of cases, with skin infections being more common among Indigenous people than among non-Indigenous people.

Factors contributing to Indigenous health

Selected health risk and protective factors

As noted under 'The context of Indigenous health', the factors contributing to the poor health status of Indigenous people should be seen within the broad context of the 'social determinants of health' [10, 27]. 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 [26]. Related to these are cultural factors, such as traditions, attitudes, beliefs, and customs. Together, these social and cultural factors have a major influence on a person's behaviour [10, 27].

Information about some of these determinants is available (see 'Indicators of Indigenous social disadvantage'), 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 [279, 280]. Poor nutrition is an important factor contributing to overweight and obesity, malnutrition, CVD, type 2 diabetes, and tooth decay [280, 281]. The National Health and Medical Research Council (NHMRC) guidelines recommend that adults eat fruit and plenty of vegetables every day, selected from a wide variety of types and colours [282]. The guidelines also recommend including reduced-fat varieties of milk, yoghurts and cheeses, and to limit the intake of foods and drinks containing added salt.

According to the 2012-2013 AATSIHS, less than one-half of Indigenous people aged 15 years or older reported eating an adequate amount of fruit (43%) each day, and only one-in-twenty people ate enough vegetables (5%) each day [73]. Females were more likely than males to have eaten an adequate amount of fruit (44% and 41% respectively) and vegetables (7% and 3% respectively) each day. Levels of fruit and vegetable consumption were different for Indigenous people living in remote and non-remote areas; 49% of Indigenous people aged 15 years or older living in remote areas consumed the recommended number of servings of fruit each day compared with 41% of people in non-remote areas. Conversely, Indigenous people aged 15 years or older living in non-remote areas were more likely than those in remote areas to consume adequate amounts of vegetables (5% compared with 3%) each day. After age-adjustment, Indigenous people aged 15 years or older were less likely than non-Indigenous people to be eating adequate amounts of fruit (ratio 0.9) or vegetables (ratio 0.9) each day.

Information about milk consumption, salt consumption, food security or the influence of other factors on dietary behaviour are not yet available from the 2012-2013 AATSIHS, but the 2004-2005 NATSIHS found that more than three-quarters (76%) of Indigenous people aged 12 years or older living in non-remote areas reported that they usually drank whole milk (including full-cream powdered milk), with only 19% drinking reduced fat and/or skim milk [101]. The consumption of reduced fat and/or skim milk was very low (6%) among Indigenous people aged 12 years or older living in remote areas, and 87% reported 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.

The 2004-2005 NATSIHS addressed the issue of food security by asking respondents aged 15 years or older whether they had run out of food in the previous 12 months [100]. 'Running out of food but able to get food by other means' was reported by 28% of Indigenous people aged 15 years or older living in remote areas (seven times more common than among non-Indigenous people) and by 12% of those living in non-remote areas (four times more common than among non-Indigenous people) [256]. 'Going without food when they could not afford to buy more' was reported by approximately 8% of Indigenous people aged 15 years or older 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 [256]. 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 intakes were also associated with tobacco use and risky/high risk alcohol consumption.

The *Footprints in time: longitudinal study of Indigenous children* reported that levels of relative isolation affected the diet of children aged 2-7 years in 2010 [283]. 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% ate bush tucker.

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 [284]. 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 [285].

Physical activity

Australia's physical activity and sedentary behaviour guidelines recommend moderate physical activity on most, preferably all, days of the week to improve health and reduce the risk of chronic disease and other conditions [286]. 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. 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.

According to the 2012-2013 AATSIHS, 46% of Indigenous people aged 18 years and over living in non-remote areas had met the target of 30 minutes of moderate intensity physical activity on most days (or a total of 150 minutes per week); after age-adjustment, this level was 0.9 times that of their non-Indigenous counterparts [73]. Two-fifths (40%) of Indigenous adults had exercised for at least 150 minutes over five sessions in the previous week; after age-adjustment, this level was 0.9 times that of their non-Indigenous counterparts. Over one-quarter (28%) of Indigenous adults had exercised at a moderate level and 10% at a high level; after age-adjustment these levels of physical activity were 0.9 and 0.6 times those of their non-Indigenous counterparts, respectively.

Of Indigenous adults living in non-remote areas, more males than females met the target of 150 minutes of moderate intensity exercise per week (50% compared with 41%) and had exercised for at least 150 minutes over five sessions in the previous week (44% compared with 36%) [73]. Indigenous males were significantly more likely than Indigenous females to have exercised at moderate intensity (31% compared with 25%) and were twice as likely to have exercised at high intensity (14% compared with 7%) in the previous week. Of Indigenous adults living in non-remote areas, 62% reported that they were physically inactive (sedentary or had exercised at a low level) in the week prior to the survey; after age-adjustment, this level of physical inactivity was 1.1 times that of their non-Indigenous counterparts. A higher proportion of Indigenous women than Indigenous men were physically inactive (68% compared with 55%); this pattern was evident for all age-groups.

According to the 2008 NATSISS, 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 287]. Of all Indigenous children aged 4-14 years who participated in some form of physical activity or sport, males had slightly higher levels of participation (66%) than did females (63%) [Derived from 287]. Among Indigenous children, the highest level of participation in physical activity was for children living in major cities (68%), followed by those living in inner/outer regional areas (65%), and in remote/very remote areas (58%). Of children participating in physical activity, the highest proportions were in Tas and the ACT (both 74%) and the lowest in the NT (50%).

Among adults, 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 287]. Participation levels were higher among Indigenous males (38%) than among Indigenous females (23%); levels decreased with age for both sexes – from around 44% for the 15-24 years age-group to around 10% for the 55 years and over age-group. For both sexes, participation levels were highest for Indigenous people living in major cities (33%), followed by those living in inner/outer regional areas (29%) and remote/very remote areas (28%). The jurisdictions with the highest participation levels were the ACT (46%), followed by Vic (34%); the lowest level was reported for SA (27%). Differences in proportions for Indigenous males and females were greatest in the NT, where Indigenous males participated more than twice as much as Indigenous females (42% compared with 20%).

Bodyweight

The standard measure for classifying a person's weight status is body mass index (BMI: weight in kilograms divided by height in metres squared) [288]. Being overweight (BMI 25 to 29) or obese (BMI of 30 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, alone or in combination, such as poor nutrition, physical inactivity, socioeconomic disadvantage, genetic predisposition, increased age, and alcohol use [151, 282, 289]. Being underweight (BMI less than 18.5) can also have adverse health consequences, including lower immunity (leading to increased susceptibility to some infectious diseases) and osteoporosis (bone loss) [282].

Abdominal obesity, also known as central obesity, is also an indicator of increased risk for the development of some chronic diseases, such as heart disease, hypertensive disease and type 2 diabetes [290]. Abdominal obesity can be measured by waist circumference alone (greater than 94cm for men and greater than 80cm for women), or waist-hip ratio (WHR) (greater than or equal to 0.90 for men and greater than or equal to 0.85 for women).

The 2013 NHMRC *Australian dietary guidelines* recommend that, to achieve and maintain a healthy weight, adults need to be physically active and choose amounts of nutritious foods and drinks to meet their energy needs [282].

Based on measurements of BMI, overweight and obesity contributed 11% to the total burden of disease among Indigenous people in 2003, second only to tobacco use [291]. 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) when calculating diabetes type 2 and cardiovascular risk [292-294]. It has been suggested that a BMI of 22 might be more appropriate than 25 as a measure of acceptable BMI for Indigenous people. There is also evidence that measuring the WHR in Indigenous people is more sensitive and easier to measure than BMI [293, 294].

Based on BMI information collected as a part of the 2012-2013 AATSIHS, 66% of Indigenous people aged 15 years or older were classified as overweight (29%) or obese (37%) [73]. Combined overweight/obesity levels were significantly higher for people living in non-remote areas (67%) than for those living in remote areas (61%). A higher proportion of Indigenous females were overweight or obese (67%) than were males (64%), mainly due to higher obesity levels for females. After age-adjustment, the combined overweight/obesity levels were slightly higher for Indigenous people aged 15 years or older than those for their non-Indigenous counterparts (prevalence ratio 1.1), but Indigenous people were 1.5 times as likely as non-Indigenous people to be obese (rate ratio 1.4 for males and 1.7 for females). According to their BMI, almost 30% of Indigenous children aged 2-14 years were overweight (20%) or obese (10%), 62% were in the normal weight range, and 8% were underweight.

Measurements of waist circumference and WHR were taken in the 2012-2013 AATSIHS (not done in the previous health survey) to help determine levels of risk for developing certain chronic diseases [73]. A higher proportion of Indigenous females (81%) than Indigenous males (60%) aged 18 years or older were found to be at increased risk based on waist circumference. Based on WHR, the other measure of abdominal obesity, 80% of males and 73% of females aged 18 years or older were at increased risk of developing chronic diseases. Based on both waist circumference and WHR, the proportions of Indigenous men and women who were at increased risk of developing chronic diseases were higher in older age-groups.

Detailed information from the 2012-2013 AATSIHS is not yet available, but the 2004-2005 NATSIHS found that Indigenous people aged 18 years or more being overweight or obese was associated with [101]:

- fair/poor self-reported health status: 68% compared with 55% of those whose health was excellent/very good
- three or more long-term health conditions: 65% compared with 56% of those with no long-term health conditions
- circulatory problems: 72% compared with 57% of those without circulatory problems
- diabetes: 83% compared with 57% of those without diabetes.

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 [56]. Indigenous adults were also more likely to be underweight if:

- 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).
- A 2012 study of Indigenous children aged 5 to 17 years in the Torres Strait found that 46% were overweight or obese and 35% had central obesity [295]. 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 children aged 3 to 17 years were overweight and 5.4% were obese (there was no difference between males and females) [296]. In comparison, the *National Health Survey 2007-2008* reported 17% of all Australian children aged 5 to 17 years were overweight and 8% obese [297].

Immunisation

Vaccination has been very successful in contributing to improvements in Indigenous health and child survival in recent decades, but some vaccine-preventable diseases are still experienced at higher rates among Indigenous people than among non-Indigenous people [243]. In recognition of these higher rates, there are some additional recommendations for vaccination for Indigenous people.

From 2005, the *National immunisation program* for children included vaccines for hepatitis B, diphtheria-tetanus-pertussis (DTP), *Haemophilus influenzae* type B (Hib), measles, mumps, rubella (MMR) and polio. In more recent years vaccines have been included for pneumococcal disease, meningococcal C, Varicella (chickenpox), rotavirus, HPV, and influenza [42].

Childhood vaccination

According to the Australian Childhood Immunisation Register (ACIR), Indigenous children had slightly lower coverage for all vaccines at 1 year of age than other children at 31 December 2011 (85% of Indigenous children fully immunised compared with 92% of other children); coverage for Indigenous and other children was similar at 2 years of age (92% and 93% respectively), and 5 years of age (87% and 90% respectively) [42].

For the 1 year age-group, the greatest difference in overall vaccination coverage was in SA, where coverage for Indigenous children was significantly lower (15% lower) than for non-Indigenous children (ratio 0.8) [42]. In terms of specific vaccines, the greatest difference in coverage nationally, was for Hib, which was 8.7% lower among Indigenous children than that among non-Indigenous children (ratio 0.9). For the 2 years age-group, ACT had the greatest difference in vaccination: coverage for Indigenous children was 8.1% lower than that for non-Indigenous children (ratio 0.9). In terms of specific vaccines, there was little difference in coverage nationally between Indigenous and non-Indigenous children. For the 5 years age-group, the greatest difference in overall vaccination was in SA, where coverage was 8.8% lower for Indigenous children than that for non-Indigenous children, (ratio 0.9). In terms of specific vaccines, the greatest differences in vaccine coverage nationally were for DTP and polio, both with coverage 3.7% lower for Indigenous children than that for non-Indigenous children (ratio 1.0).

Immunisation coverage for Indigenous children has varied over the years [42]. Combined data for NSW, Vic, WA, SA and the NT for 2001-2011 reveal that the difference in coverage for the 1 year age-group was at its lowest difference in 2004 (6.3% lower for Indigenous children than for non-Indigenous children) and highest difference (10.2% lower) in 2008. Coverage was 7.0% lower for Indigenous children than for non-Indigenous children in 2011. For the 2 years age-group, the coverage difference was 6.1% (lower among Indigenous children than among non-Indigenous children) in 2009, but was only 0.3% in both 2010 and 2011. For the 5 years age-group, information is available only for 2008-2011³²: coverage difference has been around 3-4% (lower for Indigenous children than for non-Indigenous children).

Adult vaccination

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

32 From 2008, fully vaccinated status for 5 year-olds is reported in place of that for 6 year-olds due to changes to reporting practices.

living in non-remote areas (52%) [101]. Indigenous males had slightly lower vaccination coverage (58%) than did Indigenous females (61%). These levels were higher than those for non-Indigenous males and females (49% and 54%, respectively).

Similarly, vaccination levels for pneumonia in the previous five years were higher for Indigenous adults aged 50 years or older (all: 34%; males: 31%, females: 37%) than those for their non-Indigenous counterparts (all: 20%, males: 18%, females: 23%) [101]. Vaccination levels were lower in non-remote areas (26%) than remote areas (56%).

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 is the natural and optimum food for babies and provides all the energy and nutrients that an infant needs for the first six months of life [298]. Breastfeeding promotes sensory and cognitive development. It protects the infant against infectious and chronic diseases; exclusive breastfeeding aids a quicker recovery from illness and reduces infant deaths from common childhood illnesses such as diarrhoea or pneumonia. *The Australian dietary guidelines'* recommendation is to 'encourage, support and promote breastfeeding' [282]. The WHO recommends exclusive breastfeeding for six months followed by complementary feeding with continued breastfeeding for up to two years or beyond [298]. Breastfeeding also contributes to the health of the mother by reducing the risk of ovarian and breast cancers.

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 [299]. At 5 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.

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 [101]. 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 [101]. 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 compared with 16% of non-Indigenous children in the same age-group.

The findings of the 2000-2002 WAACHS suggest that mothers of Indigenous children were more likely to breastfeed for longer than mothers in the general population, particularly those living in more remote areas [44].

The *Footprints in time – the longitudinal study of Aboriginal children* collected data from 11 sites (rural, remote and urban) around Australia in 2008-2009 [300]. 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 [49]. 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 [291]. Tobacco use accounted for one-in-five deaths in the Indigenous population.

The 2012-2013 AATSIHS found that 43% of Indigenous people aged 15 years and over reported that they were current smokers [301]. This represents a significant reduction from levels reported in the NATSISS 2008 (47%), and 2002 (51%) [302, 303]. The NATSISS found almost two-thirds (62%) of Indigenous current daily smokers reported trying to quit or reduce their smoking in the 12 months prior to interview [304].

Extent of tobacco use among Indigenous people

In 2012-2013, the proportion of Indigenous men who were current smokers (45%) was similar to the proportion of Indigenous women (41%) [301]. After age-adjustment, Indigenous people were 2.4 times more likely to smoke than non-Indigenous people (42% compared with 17%, respectively).

The overall proportion of current smokers in remote areas in 2012-2013 (52%) has not changed significantly since 2002 (56%) [305]. In 2012-2013, Indigenous people living in remote areas reported a higher proportion of current smokers (52%) than those living in non-remote areas (40%). The age-group with the highest proportion of current smokers in remote areas was the 25-34 years age-group (63%).

When comparing smoking prevalence in non-remote areas over the ten years between the AATSIHS 2012-2013 and the NATSISS 2002, the most significant reductions have been found in the younger age-groups: 50% less people are smoking among 15-17 year olds (16% down from 32%); and around 30% less people are smoking among 18-24 year olds (40% down from 56%) [305]. This drop in smoking among these age-groups is reflected in the increased prevalence of 'never smoked'. The 2012-2013 AATSIHS found that more than one-third (37%) of Indigenous people had never smoked, compared with 34% in 2008 and 30% in 2002.

High rates of smoking have been reported for Indigenous mothers [40]. In 2011, half of Indigenous mothers (50%) reported smoking during pregnancy, compared with 13% of non-Indigenous mothers. The proportion of smoking cessation for Indigenous women during the second 20 weeks of pregnancy was 11%, compared with 20% among non-Indigenous women.

In 2008, 16% of Indigenous children aged 0-3 years and 23% of Indigenous children aged 4-14 years lived with someone who usually smoked inside the house [162, 306]. For Indigenous people aged 15 years and older the proportion was 26% [304].

Alcohol use

Alcohol-related harm includes chronic diseases, accidents and injury, and is not limited to the user but extends to families and the broader community [307]. 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)) [308]. These disorders are incurable, but wholly preventable.

In 2003, the burden of disease attributable to alcohol use among Indigenous people was more than twice that among other Australians (5.4% compared with 2.3%) [309, 310]. Of 11 selected risk factors, alcohol was the fifth leading cause of the burden of disease among Indigenous people [309]. The highest levels of disease burden attributable to alcohol use among Indigenous people were for injury (22%), mental disorders (16%), and cancers (6.3%).

Box 6: Assessing risks from use of alcohol

In 2009, the NHMRC introduced revised guidelines that depart from specifying 'risky' and 'high risk' levels of drinking [307]. 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. 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 that the safest option is not drinking alcohol for those aged under 15 years and delaying alcohol use for as long as possible for those aged 15 to 17 years. Guideline four recommends that the safest option for pregnant and breast feeding women is not to drink alcohol.

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 [42, 73].

Extent of alcohol use among Indigenous people

In the 2012-2013 AATSIHS, 23% of Indigenous people aged 18 years or older had never consumed alcohol or had not done so for more than 12 months [311]. After age-adjustment, abstinence was 1.6 times more common among Indigenous people than among non-Indigenous people. Most of the difference in abstinence between the Indigenous and non-Indigenous population was attributable to those Indigenous people who drank alcohol 12 months or more ago - that is, those Indigenous and non-Indigenous drinkers who have since given up (16% and 7%, respectively). Similar proportions of Indigenous and non-Indigenous people have never consumed alcohol (10% and 9%, respectively).

The 2012-2013 AATSIHS found that 17% of Indigenous men and 28% of Indigenous women aged 18 years or older had never consumed alcohol or had not done so in the previous 12 months [311]. After age-adjustment, abstinence was 1.7 times and 1.5 times more common among Indigenous men and women than among non-Indigenous men and women (20% and 32% compared with 12% and 21%, respectively). Again, this difference in abstinence between Indigenous and non-Indigenous men and women is attributable to those who drank alcohol 12 months or more ago (15% and 17% compared with 6% and 9%, respectively).

The 2012-2013 AATSIHS reported that 22% of the Indigenous population (aged 18 years and over) drank at short-term low risk in relation to the 2001 guidelines (four or less standard drinks on a single day for women and six or less standard drinks per day for men) and a similar proportion (18%) did not exceed the 2009 guidelines (four or less standard drinks on a single day for both males and females) [311]. Females were almost twice as likely as men not to exceed the 2009 guidelines (24% compared with 13%, respectively). After age-adjustment, Indigenous people were half as likely as non-Indigenous people to drink at low risk (according to the 2001 guidelines (24% compared with 43%)) and to not exceed the 2009 guidelines (20% compared with 37%).

Levels of short term/single occasion drinking risk and long term/lifetime drinking risk were similar for both the Indigenous and non-Indigenous populations (according to the 2009 guidelines). Among Indigenous people aged 18 years and over, 57% reported drinking in excess for short-term/single occasion risk (binge drinking; no more than four standard drinks in a single day) [311]. Indigenous males were 1.5 times more likely than Indigenous females to exceed the guidelines (68% compared with 46%, respectively). After age-adjustment, drinking at risk on a single occasion was similar for both the Indigenous and non-Indigenous populations (52% compared with 45%, respectively; ratio 1.1).

Among Indigenous drinkers aged 18 years and over in 2012-2013, 20% drank at levels exceeding the 2009 guidelines for long-term/lifetime drinking risk (based on drinking no more than two standard drinks on any single day for males and females) [312]. Indigenous males were 2.7 times more likely than Indigenous females to exceed the guidelines (29% compared with 11%, respectively). After age-adjustment, lifetime drinking risk was similar for both the Indigenous and non-Indigenous populations (ratio 1.0).

The findings above do not reflect the levels of drinking risk for short term/single occasion use revealed by the number of drinks consumed above four standard drinks. This is shown by using the measures in the 2001 drinking guidelines for short term risky/high risk drinking [311].

While similar levels of short-term risky drinking (more than six and four standard drinks on a single occasion for males and females, respectively) were reported for both Indigenous males and females (around 11%), Indigenous males were nearly 1.4 times as likely to drink at short-term high risk (more than 11 standard drinks on a single occasion) than Indigenous females (more than seven standard drinks) (50% compared with 35%, respectively) [311]. Similar levels of gender parity in short-term risky drinking levels and gender differences in short-term high risk drinking were found in the non-Indigenous population. After age-adjustment, Indigenous people were 1.4 times as likely to drink at high risk of short-term harm as non-Indigenous people.

According to the 2008 NATSISS, 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

Among 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) [42]. 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) [42].

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 [42]. 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 for 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 [151]. Illicit drug use is a risk factor for ill-health, including conditions such as infection with bloodborne viruses, mental illness, 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 [310]. 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%) [309].

Extent of illicit drug use among Indigenous people

The 2012-2013 AATSIHS found that 22% of Indigenous people aged 15 years and over had used an illicit substance in the last 12 months prior to interview [73]. This is a slight decrease from that reported in the 2008 NATSISS (23%) [42]. These levels are approximately 1.5 times that reported in the 2010 *National Drug Strategy Household Survey* (NDSHS) for the Australian population aged 14 years or over (15%) [313], but less than that reported by Indigenous people aged 18 years or over (28%) in the 2004-2005 NATSIHS [101]. The 2012-2013 AATSIHS found that illicit drug use in the previous 12 months was highest among younger age-groups: 15-24 years (27%), 25-34 years (26%), 35-44 years (23%), and 45-54 (19%) [314].

The 2012-2013 AATSIHS found that the illicit substance most commonly used by Indigenous people aged 15 years and over in the last 12 months was cannabis (18%) [314]. The proportion of users was similar to that reported in the 2008 NATSISS (17%) [42]. Use of pain killers and sedatives (3.8%), amphetamines (2.3%) had decreased compared with the 2008 NATSISS (4.5% and 4%, respectively) [42].

In the 2012-2013 AATSIHS, the proportion of users of illicit substances grouped under 'other drugs' (including heroin, cocaine, petrol, LSD/synthetic hallucinogens, naturally occurring hallucinogens, ecstasy/designer drugs, methadone and other inhalants) was 2.7% [314].

In 2012-2013, males were at least 1.5 times more likely than females to have used an illicit drug in the previous 12 months; this was the case across all drug types except pain killers where proportions were similar (4% compared with 3.5%). Overall, around twice as many males as females had used cannabis (23% compared with 14%), amphetamines (2.8% compared with 1.8%), and 'other drugs' (3.6% compared with 1.8%).

In 2012-2013, use of illicit drugs in the previous 12 months was greater among Indigenous people aged 15 years or over living in non-remote areas than among those living in remote areas (23% compared with 19%); greater use was the case for all drug types [314]. These proportions are similar to those reported in the 2008 NATSISS (24% and 17%, respectively) [42]. Similarly, in 2012-2013, the proportion of Indigenous people who had ever used illicit substances was higher for those living in non-remote areas (46%) than in remote areas (35%) [314]. These proportions are similar to those reported in the 2008 NATSISS (47% and 31% respectively) [42].

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% were current smokers and 3.2% were risky/high-risk drinkers) [42].

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 [42]. Hospitalisation for conditions relating to substance use for Indigenous people occurred at around twice the rate of those for non-Indigenous people. The leading cause of substance use-related hospitalisations was ICD 'Mental/behavioural disorders related to cannabinoids', which was responsible for 17% of drug related hospitalisations. Indigenous people were hospitalised at 5.3 times the rate of non-Indigenous people due to cannabis use. The second leading cause of hospitalisation was from use of opioids (9.5%) followed by multiple drug and psychoactive substances (8.9%). Indigenous people were hospitalised for opioid and multiple drug use at two and three times the rate, respectively, of non-Indigenous people. Poisoning resulting from 'Use of antiepileptic, sedative-hypnotic and anti-Parkinson's drugs', and 'Psychotropic drugs (including antidepressants)' were the second and third most common causes of drug-related hospitalisation, accounting for 14% and 15% of all of these hospitalisations.

In relation to remoteness of residence, Indigenous people living in NSW, Vic, Qld, WA, SA and the NT in the period June 2008 to June 2010 were hospitalised with a principal diagnosis related to drug use at 3.0 times the rate of non-Indigenous people in major cities, 2.5 times the rate in inner regional areas, 2.2 times the rate in outer regional areas, 2.8 times the rate in remote areas, and 1.4 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 that for their non-Indigenous counterparts (7.8 compared with 5.3 per 100,000) (Table 35) [92]. 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 35. 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: SCRGSP, 2011 [92]

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 [315]. 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.³³ 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 [49]. 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%.

The most recent estimates of life expectancy at birth for Indigenous people – 69.1 years for males and 73.7 years for females in 2010-2012 – are higher than previous estimates, but, as the ABS warns, the apparent improvements are likely to be due largely to revised statistical methods [46].³⁴

Indigenous infant mortality rates for WA, SA and the NT declined significantly over the 20-year period 1991-2010 [49]. The Indigenous rate declined by 62% over that period, slightly more than the 43% decline of the rate for non-Indigenous infants. The gap between Indigenous and other infants 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 2011 to Indigenous mothers was still around 190 grams less than the weights of babies born to non-Indigenous mothers [40].

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 [316]
- reductions in the incidence and severity of trachoma (even though inflammatory trachoma remains endemic in some remote communities of central and northern Australia) [158]
- a reduction in the number of new cases of TB, from 79 in 1984 [317] to an average of around 30 in the mid-2000s [212]
- substantial declines in death rates from invasive pneumococcal pneumonia (mostly due to the introduction of vaccination programs) [318]
- a substantial reduction in the prevalence of HBV infection (since the introduction of vaccination programs) [238]
- a rapid decline in the incidence of invasive Hib disease in Indigenous children (following the introduction of vaccination) [204].

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

- as well as the contribution 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 [92]
- the prevalence of tobacco use among Indigenous people has decreased slightly in recent years [73, 302] and there has been a decline in the number of cigarettes smoked daily among Indigenous people [319]
- there have been some improvements in the performance of Indigenous primary and secondary school children in recent years, and the proportion of Indigenous young people receiving a year 12 certificate increased between 2001 and 2012 [29, 320].

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

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. Such information is crucial for both policy and strategy development and for monitoring progress towards the various targets set recently as a part of the COAG commitments to '*closing the gap*' in health between Indigenous and other Australians (see below) [1].

³³ 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.

³⁴ 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.

In view of the commitments made in December 2007 by all Australian governments, through the COAG,³⁵ to 'closing the gap' in disadvantage between Indigenous and other Australians [321], 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 [322].³⁶

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 [323]. 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 *Closing 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' [324, p.1].

In March 2008, the Prime Minister also announced establishment of the National Indigenous Health Equality Council,³⁷ 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' [325, 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 [326]:

- 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 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 [326]. This is the first time that such a high level of commitment 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.

35 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)'.

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

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

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

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

AATSIHS - Australian Aboriginal and Torres Strait Islander Health Survey

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 - the World Health Organization's internationally accepted classification of death and disease

IDU - Injecting drug use

IMR - Infant mortality rate

IPD - Invasive pneumococcal disease

KRT - Kidney replacement therapy

LBW - Low birthweight

MMR - 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

NNDS - 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 Disability, 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. 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
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, 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 (2013) *Information paper: death registrations to census linkage project - key findings for Aboriginal and Torres Strait Islander peoples, 2011-2012*. Retrieved 15 November 2013 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3302.0.55.005?OpenDocument>
7. Australian Bureau of Statistics (2007) *Births, Australia, 2006*. (ABS Catalogue no. 3301.0) Canberra: Australian Bureau of Statistics
8. Australian Institute of Health and Welfare (2013) *Indigenous identification in hospital separations data: quality report*. (AIHW Catalogue No IHW 90) Canberra: Australian Institute of Health and Welfare
9. Australian Institute of Health and Welfare, 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
10. Carson B, Dunbar T, Chenhall RD, Bailie R, eds. (2007) *Social determinants of Indigenous health*. Crows Nest, NSW: Allen and Unwin
11. Jackson LR, Ward JE (1999) Aboriginal health: why is reconciliation necessary? *Medical Journal of Australia*;170(9):437-440
12. Butlin NG (1993) *Economics and the dreamtime : a hypothetical history*. Melbourne: Cambridge University Press
13. Campbell J (2002) *Invisible invaders: smallpox and other diseases in Aboriginal Australia 1780-1880*. Melbourne: Melbourne University Press
14. Webb S (2009) *Palaeopathology of Aboriginal Australians: health and disease across a hunter-gatherer continent*. Cambridge: Cambridge University Press
15. Anderson W (2007) The colonial medicine of settler states: comparing histories of Indigenous health. *Health and History*;9(2):144-154
16. Butlin NG (1983) *Our original aggression : Aboriginal populations of southeastern Australia, 1788-1850*. Sydney: Allen & Unwin
17. 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
18. Reynolds H (1982) *The other side of the frontier: Aboriginal resistance to the European invasion of Australia*. Ringwood, Victoria: Penguin Books
19. Elder B (2003) *Blood on the wattle: massacres and maltreatment of Aboriginal Australians since 1788*. 3rd ed. Frenchs Forest, N.S.W: New Holland
20. 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
21. Howitt R (2001) *Rethinking resource management : justice, sustainability and Indigenous peoples*. London: Routledge
22. Hunter E (1993) *Aboriginal health and history: power and prejudice in remote Australia*. Cambridge: Cambridge University Press
23. Saggars S, Gray D (1991) *Aboriginal health and society: the traditional and contemporary Aboriginal struggle for better health*. North Sydney: Allen and Unwin
24. 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*. Retrieved 17 November 2011 from http://www.humanrights.gov.au/pdf/social_justice/bringing_them_home_report.pdf
25. Long JPM (1970) *Aboriginal settlements: a survey of institutional communities in eastern Australia*. Canberra: Australian National University Press
26. Marmot M (2004) *The status syndrome: how social standing affects our health and longevity*. New York: Holt Paperbacks
27. Wilkinson R, Marmot M (2003) *Social determinants of health: the solid facts*. (2nd ed) Denmark: World Health Organization
28. National Aboriginal Health Strategy Working Party (1989) *A national Aboriginal health strategy*. Canberra: Department of Aboriginal Affairs
29. 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
30. Australian Bureau of Statistics (2014) *Schools, Australia, 2013*. (ABS Catalogue no. 4221.0) Canberra: Australian Bureau of Statistics

31. Australian Curriculum Assessment and Reporting Authority (2013) *National Assessment Program - Literacy and Numeracy achievement in reading, persuasive writing, language conventions and numeracy: national report for 2013*. Sydney: Australian Curriculum Assessment and Reporting Authority
32. Australian Bureau of Statistics (2014) *Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026* [data cube]. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3238.02001%20to%202026?OpenDocument#Data>
33. Biddle N (2013) *CAEPR Indigenous population project 2011 census papers: population projections*. (2011 Census Papers No. 14/2013) Canberra: Centre for Aboriginal Economic Policy Research
34. Yap M, 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) *Australian demographic statistics, March quarter 2012*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
39. Australian Bureau of Statistics (2013) *Births, Australia, 2012*. (ABS Catalogue no 3301.0) Canberra: Australian Bureau of Statistics
40. Li Z, Zeki R, Hilder L, Sullivan EA (2013) *Australia's mothers and babies 2011*. (AIHW Catalogue no PER 59, perinatal statistics series no 28) Canberra: Australian Institute of Health and Welfare
41. 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
42. Australian Institute of Health and Welfare (2013) *Aboriginal and Torres Strait Islander health performance framework 2012: detailed analyses*. (AIHW Cat. no. IHW 94) Canberra: Australian Institute of Health and Welfare
43. Leeds K, Gourley M, Laws P, Zhang J, Al-Yaman F, Sullivan EA (2007) *Indigenous mothers and their babies, Australia 2001-2004*. (AIHW Catalogue no. PER 38) 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, Doyle S (2004) *The health of Aboriginal children and young people [volumes 1-4]*. Perth: Telethon Institute for Child Health Research
45. Australian Bureau of Statistics (2013) *Deaths, Australia, 2012*. (ABS Catalogue no 3302.0) Canberra: Australian Bureau of Statistics
46. Australian Bureau of Statistics (2013) *Life tables for Aboriginal and Torres Strait Islander Australians, 2010-2012*. (ABS Cat. no. 3302.0.55.003) Canberra: Australian Bureau of Statistics
47. 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
48. Australian Bureau of Statistics (2014) *Causes of death, Australia, 2012*. (ABS Catalogue no 3303.0) Canberra: Australian Bureau of Statistics
49. 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
50. Becker R, Silvi J, Ma Fat D, L'Hours A, Laurenti R (2006) A method for deriving leading causes of death. *Bulletin of the World Health Organization*;84(4):297-304
51. Australian Bureau of Statistics (2013) *Causes of Death, Australia, 2011*. (ABS Catalogue no 3303.0) Canberra: Australian Bureau of Statistics
52. Sullivan E, Hall B, King J (2008) *Maternal deaths in Australia 2003-2005*. (AIHW Catalogue no. PER 42) Canberra: Australian Institute of Health and Welfare
53. Page A, Tobias M, Glover J, Wright C, Hetzel D, Fisher E (2006) *Australian and New Zealand atlas of avoidable mortality*. Adelaide: Public Health Information Development Unit, University of Adelaide
54. Thomson N, Ali M (2003) Births, deaths, and hospitalisation. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:44-74
55. 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
56. 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
57. Australian Institute of Health and Welfare (2013) *Australian hospital statistics 2011-12*. (AIHW Catalogue no HSE 134, health services series no 50) Canberra: Australian Institute of Health and Welfare
58. 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

59. Australian Bureau of Statistics (2013) *Australian demographic statistics, September quarter 2012*. Canberra: Australian Bureau of Statistics
60. Clinical Epidemiology and Health Service Evaluation Unit (2009) *Potentially preventable hospitalisations: a review of the literature and Australian policies: final report*. Sydney: Australian Commission on Safety and Quality in Health Care
61. Baker IDI (2012) *Cardiovascular disease*. Retrieved 2012 from http://www.bakeridi.edu.au/health_fact_sheets/cardiovascular_disease/
62. 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
63. 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
64. World Heart Federation (2012) *Cardiovascular disease risk factors*. Retrieved 2012 from <http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/>
65. Parnaby MG, Carapetis JR (2010) Rheumatic fever in Indigenous Australian children. *Journal of Paediatrics and Child Health*;46(9):527-533
66. Couzos S, Carapetis J (2003) Rheumatic fever. In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 2nd ed. South Melbourne: Oxford University Press:281-310
67. Stewart T, McDonald R, Currie B (2007) Acute rheumatic fever: adherence to secondary prophylaxis and follow up of Indigenous patients in the Katherine region of the Northern Territory. *Australian Journal of Rural Health*;15(4):234-240
68. Thrift AG, Hayman N (2007) Aboriginal and Torres Strait Islander peoples and the burden of stroke. *International Journal of Stroke*;2(1):57-59
69. Brown A (2004) The context of Indigenous cardiovascular disease. *Central Australian Rural Practitioners Association Newsletter*;36(7):7-14
70. Marmot M (2005) Social determinants of health inequalities. *The Lancet*;365(9464):1099-1104
71. Bunker SJ, Colquhoun DM, Esler MD, Hickie IB, Hunt D, Jelinek VM, Oldenburg BF, Peach HG, Ruth D, Tennant CC, 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
72. 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
73. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13*. (ABS Catalogue no. 4727.0.55.001) Canberra: Australian Bureau of Statistics
74. Australian Bureau of Statistics (2012) *Australian health survey: first results, 2011-12*. (ABS catalogue no. 4364.0.55.001) Canberra: Australian Bureau of Statistics
75. Australian Cancer Research Foundation (2012) *What is cancer?* Retrieved 2 November 2012 from <http://www.acrf.com.au/on-cancer/>
76. Cancer Council Australia (2012) *What is cancer?* Retrieved 2 November 2012 from <http://www.cancer.org.au/about-cancer/what-is-cancer/>
77. Roder D (2007) Epidemiology of cancer in Indigenous Australians: implications for service delivery. *Cancer Forum*;31(2):85-90
78. Cunningham J, Rumbold AR, Zhang X, Condon JR (2008) Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *Lancet Oncology*;9(6):585-595
79. Zhang X, Condon JR, Rumbold AR, Cunningham J, Roder DM (2011) Estimating cancer incidence in Indigenous Australians. *Australian and New Zealand Journal of Public Health*;35(5):477-485
80. 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
81. Australian Institute of Health and Welfare, Cancer Australia (2013) *Cancer in Aboriginal and Torres Strait Islander peoples of Australia: an overview*. (AIHW Catalogue no CAN 75, cancer series no78) Canberra: Australian Institute of Health and Welfare
82. Threlfall TJ, Thompson JR (2009) *Cancer incidence and mortality in Western Australia, 2007*. (Statistical Series Number 86) Perth: Department of Health, Western Australia
83. Condon JR, Barnes T, Cunningham J, Armstrong BK (2004) Long-term trends in cancer mortality for Indigenous Australians in the Northern Territory. *Medical Journal of Australia*;180(10):504-511
84. 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
85. Australian Bureau of Statistics, 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
86. Diabetes Australia (2013) *Diabetes in Australia*. Retrieved 2013 from <http://www.diabetesaustralia.com.au/Understanding-Diabetes/Diabetes-in-Australia/>

87. 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
88. 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
89. 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
90. 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
91. 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
92. Steering Committee for the Review of Government Service Provision (2011) *Overcoming Indigenous disadvantage: key indicators 2011*. Canberra: Productivity Commission, Australia
93. Department of Health and Ageing (2009) *National mental health policy 2008*. Canberra: Commonwealth of Australia
94. Australian Health Ministers (2003) *National Mental Health Plan 2003-2008*. Canberra: Australian Government
95. World Health Organization (2009) *Mental health: strengthening mental health promotion*. Retrieved September 2007 from <http://www.who.int/mediacentre/factsheets/fs220/en/index.html>
96. 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
97. Garvey D (2008) *Review of the social and emotional wellbeing of Indigenous Australian peoples*. Retrieved 2008 from <http://www.healthinonet.ecu.edu.au/other-health-conditions/mental-health/reviews/our-review>
98. Vicary D, Westerman TG (2004) 'That's just the way he is': some implications of Aboriginal mental health beliefs. *Australian e-Journal for the Advancement of Mental Health*;3(3). Retrieved 2004 from <http://www.atypon-link.com/EMP/doi/pdf/10.5172/jamh.3.3.103>
99. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 7 [data cube]*. Canberra: Australian Bureau of Statistics
100. 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
101. 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
102. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008*. Retrieved 11 April 2011 from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4714.0?OpenDocument>
103. Australian Bureau of Statistics (2010) *National Aboriginal and Torres Strait Islander social survey: users' guide, 2008*. Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4720.0?OpenDocument>
104. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: table 19 [data cube]*. Canberra: Australian Bureau of Statistics
105. Australian Bureau of Statistics (2011) *General social survey: summary results: 2010*. (ABS Catalogue no 4159.0) Canberra: Australian Bureau of Statistics
106. 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]*. 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>
107. Zubrick SR, Silburn SR, Lawrence DM, Mitrou FG, Dalby RB, Blair EM, Griffin J, Milroy H, De Maio JA, Cox A, 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
108. Australian Institute of Health and Welfare (2013) *National tables for principal diagnoses (part 1)*. Canberra: Australian Institute of Health and Welfare
109. Australian Bureau of Statistics (2014) *Causes of death, Australia, 2012: Deaths of Aboriginal and Torres Strait Islander Australians [data cube]*. Retrieved 25 March 2014 from http://www.abs.gov.au/ausstats/subscriber.nsf/log?openagent&3303_12%20deaths%20of%20aboriginal%20and%20torres%20strait%20islander%20australians.xls&3303.0&Data%20Cubes&0585A7BA09CCB81DCA257CA5000C9072&0&2012&25.03.2014&Latest
110. Hunter E, Reser J, Baird M, 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
111. Tatz C (2001) *Aboriginal suicide is different: a portrait of life and self-destruction [1st ed.]*. Canberra: Aboriginal Studies Press
112. Measey ML, Li SQ, Parker R, Wang Z (2006) Suicide in the Northern Territory, 1981-2002. *Medical Journal of Australia*;185(6):315-319
113. Tatz C (2005) *Aboriginal suicide is different: a portrait of life and self-destruction [2nd ed.]*. 2nd ed. Canberra: Aboriginal Studies Press
114. National Kidney and Urologic Diseases Information Clearinghouse (2009) *The kidneys and how they work*. Retrieved 2009 from <http://kidney.niddk.nih.gov/kudiseases/pubs/pdf/yourkidneys.pdf>

115. 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
116. Kidney Health Australia (2010) *The economic impact of end-stage kidney disease in Australia - projections to 2020*. Melbourne: Kidney Health Australia
117. 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
118. Kidney Health Australia (2014) *Fast facts on CKD in Australia*. Retrieved 2014 from <http://www.kidney.org.au/KidneyDisease/FastFactsonCKD/tabid/589/Default.aspx>
119. 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
120. Steering Committee for the Review of Government Service Provision (2011) *Report on government services 2011: Indigenous compendium*. Canberra: Productivity Commission
121. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 1* [data cube]. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%201%20selected%20health%20characteristics,%202001%20to%202012-13-australia.xls&4727.0.55.001&Data%20Cubes&26F4FE668ABADCF4CA257C2F00145C83&0&2012-13&27.11.2013&Latest>
122. McDonald S, Clayton P, Hurst K, eds. (2012) *The thirty fifth annual Australia and New Zealand Dialysis and Transplant Registry Report 2012*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry
123. McDonald S, Jose M, Hurst K (2012) End-stage kidney disease among Indigenous peoples of Australia and New Zealand. In: McDonald S, Clayton P, Hurst K, eds. *The thirty fifth annual Australia and New Zealand Dialysis and Transplant Registry report 2012*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry:12.1-12.19
124. Australian Bureau of Statistics (2008) *Australian Demographic Statistics: June quarter 2008*. (ABS Catalogue no. 3101.0) Canberra: Australian Bureau of Statistics
125. Australian Bureau of Statistics (2001) *Australian demographic statistics: June quarter 2001*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
126. 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]. 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
127. Australian and New Zealand Dialysis and Transplant Registry (2013) *End stage renal disease notifications, by Indigenous status, age, jurisdiction and year [2008 to 2012, unpublished]*. Adelaide: Australian and New Zealand Dialysis and Transplant Registry
128. Australian Bureau of Statistics (2010) *Australian demographic statistics, December quarter 2010*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
129. McDonald S, Clayton P, Grace B, Chapman J, Wright J (2012) Transplant waiting list. In: McDonald S, Clayton P, Hurst K, eds. *The thirty fifth annual Australia and New Zealand Dialysis and Transplant Registry report 2012*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry:7.1-7.3
130. 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
131. Polkinghorne K, Gulyani A, McDonald S, Hurst K (2012) Haemodialysis (including home haemodialysis). In: McDonald S, Clayton P, Hurst K, eds. *The thirty fifth annual Australia and New Zealand Dialysis and Transplant Registry Report 2012*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry:5.1-5.41
132. 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
133. Prout S, 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
134. Agar JWM, Hawley CM, George CRP, Mathew TH, McDonald SP, Kerr PG (2010) Home haemodialysis in Australia — is the wheel turning full circle? *Medical Journal of Australia*;192(7):403-406
135. Brown F, Gulyani A, McDonald S, Hurst K (2012) Peritoneal dialysis. In: McDonald S, Clayton P, Hurst K, eds. *The thirty fifth annual Australia and New Zealand Dialysis and Transplant Registry report 2012*. Adelaide: Australia and New Zealand Dialysis and Transplant Registry:6.1-6.32
136. Australian Institute of Health and Welfare (2013) *Australian hospital statistics 2011–12: national tables for principal diagnoses (part 1)*. Retrieved 19 April 2013 from <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129544524>
137. 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
138. National Public Health Partnership (2005) *The national Aboriginal and Torres Strait Islander safety promotion strategy*. Canberra: National Public Health Partnership
139. National Public Health Partnership (2005) *The national injury prevention and safety promotion plan: 2004-2014*. Canberra: National Public Health Partnership

140. Clapham K, O'Dea K, Chenhall R (2007) Interventions and sustainable programs. In: Carson B, Dunbar T, Chenhall RD, Bailie R, eds. *Social determinants of Indigenous health*. Crows Nest, NSW: Allen and Unwin:271-295
141. World Health Organization (2009) *International Classification of Diseases (ICD)*. Retrieved 2009 from <http://www.who.int/classifications/icd/en/>
142. Moller J (1996) Understanding national injury data regarding Aboriginal and Torres Strait Islander peoples. *Australian Injury Prevention Bulletin*;14(December):1-8
143. Australian Bureau of Statistics (2009) *National Aboriginal and Torres Strait Islander social survey, 2008: law and justice* [data cube]. 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>
144. Thomson N, Kirov E, Ali M (2003) Respiratory system disorders. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:224-246
145. 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
146. Chang AB, Torzillo PJ (2008) Respiratory infection (including Bronchiectasis). In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:355-385
147. 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
148. Chang AB, Masel JP, Boyce NC, Torzillo PJ (2003) Respiratory morbidity in central Australian Aboriginal children with alveolar lobar abnormalities. *Medical Journal of Australia*;178(10):490-494
149. Pierce R, Antic R, Chang A, Howard M, James A, Maguire G, Matthiesson A, Musk B, Roseby R, Simpson G, Torzillo P (2010) *Respiratory and sleep health in Indigenous Australians*. Sydney: Thoracic Society of Australia and New Zealand
150. McKenzie DK, Abramson M, Crockett AJ, Glasgow N, Jenkins S, McDonald C, Wood-Baker R, Frith PA (2011) *The COPD-X plan: Australian and New Zealand guidelines for the management of chronic obstructive pulmonary disease: version 2.26*. (COPD-X Plan Version 2.26) Bowen Hills, Qld: The Australian Lung Foundation
151. Australian Institute of Health and Welfare (2012) *Australia's health 2012*. (AIHW Catalogue no AUS 156) Canberra: Australian Institute of Health and Welfare
152. Solberg Y, Rosner M, Belkin M (1998) The association between cigarette smoking and ocular diseases. *Survey of Ophthalmology*;42(6):535-547
153. Access Economics (2004) *Clear Insight: The economic impact and cost of vision loss in Australia*. Access Economics Pty Limited
154. Taylor HR, Boudville A, Anjou M, McNeil R (2011) *The roadmap to close the gap for vision: summary report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne
155. Taylor HR, Anjou MD, Boudville AI, McNeil RJ (2012) *The roadmap to close the gap for vision: full report*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne
156. Vos T, Taylor HR (2013) Contribution of vision loss to the Indigenous health gap. *Clinical & Experimental Ophthalmology*;41(3):309-310
157. Taylor HR, 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
158. Taylor HR, 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
159. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 3* [data cube]. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%203%20selected%20health%20characteristics,%20by%20state%20territory%202012-13-australia.xls&4727.055.001&Data%20Cubes&D43DB1D697BED77ECA257C2F00145D04&0&2012-13&27.11.2013&Latest>
160. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 4* [data cube]. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%204%20selected%20health%20characteristics,%20by%20sex%202012-13-australia.xls&4727.055.001&Data%20Cubes&497BBEB2AFC1B23DCA257C2F00145D2E&0&2012-13&27.11.2013&Latest>
161. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 5* [data cube]. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%205%20long-term%20conditions%20by%20sex%20by%20indigenous%20status,%202012-13%20-%20australia.xls&4727.055.001&Data%20Cubes&5C97CE7DA7059C06CA257C2F00145D5A&0&2012-13&27.11.2013&Latest>
162. 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]. 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
163. 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
164. Anjou MD, Boudville. A.I., Taylor HR (2013) Correcting Indigenous Australians' refractive error and presbyopia. *Clinical and Experimental Ophthalmology*;41(4):320-328

165. 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
166. Australian Institute of Health and Welfare (2013) *Australian hospital statistics 2012-13: elective surgery waiting times*. (AIHW Catalogue no HSE 140, health services series no 51) Canberra: Australian Institute of Health and Welfare
167. 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
168. Spurling GKP, Askew DA, Hayman NE, Hansar N, Cooney AM, Jackson CL (2010) Retinal photography for diabetic retinopathy screening in Indigenous primary health care: the Inala experience. *Australian and New Zealand Journal of Public Health*;34(s1):S30-S33
169. Mitchell P, Foran S, Wong TY, Chua B, Patel I, Ojaimi E (2008) *Guidelines for the management of diabetic retinopathy*. Canberra: National Health and Medical Research Council
170. Australian Indigenous HealthInfoNet (2007) *Review of diabetes among Indigenous peoples*. Retrieved from <http://www.healthinfonet.ecu.edu.au/chronic-conditions/diabetes/reviews/our-review>
171. The Kirby Institute (2013) *Australian trachoma surveillance report 2012*. Sydney: The Kirby Institute, University of New South Wales
172. Adams K, Burgess J, Dharmage S (2010) *Trachoma surveillance report 2009*. Melbourne: National Trachoma Surveillance and Reporting Unit
173. Taylor HR, Dunt D, Hsueh Y, Brando A (2011) *Projected needs for eye care services for Indigenous Australians*. Melbourne: Indigenous Eye Health Unit, the University of Melbourne
174. Turner A, Mulholland W, Taylor HR (2009) *Outreach eye services in Australia*. Melbourne: Indigenous Eye Health Unit
175. Commonwealth of Australia (2005) *National framework for action to promote eye health and prevent avoidable blindness and vision loss*. Canberra: Commonwealth of Australia
176. Kelaher M, Ferdinand A, Ngo S, Tambuwla N, 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
177. Burrow S, Thomson N (2003) Ear disease and hearing loss. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:247-272
178. 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
179. Access Economics (2008) *The cost burden of otitis media in Australia*. Canberra: Access Economics
180. Couzos S, Metcalf S, Murray R (2008) Ear health. In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:308-354
181. Burrow S, Galloway A, Weissfouer N (2009) *Review of educational and other approaches to hearing loss among Indigenous people*. Retrieved from <http://www.healthinfonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review-education>
182. O'Neill G (2012) Otitis media: silent epidemic. *Australian Life Scientist*;9(3):42-44
183. Senate Community Affairs References Committee (2010) *Hear us: inquiry into hearing health in Australia*. Canberra: Parliament of Australia: Senate
184. Gunasekera H, Morris PS, Daniels J, Couzos S, 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
185. Morris PS, Leach AJ, Silberberg P, Mellon G, Wilson C, Hamilton E, Beissbarth J (2005) *Otitis media in young Aboriginal children from remote communities in Northern and Central Australia: a cross-sectional survey*. BMC Pediatrics;5. Retrieved 5 April 2012 from <http://dx.doi.org/10.1186/1471-2431-5-27>
186. WHO/CIBA (2000) *Prevention of hearing impairment from chronic otitis media*. (WHO/PDH/98.4) Geneva: WHO
187. Australian Institute of Health and Welfare (2014) *Stronger futures in the Northern Territory: hearing health services 2012 - 2013*. (AIHW Catalogue no IHW 117) Canberra: Australian Institute of Health and Welfare
188. 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
189. UK Department of Health (1994) *An oral health strategy for England*. London: Department of Health
190. Chrisopoulos S, Harford JE (2013) *Oral health and dental care in Australia: key facts and figures 2012*. (AIHW Cat. no. DEN 224) Canberra: Australian Institute of Health and Welfare
191. Northern Territory Department of Health (2011) *Healthy smiles: oral health and fluoride varnish information for health professionals*. Darwin: Northern Territory Department of Health
192. Jamieson LM, Armfield JM, 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)
193. Slade GD, Spencer AJ, 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
194. Harford J, Spencer J, Roberts-Thomson K (2003) Oral health. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:313-338

195. Australian Bureau of Statistics (2013) *Disability, ageing and carers, Australia: summary of findings, 2012*. (ABS Catalogue no 4430.0) Canberra: Australian Bureau of Statistics
196. World Health Organization (2011) *World report on disability*. Geneva: World Health Organization
197. Productivity Commission (2011) *Disability within the Indigenous community*. Canberra: Productivity Commission
198. Australian Bureau of Statistics (2013) *Community profiles*. Retrieved 2013 from <http://www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles?opendocument&navpos=230>
199. Council of Australian Governments (2009) *National disability agreement*. Canberra: Council of Australian Governments
200. Council of Australian Governments (2012) *National disability agreement: intergovernmental agreement on federal financial relations*. Canberra: Council of Australian Governments
201. Disability Policy & Research Working Group (2012) *National Indigenous access framework*. Sydney: Disability Policy & Research Working Group
202. Steering Committee for the Review of Government Service Provision (2013) *Report on government services 2013: Indigenous compendium*. Canberra: Productivity Commission
203. Burns J, Burrow S, Genovese E, Pumphrey M, Sims E, Thomson N (2003) Other communicable diseases. In: Thomson N, ed. *The health of Indigenous Australians*. South Melbourne: Oxford University Press:397-441
204. Australian Government Department of Health and Ageing (2013) *The Australian immunisation handbook: 10th edition 2013*. Canberra: Australian Government Department of Health and Ageing
205. Central Australian Rural Practitioners Association (2010) *CARPA standard treatment manual [5th ed.]*. 5th ed. Alice Springs: Central Australian Rural Practitioners Association
206. National Institute of Allergy and Infectious Diseases (2009) *Tuberculosis (TB): detailed explanation of TB*. Retrieved 6 March 2009 from <http://www.niaid.nih.gov/topics/tuberculosis/Understanding/WhatIsTB/Pages/detailed.aspx>
207. Baker M, Das D, Venugopal K, Howden-Chapman P (2008) Tuberculosis associated with household crowding in a developed country. *Journal of Epidemiology and Community Health*;62(8):715-721
208. Krause V (2008) Tuberculosis (TB). In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:674-707
209. World Health Organization (2009) *Global tuberculosis control - epidemiology, strategy, financing: WHO report 2009*. Geneva: World Health Organization
210. Roche P, Bastian I, Krause V (2007) Tuberculosis notifications in Australia, 2005. *Communicable Diseases Intelligence*;31(1):71-80
211. Roche PW, Krause V, Konstantinos A, Bastian I, Antic R, Brown L, Christensen A, Gebbie S, Hurwitz M, Misrachi A, Waring J (2008) Tuberculosis notifications in Australia, 2006. *Communicable Diseases Intelligence*;32(1):1-11
212. Barry C, Konstantinos A, National Tuberculosis Advisory Committee (2009) Tuberculosis notifications in Australia, 2007. *Communicable Diseases Intelligence*;33(3):1-12
213. Barry C, Waring J, Stapledon R, Konstantinos A (2012) Tuberculosis notifications in Australia, 2008 and 2009. *Communicable Diseases Intelligence*;36(1):82-94
214. National Tuberculosis Advisory Committee (2012) The strategic plan for the control of tuberculosis in Australia: 2011-2015. *Communicable Diseases Intelligence*;36(3):E296-E293
215. Gearside E, National Tuberculosis Advisory Committee (2012) National Tuberculosis Advisory Committee: 2012 Committee report. *Communicable Diseases Intelligence*;37(2):E187-E188
216. Australian Bureau of Statistics (2007) *Australian demographic statistics, June quarter 2007*. (ABS Catalogue no. 3101.0) Canberra: Australian Bureau of Statistics
217. Hepatitis Australia (2010) *About hepatitis*. Retrieved 18 November 2011 from <http://www.hepatitisaustralia.com/about-hepatitis>
218. 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
219. 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
220. MacIntyre CR, Burgess M, Isaacs D, MacIntyre PB, Menzies R, Hull B (2007) Epidemiology of severe Hepatitis A in Indigenous Australian children. *Journal of Paediatrics and Child Health*;43(5):383-387
221. Naidu L, Chiu C, Habig A, Lowbridge C, Jayasinghe S, Wang H, McIntyre P, Menzies R (2013) Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia 2006-2010. *Communicable Diseases Intelligence*;37(December 2013 supplement):S1-S92
222. The Kirby Institute (2012) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2012*. Sydney: University of New South Wales
223. The Kirby Institute (2011) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2011*. Sydney: University of New South Wales
224. 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

225. Australian Bureau of Statistics (2011) *Australian demographic statistics, March quarter 2011*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
226. 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
227. Australian Bureau of Statistics (2012) *Australian demographic statistics, September quarter 2011*. (ABS Catalogue no 3101.0) Canberra: Australian Bureau of Statistics
228. The Kirby Institute (2013) *HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2013*. Sydney: University of New South Wales
229. The Kirby Institute (2013) *Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2013*. Sydney: University of New South Wales
230. Sullivan JS, 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
231. Hanna J, Faoagali J, Buda P, 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
232. Dent E, Selvey CE, Bell A, Davis J, McDonald MI (2010) Incomplete protection against hepatitis B among remote Aboriginal adolescents despite full vaccination in infancy. *Communicable Diseases Intelligence*;34(4):435-439
233. Communicable Diseases Section DoHS (2005) *The blue book - guidelines for the control of infectious diseases*. Melbourne: Victorian Government Department of Human Services
234. 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
235. Wilson H, Hopwood M, Hull P, Lavis Y, Newland J, Bryant J, Treloar C (2010) *Treatment decisions: what makes people decide to have treatment for hepatitis C?* Brisbane: Hepatitis Council of Queensland
236. 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
237. Horby P, Gilmour R, Wang H, 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
238. Menzies R, Turnour C, Chiu C, 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
239. Wang H, Deeks S, Glasswell A, McIntyre P (2008) Trends in invasive Haemophilus influenzae type b disease in Australia, 1995-2005. *Communicable Diseases Intelligence*;32(3):316-325
240. Jacups SP, Morris PS, 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
241. Barry C, Krause VL, Cook HM, Menzies RI (2012) Invasive pneumococcal disease in Australia 2007 and 2008. *Communicable Diseases Intelligence*;36(2):E151-E165
242. Jacups SP, 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
243. Australian Government Department of Health and Ageing (2014) *The Australian immunisation handbook: 10th edition 2013 (updated January 2014)*. Canberra: Australian Government Department of Health and Ageing
244. Hanna JN, Humphreys JL, Murphy DM (2006) Invasive pneumococcal disease in Indigenous people in north Queensland, 1999-2004. *Medical Journal of Australia*;184(3):118-121
245. Mak DB (2004) Invasive pneumococcal disease in the Kimberley, 1995-2001. *Australian Journal of Rural Health*;12(6):237-240
246. 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
247. Fitzgerald T, Massey PD, 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
248. 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, Murphy D (2006) Invasive pneumococcal disease in Australia, 2004. *Communicable Diseases Intelligence*;30(1):80-92
249. Roche P, Krause V, Cook H (2007) Invasive pneumococcal disease in Australia, 2005. *Communicable Diseases Intelligence*;31(1):86-100
250. Lahra MM, Enriquez RP (2012) Annual report of the Australian Meningococcal Surveillance Programme, 2011. *Communicable Diseases Intelligence*;36(3):E251-E262
251. 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
252. Australasian Society for HIV Medicine (2009) *Toward a second national sexually transmissible infections strategy 2009 - 2013*. Sydney: Australasian Society for HIV Medicine
253. de Wit J, Mao L, Holt M, Treloar CE (2013) *HIV/AIDS, hepatitis and sexually transmissible infections in Australia: annual report of trends in behaviour 2013*. (Monograph 6/2013) Sydney: Centre for Social Research in Health, The University of New South Wales

254. Bowden FJ, Tabrizi SN, Garland SM, Fairley CK (2002) Sexually transmitted infections: new diagnostic approaches and treatments. *Medical Journal of Australia*;176(11):551-557
255. Australian Department of Health and Ageing (2010) *Second national sexually transmissible infections strategy 2010 - 2013*. Canberra: Department of Health and Ageing, Australia
256. 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
257. 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
258. National Notifiable Diseases Surveillance System Annual Report Writing Group (2013) *Australia's notifiable disease status, 2011: annual report of the National Notifiable Diseases Surveillance System*. Canberra: National Notifiable Diseases Surveillance System
259. Family Planning Association of WA (2006) *Gonorrhoea*. Perth, WA: FPA Sexual Health Services
260. Western Australia Communicable Disease Control PH (2009) *Syphilis [fact sheet]*. Perth, WA: Western Australia Department of Health, Public Health
261. Merianos A, Bowden F, Krause V, Savage J, Wallace T (2001) Communicable diseases. In: Condon JR, Warman G, Arnold L, eds. *The health and welfare of Territorians*. Darwin: Territory Health Services:71-86
262. 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
263. Western Australian Department of Health (2008) *HIV model of care*. Perth, WA: Health Networks, Western Australian Department of Health
264. Western Australia Communicable Disease Control (2012) *HIV & AIDS*. Perth, WA: Western Australia Department of Health
265. Australian Department of Health and Ageing (2010) *Sixth national HIV strategy 2010-2013*. Canberra: Department of Health and Ageing, Australia
266. 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
267. McDonald E, Bailie R, Brewster D, 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. *BMC Public Health*;8. Retrieved 8 May 2008 from <http://www.biomedcentral.com/1471-2458/8/153>
268. Currie B, Couzos S (2008) Skin infections. In: Couzos S, Murray R, eds. *Aboriginal primary health care: an evidence-based approach*. 3rd ed. South Melbourne: Oxford University Press:410-444
269. McMeniman E, Holden L, Kearns T, Clucas DB, Carapetis JR, Currie BJ, Connors C, 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
270. Walton SF, D. Beroukas D, Roberts-Thomson P, 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
271. Hengge UR, Currie BJ, Jäger G, Lupi O, Schwartz RA (2006) Scabies: a ubiquitous neglected skin disease. *The Lancet Infectious Diseases*;6(12):769-779
272. Carapetis JR, Connors C, Yarmirr D, Krause V, Currie BJ (1997) Success of a scabies control program in an Australian Aboriginal community. *Pediatric Infectious Disease Journal*;16(5):494-499
273. Clucas DB, Carville KS, Connors C, Currie B, Carapetis J, 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
274. Currie BJ, Carapetis JR (2000) Skin infections and infestations in Aboriginal communities in northern Australia. *Australasian Journal of Dermatology*;41(3):139-145
275. McDonald M, Currie BJ, 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
276. Heyes C, Tait C, Toholka R, Gebauer K (2013) Non-infectious skin disease in Indigenous Australians. *Australasian Journal of Dermatology*; Early view (<http://onlinelibrary.wiley.com/doi/10.1111/ajd.12106/abstract>)
277. Whitehall J, Kuzulugil D, Sheldrick K, Wood A (2013) Burden of paediatric pyoderma and scabies in North West Queensland. *Journal of Paediatrics and Child Health*;49(2):141-143
278. Hewagama S, Einsiedel L, Spelman T (2012) Staphylococcus aureus bacteraemia at Alice Springs Hospital, Central Australia, 2003-2006. *Internal Medicine Journal*;42(5):505-512
279. Gracey MS (2007) Nutrition-related disorders in Indigenous Australians: how things have changed. *Medical Journal of Australia*;186(1):15-17
280. 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
281. 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

282. National Health and Medical Research Council (2013) *Australian Dietary Guidelines: providing the scientific evidence for healthier Australian diets*. Canberra: National Health and Medical Research Council
283. 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
284. 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
285. Commonwealth of Australia (2012) *Stronger futures in the Northern Territory Act 2012 - C2012A00100*. Retrieved from http://www.comlaw.gov.au/Details/C2012A00100/Html/Text#_Toc329244469
286. Australian Government Department of Health (2014) *Australia's physical activity and sedentary behaviour guidelines*. Canberra: Australian Government Department of Health
287. 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
288. World Health Organization (2013) *Obesity and overweight: fact sheet no 311*. Retrieved March 2013 from <http://www.who.int/mediacentre/factsheets/fs311/en/>
289. National Health and Medical Research Council (2013) *Eat for Health: Australian dietary guidelines summary*. Canberra: National Health and Medical Research Council
290. World Health Organization (2011) *Waist circumference and waist-hip ratio: report of a WHO expert consultation* Presented Geneva
291. Vos T, Barker B, Stanley L, Lopez A (2007) *The burden of disease and injury in Aboriginal and Torres Strait Islander peoples 2003*. Brisbane: Centre for Burden of Disease and Cost-Effectiveness, University of Queensland
292. Daniel M, Rowley K, McDermott R, O'Dea K (2002) Diabetes and impaired glucose tolerance in Aboriginal Australians: prevalence and risk. *Diabetes Research and Clinical Practice*;57:23-33
293. Li M, 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
294. Gracey M, Burke V, Martin DD, Johnston RJ, Jones T, 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
295. Valery PC, Ibiebele T, Harris M, Green AC, Cotterill A, Moloney A, Sinha AK, Garvey G (2012) Diet, physical activity, and obesity in school-aged Indigenous youths in northern Australia. *Journal of Obesity*;2012. Retrieved 28 March 2012 from <http://www.hindawi.com/journals/jobes/2012/893508/abs/>
296. Shultz R (2012) Prevalences of overweight and obesity among children in remote Aboriginal communities in central Australia. *Rural and Remote Health*;12. Retrieved 9 March 2012 from <http://www.rrh.org.au/articles/showarticlenew.asp?ArticleID=1872>
297. Australian Bureau of Statistics (2009) *National Health Survey: summary of results, 2007-2008 (reissue)*. (ABS Catalogue no. 4364.0) Canberra: Australian Bureau of Statistics
298. World Health Organization (2013) *Exclusive breastfeeding*. Retrieved 2013 from http://www.who.int/nutrition/topics/exclusive_breastfeeding/en/
299. 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
300. 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
301. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 10 Smoker status by age, Indigenous status and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2010%20smoker%20status%20by%20age,%20indigenous%20status%20and%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&F4D0622045E4A29ACA257C2F00145E51&0&2012-13&27.11.2013&Latest>
302. 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]*. 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
303. Australian Bureau of Statistics (2004) *National Aboriginal and Torres Strait Islander Social Survey, 2002*. (ABS Catalogue no. 4714.0) Canberra: Australian Bureau of Statistics
304. 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
305. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 12 Smoker status by remoteness areas and age [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2012%20smoker%20status%20by%20age%20by%20remoteness,%202002,%202008%20and%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&0B71BC8F738DB083CA257C2F00145EB9&0&2012-13&27.11.2013&Late>

306. 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]*. Retrieved from http://abs.gov.au/AUSSTATS/SUBSCRIBER.NSF/log?openagent&47140do009_2008.xls&4714.0&Data%20Cubes&CAA9C3AC720772ACA25765E001541A1&0&2008&30.10.2009&Previous
307. National Health and Medical Research Council (2009) *Australian guidelines to reduce health risks from drinking alcohol*. Canberra: National Health and Medical Research Council
308. Western Australian Department of Health (2010) *Fetal alcohol spectrum disorder model of care*. Perth, WA: Health Networks, Western Australian Department of Health
309. Vos T, Barker B, Stanley L, 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
310. Begg S, Vos T, Barker B, Stevenson C, Stanley L, Lopez A (2007) *The burden of disease and injury in Australia 2003*. (AIHW cat. no. PHE 82) Canberra: Australian Institute of Health and Welfare
311. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 14 Alcohol consumption - Short-term or Single occasion risk by age, Indigenous status and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2014%20alcohol%20consumption%20-%20sh-term%20or%20single%20occ%20risk%20-age,%20indigenous%20status,%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&0E985E680C399BF7CA257C2F>
312. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 13 Alcohol consumption - Long-term or Lifetime risk by age, Indigenous status and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2013%20alcohol%20consumption%20-%20long-term%20or%20lifetime%20risk%20by%20age,%20indigenous%20status%20and%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&D5ABABF005F0BEF3C>
313. 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
314. Australian Bureau of Statistics (2013) *Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012-13: Table 15 Substance use by age, remoteness and sex [data cube]*. Retrieved 27 November 2013 from <http://www.abs.gov.au/AUSSTATS/subscriber.nsf/log?openagent&table%2015%20substance%20use%20by%20age,%20remoteness%20and%20sex,%202012-13%20-%20australia.xls&4727.0.55.001&Data%20Cubes&E6B1092ED1C8DC69CA257C2F00145F58&0&2012-13&27.11.2013&Latest>
315. 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
316. Australian Indigenous HealthInfoNet (2005) *Review of respiratory disease among Indigenous peoples*. Retrieved from <http://www.healthinfonet.ecu.edu.au/chronic-conditions/respiratory/reviews/our-review>
317. Penny M, Thomson N (1987) A preliminary analysis of Aboriginal tuberculosis, 1984. *Aboriginal Health Information Bulletin*;8:15-18
318. 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, Murphy D (2008) Invasive pneumococcal disease in Australia, 2006. *Communicable Diseases Intelligence*;32(1):18-30
319. Thomas DP (2012) Changes in smoking intensity among Aboriginal and Torres Strait Islander people, 1994–2008. *Medical Journal of Australia*;197(9):503-506
320. Australian Bureau of Statistics (2013) *Schools, Australia, 2012*. (ABS Catalogue no. 4221.0) Canberra: Australian Bureau of Statistics
321. Council of Australian Governments (2009) *National Indigenous reform agreement (closing the gap)*. Canberra: Council of Australian Governments
322. Aboriginal and Torres Strait Islander Social Justice Commissioner (2005) *Social justice report 2005*. Sydney: Human Rights & Equal Opportunity Commission
323. 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
324. Australian Government (2008) *Statement of intent*. Presented at *Indigenous Health Equality Summit: Close the Gap* 20 March 2008, Canberra
325. Anderson I (2009) Close the Gap: National Indigenous Health Equality Council. *Medical Journal of Australia*;190(10):546
326. Department of Families Housing Community Services and Indigenous Affairs (2009) *Closing the gap on Indigenous disadvantage: the challenge for Australia*. Canberra: Commonwealth of Australia

Core funding is
provided by the
Australian Department
of Health

www.healthinfonet.ecu.edu.au

